IMPORTANT INFORMATION!

On the following pages, you will find our versatile product range with technical drawings and information about approvals, patents and static calculations.

You will find a QR code for the products with the link to download approvals, technical drawings and images.

Should you have any further questions or require documents from us, our technology department is pleased to remain at your disposal on **+49 7023743323-40**.

TOPLINE **GREEN**LINE **KONSTRU**LINE **ZIN**TOP

ETA

Load capacity, safety and durability are the basic elements that characterise our products.

This is reinforced by German approvals and the ETA (CE symbol), which we have carried out for many of our products.

HERE FOR YOU

Sales / advisory service	Telephone	+49 7023 743323-0
	Fax	+49 7023 743323-29
	E-mail	verkauf@holzverbinder.de
Technology	Telephone	+49 7023 743323-40
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	E-mail	rechnung@holzverbinder.de
Sales management	Telephone	+49 7023 743323-11
Internet	**www.holzverbinder.de**	
E-mail	info@holzverbinder.de	

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JOIST HANGERS **From page 18** 1

CONCEALED CONNECTORS **From page 62** 2

ANGLE BRACKETS **From page 106** 3

TENSION TIES **From page 160** 4

SHEARING ANGLES/SHEARING-TENSILE PLATES **From page 190** 5

OTHER CONNECTORS **From page 204** 6

RAFTER ANCHORS AND TRUSS CLIPS **From page 222** 7

WIDTH-ADJUSTABLE JOIST HANGERS AND CANTILEVER BRACKETS **From page 236** 8

NAIL PLATES AND NAIL PLATE BRACKETS **From page 248** 9

BRACING STRIPS / ROLLED TIE STRAP CONNECTIONS **From page 260** 10

NAILS / GH SCREWS / ROD DOWELS **From page 274** 11

VA steel
PRODUCTS IN VA **From page 288** 12

WOOD CONSTRUCTION SCREWS **From page 296** 13

STANCHION **From page 318** 14

TOOLS **From page 370** 15

You will find a detailed list of contents from page 372.

INNOVATIONS

IN TIMBER CONSTRUCTION

MANY PATENTS AND UTILITY MODELS - BOTH NATIONAL AND INTERNATIONAL

are the proof that we put our motto **“Innovations in Timber Construction”** into practice and make sure that the processor can do their work more effectively and economically.

Whether the innovative GH metre marking on the bracing strip, the third hand on the TOP-M joist hanger of the **TOP**LINE series or one of our latest patents, the award-winning two-piece tension tie, all of these are now successful products that are used throughout Europe.

But our new products such as the HT tension tie series or the UV series of our concealed connectors, as well as many other smaller innovative product optimisations, also make things noticeably easier for processors.

Our series such as the ecological, resource-saving **GREEN**-LINE, and the innovative series **TOP**LINE, **KONSTRU**LINE and **ZIN**TOP stand as a synonym for our innovative strength and the proximity to the processor, which underlines our market position as an innovative company for wood construction and will solidify this even further in the future.

INNOVATIONS AND IDEAS DIRECTLY FROM THE PROCESSOR!

To create new patents and innovative products, we need the proximity to processors. Because precisely there, in practice and processing is where the problems arise for which we must find a solution together.
But trade fairs such as Dach und Holz (Roof and Wood), where we have been exhibiting for many years, also help to ensure that problems can be heard in a direct exchange and then analysed together with the processor.

ALL PROCESSES

FROM ONE SOURCE

1

IDEA

After ideas for new products and changes, often supported by visual prototypes and realised with **our 3D printer** in the GH development team, consisting of **technology and production and processors**, are collected and analysed, the implementation is decided.

2

STATICS

In the next step, our **statics department** becomes active and, in close cooperation with universities such as the KIT in Karlsruhe, carries out theoretical and practical tests, which are a prerequisite for applying for European approval (ETAO). Here, we try to reach the optimum values and it is often the case that the product is changed slightly in this phase

3

DEVELOPMENT

in close cooperation with the development team, because the static values and the load capacity of the product play a crucial role.

4

5

At the same time as the test trials, our **production department and toolmaking department** carry out initial tool planning, analyse and create production options and obtaincorresponding quotations.

6

CREATION PHASE

The market introduction begins with complex marketing activities such as the box layout or labelling through to advertisements for trade magazines and promotional flyers, which are produced in our in-house **marketing department**.

7

PARTNERS

To close the circle, our **trade partners** and their **field staff** support us with the **introduction of the product** in the market, with test installations and current projects ...

INNOVATIVE

GH SERIES

In order to be able to offer users the best possible solutions, we have focussed on our strengths in topics so that these are presented clearly and concisely for each target group.

The **TOP**LINE series started it all off more than 16 years ago - a range where we collected all the innovations and special products that differ from the competition with their individual added value. This enabled specialist retailers to talk to their customers about the few value-added products in a targeted and clear manner and to emphasise this added value.

Still today, the **TOP**LINE series is constantly being expanded with products that offer added value, and therefore feature market benefits.

Over 14 years ago, we built what was then the largest photovoltaic system (approx one football pitch) in our town and surrounding area with an annual output of 300,000 kWh, which corresponds to an average annual consumption of approx. 85 households, which is significantly more than the amount of electricity consumption in our company.

Due to the processing of steel, which produces considerable emissions during production, it was clear to us early on that sooner or later we too would have to make our contribution to ecologically combating the previously unavoidable emission loads during steel production, at least with the possibilities available to us, and therefore reduce the overall load of our production by using photovoltaic.
In addition to this measure, we also created the **GREEN**LINE series 14 years ago, which now includes many products that are characterised by new production processes with a reduced cross-section with similar or even better statics since their introduction compared to the over 7,000 tonnes of CO_2 of standard products, which is roughly equivalent to the annual energy consumption of 1,000 German citizens.

In addition to making ecological sense, this is also economically advantageous for everyone involved and saves transport costs that have not yet been included in the calculation.

Now many of our **GREEN**LINE products are established, such as the TOP joist hanger in 1.5 mm, of which we were the first company to introduce it to the market, just like the bracing strip in 1.5 mm with metre marking. Over the past years, more **GREEN**LINE products followed such as standard angle brackets, 3 mm KR brackets and other brackets, rafter anchors and nail plates. More products for the **GREEN**LINE series are already being planned.

In the ever-expanding timber construction sector, structural timber, solid timber buildings, multi-storey timber buildings, prefabricated buildings and halls are a particularly fast-growing market, with ever-larger and taller timber buildings requiring their own special products.

For this, we have created the **KONSTRU**LINE series, in which only products are included that meet the requirements of this group. These include tension ties, storey connectors, shearing angles, extra thick joist hangers and beam hangers

LEAD THROUGH

SPECIALISATION

The fourth series, our **ZIN**TOP series, is dedicated to our stanchions and their coating. Many of the stanchions with adjustable threads are only subject to usage class 2 due to the galvanisation.
Because these column feet are mostly fitted and installed outdoors, they need the usage class 3 according to EN 195-1-1:2.3.1.3, which is intended for outdoor use.

For threaded parts, hot-dip galvanising, which also corresponds to usage class 3, is technically difficult to realise as the zinc coating blocks the thread. Alternatives such as re-cutting reduce the zinc coating and undersized threads or nuts are hardly economically feasible.

ZINTOP, however, only requires a low layer thickness and meets usage class 3 via our ETA.

- **Even, attractive surface and therefore an attractive look**
- **High corrosion resistance**
- **No contact corrosion in connection with stainless steel**
- **Approved for usage class 3 in timber construction**
- **Good surface hardness**
- **Even layer thickness, including on thread parts**

We have been very successfully pursuing a cutting edge with ecological principles for many years now. It has always been important to us to stay close to the user and keep processes as lean as possible in order to be able to react flexibly to requirements.

We manufacture the majority of our products at two locations in Germany, which enables us to react flexibly to market changes and maintain consistent quality and a high level of delivery readiness.

Particularly during the pandemic, when a lack of supplies and price explosions were our daily business, we were able to ensure that almost no products were put on backorder by exerting our own influence to ensure that almost no product fell behind schedule.
This also showed that our long-standing partnerships with our steel suppliers were a great advantage, as solutions for fast delivery were always found for us. Our measures for the coming years will be strongly characterised by the fact that we will continue to do everything in our power to produce in Germany and strengthen our partnerships with our suppliers.

We will also continue to adapt our production processes in order to achieve a balanced environmental footprint for our company in almost all areas in the near future, from green emission-free steel to fossil-free delivery.

Usage class 1
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 65% for a few weeks per year, e.g. in the case of buildings that are closed on all sides and heated.
Comment: In UC 1, the average moisture content of most softwoods does not exceed 12 %.

Usage class 2
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 85% for a few weeks per year, e.g. in the case of open buildings covered by a roof.
Comment: In UC 2, the average moisture content of most softwoods does not exceed 20 %.

Usage class 3
Includes climatic conditions that lead to higher moisture contents than in UC 2, e.g. structures that are exposed to the weather without protection. Eurocode 5 / DIN EN 1995-1-1 section 2.3.1.3

B2B ONLINE PORTAL

SIMPLY EVERYTHING IN VIEW

CUSTOMER SERVICE SUPPORTED BY TECHNOLOGY!

An important aspect of a partnership for us is the service we put into practice and offer in an uncomplicated way in all areas. Prompt and quick processing is guaranteed by telephone or by e-mail. Whether it's straightforward complaints processing or fast delivery directly to the customer on site, these are our daily tasks, which we are always happy to take on.

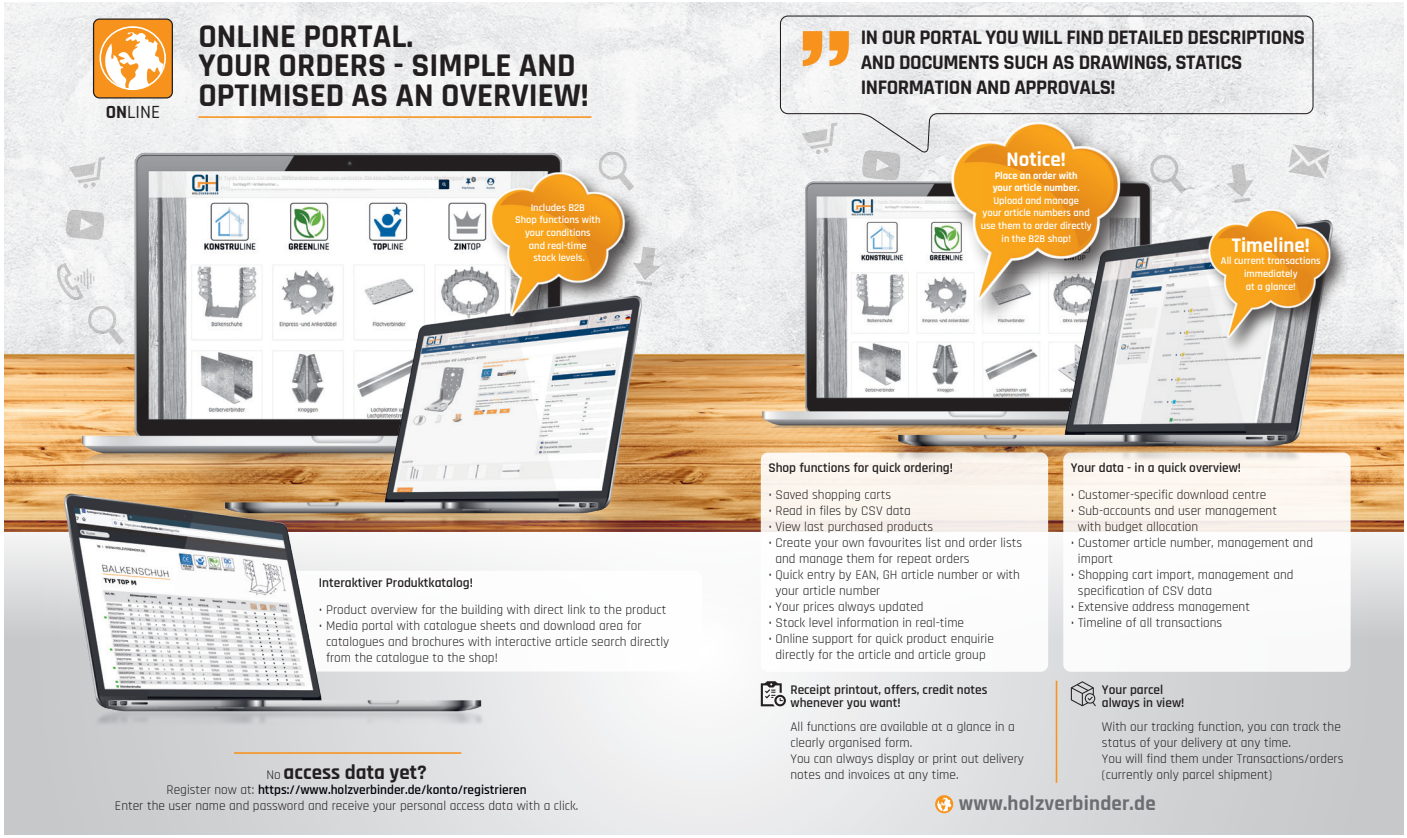
In order to guarantee this service outside of our office hours in the future, we have expanded our website with a B2B shop that is directly connected to our merchandise management system. This makes it possible for our specialist retail partners to call up all relevant information on orders, delivery status, stock levels, prices, articles and much more around the clock.

With our modern website **www.holzverbinder.de** you can generate orders in our system yourself, from a simple order to a quick entry with your own article numbers, an import via csv files or an OCI interface, for example, to recurring order lists for stock orders, to generate orders independently in our system or simply to check your current price and availability quickly and easily.

In our shop system, our customers can view the latest processes and status of their orders in detail or in the form of a quick timeline view, regardless of whether they were received by phone, e-mail or fax, and check the current delivery status.

Processors will find lots of information about out products in our online portal. Technical information such as usage class, material type, structural tables, calculation examples, drawings, approvals such as ETA and much more can be downloaded directly from the product.
Other features are the display of outstanding orders, simple returns processing, rights assignment, budget with approval and lots more.

In a special download area, we have a special and individualised download area for our B2B specialist trade customers as well as customers.



CUSTOMISED PRODUCTION

WITHIN 24 HOURS
WITH MODERN MACHINES

SPECIAL PARTS ACCORDING TO DRAWING

Our special service also includes the manufacture of **customised parts according to drawings,** which we produce by keeping perforated sheet metal panels and cut-to-size parts in stock, with prefabricated semi-finished products for joist hangers and many other parts lists with modern machinery. With our welding robot, Trumpf laser, folding benches, impact shears and several small punching machines, in the shortest time possible, we can produce everything a carpenter needs to be able to react quickly to building changes without risking expensive building downtimes.

Whether it's 1 piece or 100 pieces, we can generally produce customised parts on request within **24 hours** and send them in consultation directly to your customer's building site.

APPRECIATION, OPENNESS AND DEDICATION

ARE OUR VALUES

Working together as equals in a spirit of partnership and trust is very important to us - both within the company and in our dealings with customers, partners, suppliers and our service providers.

Our openness and trust goes far beyond what many expect in a business. We are deeply convinced that a partnership without trust and vast openness cannot last in the long term and will not withstand difficult situations.

Our dedication with a passion for wood and building as well as our proximity to processors and specialised dealers enable us time and again to develop innovative products, some with international patents, which pursue the one goal of making things as simple and effective as possible for the processor.

QUALITY AND SAFETY ARE ALSO WHAT WE STAND FOR!

The CE symbol on the timber connectors from GH Baubeschlägen is your warranty for safe and tested connectors that comply with the building regulations for the whole of Europe and promises you additional safety under building law. In our modern production facilities, which are located exclusively in Germany and are which are certified to ISO 9001:2008, we can manufacture to a high production standard with great flexibility.

Almost the entire range of GH timber connectors has national and international approvals and can be used in the entire EU area.

ECOLOGICAL AND ECONOMIC RESPONSIBILITY

is something we understand to be the protection of the environment and its resources and over 14 years ago we built the largest photovoltaic system in our area at the time (approx. one football pitch in size) with an annual output of 300,000 kWh, which corresponds to the average annual consumption of approx. 85 households and is significantly more than the electricity we use in our company. Since the production of steel from iron ore produces significant emissions, we decided many years ago that sooner or later we would have to do our bit to offset the unavoidable emissions from steel production, at least as far as we could, by using photovoltaics to reduce the overall impact of our production. In addition to this measure, we also created the **GREENLINE** series 14 years ago, which now includes many products that are characterised by new production processes with a reduced cross-section with similar or even better statics since their introduction compared to the over 7,000 tonnes CO_2 standard products, which is roughly equivalent to the annual energy consumption of 1,000 German citizens.

In addition to making ecological sense, this is also economically advantageous for everyone involved and saves transport costs that have not yet been included in the calculation.

GH HOLZVERBINDER

COMPLIANCE

PRINCIPLES

COMPLIANCE

Corporate responsibility and prevention are the fundamental basis of our compliance principles.
In conjunction with the voluntary commitment of our employees and corresponding control mechanisms a consistent culture of trust for lawful and responsible behaviour is created. At the same time, this should prevent risks, corruption and a conflict of interests.

TOLERANCE AND DIVERSITY

This also includes recognising the performance and social skills of our employees, regardless of their origin, religious affiliation, gender, disability or other characteristics. We generally used gender-neutral forms of the terms “employee”, “customer”, “supplier”, etc.

CONFIDENTIALITY, IDEAS AND PATENTS

With our innovative products, which are at the heart of our company, we are able to strengthen and increase the competitiveness of our customers. We rely on inventive minds, information from users and our customers to develop new innovative products that keep the cycle of innovation going.

It is therefore a matter of course for us that, in the event of success, everyone must benefit together and that we treat confidential matters such as ideas with absolute discretion, even if they do not lead to series production.

Dirk Weiss
Managing director

QUALITY MANAGEMENT

QUALITY MANAGEMENT

CE SYMBOL

EUROCODE

ISO 9001:2015

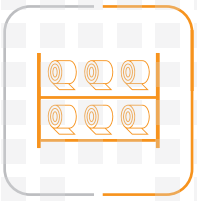
Coil in goods-in QA inspection
All relevant information and features are checked and documented and archived for tracking.

Company assignment and tool certificate
The company assignment with all relevant data and testing intervals is created. A tool note with test information goes into toolmaking.

Setting up the punching machine
After set up, the first product tests take place based on sample parts. Other tests on the packaging as well as information on the label, especially the batch number for tracking, are carried out and checked by QA.

1 → 2 → 3 → 4 → 5

Coils in the warehouse
The coils labelled by QA are put into stock.



Toolmaking
The tool that comes from our toolmaking department, with the tool certificate, is checked by QA, compared and approved for production.

CE AND EN ISO 9001:2015

As a manufacturer of Europe-wide approved products in structural timber construction and for our customers and processors, consistent and high quality in series and customised production is essential.

This requires product-specific quality and monitoring management in advance. The requirements for each product are defined in our quality manual and are implemented by both qualified quality management staff and production employees.

Permanent, standardised and continuous control processes, as well as their archiving, also form the basis for the CE symbol.

TRACEABILITY

PROCESS RELIABILIY

EXTERNAL MONITORING

QUALITY STANDARD

TRAINING SESSIONS

Production start
The BDE entry for production start then takes place after approval by QA.

Production end
BDE registration and last visual check of products.

Production series
Final check and approval.
Last checks of the packaging and information on the label, especially the batch number for tracking, are carried out. The goods are then put into stock in the main warehouse and are available for sale.

6 → 7 → 8 → 9 → 10 → 11

Current production
Current quality checks during production after a specified test interval according to the product's control plan.

Company assignment
Until final release, the goods are posted to the inspection warehouse and the order is de-registered in the system.

Toolmaking
The tool goes into toolmaking with the test certificate and the last manufactured product for checking and maintenance.

National and international approvals and certifications require reliable and understandable processes.

These prerequisites and requirements are clearly defined in our ETA approvals and in the Eurocode.
An essential component is the traceability of a product from the construction site back to the raw material and its properties based on the factory certificates of the raw material suppliers.

In order to be authorised to use the CE symbol, we undergo the necessary continuous external monitoring by external testing institutes.

For all department at our production sites, we additionally use the process and quality standards of the EN ISO 9001:2015 according to which we are also certified. This is also the minimum standard for our suppliers.

With regular, internal training, we ensure that the processes remain consistent in production and continuously correspond to our standards.

PRODUCT

DEVELOPMENT IN DETAIL

3D MODELLING
Creation of 3D models and simulations of various proposed solutions. Our technology department determines and checks the static functions. The information gained from market analysis serve as the basis. Technical regulations, standards and guidelines are considered, as well as the optimum type of material, properties and possibilities for maximum environmental friendliness.

CONSTRUCTION
Various production methods at our sites are checked and analysed.

3D PRINTING
The digital models are turned into the first prototypes using state-of-the-art 3D printing technology.

PROTOTYPE
In discussion with planners, users and research facilities, the prototype is optimised and adapted.

TRIALS
Certified and monitored series of trials to determine the performance capacity are commissioned and carried out.

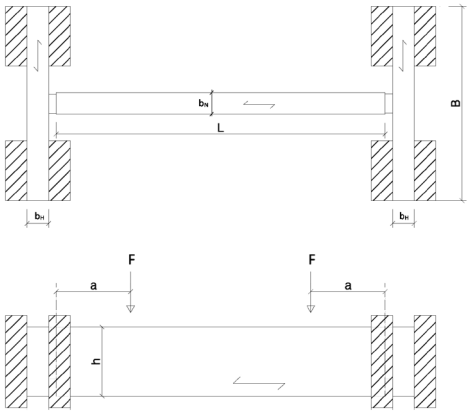
PROGRESSIVE TOOL PLANNING
Tools for series production are constructed in our toolmaking department and the commissioned.

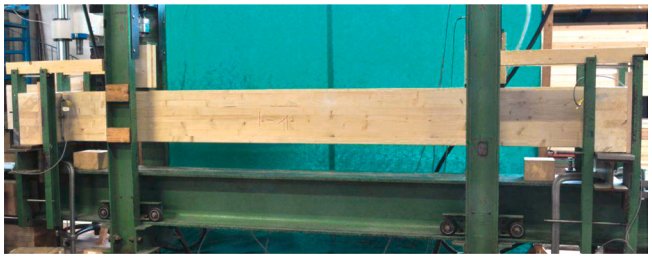
ETA APPROVAL
An application is made for the ETA approval based on trials, test reports and expert statements.

To achieve a European Technical Approval (ETA), extensive series of tests are carried out by the testing facility for steel, wood and stone of the Karlsruhe Institute for Technology (KIT).

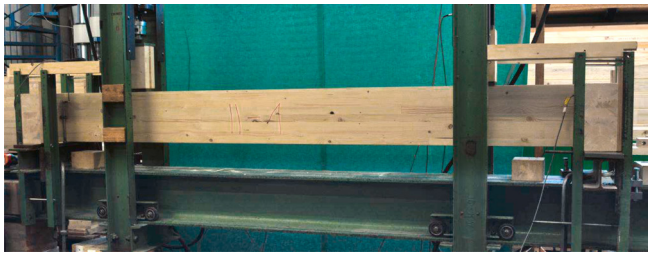
Depending on the product type and planned applications, various series of trials are determined, carried out and documented in a test report.

On the basis of the trial results, the test reports and the resulting appraisals, an approval draft is created with which the ETA can be applied for with a European approval authority.

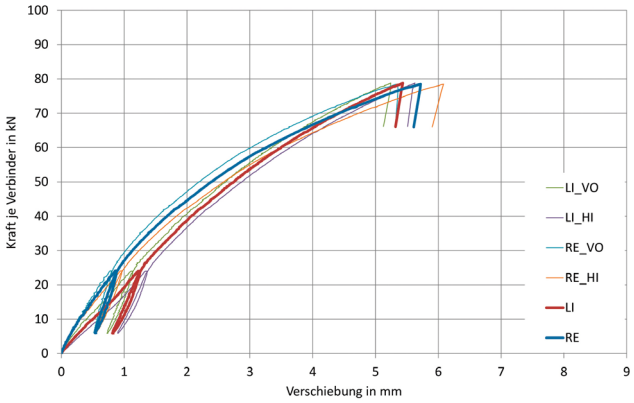




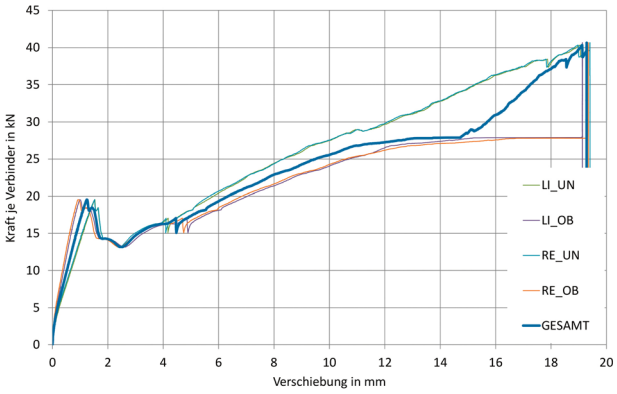
Test bench row I



Test bench row II



Load displacement diagram



Further diagram from the test report

Failure pattern: Crack parallel to the grain in the secondary beam and plastic deformations

Failure pattern: Bending tensile failure of the secondary beam

BRACING STRIP

S. 266

JOIST HANGERS TOP/TOP-M/TOP-K

S. 30

TOP OV CONNECTORS

S. 82

TOP UV CONNECTORS

S. 66

JOIST H… TYPE

BRACING STRIP STRETCHER

S. 270

CANTILEVER BRACKETS

S. 246

ANGLE BRACKETS TYPE KR 90 E

S. 124

STRUT CONNECTOR

S. 132

NAIL PLATES

S. 258

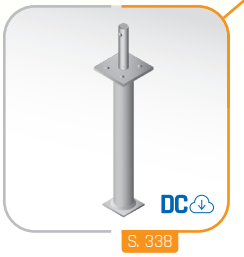
S. 228

RAFTER ANCHORS RL-D

NAIL PLATE BRACKET

S. 148

STANCHION TYPE DS



S. 338

INTEGRAL CONNECTORS

S. 98

ANGLE BRACKETS KR SLOTTED HOLE

S. 134

MADE IN GERMANY · GREENLINE · TOPLINE · KONSTRULINE · ZINTOP · DCSTATIK

ANGERS
E 04

S. 52

WIDTH-ADJUSTABLE JOIST HANGERS TYPE 2

S. 242

WIDTH-ADJUSTABLE JOIST HANGERS TYPE 3

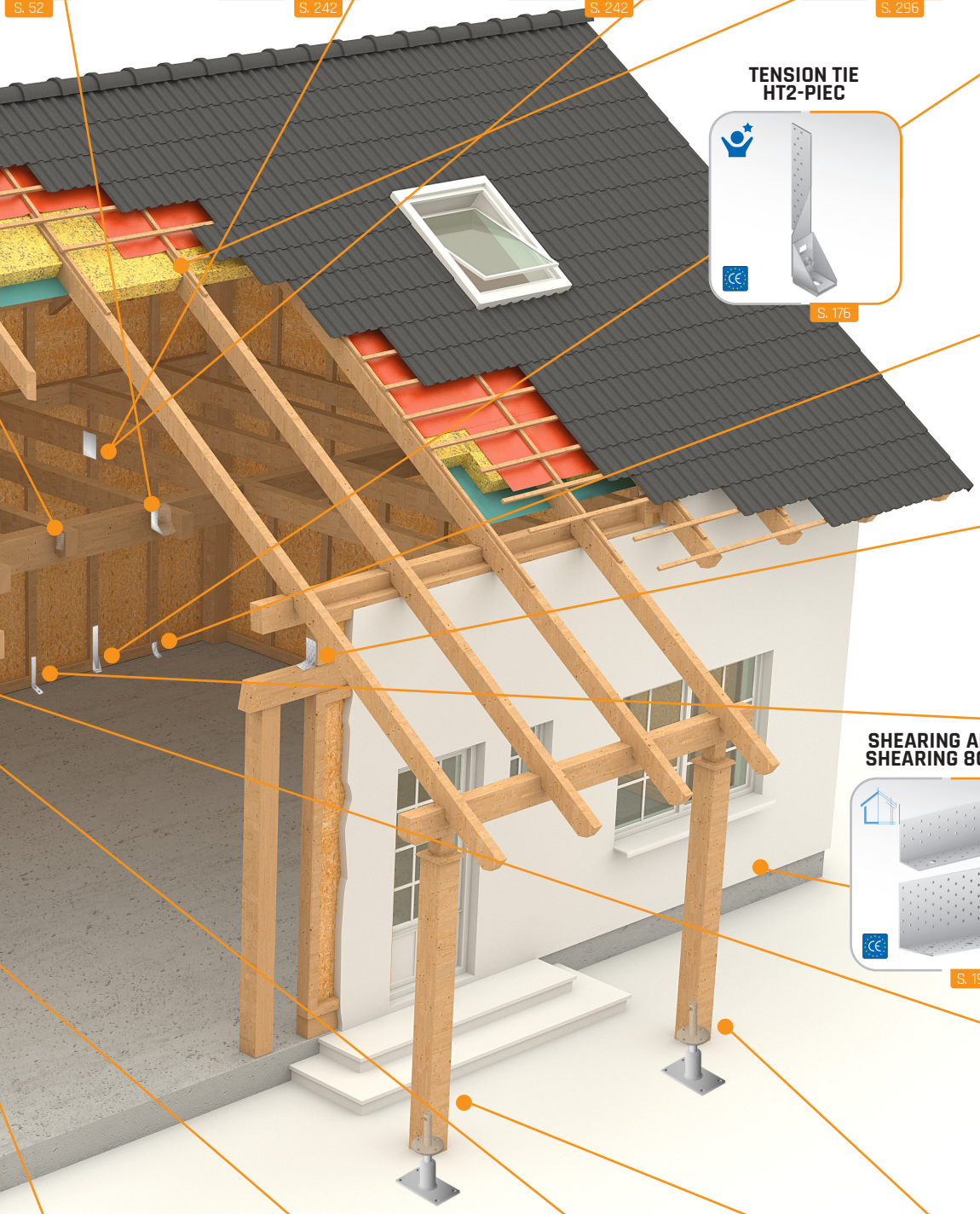
S. 242

WOOD CONSTRUCTION SCREWS

S. 296

HT TENSION TIE

S. 172



TENSION TIE HT2-PIEC

S. 176

ANGLE BRACKETS KR ROUND HOLE

S. 136

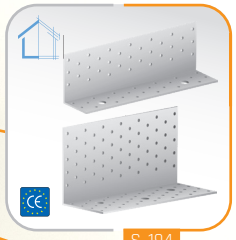
TOP CONNECTORS 80/120

S. 120

TENSION TIE TOP 240/280 VARIO

S. 168

SHEARING ANGLE SHEARING 80/120



S. 194

TENSION TIE

S. 182

CONCRETE BRACKET

S. 156

ANGLE BRACKETS 110/170 S

S. 132

ANGLE BRACKETS TYPE 110

S. 138

STANCHION TYPE D

S. 350

TOPLINE

YOUR **TOP**LINE – ADVANTAGES! MORE FLEXIBILITY IN CONNECTION TECHNOLOGY

- **Time savings during installation**
- **Simple and quick processing**
- **Safe due to approvals**
- **Flexible use**
- **Quality products “Made in Germany”**

TOP OV CONNECTORS

ETA-12 0171

DC

S. 82

TOP UV CONNECTORS

ETA-11 0036

DC

S. 66

TENSION TIE TOP 240/280 VARIO

ETA-10 0010

S. 168

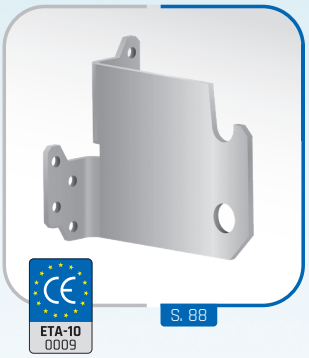
JOIST HANGERS TOP/TOP-M

ETA-08 0264

DC

S. 30

INTEGRAL CONNECTORS



ETA-10 0009

S. 88

BRACING STRIP TYPE Z

EN 14545

S. 266

TOP PRODUCTS INNOVATIVELY PACKAGED!

RECYCLE REUSE REDUCE

GH **TOPLINE** PRODUCTS INNOVATIONS "MADE IN GERMANY

MADE IN GERMANY

TENSION TIE HT

ETA-10 0010

S. 172

TENSION TIE HT2-PIECE

ETA-10 0010

S. 176

ANGLE BRACKETS TYPE KR 90 E

ETA-09 0324

S. 124

RAFTER ANCHOR RL-D

ETA-10 0007

S. 228

TOP CONNECTORS 80/120

ETA-09 0322

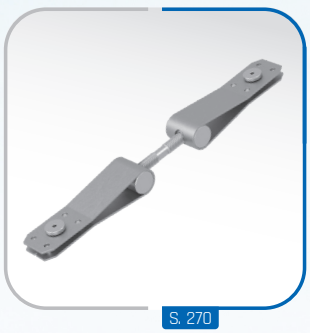
S. 120

TOP CONNECTORS 80/120 VARIO

ETA-09 0322

S. 184

ROLLED STRAP TIE SYSTEM SCREW FIX



S. 270

Further information on the **TOP**LINE series as well as the GH **TOP**LINE flyer can be requested from us or simply downloaded at **www.holzverbinder.de**.

1

JOIST HANGERS

01

TOPLINE GREENLINE KONSTRULINE DCSTATIK ETA-08 0264

1

JOIST HANGERS

JOIST HANGERS BS TOP, TOP M, TOP K

Modern wave profile

Assembly mandrel - your third hand during assembly
- Time-saving quick assembly thanks to an independent hold for further processing
- Easier assembly e.g. for overhead installation

Ring marking at the nail holes for fast and professional partial nail fitting (40 % fewer nails)

Corrugations
The corrugations give the joist hangers additional stability for the highest demands (also 2-axis load)
Approved transverse installation

Connections according to the approval to:
- Timber/timber
- Intermediate layer such as OSB
- Timber boards such as OSB
- Timber/concrete, timber/steel

SPECIALLY FOR TYPE TOP M

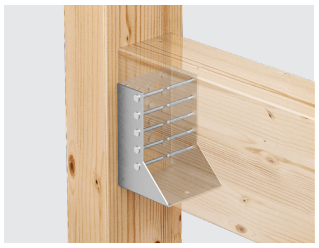
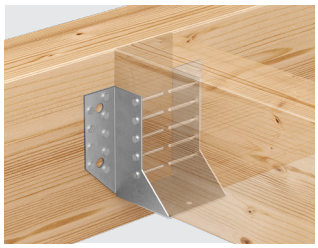
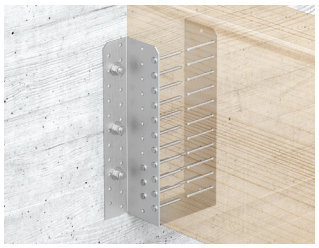
Assembly aid
- Always flush and at a right-angle to the main beam
- By pushing in place onceonly, immeditate and dimensionally stable joist hanger position
- Millimetre-precise assembly on the scrible line for different timber cross-sections

ESPECIALLY FOR TOP K

- Same performance features and dimensions as BS TOP
- Installation depth of just 50 mm
- Specially for concealed installation in the installation level in timber frame construction
- No limitations in load capacity
- Approved connection to timber boards including in the centre of timber frames

JOIST HANGER TYPE 04 COMBI 1.5 + 2.0

Standard joist hanger
Connections according to the approval to:
- Timber/timber
- Over the intermediate layer, such as OSB
- Only to timber boards such as OSB
- Timber/concrete, timber/steel

JOIST HANGER TYPE 05 EXTRA STARK

Konstruline series
- Very strong and clean connection
- Approved for 2-axis load with exterior legs

Connections according to the approval to:
- Timber/timber
- Timber/concrete
- Timber/masonry
- Timber/steel

JOIST HANGERS INSIDE

- Ideal for connection to columns
- Available as type 04 and type 05

Connections according to the approval to:
- Timber/timber
- Timber/concrete
- Timber/masonry
- Timber/steel

JOIST HANGERS CUSTOMISATIONS

We can produce customised sizes with quick turnaround times according to your specifications

CATALOGUE PAGES

Basics of statics & diagrams **From page 21**
Products & statics **From page 30**

1

JOIST HANGERS

ASSORTMENT

		Width min.	Width max.	Height* min.	Height* max.	Basics Statics & Diagrams from page	Products & Statics from page	Products Made of V4A from page
JOIST HANGER TYPE TOP-M		40	120	100	170	21	30	
JOIST HANGER TYPE TOP		40	120	100	180	21	34	
JOIST HANGER TYPE TOP K 50		60	120	100	180	21	36	
JOIST HANGER TYP 04 GREENLINE		32	140	80	210	21	38	
JOIST HANGER TYPE 04 COMBI		32	140	80	220	21	40	292
JOIST HANGER TYPE 05 COMBI		100	240	160	320	21	44	
JOIST HANGERS TYPE 05 GREENLINE		100	240	160	320	21	46	
JOIST HANGER TYPE 07		100	180	200	320	21	48	
JOIST HANGER TYPE I 04 GREENLINE		60	140	90	210	21	50	
JOIST HANGER TYPE I 04 COMBI		32	140	98	210	21	52	292
JOIST HANGER TYPE I 05 COMBI		100	240	160	320	21	54	
JOIST HANGER TYPE I 05 GREENLINE		100	240	160	320	21	56	
2-PIECE JOIST HANGER		50	140	80	200		58	

* Min./max. depending on width

CE symbol

Steel with indication of the steel quality and galvanisation

Stainless steel with material number

Timber/timber connection

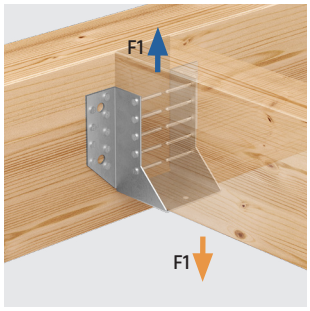
Timber/concrete-connection

Timber/OSB-connection

Usage class 1
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 65% for a few weeks per year, e.g. in the case of buildings that are closed on all sides and heated.
Comment: In UC 1, the average moisture content of most softwoods does not exceed 12 %.

Usage class 2
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 85% for a few weeks per year, e.g. in the case of open buildings covered by a roof.
Comment: In UC 2, the average moisture content of most softwoods does not exceed 20 %.

Usage class 3
Includes climatic conditions that lead to higher moisture contents than in UC 2, e.g. structures that are exposed to the weather without protection. Eurocode 5 / DIN EN 1995-1-1 section 2.3.1.3



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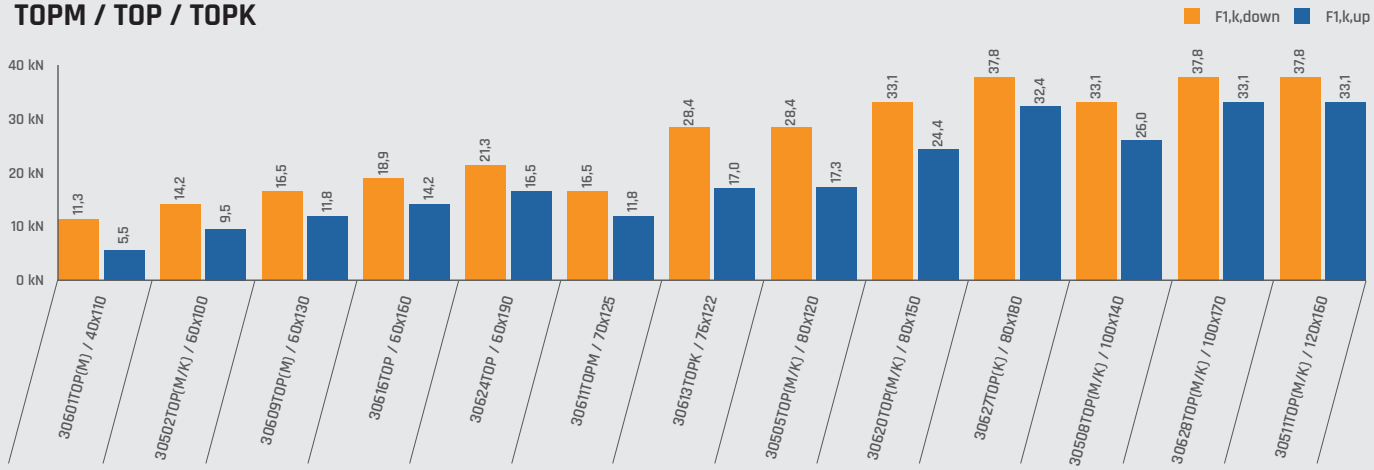
JOIST HANGERS

STATICS DIAGRAM

TOPM / TOP / TOPK



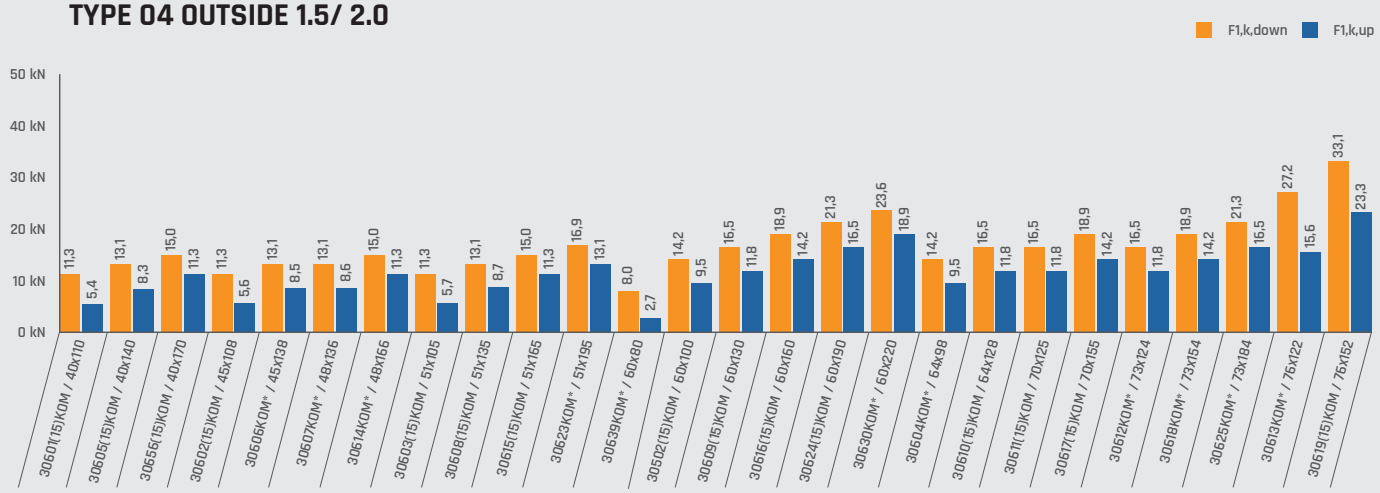
More statics diagrams for joist hangers on the following pages!

1

JOIST HANGERS

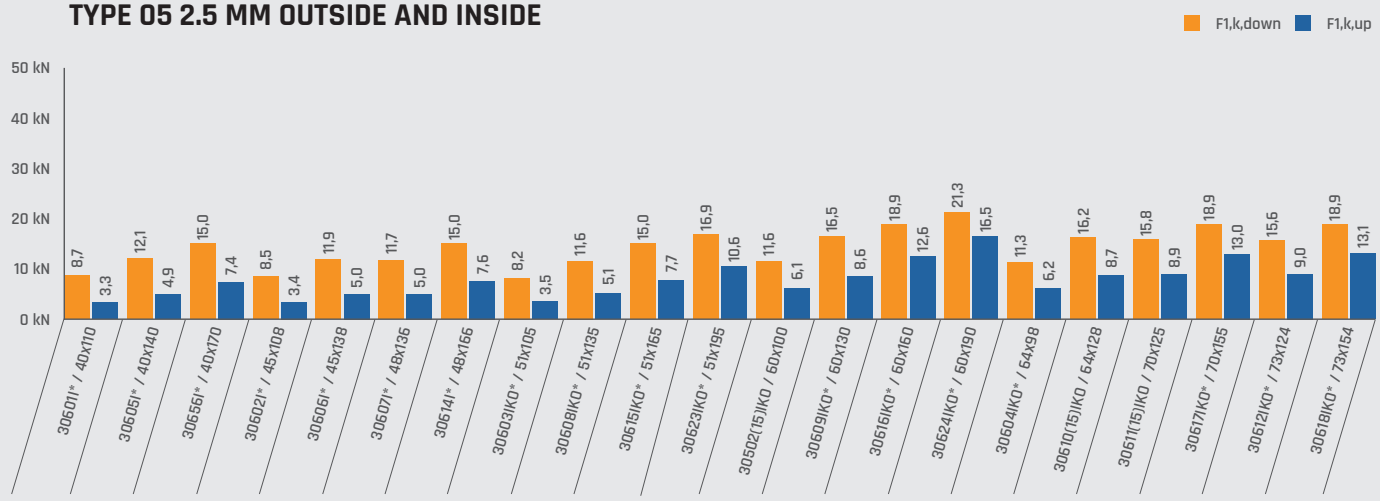
STATICS DIAGRAM

TYPE 04 OUTSIDE 1.5/ 2.0



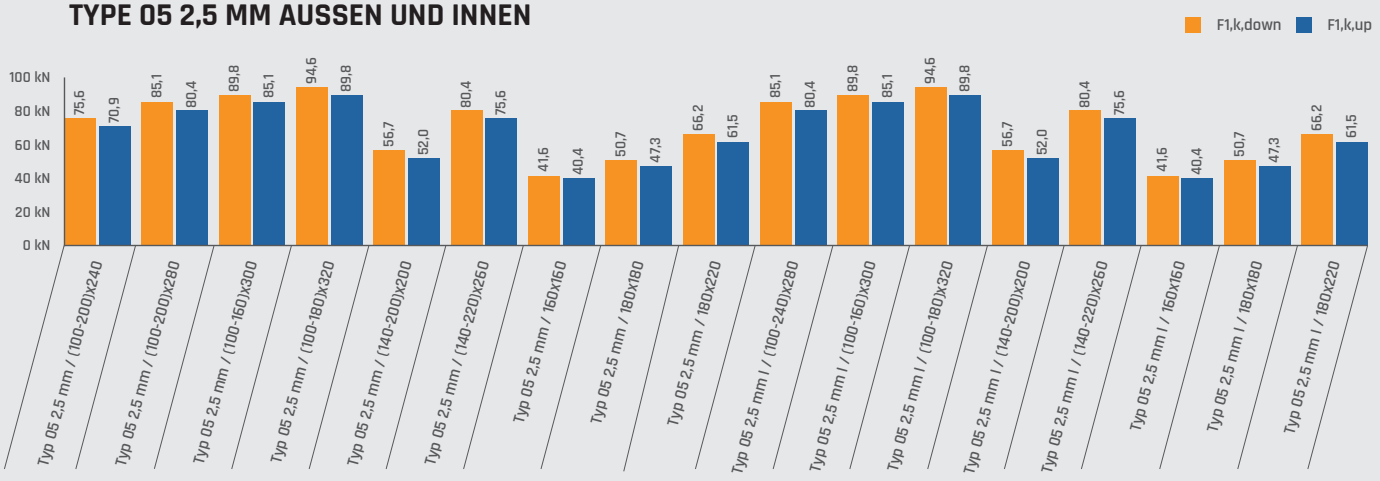
* 2.0 mm only

TYPE 05 2.5 MM OUTSIDE AND INSIDE



* 2.0 mm only

TYPE 05 2,5 MM AUSSEN UND INNEN



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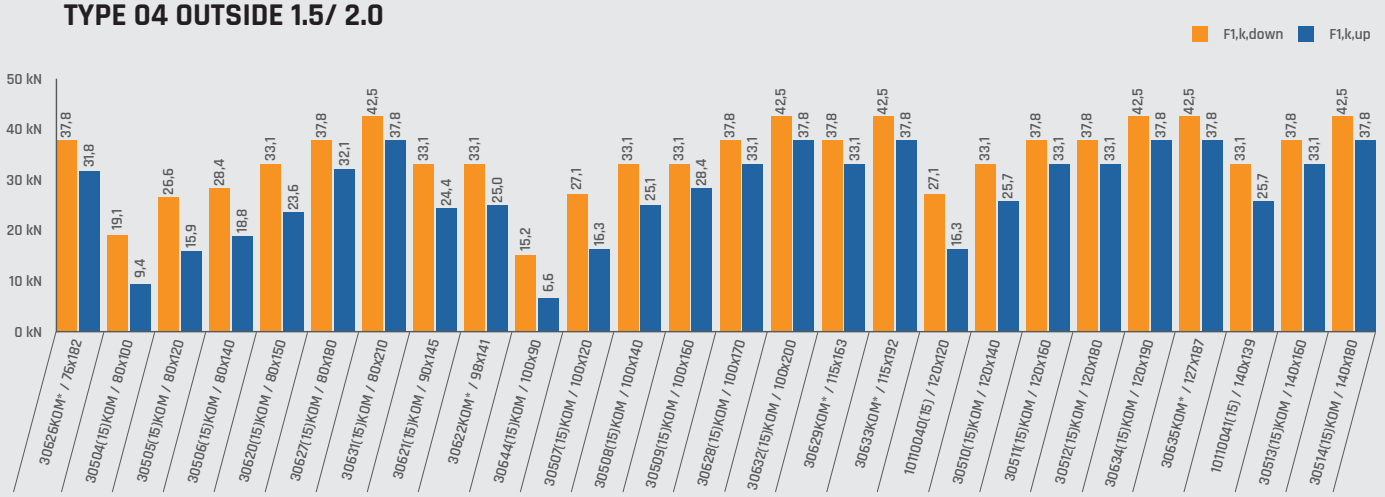
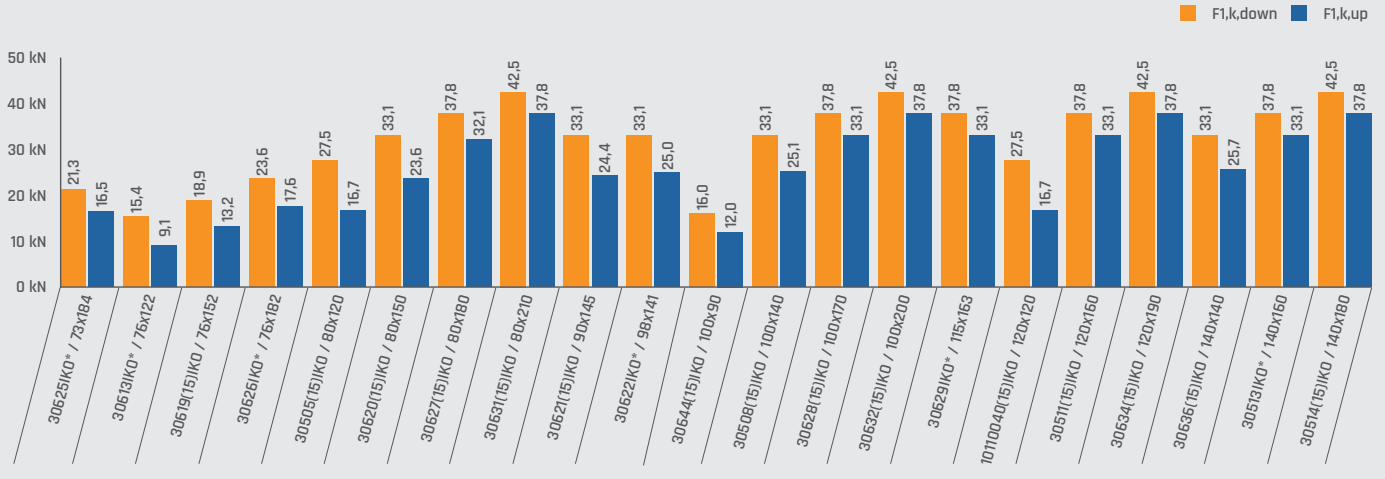
TYPE 04 OUTSIDE 1.5/ 2.0



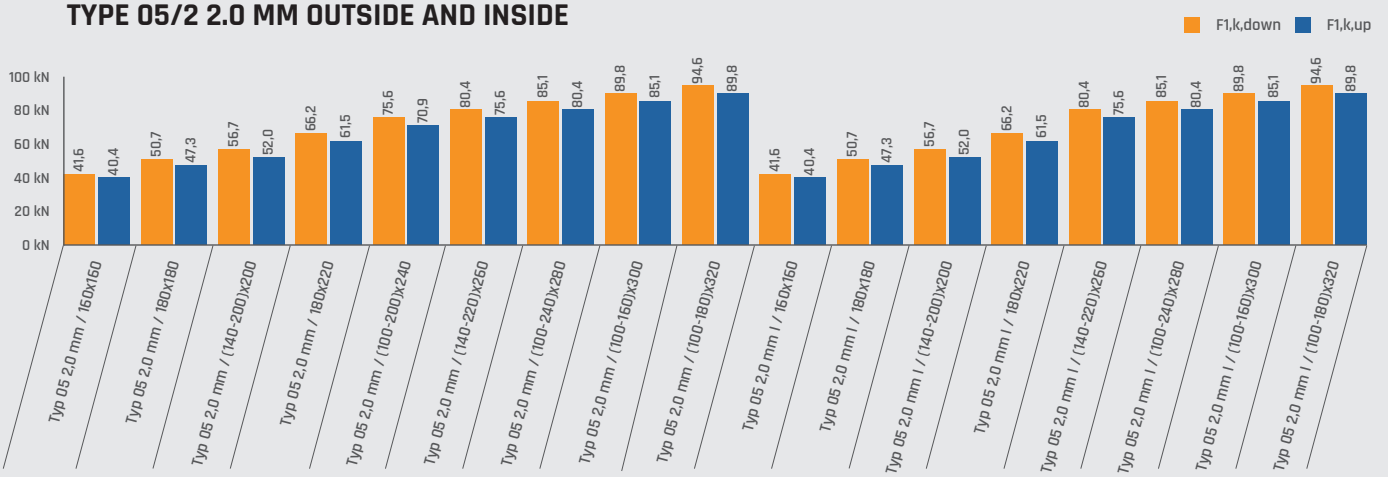
* 2.0 mm only

TYPE 04 INSIDE 1.5 / 2.0



* 2.0 mm only

TYPE 05/2 2.0 MM OUTSIDE AND INSIDE



1

JOIST HANGERS

TECHNICAL FEATURES

Geometry

W (B)	Width (mm)
H	Height (mm)
T (S)	Material thickness (mm)

Tables

nH	Number of holes in main beam
nN	Number of holes in secondary beam
n_H	Number of holes in main beam
n_N	Number of holes in secondary beam
n_v	Full nail fitting
n_T	Partial nail fitting
HT_H	Main beam height
HT_B	Main beam width
NT_H	Secondary beam height
NT_B	Secondary beam width
h_e	Spacing between top of main beam and top connecting element

Connecting element concrete/ steel

n	Number of dowels/bolts
$F_{ax,Ek}$	Characteristic axial load per bolt
$F_{v,Ek}$	Characteristic shearing load per bolt

Design

F_{Rd}	Design value of load capacity
F_{Rk}	Characteristic value of load capacity
K_{mod}	Modification factor
γ_M	Partial safety factor

Load directions

$F_{1,k}$ ↓	Load direction baseplate
$F_{1,k}$ ↑	Load away from baseplate
$F_{2,k}$ ↙	Load vertical to symmetry axis (2-axis)

Timber connecting element

ø (mm)	Diameter
L (mm)	Length
⟵⟶	Grain course

Dowel design

$F_{ax,n,Bo,ED}$	Design load for the stress on a bolt if the joist hanger is fixed with n bolts.
$F_{ax,n=1,Bo,ED}$	Design value of the load acting on a bolt when the joist hanger is fixed with a pair of bolts.
Z_{max}	Spacing of top bolt pair from the lower edge
Z_i	Spacing of xth bolt pair from the lower edge
n	Spacing of used bolt pair
n_j	Number of nails in secondary beam
E_d	Design value of stress
R_d	Design value of load capacity

CE symbol

Steel with indication of the steel quality and galvanisation

Stainless steel with material number

Timber/timber connection

Timber/concrete-connection

Timber/OSB-connection

Usage class 1
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 65% for a few weeks per year, e.g. in the case of buildings that are closed on all sides and heated.
Comment: In UC 1, the average moisture content of most softwoods does not exceed 12 %.

Usage class 2
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 65% for a few weeks per year, e.g. in the case of buildings that are closed on all sides and heated.
Comment: In UC 1, the average moisture content of most softwoods does not exceed 12 %.

Usage class 3
Includes climatic conditions that lead to higher moisture contents than in UC 2, e.g. structures that are exposed to the weather without protection. Eurocode 5 / DIN EN 1995-1-1 section 2.3.1.3

1

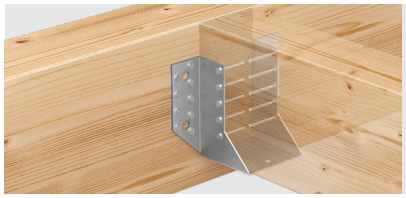
JOIST HANGERS

APPLICATIONS

Application:
Connection of a secondary beam made of timber or timber materials on the main beam

Materials: 250 GD Z275 | A4 1.4571

Material thicknesses:
1.5 / 2.0/ 2.5 mm
More on request.



90° connection

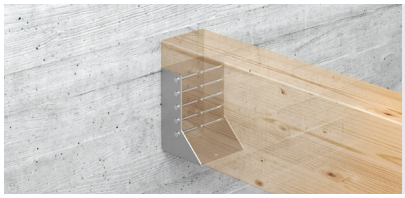
MB / SB

OSB only

MB / SB

Intermediate layer with OSB

MB / SB



Concrete wall

MB / SB

column connection

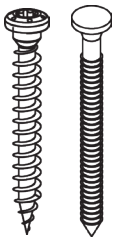
MB / SB

Concrete ring anchor

MB / SB

For use in usage classes

NKL 1 | NKL 2 | NKL 3



Connecting element:

Timber/timber
Main and secondary beam
GH threaded nails 4.0 x 35 / 40 / 50 / 60 / 75 / 100 mm
GH screws 5.0 x 25 / 35 / 40 / 50 / 60 / 70 mm

Timber/concrete-steel
Main beam
Bolts, dowels or concrete anchors M8, M10, M12 - washers in accordance with EN ISO 7094 must be fitted at least under the 2 upper bolt heads or nuts.

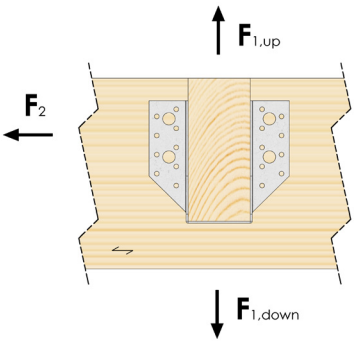
Connecting elements from page 274

User video
To our TOP M joist hangers

1

JOIST HANGERS

LOAD DIRECTIONS



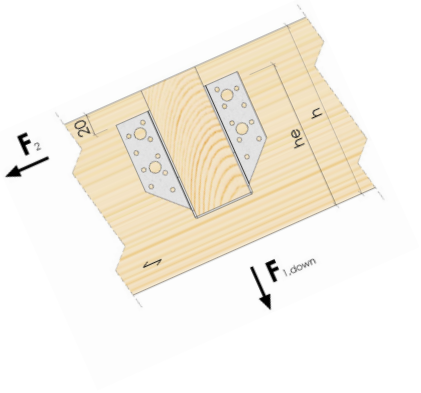
Two-axis stress

If the load components FZ and FY act simultaneously, the proof of interaction must also be provided in the following form:

$$\left(\frac{F_{Z,Ed}}{F_{Z,Rd}}\right)^2 + \left(\frac{F_{Y,Ed}}{F_{Y,Rd}}\right)^2 \leq 1$$

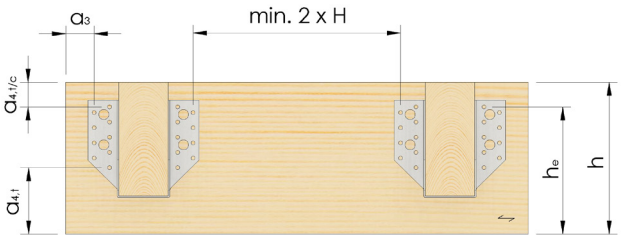
Connection over intermediate layers

If there is an intermediate layer between the joist hangers and the main beam, the length of the connecting centre must be selected so that the fastener is anchored to the main beam at the lengths given above.



Minimum and edge spacing

The regulations according to EN1995-1-1 apply for edge spacing parallel and vertical to the grain. In accordance with DIN 1052:2008-12 it is recommended that the clear distance between the outer connecting element groups of two joist hangers corresponds to 2 times the main beam height. If this is not achieved, the load capacity should be reduced.



		GH threaded nails Ø 4 mm	GH screws Ø 5 mm
$a_{3,t}$	End grain with stress	60 mm	75 mm
$a_{3,c}$	End grain without stress	40 mm	50 mm
$a_{4,t}$	Loaded edge	28 mm	50 mm
$a_{4,c}$	Unloaded edge	20 mm	25 mm

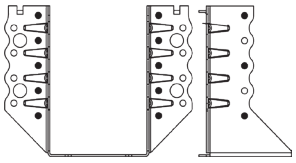
Minimum spacing according to EN 1996-1-1, without pilot drilling, $\rho_k \leq 420$ kg/m³

JOIST HANGERS

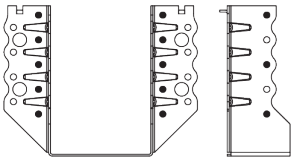
HOLE PATTERNS

Timber/timber connection
Partial and full nail fitting or partial and full screw fitting

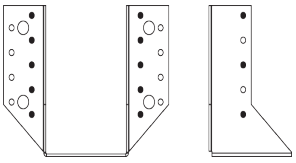
Type Top M / TOP



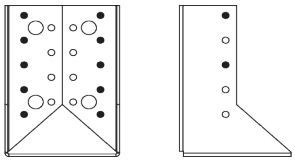
Type TOPK



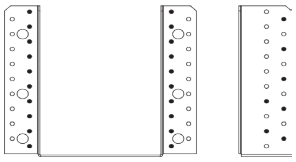
Type 04 1,5 + 2,0



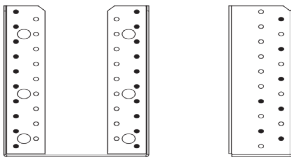
Type 04 I 1,5 + 2,0



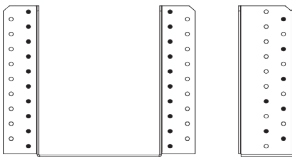
Type 05/2,5 Combi



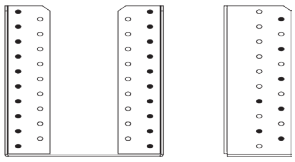
Type 05/2,5 I Combi



Type 05/2,0



Type 05/2,0 I



- **Partial nail fitting/partial screw fitting**

General information on design
The main beam must be mounted torsionally rigid. In the case of a one-sided joist hanger connection or a difference in opposing support forces of more than 20 %, proof of torsion is required (also for connections to concrete or masonry). These support forces on the main beam each generate an offset moment (torsion) of :

$$M_{ec} = F_{Z,E} \cdot \left(\frac{b_{header}}{2} + e_{J,0} \right)$$

b_{header} Width of the main beam

$e_{J,o}$ Spacing of the centre of gravity of the nail pattern in the secondary beam from the shear surface

Proof of the cross-tensile failure in the main and/or secondary beam must be provided separately. For cross-connections with $h_e/h > 0.7$, proof is not required.

For the load-bearing capacity of load component F2, it is assumed in the table values that the position of the line of action is 20 mm below the upper edge of the joist hangers. As the spacing between the line of action of the load and the centre of gravity of the connection on the main beam increases, the load-bearing capacity decreases.

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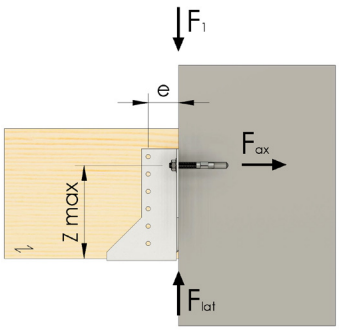
JOIST HANGER CONNECTIONS

MASONRY, CONCRETE, STEEL



Example

Load capacity: $F_{Z,down,Ed}$= 30 kN min., k_{mod} = 0.8 (KLED medium)

Joist hanger: Combi 05 160x200x2,5
Full nail fitting
4 dowels/bolts

Threaded nails: 4,0x60 according to ETA-13/0523 $F_{v,Rd}$= 1.45 kN

The indicated load capacities result for fixing with a dowel, bolt or concrete anchor pair.

If fastening is done with several pairs of dowels, bolts or concrete anchors,the load capacity of the joist hanger and the stress on each dowel, bolt or concrete anchor can be converted.

A quick explanation!

Design tables
The load capacities listed in the tables were determined assuming usage classes 1 and 2. The shear and axial load-bearing capacities of the nails and screws were determined using material grade C24 or GL24c.

The strength parameters for OSB/3 were taken into account for fastening to timber materials.
The tables contain characteristic load capacities.

For design values, the following apply: $F_{Rd} = \frac{k_{mod} \cdot F_{Rk}}{\gamma_M}$

KLED	Constant	Long	Medium	Short	Very briefly	Short/very short
kmod	0.6	0.7	0.8	0.9	1.1	1

With the assumption γ_M =1.3 (e.g. softwood, plywood, laminated veneer wood, etc.)

KLED	Constant	Long	Medium	Short	Very briefly	Short/very short
k_{mod} / g_M	0.46	0.54	0.62	0.69	0.85	0.77

The following conversion factors result for the load duration classes defined in DIN EN 1995-1-1/NA (k_{mod} / γ_M):
For usage class 3, the load-bearing capacities are determined separately, taking into account the material-specific parameters.

Design example

The following proof must be kept:

The following proof must be kept:
$F_{Z,Rd,NT} = (n_J+2) \times F_{v,J,Rd}$
$F_{Z,Rd,NT} = (22 + 2) \times 1{,}45 = \underline{34.8\ kN} > OK$

Main beam load capacity:
$F_{Z,Rd,HT} = n_{bolt} / 2 \times F_{1,RK,Stahl} / \gamma_{M2}$
$F_{Z,Rd,HT} = 4 / 2 \times 19.8 / 1.25 = \underline{31.7\ kN} > Ok$

Lateral stress of a dowel/bolt:
$F_{lat,bolt} = F/n_{bolt}$
$F_{lat,bolt} = 30\ kN / 4 = \underline{7.5\ kN}$

Axial stress that affect the top dowel, bolt or concrete anchor:
$F_{ax,bolt} = \frac{F \times e}{2 \times z_{max}}$ $F_{ax,bolt} = 30\ kN \times (44.4) / (2 \times (162) = \underline{4.11\ kN}$ (with e_j aus ETA-08/0264 table C4)

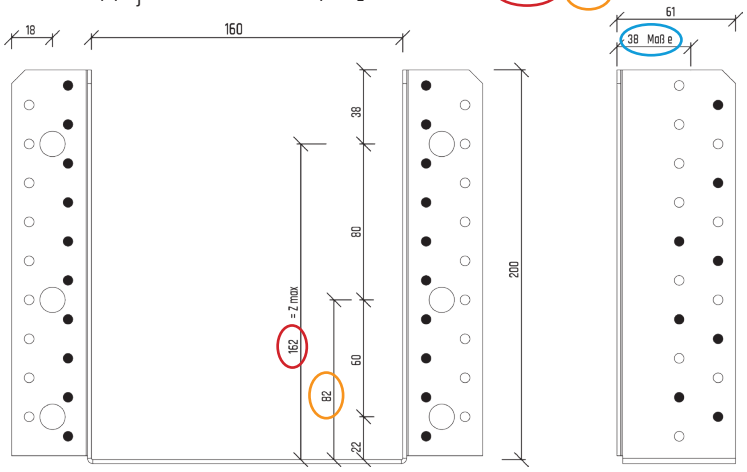
Table C4 (contd.): Joist hanger type 05 combi with external flanges
Form factors $k_{H,1}$ and $k_{H,2}$ and dimensions e_1, e_2 and $e_{j,0}$

W [mm]	H [mm]	nH	nj	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	$e_{j,0}$ [mm]	nH	nj	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	$e_{j,0}$ [mm]
160	200	38	22	54	52.2	5917	4631	44.4	20	12	26.9	26.1	2739	2595	48

			Timber / Timber										Timber / Concrete			
			Full nail fitting [kN]								Partial nail fitting [kN]								Dowels/bolts			
					GH 4.0x40				GH 4.0x60				GH 4.0x40				GH 4.0x60				Ø13	1 pair of dowels		
W	H	T	n_H	n_N	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	$F_{3,k}$ ←	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	$F_{3,k}$ ←	n_H	n_N	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	$F_{3,k}$ ←	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	$F_{3,k}$ ←	n_H	F_{1K} ↓	$F_{V,EK}$ ↓	$F_{ax,Ek}$ ←
160	200	2.5	38	(22)	40.1	39.2	15.3	-	56.7	52.0	22.4	-	20	12	20.3	19.9	8.4	-	30.7	28.4	12.3	-	6	19.8	9.9	2.9

If fastening is done with several pairs of dowels, bolts or concrete anchors, the axial stress on each dowel, bolt or concrete anchor can be converted as follows:

$$F_{ax,n,Bo,Ed} = \frac{z^2_{max}}{\Sigma_{i=1}^{n} z_j^2} \cdot F_{ax,n=1Bo,Ed} = \frac{z^2_{max}}{\Sigma z_1^2 + z_2^2} \cdot F_{ax,1,Bo,Ed} = \frac{162^2}{162^2+82^2} \cdot 4{,}11 = \underline{3{,}27\ kN}$$



$F_{ax,n,Bo,Ed}$	Design value of the load acting on a dowel, bolt or concrete anchor when the joist hangers are fixed with with n pairs of dowels, bolts or concrete anchors.
$F_{ax,n=1,Bo,Ed}$	Design value of the load acting on a dowel, bolt or concrete anchor when the joist hangers are fixed with with n pairs of dowels, bolts or concrete anchors (table value).
z_{max}	Spacing of the top pair of dowels, bolts or concrete anchors from the lower edge of the joist hangers minus 10 mm.
z_i	Spacing of the x^{th} pair of dowels, bolts or concrete anchors from the lower edge of the joist hangers minus 10 mm.
n	Number of dowels, bolts or concrete anchor pairs with which the joist hanger is fixed.
n_J	Number of nails in secondary beam
E_d	Design value of stress
R_d	Design value of load capacity

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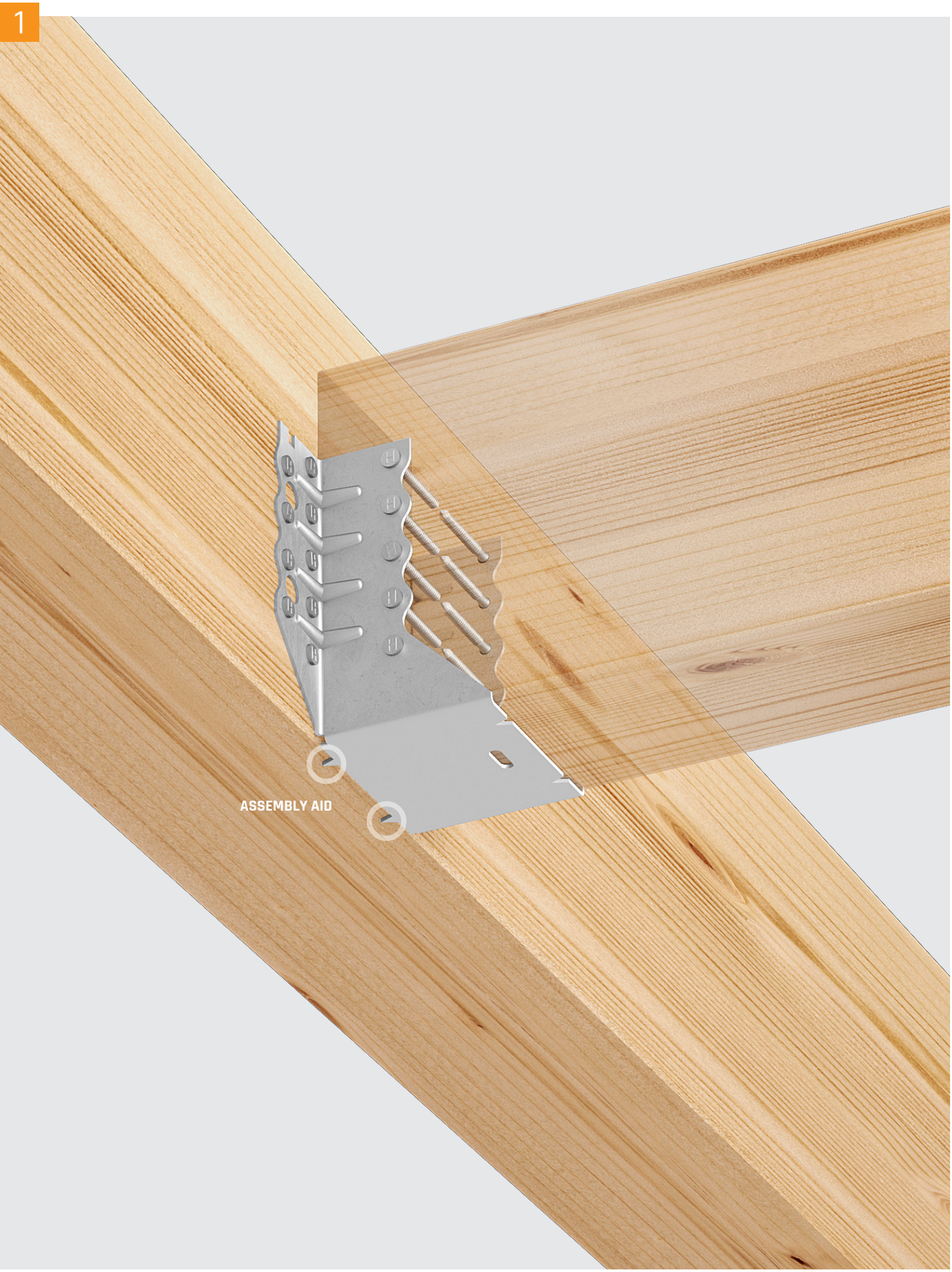
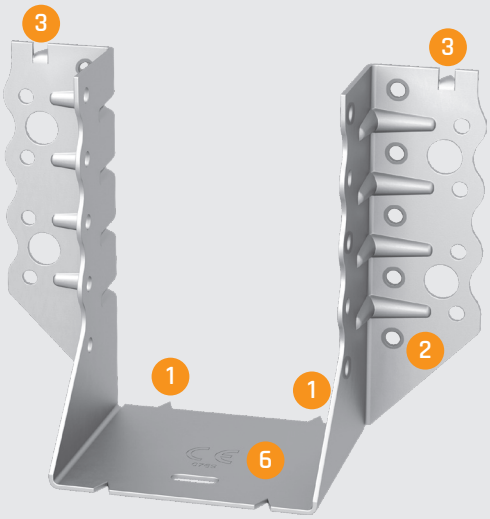


1

JOIST HANGERE

TYPE TOP M/ TOP/ TOP K

1. Assembly aid (only for TOP M)
2. Ring marking for partial nail fitting
3. Assembly mandrel
4. Corrugation for reinforcement
5. Slotted hole
6. Embossed CE
7. Modern wave profile



ASSEMBLY ADVANTAGES FOR TOP JOIST HANGERS

1 ASSEMBLY AID (ONLY FOR TOP M)

Advantages

- Always flush and at a right-angle to the main beam
- By pushing in place once only, immediate and dimensionally stable joist hanger position
- Millimetre-precise assembly on the scribe line for different timber cross-sections

Simple use

- Position the assembly aid on the lower edge and fix the joist hanger with light pressure onto the upper assembly mandrels.
  The joist hanger pulls itself onto the lower edge of the beam, meaning that it is precisely flush and fixed at a right angle.
- Installation centred or flush at the top if the secondary beam is mounted flush with the centre or top of the main beam, both assembly aids are printed directly on the metre mark. This means that the Top M is aligned and fixed at right angles without additional aids.

FOR INSTALLATION LEVELS (ONLY FOR TOP K)

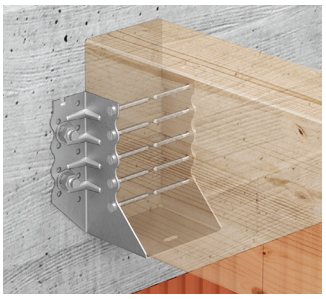
Advantages

- Installation depth of just 50 mm
- Specially for concealed installation in the installation level
- in the timber frame construction. No limitations in load capacity.

3 ASSEMBLY MANDREL - THE THIRD HAND

Advantages

- Time-saving quick assembly due to independent hold for further processing
- Easier assembly e.g. for overhead installation



2 RING MARKING

Advantages

- The ring marking on the nail holes allows fast and professional partial nail fitting
- Easier assembly e.g. for overhead installation

ADDITIONAL ADVANTAGES FOR TIMBER FRAME CONSTRUCTION

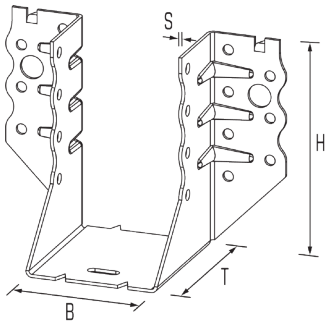
Advantages

- Approved connection directly to timber board materials including in the centre of timber frames (with GH screws approval ETA-13/0523)
- The first and only approved joist hanger for assembly on timber board materials in the centre of timber frames, independent of construction timbers between the timber posts
  Example: BS Top 80 x 120 characteristic load capacity on OSB3: 4.4 kN, with GH screw 5 x 25 mm
- No additional edge plank in the refurbishment
- Joist grid on intermediate ceilings independent of the timber frame wall
- Continuous air-tight level
- Low thermal bridge
- Quick and low-cost assembly

1

JOIST HANGER

TYPE TOP M



TOPLINE GREENLINE DCSTATIK ETA-08 0264

NKL 2 250 GD Z275

Art. No.	Dimensions [mm]							nH	nN	nH	EAN	Weight	Pallet	PU			
	W(B)	x	H	x	D(T)	x	T(S)	Ø 5	Ø5	Ø 11	4019346	kg					
30601TOPM	40	x	110	x	70	x	1,5	14	8	2	122495	0.187	1200	50	■	■	■
30502TOPM	60	x	100	x	70	x	1,5	14	8	2	122501	0.187	1200	50	■	■	■
30609TOPM	60	x	130	x	70	x	1,5	18	10	4	122587	0.231	1200	50	■	■	■
30611TOPM	70	x	125	x	70	x	1,5	18	10	4	122600	0.231	1200	50	■	■	■
30505TOPM	80	x	120	x	70	x	1,5	18	10	4	122518	0.231	1200	50	■	■	■
30620TOPM	80	x	150	x	70	x	1,5	22	12	4	122631	0.274	1200	50	■	■	■
30508TOPM	100	x	140	x	70	x	1,5	22	12	4	122525	0.274	1200	50	■	■	■
30628TOPM	100	x	170	x	70	x	1,5	26	14	4	122662	0.317	1200	50	■	■	■
30511TOPM	120	x	160	x	70	x	1,5	26	14	4	122532	0.317	1200	50	■	■	■

Standard dimensions

Further dimensions available on request

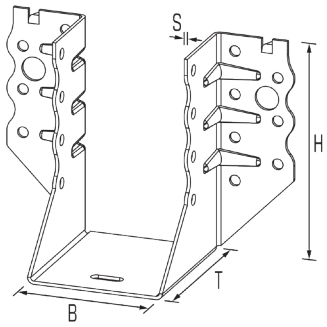
TYPE TOP M

Art. No				Timber / Timber															Timber / OSB								Timber / Concrete			
				Full nail fitting									Partial nail fitting						Full screw fitting				Partial screw fitting							
						GH 4.0x40			GH 4.0x60					GH 4.0x40			GH 4.0x60			GH 5.0x25				GH 5.0x25				Ø11	1 pair of dowels		
	W	H	T	n_H	n_N	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	n_H	n_N	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	n_H	n_N	$F_{1,k}$ ↓	$F_{2,k}$ ↙	n_H	n_N	$F_{1,k}$ ↓	$F_{2,k}$ ↙	n_H	$F_{1,k}$ ↓	$F_{V,Ek}$ ↓	$F_{ax,Ek}$ ←
30601TOPM	40	110	1,5	14	8	11,3	5,5	2,1	-	-	-	8	4	8,8	3,4	1,9	-	-	-	14	8	1,4	1,0	8	4	1,4	1,0	2	9,9	5,0	1,9
30502TOPM	60	100	1,5	14	8	13,2	5,8	2,3	14,2	9,5	3,5	8	4	7,7	3,8	2,5	11,8	6,1	3,5	14	8	2,9	2,3	8	4	1,4	1,4	2	9,9	5,0	2,2
30609TOPM	60	130	1,5	18	10	21,2	9,9	5,8	16,5	11,8	4,0	10	5	11,9	5,8	2,9	16,5	9,3	4,0	18	10	4,4	3,1	10	5	2,2	1,5	4	9,9	5,0	1,5
30611TOPM	70	125	1,5	18	10	20,2	10,3	6,3	16,5	11,8	4,5	10	5	11,4	6,0	3,2	16,5	9,7	4,5	18	10	4,4	3,5	10	5	2,2	1,7	4	9,9	5,0	1,6
30505TOPM	80	120	1,5	18	10	19,0	10,8	6,7	28,4	17,3	9,7	10	5	10,8	6,3	3,4	16,1	10,1	4,8	18	10	4,4	3,9	10	5	2,2	1,9	4	9,9	5,0	1,7
30620TOPM	80	150	1,5	22	12	26,5	15,4	7,7	33,1	24,4	10,8	12	6	15,1	8,7	3,8	18,9	13,8	5,4	22	12	6,3	4,2	12	6	3,2	2,1	4	9,9	5,0	1,3
30508TOPM	100	140	1,5	22	12	25,4	16,5	8,4	33,1	26,0	12,3	12	6	14,1	9,3	4,2	18,9	14,2	6,2	22	12	6,3	5,0	12	6	3,2	2,5	4	9,9	5,0	1,4
30628TOPM	100	170	1,5	26	14	30,2	21,8	9,4	37,8	33,1	13,6	14	7	17,0	12,2	4,7	21,3	16,5	6,8	26	14	8,3	5,4	14	7	4,1	2,7	4	9,9	5,0	1,1
30511TOPM	120	160	1,5	26	14	30,2	23,1	10,1	37,8	33,1	15,0	14	7	17,0	12,8	5,1	21,3	16,5	7,5	26	14	8,3	6,2	14	7	4,1	3,1	4	9,9	5,0	1,2

1

JOIST HANGER

TYPE TOP



TOPLINE GREENLINE DCSTATIK ETA-08 0264

NKL 2 250 GD Z275

	Art. No.	Dimensions [mm]							nH	nN	nH	EAN	Weight	Pallet	PU			
		W(B)	x	H	x	D(T)	x	T(S)	Ø 5	Ø5	Ø 11	4019346	kg					
	30601TOP	40	x	110	x	70	x	1,5	14	8	2	122723	0.187	1200	50	■	■	■
■	30502TOP	60	x	100	x	70	x	1,5	15	8	2	122686	0.187	1200	50	■	■	■
	30609TOP	60	x	130	x	70	x	1,5	18	10	4	122808	0.231	1200	50	■	■	■
	30616TOP	60	x	160	x	70	x	1,5	22	12	4	122877	0.274	1200	50	■	■	■
	30624TOP	60	x	190	x	70	x	1,5	26	14	4	122952	0.317	1200	50	■	■	■
■	30505TOP	80	x	120	x	70	x	1,5	18	10	4	122693	0.231	1200	50	■	■	■
	30620TOP	80	x	150	x	70	x	1,5	22	12	4	122914	0.274	1200	50	■	■	■
	30627TOP	80	x	180	x	70	x	1,5	26	14	4	122983	0.317	1200	50	■	■	■
■	30508TOP	100	x	140	x	70	x	1,5	22	12	4	122709	0.274	1200	50	■	■	■
	30628TOP	100	x	170	x	70	x	1,5	26	14	4	122990	0.317	1200	50	■	■	■
■	30511TOP	120	x	160	x	70	x	1,5	26	14	4	122716	0.317	1200	50	■	■	■

■ Standard dimensions

Further dimensions available on request

STATICS

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TYPE TOP

Art. No.				Timber / Timber														Timber / OSB								Timber / Concrete			
				Full nail fitting								Partial nail fitting						Full screw fitting				Partial screw fitting							
						GH 4.0x40			GH 4.0x60					GH 4.0x40			GH 4.0x60				GH 5.0x25				GH 5.0x25				Ø11	1 pair of dowels		
	W	H	T	n_H	n_N	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	n_H	n_N	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	n_H	n_N	$F_{1,k}$ ↓	$F_{2,k}$ ↙	n_H	n_N	$F_{1,k}$ ↓	$F_{2,k}$ ↙	n_H	$F_{1,k}$ ↓	$F_{v,Ek}$ ↓	$F_{ax,Ek}$ ←
30601TOP	40	110	1,5	14	4	11,3	5,5	1,9	-	-	-	8	4	8,8	3,4	1,9	-	-	-	14	4	1,4	1,0	8	4	1,4	1,0	2	9,9	5,0	1,9
30502TOP	60	100	1,5	14	8	13,2	6,1	5,0	14,2	9,5	3,5	8	4	7,7	3,8	2,5	11,8	6,1	3,5	14	8	2,9	2,7	8	4	1,4	1,4	2	9,9	5,0	2,2
30609TOP	60	130	1,5	18	10	21,2	9,9	5,8	16,5	11,8	4,0	10	5	11,9	5,8	2,9	16,5	9,3	4,0	18	10	4,4	3,1	10	5	2,2	1,5	4	9,9	5,0	1,5
30616TOP	60	160	1,5	22	12	26,5	14,5	6,5	18,9	14,2	4,4	12	6	15,1	8,2	3,2	18,9	13,1	4,4	22	12	6,3	3,3	12	6	3,2	1,7	4	9,9	5,0	1,2
30624TOP	60	190	1,5	26	14	30,2	19,7	7,1	21,3	16,5	4,8	14	7	17,0	11,0	3,5	21,3	16,5	4,8	26	14	8,3	3,5	14	7	4,1	1,8	4	9,9	5,0	1,0
30505TOP	80	120	1,5	18	10	19,0	10,8	6,7	28,4	17,3	9,7	10	5	10,8	6,3	3,4	16,1	10,1	4,8	18	10	4,4	3,9	10	5	2,2	1,9	4	9,9	5,0	1,7
30620TOP	80	150	1,5	22	12	26,5	15,4	7,7	33,1	24,4	10,8	12	6	15,1	8,7	3,8	18,9	13,8	5,4	22	12	6,3	4,2	12	6	3,2	2,1	4	9,9	5,0	1,3
30627TOP	80	180	1,5	26	14	30,2	20,7	8,4	37,8	32,4	11,8	14	7	17,0	11,5	4,2	21,3	16,5	5,9	26	14	8,3	4,5	14	7	4,1	2,3	4	9,9	5,0	1,0
30508TOP	100	140	1,5	22	12	25,4	16,5	8,4	33,1	26,0	12,3	12	6	14,1	9,3	4,2	18,9	14,2	6,2	22	12	6,3	5,0	12	6	3,2	2,5	4	9,9	5,0	1,4
30628TOP	100	170	1,5	26	14	30,2	21,8	9,4	37,8	33,1	13,6	14	7	17,0	12,2	4,7	21,3	16,5	6,8	26	14	8,3	5,4	14	7	4,1	2,7	4	9,9	5,0	1,1
30511TOP	120	160	1,5	26	14	30,2	23,1	10,1	37,8	33,1	15,0	14	7	17,0	12,8	5,1	21,3	16,5	7,5	26	14	8,3	6,2	14	7	4,1	3,1	4	9,9	5,0	1,2

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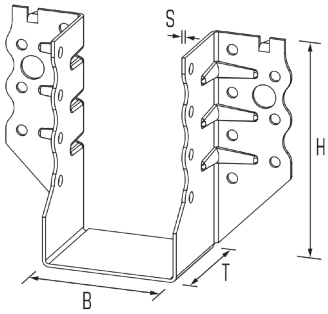
JOIST HANGER

TYPE TOP K 50



TOPLINE GREENLINE DCSTATIK ETA-08 0264

NKL 2 250 GD Z275

	Art. No.	Dimensions [mm]							nH	nN	nH	EAN	Weight	Pallet	PU			
		W(B)	x	H	x	D(T)	x	T(S)	Ø 5	Ø5	Ø 11	4019346	kg					
■	30502TOPK	60	x	100	x	50	x	1,5	14	8	2	503461	0.187	1200	50	■	■	■
	30613TOPK	76	x	122	x	50	x	1,5	18	10	4	501474	0.231	1200	50	■	■	■
■	30505TOPK	80	x	120	x	50	x	1,5	18	10	4	502105	0.231	1200	50	■	■	■
	30620TOPK	80	x	150	x	50	x	1,5	22	12	4	502112	0.274	1200	50	■	■	■
	30627TOPK	80	x	180	x	50	x	1,5	26	14	4	502129	0.317	1200	50	■	■	■
■	30508TOPK	100	x	140	x	50	x	1,5	22	12	4	502150	0.274	1200	50	■	■	■
	30628TOPK	100	x	170	x	50	x	1,5	26	14	4	502167	0.317	1200	50	■	■	■
■	30511TOPK	120	x	160	x	50	x	1,5	26	14	4	502181	0.317	1200	50	■	■	■

■ Standard dimensions

Further dimensions available on request

TYPE TOP K 50

Art. No.				Timber / Timber														Timber / OSB								Timber / Concrete			
				Full nail fitting								Partial nail fitting						Full screw fitting				Partial screw fitting							
				GH 4.0x40				GH 4.0x60				GH 4.0x40				GH 4.0x60		GH 5.0x25				GH 5.0x25				Ø11	1 pair of dowels		
	W	H	T	n_H	n_N	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	n_H	n_N	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	n_H	n_N	$F_{1,k}$ ↓	$F_{2,k}$ ↙	n_H	n_N	$F_{1,k}$ ↓	$F_{2,k}$ ↙	n_H	$F_{1,k}$ ↓	$F_{v,Ek}$ ↓	$F_{ax,Ek}$ ←
30502TOPK	60	100	1,5	14	8	13,2	6,1	5,0	14,2	9,5	3,5	8	4	7,7	3,8	2,5	11,8	6,1	3,5	14	8	2,9	2,7	8	4	1,4	1,4	2	9,9	5,0	2,2
30613TOPK	76	122	1,5	18	10	19,5	10,6	6,6	28,4	17,0	9,4	10	5	11,0	6,2	3,3	16,4	9,9	4,7	18	10	4,4	3,7	10	5	2,2	1,9	4	9,9	5,0	1,7
30505TOPK	80	120	1,5	18	10	19,0	10,8	6,7	28,4	17,3	9,7	10	5	10,8	6,3	3,4	16,1	10,1	4,8	18	10	4,4	3,9	10	5	2,2	1,9	4	9,9	5,0	1,7
30620TOPK	80	150	1,5	22	12	26,5	15,4	7,7	33,1	24,4	10,8	12	6	15,1	8,7	3,8	18,9	13,8	5,4	22	12	6,3	4,2	12	6	3,2	2,1	4	9,9	5,0	1,3
30627TOPK	80	180	1,5	26	14	30,2	20,7	8,4	37,8	32,4	11,8	14	7	17,0	11,5	4,2	21,3	16,5	5,9	26	14	8,3	4,5	14	7	4,1	2,3	4	9,9	5,0	1,0
30508TOPK	100	140	1,5	22	12	25,4	16,5	8,4	33,1	26,0	12,3	12	6	14,1	9,3	4,2	18,9	14,2	6,2	22	12	6,3	5,0	12	6	3,2	2,5	4	9,9	5,0	1,4
30628TOPK	100	170	1,5	26	14	30,2	21,8	9,4	37,8	33,1	13,6	14	7	17,0	12,2	4,7	21,3	16,5	6,8	26	14	8,3	5,4	14	7	4,1	2,7	4	9,9	5,0	1,1
30511TOPK	120	160	1,5	26	14	30,2	23,1	10,1	37,8	33,1	15,0	14	7	17,0	12,8	5,1	21,3	16,5	7,5	26	14	8,3	6,2	14	7	4,1	3,1	4	9,9	5,0	1,2

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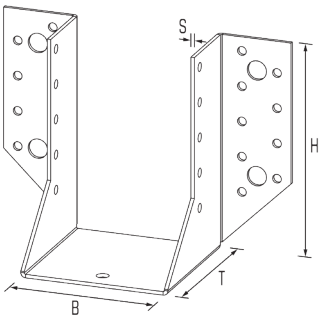
JOIST HANGER

TYPE 04 COMBI GREENLINE



GREENLINE DCSTATIK ETA-08 0264

NKL 2 250 GD Z275

Art. No.	Dimensions [mm]							nH	nN	nH	EAN	Weight	Pallet	PU			
	W(B)	x	H	x	D(T)	x	T(S)	Ø 5	Ø5	Ø 11	4019346	kg					
1011003215	32	x	114	x	80	x	1,5	14	8	4xØ9	105702	0.237	1200	50	■	■	■
3065515KOM	38	x	111	x	80	x	1,5	14	8	4xØ9	109236	0.237	1200	50	■	■	■
3060115KOM	40	x	110	x	80	x	1,5	14	8	4xØ9	109250	0.237	1200	50	■	■	■
3060515KOM	40	x	140	x	80	x	1,5	18	10	4	109267	0.291	1200	50	■	■	■
3065615KOM	40	x	170	x	80	x	1,5	22	12	4	109274	0.346	1200	50	■	■	■
3060215KOM	45	x	108	x	80	x	1,5	14	8	4xØ9	109298	0.238	1200	50	■	■	■
3060315KOM	51	x	105	x	80	x	1,5	14	8	4xØ9	109311	0.235	1200	50	■	■	■
3060815KOM	51	x	135	x	80	x	1,5	18	10	4	109328	0.291	1200	50	■	■	■
3063915KOM	60	x	80	x	80	x	1,5	10	6	2xØ9	109359	0.202	1200	50	■	■	■
■ 3050215KOM	60	x	100	x	80	x	1,5	14	8	4xØ9	109366	0.237	1200	50	■	■	■
3060915KOM	60	x	130	x	80	x	1,5	18	10	4	109373	0.291	1200	50	■	■	■
3061615KOM	60	x	160	x	80	x	1,5	22	12	4	109380	0.346	1200	50	■	■	■
3062415KOM	60	x	190	x	80	x	1,5	26	14	6	109397	0.399	600	25	■	■	■
3061015KOM	64	x	128	x	80	x	1,5	18	10	4	109410	0.291	1200	50	■	■	■
3061115KOM	70	x	125	x	80	x	1,5	18	10	4	109427	0.291	1200	50	■	■	■
3061715KOM	70	x	155	x	80	x	1,5	22	12	4	109434	0.346	1200	50	■	■	■
3061915KOM	76	x	152	x	80	x	1,5	22	12	4	109458	0.346	1200	50	■	■	■
3050415KOM	80	x	100	x	80	x	1,5	14	8	4	109472	0.254	1200	50	■	■	■
■ 3050515KOM	80	x	120	x	80	x	1,5	18	10	4	109489	0.291	1200	50	■	■	■
3050615KOM	80	x	140	x	80	x	1,5	20	10	4	109496	0.330	1200	50	■	■	■
3062015KOM	80	x	150	x	80	x	1,5	22	12	6	109502	0.346	1200	50	■	■	■
3062715KOM	80	x	180	x	80	x	1,5	26	14	6	109946	0.399	600	25	■	■	■
3063115KOM	80	x	210	x	80	x	1,5	30	16	6	109519	0.454	600	25	■	■	■
3062115KOM	90	x	145	x	80	x	1,5	22	12	4	109526	0.346	1200	50	■	■	■
3064415KOM	100	x	90	x	80	x	1,5	12	6	2	109533	0.257	1200	50	■	■	■
3050715KOM	100	x	120	x	80	x	1,5	18	10	2	109540	0.312	1200	50	■	■	■
■ 3050815KOM	100	x	140	x	80	x	1,5	22	12	4	109557	0.346	1200	50	■	■	■
3050915KOM	100	x	160	x	80	x	1,5	24	12	4	109564	0.383	600	25	■	■	■
3062815KOM	100	x	170	x	80	x	1,5	26	14	6	109571	0.399	600	25	■	■	■
3063215KOM	100	x	200	x	80	x	1,5	30	16	6	109588	0.457	600	25	■	■	■
1011004015	120	x	120	x	80	x	1,5	18	10	4	109618	0.328	600	25	■	■	■
3051015KOM	120	x	140	x	80	x	1,5	22	12	4	109625	0.365	600	25	■	■	■
■ 3051115KOM	120	x	160	x	80	x	1,5	26	14	4	109632	0.401	600	25	■	■	■
3051215KOM	120	x	180	x	80	x	1,5	28	14	4	109649	0.438	600	25	■	■	■
3063415KOM	120	x	190	x	80	x	1,5	30	16	6	109656	0.454	600	25	■	■	■
1011004115	140	x	139	x	80	x	1,5	22	12	4	109663	0.381	600	25	■	■	■
3051315KOM	140	x	160	x	80	x	1,5	26	14	6	109670	0.417	600	25	■	■	■
■ 3051415KOM	140	x	180	x	80	x	1,5	30	16	6	109687	0.454	600	25	■	■	■

■ Standard dimensions

Further dimensions available on request

TYPE 04 COMBI GREENLINE

Art. No.				Timber / Timber																Timber / OSB								Timber / Concrete			
				Full nail fitting									Partial nail fitting							Full screw fitting				Partial screw fitting							
				GH 4.0x40					GH 4.0x60				GH 4.0x40				GH 4.0x60			GH 5.0x25				GH 5.0x25				Ø11	1 pair of dowels		
	W	H	T	n_H	n_N	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	n_H	n_N	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	n_H	n_N	$F_{1,k}$ ↓	$F_{2,k}$ ↙	n_H	n_N	$F_{1,k}$ ↓	$F_{2,k}$ ↙	n_H	$F_{1,k}$ ↓	$F_{V,Ek}$ ↓	$F_{ax,Ek}$ ←
1011003215	32	114	1,5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,5	1,3	-	-	2,5	1,3	-	-	-	-
3065515KOM	38	111	1,5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3060115KOM	40	110	1,5	14	4	11,3	5,4	1,9	-	-	-	8	4	8,7	3,3	1,9	-	-	-	14	4	2,5	1,6	8	4	2,5	1,6	4x9	10,6	5,3	2,1
3060515KOM	40	140	1,5	18	5	13,1	8,3	2,2	-	-	-	10	5	12,1	4,9	2,2	-	-	-	18	5	3,7	1,8	10	5	3,7	1,8	4	13,1	4,0	2,1
3065615KOM	40	170	1,5	22	6	15,0	11,3	2,4	-	-	-	12	6	15,0	7,4	2,4	-	-	-	22	6	5,5	1,9	12	6	5,5	1,9	4	13,2	6,6	1,5
3060215KOM	45	108	1,5	14	8	11,3	5,6	2,1	-	-	-	8	4	8,5	3,4	2,1	-	-	-	14	8	5,1	3,4	8	4	3,2	1,8	4x9	10,6	3,5	2,1
3060315KOM	51	105	1,5	14	8	11,3	5,7	2,2	-	-	-	8	4	8,2	3,5	2,2	-	-	-	14	8	5,1	3,7	8	4	3,2	2,0	4x9	10,6	5,3	2,2
3060815KOM	51	135	1,5	18	10	13,1	8,7	2,5	-	-	-	10	6	11,6	5,1	2,5	-	-	-	18	10	7,4	4,2	10	6	5,1	2,5	4	13,1	6,6	2,1
3063915KOM	60	80	1,5	10	6	8,0	2,7	4,0	-	-	-	6	4	5,0	1,8	2,6	7,7	3,0	2,9	10	6	3,4	3,3	6	4	3,2	2,2	2	13,2	6,6	4,1
3050215KOM	60	100	1,5	14	8	13,0	6,1	4,9	14,2	9,5	3,5	8	4	7,6	3,7	2,6	11,6	6,1	3,5	14	8	5,1	4,1	8	4	3,2	2,2	4x9	10,6	5,3	2,3
3060915KOM	60	130	1,5	18	10	19,7	9,0	5,7	16,5	11,8	3,9	10	6	11,1	5,3	3,4	16,5	8,6	3,9	18	10	7,4	4,7	10	6	5,1	2,8	4	13,2	6,6	2,3
3061615KOM	60	160	1,5	22	12	26,3	13,9	6,4	18,9	14,2	4,4	12	6	15,0	7,9	3,4	18,9	12,6	4,4	22	12	11,1	5,3	12	6	5,3	2,8	4	13,2	6,6	1,7
3062415KOM	60	190	1,5	26	14	30,0	19,5	7,0	21,3	16,5	4,7	14	8	18,8	10,8	4,0	21,3	16,5	4,7	26	14	14,8	5,7	14	8	8,9	3,3	6	13,2	6,6	1,3
3061015KOM	64	128	1,5	18	10	19,2	9,2	5,9	16,5	11,8	4,1	10	6	10,9	5,4	3,6	16,2	8,7	4,1	18	10	7,4	4,9	10	6	5,1	2,9	4	13,2	6,6	2,3
3061115KOM	70	125	1,5	18	10	18,6	9,4	6,2	16,5	11,8	4,4	10	6	10,5	5,5	3,7	15,8	8,9	4,4	18	10	7,4	5,2	10	6	5,1	3,1	4	13,2	6,6	2,4
3061715KOM	70	155	1,5	22	12	26,3	14,3	7,1	18,9	14,2	4,9	12	6	15,0	8,2	3,8	18,9	13,0	4,9	22	12	11,1	5,8	12	6	5,3	3,1	4	13,2	6,6	1,7
3061915KOM	76	152	1,5	22	12	26,3	14,6	7,4	33,1	23,3	10,4	12	6	15,0	8,4	3,9	18,9	13,3	5,6	22	12	11,1	6,1	12	6	5,3	3,3	4	13,2	6,6	1,8
3050415KOM	80	100	1,5	14	8	12,4	5,7	5,6	19,1	9,41	8,2	8	4	7,3	3,5	2,9	11,1	5,7	4,4	14	8	4,8	4,7	8	4	3,0	2,5	2	13,2	6,6	3,1
3050515KOM	80	120	1,5	18	10	17,5	9,8	6,6	26,6	15,9	9,5	10	6	9,9	5,8	4,0	15,0	9,3	5,7	18	10	7,4	5,5	10	6	5,1	3,3	4	13,2	6,6	2,5
3050615KOM	80	140	1,5	20	10	22,5	11,7	6,7	28,4	18,8	9,6	10	6	12,3	5,0	4,0	17,8	8,2	5,7	20	10	7,6	5,6	10	6	5,2	3,3	4	13,2	6,6	2,0
3062015KOM	80	150	1,5	22	12	26,3	14,9	7,6	33,1	23,6	10,7	12	6	14,8	8,4	4,0	18,9	13,4	5,8	22	12	11,1	6,3	12	6	5,3	3,3	4	13,2	6,6	1,8
3062715KOM	80	180	1,5	26	14	30,0	20,5	8,4	37,8	32,1	11,7	14	8	18,8	11,4	4,8	23,6	17,7	6,7	26	14	14,8	6,9	14	8	8,9	4,0	6	13,2	6,6	1,4
3063115KOM	80	210	1,5	30	16	33,8	26,3	9,1	42,5	37,8	12,5	16	8	18,8	14,4	4,8	23,6	18,9	6,7	30	16	18,4	7,5	16	8	8,9	4,0	6	13,2	6,6	1,2
3062115KOM	90	145	1,5	22	12	25,7	15,4	8,0	33,1	24,4	11,6	12	6	14,2	8,7	4,2	18,9	13,8	6,2	22	12	11,1	6,7	12	6	5,3	3,5	4	13,2	6,6	1,9
3064415KOM	100	90	1,5	12	6	9,7	4,0	4,7	15,2	6,6	7,2	6	4	5,7	1,5	3,1	8,7	2,4	4,8	12	6	3,3	4,0	6	4	3,0	2,7	2	11,3	5,6	3,1
3050715KOM	100	120	1,5	18	10	17,9	10,1	7,3	27,1	16,3	10,8	10	6	10,1	5,9	4,4	15,3	9,5	6,5	18	10	7,6	6,1	10	6	5,2	3,7	2	13,2	6,6	2,4
3050815KOM	100	140	1,5	22	12	24,5	15,9	8,4	33,1	25,1	12,3	12	6	13,6	9,0	4,4	18,9	14,2	6,5	22	12	11,1	7,0	12	6	5,3	3,7	4	13,2	6,6	1,9
3050915KOM	100	160	1,5	24	12	26,3	18,3	8,4	33,1	28,4	12,3	12	6	15,0	8,1	4,4	18,9	12,9	6,5	24	12	11,3	7,1	12	6	5,4	3,7	4	13,2	6,6	1,6
3062815KOM	100	170	1,5	26	14	30,0	21,6	9,4	37,8	33,1	13,5	14	8	18,5	12,0	5,4	23,6	18,6	7,7	26	14	14,8	7,8	14	8	8,9	4,5	6	13,2	6,6	1,5
3063215KOM	100	200	1,5	30	16	33,8	27,4	10,2	42,5	37,8	14,6	16	8	18,8	15,0	5,4	23,6	18,9	7,7	30	16	18,4	8,5	16	8	8,9	4,5	6	13,2	6,6	1,2
1011004015	120	120	1,5	18	10	17,9	10,1	7,7	27,1	16,3	11,7	10	6	10,1	5,9	4,6	15,3	9,5	7,0	18	10	7,6	6,5	10	6	5,2	3,9	4	13,2	6,6	2,4
3051015KOM	120	140	1,5	22	12	25,0	16,3	9,0	33,1	25,7	13,4	12	6	15,0	8,6	4,6	18,9	13,7	7,0	22	12	11,3	7,6	12	6	5,4	3,9	4	13,2	6,6	1,9
3051115KOM	120	160	1,5	26	14	30,0	22,8	10,1	37,8	33,1	14,9	14	8	17,3	12,6	5,8	23,6	18,9	8,5	26	14	14,8	8,5	14	8	8,9	4,9	6	13,2	6,6	1,6
3051215KOM	120	180	1,5	28	14	30,0	25,0	10,1	37,8	33,1	14,9	14	8	18,8	11,4	5,8	23,6	17,7	8,5	28	14	14,8	8,5	14	8	8,9	4,9	4	13,2	6,6	1,4
3063415KOM	120	190	1,5	30	16	33,8	28,6	11,1	42,5	37,8	16,2	16	8	18,8	15,0	5,8	23,6	18,9	8,5	30	16	18,4	9,3	16	8	8,9	4,9	6	13,2	6,6	1,3
1011004115	140	139	1,5	22	12	25,0	16,3	9,4	33,1	25,7	14,3	12	6	13,8	9,3	4,8	18,9	14,2	7,4	22	12	11,3	8,0	12	6	5,4	4,1	4	13,2	6,6	1,9
3051315KOM	140	160	1,5	26	14	30,0	22,8	10,6	37,8	33,1	16,0	14	8	17,3	12,6	6,1	23,6	18,9	9,1	26	14	14,8	9,0	14	8	8,9	5,1	4	13,2	6,6	1,6
3051415KOM	140	180	1,5	30	16	33,8	29,9	11,8	42,5	37,8	17,5	16	8	18,8	15,0	6,1	23,6	18,9	9,1	30	16	18,4	10,0	16	8	8,9	5,1	6	13,2	6,6	1,4

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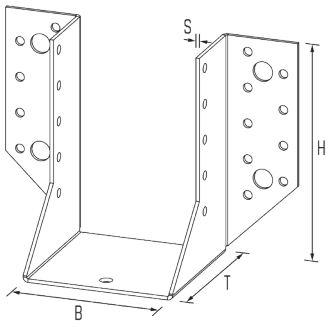
JOIST HANGER

TYPE 04 COMBI



DCSTATIK

ETA-08 0264

NKL 2

250 GD Z275

Art. No.	Dimensions [mm]							nH	nN	nH	EAN	Weight	Pallet	PU			
	W(B)	x	H	x	D(T)	x	T(S)	Ø 5	Ø5	Ø 11	4019346	kg					
10110032	32	x	114	x	80	x	2,0	14	8	4xØ9	100462	0.270	1200	50	■	■	■
10110314	32	x	144	x	80	x	2,0	18	10	4	101605	0.354	1200	50	■	■	■
10110033	32	x	174	x	80	x	2,0	22	12	4	100400	0.420	1200	50	■	■	■
30637KOM	36	x	142	x	80	x	2,0	18	10	4	101612	0.354	1200	50	■	■	■
30655KOM	38	x	111	x	80	x	2,0	14	8	4xØ9	100912	0.270	1200	50	■	■	■
30601KOM	40	x	110	x	80	x	2,0	14	8	4xØ9	100073	0.270	1200	50	■	■	■
30605KOM	40	x	140	x	80	x	2,0	18	10	4	100110	0.354	1200	50	■	■	■
30656KOM	40	x	170	x	80	x	2,0	22	12	4	100929	0.420	1200	50	■	■	■
30602KOM	45	x	108	x	80	x	2,0	14	8	4xØ9	100080	0.270	1200	50	■	■	■
30606KOM	45	x	138	x	80	x	2,0	18	10	4	100127	0.354	1200	50	■	■	■
30607KOM	48	x	136	x	80	x	2,0	18	10	4	100134	0.354	1200	50	■	■	■
30614KOM	48	x	166	x	80	x	2,0	22	12	4	101308	0.420	1200	50	■	■	■
30603KOM	51	x	105	x	80	x	2,0	14	8	4xØ9	100097	0.270	1200	50	■	■	■
30608KOM	51	x	135	x	80	x	2,0	18	10	4	100141	0.354	1200	50	■	■	■
30615KOM	51	x	165	x	80	x	2,0	22	12	4	100202	0.420	1200	50	■	■	■
30623KOM	51	x	195	x	80	x	2,0	26	14	6	100288	0.486	600	25	■	■	■
30639KOM	60	x	80	x	80	x	2,0	10	6	2xØ9	101681	0.228	1200	50	■	■	■
30502KOM	60	x	100	x	80	x	2,0	14	8	4xØ9	100011	0.270	1200	50	■	■	■
30609KOM	60	x	130	x	80	x	2,0	18	10	4	100158	0.354	1200	50	■	■	■
30616KOM	60	x	160	x	80	x	2,0	22	12	4	100219	0.420	1200	50	■	■	■
30624KOM	60	x	190	x	80	x	2,0	26	14	6	100295	0.486	600	25	■	■	■
30630KOM	60	x	220	x	80	x	2,0	30	16	6	100356	0.553	600	25	■	■	■
30604KOM	64	x	98	x	80	x	2,0	14	8	4xØ9	100196	0.269	1200	50	■	■	■
30610KOM	64	x	128	x	80	x	2,0	18	10	4	100165	0.354	1200	50	■	■	■
30611KOM	70	x	125	x	80	x	2,0	18	10	4	100028	0.354	1200	50	■	■	■
30617KOM	70	x	155	x	80	x	2,0	22	12	4	100226	0.420	1200	50	■	■	■
30612KOM	73	x	124	x	80	x	2,0	18	10	4	100172	0.354	1200	50	■	■	■
30618KOM	73	x	154	x	80	x	2,0	22	12	4	100233	0.420	1200	50	■	■	■
30625KOM	73	x	184	x	80	x	2,0	26	14	6	100301	0.486	600	25	■	■	■
30613KOM	76	x	122	x	80	x	2,0	18	10	4	100189	0.354	1200	50	■	■	■
30619KOM	76	x	152	x	80	x	2,0	22	12	4	100240	0.420	1200	50	■	■	■
30626KOM	76	x	182	x	80	x	2,0	26	14	6	100318	0.486	600	25	■	■	■
30504KOM	80	x	100	x	80	x	2,0	14	8	4	103012	0.309	1200	50	■	■	■
30505KOM	80	x	120	x	80	x	2,0	18	10	4	100035	0.354	1200	50	■	■	■
30506KOM	80	x	140	x	80	x	2,0	20	10	2	103029	0.398	1200	50	■	■	■
30620KOM	80	x	150	x	80	x	2,0	22	12	4	100257	0.420	1200	50	■	■	■
30627KOM	80	x	180	x	80	x	2,0	26	14	6	100325	0.486	600	25	■	■	■
30631KOM	80	x	210	x	80	x	2,0	30	16	6	100363	0.553	600	25	■	■	■
30621KOM	90	x	145	x	80	x	2,0	22	12	4	100264	0.420	1200	50	■	■	■

■ Standard dimensions

Further dimensions available on request

Joist hangers in stainless steel V4A on page 292

TYPE 04 COMBI

Art. No.				Timber / Timber																Timber / OSB								Timber / Concrete			
				Full nail fitting									Partial nail fitting							Full screw fitting				Partial screw fitting							
				GH 4.0x40					GH 4.0x60				GH 4.0x40				GH 4.0x60			GH 5.0x25				GH 5.0x25				Ø11	1 pair of dowels		
	W	H	T	n_H	n_N	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	n_H	n_N	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	n_H	n_N	$F_{1,k}$ ↓	$F_{2,k}$ ↙	n_H	n_N	$F_{1,k}$ ↓	$F_{2,k}$ ↙	n_H	$F_{1,k}$ ↓	$F_{V,Ek}$ ↓	$F_{ax,Ek}$ ←
10110032	32	114	2,0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,5	1,3	-	-	2,5	1,3	-	-	-	-
10110314	32	144	2,0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3,7	1,5	-	-	3,7	1,5	-	-	-	-
10110033	32	174	2,0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30637KOM	36	142	2,0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30655KOM	38	111	2,0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30601KOM	40	110	2,0	14	4	11,3	5,4	1,9	-	-	-	8	4	8,7	3,3	1,9	-	-	-	14	4	2,5	1,6	8	4	2,5	1,6	4x9	10,6	5,3	2,1
30605KOM	40	140	2,0	18	5	13,1	8,3	2,2	-	-	-	10	5	12,1	4,9	2,2	-	-	-	18	5	3,7	1,8	10	5	3,7	1,8	4	13,1	4,0	2,1
30656KOM	40	170	2,0	22	6	15	11,3	2,4	-	-	-	12	6	15,0	7,4	2,4	-	-	-	22	6	5,5	1,9	12	6	5,5	1,9	4	13,2	6,6	1,5
30602KOM	45	108	2,0	14	8	11,3	5,6	2,1	-	-	-	8	4	8,5	3,4	2,1	-	-	-	14	8	5,1	3,4	8	4	3,2	1,8	4x9	10,6	3,5	2,1
30606KOM	45	138	2,0	18	10	13,1	8,5	2,3	-	-	-	10	6	11,9	5,0	2,3	-	-	-	18	10	7,4	3,8	10	6	5,1	2,3	4	13,1	6,6	2,1
30607KOM	48	136	2,0	18	10	13,1	8,6	2,5	-	-	-	10	6	11,7	5,0	2,5	-	-	-	18	10	7,4	4,0	10	6	5,1	2,4	4	13,1	6,6	2,1
30614KOM	48	166	2,0	22	12	15	11,3	2,7	-	-	-	12	6	15,0	7,6	2,7	-	-	-	22	12	11,1	4,5	12	6	5,3	2,4	4	13,2	6,6	1,6
30603KOM	51	105	2,0	14	8	11,3	5,7	2,2	-	-	-	8	4	8,2	3,5	2,2	-	-	-	14	8	5,1	3,7	8	4	3,2	2,0	4x9	10,6	5,3	2,2
30608KOM	51	135	2,0	18	10	13,1	8,7	2,5	-	-	-	10	6	11,6	5,1	2,5	-	-	-	18	10	7,4	4,2	10	6	5,1	2,5	4	13,1	6,6	2,1
30615KOM	51	165	2,0	22	12	15,0	11,3	2,8	-	-	-	12	6	15,0	7,7	2,8	-	-	-	22	12	11,1	4,6	12	6	5,3	2,5	4	13,2	6,6	1,6
30623KOM	51	195	2,0	26	14	16,9	13,1	3,1	-	-	-	14	8	16,9	10,6	3,1	-	-	-	26	14	14,8	5,0	14	8	8,9	2,8	6	13,2	6,6	1,3
30639KOM	60	80	2,0	10	6	8,0	2,7	4,0	-	-	-	6	4	5,0	1,8	2,6	7,7	3,0	2,9	10	6	3,4	3,3	6	4	3,2	2,2	2	13,2	6,6	4,1
30502KOM	60	100	2,0	14	8	13,0	6,1	4,9	14,2	9,5	3,5	8	4	7,6	3,7	2,6	11,6	6,1	3,5	14	8	5,1	4,1	8	4	3,2	2,2	4x9	10,6	5,3	2,3
30609KOM	60	130	2,0	18	10	19,7	9,0	5,7	16,5	11,8	3,9	10	6	11,1	5,3	3,4	16,5	8,6	3,9	18	10	7,4	4,7	10	6	5,1	2,8	4	13,2	6,6	2,3
30616KOM	60	160	2,0	22	12	26,3	13,9	6,4	18,9	14,2	4,4	12	6	15,0	7,9	3,4	18,9	12,6	4,4	22	12	11,1	5,3	12	6	5,3	2,8	4	13,2	6,6	1,7
30624KOM	60	190	2,0	26	14	30,0	19,5	7,0	21,3	16,5	4,7	14	8	18,8	10,8	4,0	21,3	16,5	4,7	26	14	14,8	5,7	14	8	8,9	3,3	6	13,2	6,6	1,3
30630KOM	60	220	2,0	30	16	33,8	25,3	7,5	23,6	18,9	5,0	16	8	18,8	13,8	4,0	23,6	18,9	5,0	30	16	18,4	6,1	16	8	8,9	3,3	6	13,2	6,6	1,1
30604KOM	64	98	2,0	14	8	12,6	6,2	5,1	14,2	9,5	3,6	8	4	7,4	3,8	2,7	11,3	6,2	3,6	14	8	5,1	4,3	8	4	3,2	2,3	4x9	10,6	5,3	2,4
30610KOM	64	128	2,0	18	10	19,2	9,2	5,9	16,5	11,8	4,1	10	6	10,9	5,4	3,6	16,2	8,7	4,1	18	10	7,4	4,9	10	6	5,1	2,9	4	13,2	6,6	2,3
30611KOM	70	125	2,0	18	10	18,6	9,4	6,2	16,5	11,8	4,4	10	6	10,5	5,5	3,7	15,8	8,9	4,4	18	10	7,4	5,2	10	6	5,1	3,1	4	13,2	6,6	2,4
30617KOM	70	155	2,0	22	12	26,3	14,3	7,1	18,9	14,2	4,9	12	6	15,0	8,2	3,8	18,9	13,0	4,9	22	12	11,1	5,8	12	6	5,3	3,1	4	13,2	6,6	1,7
30612KOM	73	124	2,0	18	10	18,4	9,5	6,3	16,5	11,8	4,5	10	6	10,4	5,6	3,8	15,6	9,0	4,5	18	10	7,4	5,2	10	6	5,1	3,1	4	13,2	6,6	2,4
30618KOM	73	154	2,0	22	12	26,3	14,5	7,2	18,9	14,2	5,0	12	6	15,0	8,2	3,8	18,9	13,1	5,0	22	12	11,1	5,9	12	6	5,3	3,2	4	13,2	6,6	1,7
30625KOM	73	184	2,0	26	14	30,0	20,1	7,9	21,3	16,5	5,4	14	8	18,8	11,2	4,5	21,3	16,5	5,4	26	14	14,8	6,5	14	8	8,9	3,7	6	13,2	6,6	1,4
30613KOM	76	122	2,0	18	10	18,0	9,7	6,5	27,2	15,6	9,2	10	6	10,2	5,7	3,9	15,4	9,1	5,5	18	10	7,4	5,4	10	6	5,1	3,2	4	13,2	6,6	2,5
30619KOM	76	152	2,0	22	12	26,3	14,6	7,4	33,1	23,3	10,4	12	6	15,0	8,4	3,9	18,9	13,3	5,6	22	12	11,1	6,1	12	6	5,3	3,3	4	13,2	6,6	1,8
30626KOM	76	182	2,0	26	14	30,0	20,3	8,1	37,8	31,8	11,3	14	8	18,8	11,3	4,7	23,6	17,6	6,5	26	14	14,8	6,7	14	8	8,9	3,8	6	13,2	6,6	1,4
30504KOM	80	100	2,0	14	8	12,4	5,7	5,6	19,1	9,4	8,2	8	4	7,3	3,5	2,9	11,1	5,7	4,4	14	8	4,8	4,7	8	4	3,0	2,5	2	13,2	6,6	3,1
30505KOM	80	120	2,0	18	10	17,5	9,8	6,6	26,6	15,9	9,5	10	6	9,9	5,8	4,0	15,0	9,3	5,7	18	10	7,4	5,5	10	6	5,1	3,3	4	13,2	6,6	2,5
30506KOM	80	140	2,0	20	10	22,5	11,7	6,7	28,4	18,8	9,6	10	6	12,3	5,0	4,0	17,8	8,2	5,7	20	10	7,6	5,6	10	6	5,2	3,3	4	13,2	6,6	2,0
30620KOM	80	150	2,0	22	12	26,3	14,9	7,6	33,1	23,6	10,7	12	6	14,8	8,4	4,0	18,9	13,4	5,8	22	12	11,1	6,3	12	6	5,3	3,3	4	13,2	6,6	1,8
30627KOM	80	180	2,0	26	14	30,0	20,5	8,4	37,8	32,1	11,7	14	8	18,8	11,4	4,8	23,6	17,7	6,7	26	14	14,8	6,9	14	8	8,9	4,0	6	13,2	6,6	1,4
30631KOM	80	210	2,0	30	16	33,8	26,3	9,1	42,5	37,8	12,5	16	8	18,8	14,4	4,8	23,6	18,9	6,7	30	16	18,4	7,5	16	8	8,9	4,0	6	13,2	6,6	1,2
30621KOM	90	145	2,0	22	12	25,7	15,4	8,0	33,1	24,4	11,6	12	6	14,2	8,7	4,2	18,9	13,8	6,2	22	12	11,1	6,7	12	6	5,3	3,5	4	13,2	6,6	1,9

DCSTATIK

ETA-08 0264

1

JOIST HANGER

TYPE 04 COMBI

NKL 2

250 GD Z275

Art. No.	Dimensions [mm]							nH	nN	nH	EAN	Weight	Pallet	PU			
	W(B)	x	H	x	D(T)	x	T(S)	Ø 5	Ø5	Ø 11	4019346	kg					
30622KOM	98	x	141	x	80	x	2,0	22	12	4	100271	0.420	1200	50	■	■	■
30644KOM	100	x	90	x	80	x	2,0	12	6	2	101766	0.332	1200	50	■	■	■
30507KOM	100	x	120	x	80	x	2,0	18	10	2	103036	0.376	1200	50	■	■	■
30508KOM	100	x	140	x	80	x	2,0	22	12	4	100042	0.420	1200	50	■	■	■
30509KOM	100	x	160	x	80	x	2,0	24	12	4	103043	0.464	600	25	■	■	■
30628KOM	100	x	170	x	80	x	2,0	26	14	6	100332	0.486	600	25	■	■	■
30632KOM	100	x	200	x	80	x	2,0	30	16	6	100370	0.553	600	25	■	■	■
30629KOM	115	x	163	x	80	x	2,0	26	14	6	100905	0.486	600	25	■	■	■
30633KOM	115	x	192	x	80	x	2,0	30	16	6	100387	0.635	600	25	■	■	■
10110040	120	x	120	x	80	x	2,0	18	10	4	100776	0.398	600	25	■	■	■
30510KOM	120	x	140	x	80	x	2,0	22	12	4	103050	0.442	600	25	■	■	■
30511KOM	120	x	160	x	80	x	2,0	26	14	4	100059	0.486	600	25	■	■	■
30512KOM	120	x	180	x	80	x	2,0	28	14	4	103067	0.531	600	25	■	■	■
30634KOM	120	x	190	x	80	x	2,0	30	16	6	100394	0.553	600	25	■	■	■
30635KOM	127	x	187	x	80	x	2,0	30	16	6	100820	0.553	600	25	■	■	■
10110041	140	x	139	x	80	x	2,0	22	12	4	100783	0.464	600	25	■	■	■
30513KOM	140	x	160	x	80	x	2,0	26	14	6	103074	0.508	600	25	■	■	■
30514KOM	140	x	180	x	80	x	2,0	30	16	6	100066	0.553	600	25	■	■	■

■ Standard dimensions

Further dimensions available on request

Joist hangers in stainless steel V4A on page 292

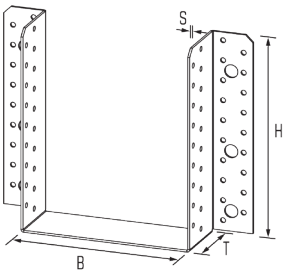
TYPE 04 COMBI

Art. No.				Timber / Timber														Timber / OSB								Timber / Concrete			
				Full nail fitting								Partial nail fitting						Full screw fitting				Partial screw fitting							
						GH 4.0x40			GH 4.0x60					GH 4.0x40			GH 4.0x60				GH 5.0x25				GH 5.0x25				Ø11 1 pair of dowels			
	W	H	T	n_H	n_N	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	n_H	n_N	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	n_H	n_N	$F_{1,k}$ ↓	$F_{2,k}$ ↙	n_H	n_N	$F_{1,k}$ ↓	$F_{2,k}$ ↙	n_H	$F_{1,k}$ ↓	$F_{v,Ek}$ ↓	$F_{ax,Ek}$ ←
30622KOM	98	141	2,0	22	12	24,7	15,8	8,3	33,1	25,0	12,1	12	6	13,7	8,9	4,3	18,9	14,1	6,4	22	12	11,1	7,0	12	6	5,3	3,7	4	13,2	6,6	1,9
30644KOM	100	90	2,0	12	6	9,7	4,0	4,7	15,2	6,6	7,2	6	4	5,7	1,5	3,1	8,7	2,4	4,8	12	6	3,3	4,0	6	4	3,0	2,7	2	11,3	5,6	3,1
30507KOM	100	120	2,0	18	10	17,9	10,1	7,3	27,1	16,3	10,8	10	6	10,1	5,9	4,4	15,3	9,5	6,5	18	10	7,6	6,1	10	6	5,2	3,7	2	13,2	6,6	2,4
30508KOM	100	140	2,0	22	12	24,5	15,9	8,4	33,1	25,1	12,3	12	6	13,6	9,0	4,4	18,9	14,2	6,5	22	12	11,1	7,0	12	6	5,3	3,7	4	13,2	6,6	1,9
30509KOM	100	160	2,0	24	12	26,3	18,3	8,4	33,1	28,4	12,3	12	6	15,0	8,1	4,4	18,9	12,9	6,5	24	12	11,3	7,1	12	6	5,4	3,7	4	13,2	6,6	1,6
30628KOM	100	170	2,0	26	14	30,0	21,6	9,4	37,8	33,1	13,5	14	8	18,5	12,0	5,4	23,6	18,6	7,7	26	14	14,8	7,8	14	8	8,9	4,5	6	13,2	6,6	1,5
30632KOM	100	200	2,0	30	16	33,8	27,4	10,2	42,5	37,8	14,6	16	8	18,8	15,0	5,4	23,6	18,9	7,7	30	16	18,4	8,5	16	8	8,9	4,5	6	13,2	6,6	1,2
30629KOM	115	163	2,0	26	14	30,0	22,5	10,0	37,8	33,1	14,7	14	8	17,6	12,5	5,7	23,6	18,9	8,4	26	14	14,8	8,3	14	8	8,9	4,8	6	13,2	6,6	1,6
30633KOM	115	192	2,0	30	16	33,8	28,4	11,0	42,5	37,8	15,9	16	8	18,8	15,0	5,7	23,6	18,9	8,4	30	16	18,4	9,1	16	8	8,9	4,8	6	13,2	6,6	1,3
10110040	120	120	2,0	18	10	17,9	10,1	7,7	27,1	16,3	11,7	10	6	10,1	5,9	4,6	15,3	9,5	7,0	18	10	7,6	6,5	10	6	5,2	3,9	4	13,2	6,6	2,4
30510KOM	120	140	2,0	22	12	25,0	16,3	9,0	33,1	25,7	13,4	12	6	15,0	8,6	4,6	18,9	13,7	7,0	22	12	11,3	7,6	12	6	5,4	3,9	4	13,2	6,6	1,9
30511KOM	120	160	2,0	26	14	30,0	22,8	10,1	37,8	33,1	14,9	14	8	17,3	12,6	5,8	23,6	18,9	8,5	26	14	14,8	8,5	14	8	8,9	4,9	6	13,2	6,6	1,6
30512KOM	120	180	2,0	28	14	30,0	25,0	10,1	37,8	33,1	14,9	14	8	18,8	11,4	5,8	23,6	17,7	8,5	28	14	14,8	8,5	14	8	8,9	4,9	4	13,2	6,6	1,4
30634KOM	120	190	2,0	30	16	33,8	28,6	11,1	42,5	37,8	16,2	16	8	18,8	15,0	5,8	23,6	18,9	8,5	30	16	18,4	9,3	16	8	8,9	4,9	6	13,2	6,6	1,3
30635KOM	127	187	2,0	30	16	33,8	28,9	11,3	42,5	37,8	16,6	16	8	18,8	15,0	5,9	23,6	18,9	8,7	30	16	18,4	9,5	16	8	8,9	5,0	6	13,2	6,6	1,3
10110041	140	139	2,0	22	12	25,0	16,3	9,4	33,1	25,7	14,3	12	6	13,8	9,3	4,8	18,9	14,2	7,4	22	12	11,3	8,0	12	6	5,4	4,1	4	13,2	6,6	1,9
30513KOM	140	160	2,0	26	14	30,0	22,8	10,6	37,8	33,1	16,0	14	8	17,3	12,6	6,1	23,6	18,9	9,1	26	14	14,8	9,0	14	8	8,9	5,1	4	13,2	6,6	1,6
30514KOM	140	180	2,0	30	16	33,8	29,9	11,8	42,5	37,8	17,5	16	8	18,8	15,0	6,1	23,6	18,9	9,1	30	16	18,4	10,0	16	8	8,9	5,1	6	13,2	6,6	1,4

1

JOIST HANGER

TYPE 05 COMBI EXTRA THICK



KONSTRULINE DCSTATIK ETA-08 0264

NKL 2 250 GD Z275

Art. No.	Dimensions [mm]							nH	nN	nH	EAN	Weight	Pallet	PU			
	W(B)	x	H	x	D(T)	x	T(S)	Ø 5	Ø5	Ø 13	4019346	kg					
40501KOM	100	x	240	x	61	x	2,5	46	30	6	100486	0.995	480	20	■		■
40502KOM	100	x	280	x	61	x	2,5	54	34	6	100493	1.133	480	20	■		■
40503KOM	100	x	300	x	61	x	2,5	58	36	6	100509	1.201	480	20	■		■
40504KOM	100	x	320	x	61	x	2,5	62	38	6	017500	1.270	480	20	■		■
40505KOM	120	x	240	x	61	x	2,5	46	30	6	100547	1.030	480	20	■		■
40506KOM	120	x	280	x	61	x	2,5	54	34	6	017517	1.167	480	20	■		■
40507KOM	120	x	300	x	61	x	2,5	58	36	6	017524	1.236	480	20	■		■
40508KOM	120	x	320	x	61	x	2,5	62	38	6	017531	1.304	480	20	■		■
40513KOM	140	x	200	x	61	x	2,5	38	22	6	018101	0.927	480	20	■		■
40509KOM	140	x	240	x	61	x	2,5	46	30	6	017548	1.064	480	20	■		■
40549KOM	140	x	260	x	61	x	2,5	50	32	6	018118	1.133	480	20	■		■
40510KOM	140	x	280	x	61	x	2,5	54	34	6	017555	1.201	480	20	■		■
40511KOM	140	x	300	x	61	x	2,5	58	36	6	017562	1.162	480	20	■		■
40512KOM	140	x	320	x	61	x	2,5	62	38	6	017579	1.338	360	15	■		■
40516KOM	160	x	160	x	61	x	2,5	30	18	4	100790	0.824	360	15	■		■
40517KOM	160	x	200	x	61	x	2,5	38	22	6	017586	0.961	360	15	■		■
40518KOM	160	x	240	x	61	x	2,5	46	30	6	017593	1.098	360	15	■		■
40561KOM	160	x	260	x	61	x	2,5	50	32	6	018125	1.168	360	15	■		■
40519KOM	160	x	280	x	61	x	2,5	54	34	6	017609	1.236	360	15	■		■
40532KOM	160	x	300	x	61	x	2,5	58	36	6	018132	1.305	360	15	■		■
40520KOM	160	x	320	x	61	x	2,5	62	38	6	017616	1.373	360	15	■		■
40542KOM	180	x	180	x	61	x	2,5	34	20	4	018149	0.927	240	10	■		■
40521KOM	180	x	200	x	61	x	2,5	38	22	6	017623	0.995	240	10	■		■
40522KOM	180	x	220	x	61	x	2,5	42	26	6	017630	1.064	240	10	■		■
40523KOM	180	x	240	x	61	x	2,5	46	30	6	017647	1.133	240	10	■		■
40524KOM	180	x	280	x	61	x	2,5	54	34	6	017654	1.270	240	10	■		■
40555KOM	180	x	320	x	61	x	2,5	62	38	6	018156	1.408	240	10	■		■
40527KOM	200	x	200	x	61	x	2,5	38	22	6	100806	1.030	240	10	■		■
40525KOM	200	x	240	x	61	x	2,5	46	30	6	017661	1.167	240	10	■		■
40526KOM	200	x	280	x	61	x	2,5	54	34	6	018163	1.305	240	10	■		■
40529KOM	220	x	260	x	61	x	2,5	50	32	6	017869	1.202	240	10	■		■
40533KOM	240	x	280	x	61	x	2,5	54	34	6	017876	1.441	240	10	■		■

Standard dimensions

Further dimensions available on request

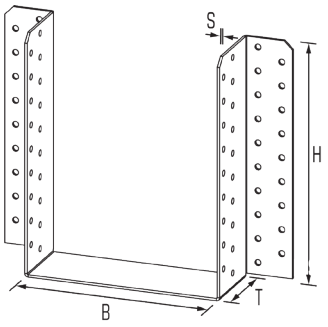
TYPE 05 COMBI EXTRA THICK

Art. No.				Timber / Timber																				Timber / Concrete			
				Full nail fitting										Partial nail fitting													
				GH 4.0x40						GH 4.0x60				Ø13				1 pair of dowels				Ø13	1 Dübelpaar		
	W	H	T	n_H	n_N	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	$F_{3,k}$ ←	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	$F_{3,k}$ ←	n_H	n_N	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	$F_{3,k}$ ←	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	$F_{3,k}$ ←	n_H	$F_{1,k}$ ↓	$F_{V,Ek}$ ↓	$F_{ax,Ek}$ ←
40501KOM	100	240	2,5	46	30	56,1	55,2	14,7	-	75,6	70,9	19,9	-	24	16	27,6	27,2	7,9	-	40,7	37,8	10,7	-	6	19,8	9,9	2,4
40502KOM	100	280	2,5	54	34	67,1	63,4	15,1	-	85,1	80,4	20,3	-	28	18	35,3	33,6	8,1	-	47,3	42,5	10,8	-	6	19,8	9,9	2,0
40503KOM	100	300	2,5	58	36	70,9	67,1	15,3	-	89,8	85,1	20,4	-	30	18	37,3	33,6	8,1	-	47,3	42,5	10,8	-	6	19,8	9,9	1,8
40504KOM	100	320	2,5	62	38	74,6	70,9	15,5	-	94,6	89,8	20,6	-	32	20	41,0	37,3	8,2	-	52,0	47,3	10,9	-	6	19,8	9,9	1,7
40505KOM	120	240	2,5	46	30	56,1	55,2	16,6	-	75,6	70,9	22,9	-	24	16	27,6	27,2	8,9	-	40,7	37,8	12,3	-	6	19,8	9,9	2,4
40506KOM	120	280	2,5	54	34	67,1	63,4	17,3	-	85,1	80,4	23,5	-	28	18	35,3	33,6	9,2	-	47,3	42,5	12,6	-	6	19,8	9,9	2,0
40507KOM	120	300	2,5	58	36	70,9	67,1	17,5	-	89,8	85,1	23,8	-	30	18	37,3	33,6	9,2	-	47,3	42,5	12,6	-	6	19,8	9,9	1,8
40508KOM	120	320	2,5	62	38	74,6	70,9	17,8	-	94,6	89,8	24,0	-	32	20	41,0	37,3	9,4	-	52,0	47,3	12,7	-	6	19,8	9,9	1,7
40513KOM	140	200	2,5	38	22	40,1	39,2	14,4	-	56,7	52,0	20,8	-	20	12	20,3	19,9	7,9	-	30,7	28,4	11,4	-	6	19,8	9,9	2,9
40509KOM	140	240	2,5	46	30	56,1	55,2	18,1	-	75,6	70,9	25,6	-	24	16	27,6	27,2	9,7	-	40,7	37,8	13,7	-	6	19,8	9,9	2,4
40549KOM	140	260	2,5	50	32	63,4	59,7	18,6	-	80,4	75,6	26,0	-	26	16	31,4	29,8	9,7	-	42,5	37,8	13,7	-	6	19,8	9,9	2,1
40510KOM	140	280	2,5	54	34	67,1	63,4	19,1	-	85,1	80,4	26,4	-	28	18	35,3	33,6	10,2	-	47,3	42,5	14,1	-	6	19,8	9,9	2,0
40511KOM	140	300	2,5	58	36	70,9	67,1	19,5	-	89,8	85,1	26,8	-	30	18	37,3	33,6	10,2	-	47,3	42,5	14,1	-	6	19,8	9,9	1,8
40512KOM	140	320	2,5	62	38	74,6	70,9	19,8	-	94,6	89,8	27,1	-	32	20	41,0	37,3	10,5	-	52,0	47,3	14,4	-	6	19,8	9,9	1,7
40516KOM	160	160	2,5	30	18	27,0	26,1	13,3	-	41,6	40,4	19,9	-	16	10	13,7	13,2	7,4	-	21,2	20,6	11,1	-	4	19,8	9,9	3,9
40517KOM	160	200	2,5	38	22	40,1	39,2	15,3	-	56,7	52,0	22,4	-	20	12	20,3	19,9	8,4	-	30,7	28,4	12,3	-	6	19,8	9,9	2,9
40518KOM	160	240	2,5	46	30	56,1	55,2	19,4	-	75,6	70,9	27,9	-	24	16	27,6	27,2	10,4	-	40,7	37,8	15,0	-	6	19,8	9,9	2,4
40561KOM	160	260	2,5	50	32	63,4	59,7	20,0	-	80,4	75,6	28,5	-	26	16	31,4	29,8	10,4	-	42,5	37,8	15,0	-	6	19,8	9,9	2,1
40519KOM	160	280	2,5	54	34	67,1	63,4	20,6	-	85,1	80,4	29,0	-	28	18	35,3	33,6	11,0	-	47,3	42,5	15,5	-	6	19,8	9,9	2,0
40532KOM	160	300	2,5	58	36	70,9	67,1	21,1	-	89,8	85,1	29,5	-	30	18	37,3	33,6	11,0	-	47,3	42,5	15,5	-	6	19,8	9,9	1,8
40520KOM	160	320	2,5	62	38	74,6	70,9	21,6	-	94,6	89,8	30,0	-	32	20	41,0	37,3	11,4	-	52,0	47,3	15,9	-	6	19,8	9,9	1,7
40542KOM	180	180	2,5	34	20	33,3	32,5	14,9	-	50,7	47,3	22,4	-	18	10	16,9	16,5	7,7	-	25,9	23,6	11,7	-	4	19,8	9,9	3,3
40521KOM	180	200	2,5	38	22	40,1	39,2	16,0	-	56,7	52,0	23,8	-	20	12	20,3	19,9	8,7	-	30,7	28,4	13,0	-	6	19,8	9,9	2,9
40522KOM	180	220	2,5	42	26	48,0	47,1	18,3	-	66,2	61,5	27,0	-	22	14	23,9	23,5	10,2	-	35,7	33,1	15,2	-	6	19,8	9,9	2,6
40523KOM	180	240	2,5	46	30	56,1	55,2	20,5	-	75,6	70,9	29,9	-	24	16	27,6	27,2	11,0	-	40,7	37,8	16,0	-	6	19,8	9,9	2,4
40524KOM	180	280	2,5	54	34	67,1	63,4	21,9	-	85,1	80,4	31,3	-	28	18	35,3	33,6	11,7	-	47,3	42,5	16,7	-	6	19,8	9,9	2,0
40555KOM	180	320	2,5	62	38	74,6	70,9	23,1	-	94,6	89,8	32,6	-	32	20	41,0	37,3	12,2	-	52,0	47,3	17,3	-	6	19,8	9,9	1,7
40527KOM	200	200	2,5	38	22	40,1	39,2	16,5	-	56,7	52,0	25,0	-	20	12	20,3	19,9	9,0	-	30,7	28,4	13,7	-	6	19,8	9,9	2,9
40525KOM	200	240	2,5	46	30	56,1	55,2	21,4	-	75,6	70,9	31,6	-	24	16	27,6	27,2	11,5	-	40,7	37,8	16,9	-	6	19,8	9,9	2,4
40526KOM	200	280	2,5	54	34	67,1	63,4	23,0	-	85,1	80,4	33,4	-	28	18	35,3	33,6	12,2	-	47,3	42,5	17,8	-	6	19,8	9,9	2,0
40529KOM	220	260	2,5	50	32	63,4	59,7	23,0	-	80,4	75,6	34,2	-	26	16	31,4	29,8	11,8	-	42,5	37,8	17,7	-	6	19,8	9,9	2,1
40533KOM	240	280	2,5	54	34	67,1	63,4	24,7	-	85,1	80,4	36,7	-	28	18	35,3	33,6	13,1	-	47,3	42,5	19,6	-	6	19,8	9,9	2,0

1

JOIST HANGER

TYPE 05 GREENLINE



GREENLINE DCSTATIK ETA-08 0264

NKL 2 250 GD Z275

Art. No.	Dimensions [mm]							nH	nN	EAN	Weight	Pallet	PU			
	W(B)	x	H	x	D(T)	x	T(S)	Ø 5	Ø5	4019346	kg					
405012	100	x	240	x	61	x	2,0	46	30	501900	0.860	480	20	■		
405022	100	x	280	x	61	x	2,0	54	34	501917	0.970	480	20	■		
405032	100	x	300	x	61	x	2,0	58	36	501924	1.030	480	20	■		
405042	100	x	320	x	61	x	2,0	62	38	501931	1.090	480	20	■		
405052	120	x	240	x	61	x	2,0	46	30	501948	0.890	480	20	■		
405062	120	x	280	x	61	x	2,0	54	34	501955	1.000	480	20	■		
405072	120	x	300	x	61	x	2,0	58	36	501962	1.060	480	20	■		
405082	120	x	320	x	61	x	2,0	62	38	501979	1.120	480	20	■		
405132	140	x	200	x	61	x	2,0	38	22	501504	0.810	480	20	■		
405092	140	x	240	x	61	x	2,0	46	30	501993	0.910	480	20	■		
405492	140	x	260	x	61	x	2,0	50	32	501511	0.980	480	20	■		
405102	140	x	280	x	61	x	2,0	54	34	502600	1.030	480	20	■		
405112	140	x	300	x	61	x	2,0	58	36	502617	1.090	480	20	■		
405122	140	x	320	x	61	x	2,0	62	38	502624	1.150	360	15	■		
405162	160	x	160	x	61	x	2,0	30	18	502631	0.710	360	15	■		
405172	160	x	200	x	61	x	2,0	38	22	502648	0.830	360	15	■		
405182	160	x	240	x	61	x	2,0	46	30	502655	0.940	360	15	■		
405612	160	x	260	x	61	x	2,0	50	32	501528	1.010	360	15	■		
405192	160	x	280	x	61	x	2,0	54	34	502662	1.060	360	15	■		
405322	160	x	300	x	61	x	2,0	58	38	501535	1.130	360	15	■		
405202	160	x	320	x	61	x	2,0	62	38	502679	1.180	360	15	■		
405422	180	x	180	x	61	x	2,0	34	20	501542	0.810	240	10	■		
405212	180	x	200	x	61	x	2,0	38	22	502686	0.860	240	10	■		
405222	180	x	220	x	61	x	2,0	42	26	502693	0.910	240	10	■		
405232	180	x	240	x	61	x	2,0	46	30	503300	0.970	240	10	■		
405242	180	x	280	x	61	x	2,0	54	34	503317	1.090	240	10	■		
405552	180	x	320	x	61	x	2,0	62	38	501559	1.220	240	10	■		
405272	200	x	200	x	61	x	2,0	38	22	503324	0.890	240	10	■		
405252	200	x	240	x	61	x	2,0	46	30	503331	1.000	240	10	■		
405262	200	x	280	x	61	x	2,0	54	34	501566	1.130	240	10	■		
405292	220	x	260	x	61	x	2,0	50	32	503355	1.090	240	10	■		
405332	240	x	280	x	61	x	2,0	54	34	503362	1.180	240	10	■		

Standard dimensions

Further dimensions available on request

TYPE 05 GREENLINE

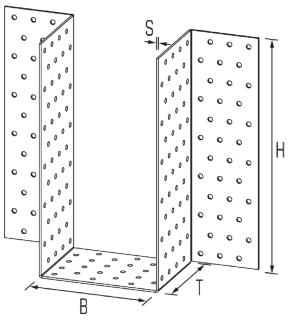
Timber / Timber

Art.-Nr.				Vollausnagelung										Teilausnagelung									
						GH 4,0x40				GH 4,0x60						GH 4,0x40				GH 4,0x60			
	W	H	T	n_H	n_N	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	$F_{3,k}$ ←	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	$F_{3,k}$ ←	n_H	n_N	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	$F_{3,k}$ ←	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	$F_{3,k}$ ←
405012	100	240	2,0	46	30	56,1	55,2	14,7	-	75,6	70,9	19,9	-	24	16	27,6	27,2	7,9	-	40,7	37,8	10,7	-
405022	100	280	2,0	54	34	67,1	63,4	15,1	-	85,1	80,4	20,3	-	28	18	35,3	33,6	8,1	-	47,3	42,5	10,8	-
405032	100	300	2,0	58	36	70,9	67,1	15,3	-	89,8	85,1	20,4	-	30	18	37,3	33,6	8,1	-	47,3	42,5	10,8	-
405042	100	320	2,0	62	38	74,6	70,9	15,5	-	94,6	89,8	20,6	-	32	20	41,0	37,3	8,2	-	52,0	47,3	10,9	-
405052	120	240	2,0	46	30	56,1	55,2	16,6	-	75,6	70,9	22,9	-	24	16	27,6	27,2	8,9	-	40,7	37,8	12,3	-
405062	120	280	2,0	54	34	67,1	63,4	17,3	-	85,1	80,4	23,5	-	28	18	35,3	33,6	9,2	-	47,3	42,5	12,6	-
405072	120	300	2,0	58	36	70,9	67,1	17,5	-	89,8	85,1	23,8	-	30	18	37,3	33,6	9,2	-	47,3	42,5	12,6	-
405082	120	320	2,0	62	38	74,6	70,9	17,8	-	94,6	89,8	24,0	-	32	20	41,0	37,3	9,4	-	52,0	47,3	12,7	-
405132	140	200	2,0	38	22	40,1	39,2	14,4	-	56,7	52,0	20,8	-	20	12	20,3	19,9	7,9	-	30,7	28,4	11,4	-
405092	140	240	2,0	46	30	56,1	55,2	18,1	-	75,6	70,9	25,6	-	24	16	27,6	27,2	9,7	-	40,7	37,8	13,7	-
405492	140	260	2,0	50	32	63,4	59,7	18,6	-	80,4	75,6	26,0	-	26	16	31,4	29,8	9,7	-	42,5	37,8	13,7	-
405102	140	280	2,0	54	34	67,1	63,4	19,1	-	85,1	80,4	26,4	-	28	18	35,3	33,6	10,2	-	47,3	42,5	14,1	-
405112	140	300	2,0	58	36	70,9	67,1	19,5	-	89,8	85,1	26,8	-	30	18	37,3	33,6	10,2	-	47,3	42,5	14,1	-
405122	140	320	2,0	62	38	74,6	70,9	19,8	-	94,6	89,8	27,1	-	32	20	41,0	37,3	10,5	-	52,0	47,3	14,4	-
405162	160	160	2,0	30	18	27,0	26,1	13,3	-	41,6	40,4	19,9	-	16	10	13,7	13,2	7,4	-	21,2	20,6	11,1	-
405172	160	200	2,0	38	22	40,1	39,2	15,3	-	56,7	52,0	22,4	-	20	12	20,3	19,9	8,4	-	30,7	28,4	12,3	-
405182	160	240	2,0	46	30	56,1	55,2	19,4	-	75,6	70,9	27,9	-	24	16	27,6	27,2	10,4	-	40,7	37,8	15,0	-
405612	160	260	2,0	50	32	63,4	59,7	20,0	-	80,4	75,6	28,5	-	26	16	31,4	29,8	10,4	-	42,5	37,8	15,0	-
405192	160	280	2,0	54	34	67,1	63,4	20,6	-	85,1	80,4	29,0	-	28	18	35,3	33,6	11,0	-	47,3	42,5	15,5	-
405322	160	300	2,0	58	36	70,9	67,1	21,1	-	89,8	85,1	29,5	-	30	18	37,3	33,6	11,0	-	47,3	42,5	15,5	-
405202	160	320	2,0	62	38	74,6	70,9	21,6	-	94,6	89,8	30,0	-	32	20	41,0	37,3	11,4	-	52,0	47,3	15,9	-
405422	180	180	2,0	34	20	33,3	32,5	14,9	-	50,7	47,3	22,4	-	18	10	16,9	16,5	7,7	-	25,9	23,6	11,7	-
405212	180	200	2,0	38	22	40,1	39,2	16,0	-	56,7	52,0	23,8	-	20	12	20,3	19,9	8,7	-	30,7	28,4	13,0	-
405222	180	220	2,0	42	26	48,0	47,1	18,3	-	66,2	61,5	27,0	-	22	14	23,9	23,5	10,2	-	35,7	33,1	15,2	-
405232	180	240	2,0	46	30	56,1	55,2	20,5	-	75,6	70,9	29,9	-	24	16	27,6	27,2	11,0	-	40,7	37,8	16,0	-
405242	180	280	2,0	54	34	67,1	63,4	21,9	-	85,1	80,4	31,3	-	28	18	35,3	33,6	11,7	-	47,3	42,5	16,7	-
405552	180	320	2,0	62	38	74,6	70,9	23,1	-	94,6	89,8	32,6	-	32	20	41,0	37,3	12,2	-	52,0	47,3	17,3	-
405272	200	200	2,0	38	22	40,1	39,2	16,5	-	56,7	52,0	25,0	-	20	12	20,3	19,9	9,0	-	30,7	28,4	13,7	-
405252	200	240	2,0	46	30	56,1	55,2	21,4	-	75,6	70,9	31,6	-	24	16	27,6	27,2	11,5	-	40,7	37,8	16,9	-
405262	200	280	2,0	54	34	67,1	63,4	23,0	-	85,1	80,4	33,4	-	28	18	35,3	33,6	12,2	-	47,3	42,5	17,8	-
405292	220	260	2,0	50	32	63,4	59,7	23,0	-	80,4	75,6	34,2	-	26	16	31,4	29,8	11,8	-	42,5	37,8	17,7	-
405332	240	280	2,0	54	34	67,1	63,4	24,7	-	85,1	80,4	36,7	-	28	18	35,3	33,6	13,1	-	47,3	42,5	19,6	-

1

JOIST HANGER

TYPE 07



NKL 2

250 GD Z275

Art. No.	Dimensions [mm]							nH	EAN	Weight	Pallet	PU			
	W(B)	x	H	x	D(T)	x	T(S)	Ø 5	4019346	kg					
60501	100	x	240	x	90	x	2,0	214	104002	1.274	240	10	■		
60502	100	x	280	x	90	x	2,0	246	104019	1.450	240	10	■		
60503	100	x	300	x	90	x	2,0	262	104026	1.538	240	10	■		
60504	100	x	320	x	90	x	2,0	278	104033	1.625	240	10	■		
60505	120	x	240	x	90	x	2,0	219	104040	1.318	240	10	■		
60506	120	x	280	x	90	x	2,0	251	104057	1.494	240	10	■		
60507	120	x	300	x	90	x	2,0	267	104064	1.581	240	10	■		
60508	120	x	320	x	90	x	2,0	283	104071	0.017	240	10	■		
60509	140	x	240	x	90	x	2,5	223	104088	1.702	240	10	■		
60510	140	x	280	x	90	x	2,5	255	104095	1.922	240	10	■		
60511	140	x	300	x	90	x	2,5	271	104101	2.032	240	10	■		
60512	140	x	320	x	90	x	2,5	287	104118	2.142	240	10	■		
60517	160	x	200	x	90	x	2,5	196	104125	1.538	240	10	■		
60518	160	x	240	x	90	x	2,5	228	104132	1.757	240	10	■		
60519	160	x	280	x	90	x	2,5	260	104149	1.977	240	10	■		
60520	160	x	320	x	90	x	2,5	292	104156	2.142	240	10	■		
60521	180	x	200	x	90	x	2,5	200	104163	1.592	240	10	■		
60522	180	x	220	x	90	x	2,5	216	104170	1.702	240	10	■		
60523	180	x	240	x	90	x	2,5	232	104187	1.812	240	10	■		
60524	180	x	280	x	90	x	2,5	264	104194	2.032	240	10	■		

GH joist hangers type 07

Timber/timber connection
Further dimensions available at short notice
Also available with inside tabs
Proof of statics must be provided as necessary

GH PACKAGING

TO PROTECT THE ENVIRONMENT

Our GH box sizes are optimised to both the packing units and for storage on pallets.

We print all the relevant information on our labels such as approvals, article name,
dimensions, EAN code and article images.

GH packaging to protect the environment.
Ecological change is changing our society in general and **GH Baubeschläge** also wants to support this with commitment.

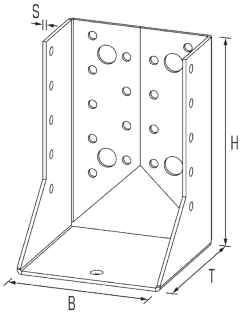
At **GH Baubeschläge** we therefore use a sustainable brown box for our **packaging**,
mainly based on recycled paper.

If we take our role as a manufacturer and our core expertise and the benefits of packaging in terms of protection and transportation seriously, we are equally committed to actively and sustainably reducing our environmental footprint.
The changeover to boxes took place progressively.

1

JOIST HANGER

TYPE 04 I COMBI GREENLINE



GREENLINE DCSTATIK ETA-08 0264

NKL 2 250 GD Z275

	Art. No.	Dimensions [mm]							nH	nN	nH	EAN	Weight	Pallet	PU			
		W(B)	x	H	x	D(T)	x	T(S)	Ø 5	Ø5	Ø 11	4019346	kg					
■	3050215IKO	60	x	100	x	80	x	1,5	8	8	4xØ9*	109694	0.238	1200	50	■	■	
	3061015IKO	64	x	128	x	80	x	1,5	10	10	4*	109724	0.292	1200	50	■	■	
	3061115IKO	70	x	125	x	80	x	1,5	10	10	4*	109731	0.292	1200	50	■	■	
	3061915IKO	76	x	152	x	80	x	1,5	22	12	4*	109755	0.346	600	25	■	■	
■	3050515IKO	80	x	120	x	80	x	1,5	18	10	4	109779	0.291	1200	50	■	■	■
	3062015IKO	80	x	150	x	80	x	1,5	22	12	4	109786	0.346	1200	50	■	■	■
	3062715IKO	80	x	180	x	80	x	1,5	26	14	6	109793	0.399	600	25	■	■	■
	3063115IKO	80	x	210	x	80	x	1,5	30	16	6	109809	0.454	600	25	■	■	■
	3062115IKO	90	x	145	x	80	x	1,5	22	12	4	109816	0.346	1200	50	■	■	■
	3064415IKO	100	x	90	x	80	x	1,5	12	6	2	109823	0.257	1200	50	■	■	■
■	3050815IKO	100	x	140	x	80	x	1,5	22	12	4	109847	0.346	1200	50	■	■	■
	3062815IKO	100	x	170	x	80	x	1,5	26	14	6	109854	0.399	600	25	■	■	■
	3063215IKO	100	x	200	x	80	x	1,5	30	16	6	109861	0.454	600	25	■	■	■
	1011004015IKO	120	x	120	x	80	x	1,5	18	10	4	109885	0.328	600	25	■	■	■
■	3051115IKO	120	x	160	x	80	x	1,5	26	14	6	109892	0.399	600	25	■	■	■
	3063415IKO	120	x	190	x	80	x	1,5	30	16	6	109908	0.454	600	25	■	■	■
	3063615IKO	140	x	140	x	80	x	1,5	22	12	4	109915	0.383	600	25	■	■	■
■	3051415IKO	140	x	180	x	80	x	1,5	30	16	6	109939	0.454	600	25	■	■	■

■ Standard dimensions Further dimensions available on request *With approval only for timber/timber connection

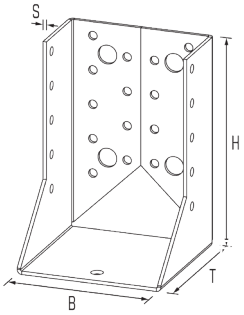
TYPE 04 I COMBI GREENLINE

Art. No.				Timber / Timber																Timber / OSB								Timber / Concrete			
				Full nail fitting									Partial nail fitting							Full screw fitting				Partial screw fitting							
				GH 4.0x40					GH 4.0x60				GH 4.0x40				GH 4.0x60			GH 5.0x25				GH 5.0x25				Ø11	1 pair of dowels		
	W	H	T	n_H	n_N	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	n_H	n_N	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	n_H	n_N	$F_{1,k}$ ↓	$F_{2,k}$ ↙	n_H	n_N	$F_{1,k}$ ↓	$F_{2,k}$ ↙	n_H	$F_{1,k}$ ↓	$F_{V,Ek}$ ↓	$F_{ax,Ek}$ ←
3050215IKO	60	100	1,5	-	-	-	-	-	-	-	-	8	4	7,6	3,7	2,6	11,6	6,1	3,5	-	-	-	-	8	4	3,2	2,2	4x9*	-	-	-
3061015IKO	64	128	1,5	-	-	-	-	-	-	-	-	10	6	10,9	5,4	3,6	16,2	8,7	4,1	-	-	-	-	10	6	5,1	2,9	4*	-	-	-
3061115IKO	70	125	1,5	-	-	-	-	-	-	-	-	10	6	10,5	5,5	3,7	15,8	8,9	4,4	-	-	-	-	10	6	5,1	3,1	4*	-	-	-
3061915IKO	76	152	1,5	-	-	-	-	-	-	-	-	12	6	15,0	8,3	3,9	18,9	13,2	5,6	-	-	-	-	12	6	5,3	3,3	4*	-	-	-
3050515IKO	80	120	1,5	18	10	18,3	10,4	6,7	27,5	16,7	9,6	10	6	10,4	6,1	4,0	15,6	9,7	5,8	18	10	7,7	5,6	10	6	5,3	3,3	4	13,2	6,6	2,4
3062015IKO	80	150	1,5	22	12	26,3	14,9	7,6	33,1	23,6	10,7	12	6	14,8	8,4	4,0	18,9	13,4	5,8	22	12	11,1	6,3	12	6	5,3	3,3	4	13,2	6,6	1,8
3062715IKO	80	180	1,5	26	14	30,0	20,5	8,4	37,8	32,1	11,7	14	8	18,8	11,4	4,8	23,6	17,7	6,7	26	14	14,8	6,9	14	8	8,9	4,0	6	13,2	6,6	1,4
3063115IKO	80	210	1,5	30	16	33,8	26,3	9,1	42,5	37,8	12,5	16	8	18,8	14,4	4,8	23,6	18,9	6,7	30	16	18,4	7,5	16	8	8,9	4,0	6	13,2	6,6	1,2
3062115IKO	90	145	1,5	22	12	25,7	15,4	8,0	33,1	24,4	11,6	12	6	14,2	8,7	4,2	18,9	13,8	6,2	22	12	11,1	6,7	12	6	5,3	3,5	4	13,2	6,6	1,9
3064415IKO	100	90	1,5	16	6	10,5	11,3	4,7	16,0	12,0	7,6	6	4	5,7	1,5	3,1	8,7	2,4	4,8	12	6	3,3	4,0	6	4	3,0	2,7	2	13,2	6,6	3,6
3050815IKO	100	140	1,5	22	12	24,5	15,9	8,4	33,1	25,1	12,3	12	6	13,6	9,0	4,4	18,9	14,2	6,5	22	12	11,1	7,0	12	6	5,3	3,7	4	13,2	6,6	1,9
3062815IKO	100	170	1,5	26	14	30,0	21,6	9,4	37,8	33,1	13,5	14	8	18,5	12,0	5,4	23,6	18,6	7,7	26	14	14,8	7,8	14	8	8,9	4,5	6	13,2	6,6	1,5
3063215IKO	100	200	1,5	30	16	33,8	27,4	10,2	42,5	37,8	14,6	16	8	18,8	15,0	5,4	23,6	18,9	7,7	30	16	18,4	8,5	16	8	8,9	4,5	6	13,2	6,6	1,2
1011004015IKO	120	120	1,5	18	10	18,3	10,4	7,7	27,5	16,7	11,7	10	6	10,4	6,1	4,6	15,6	9,7	7,0	18	10	7,7	6,6	10	6	5,3	3,9	4	13,2	6,6	2,4
3051115IKO	120	160	1,5	26	14	30,0	22,8	10,1	37,8	33,1	14,9	14	8	17,3	12,6	5,8	23,6	18,9	8,5	26	14	14,8	8,5	14	8	8,9	4,9	6	13,2	6,6	1,6
3063415IKO	120	190	1,5	30	16	33,8	28,6	11,1	42,5	37,8	16,2	16	8	8,8	15,0	5,8	23,6	18,9	8,8	30	16	18,4	9,3	16	8	8,9	4,9	6	13,2	6,6	1,3
3063615IKO	140	140	1,5	22	12	25,0	16,3	9,4	33,1	25,7	14,3	12	6	3,8	9,3	4,8	18,9	14,2	7,4	22	12	11,3	8,0	12	6	5,4	4,1	4	13,2	6,6	1,9
3051415IKO	140	180	1,5	30	16	33,8	29,9	11,8	42,5	37,8	17,5	16	8	18,8	15,0	6,1	23,6	18,9	9,1	30	16	18,4	10,0	16	8	8,9	5,1	6	13,2	6,6	1,4

1

JOIST HANGER

TYPE 04 I COMBI



DCSTATIK

ETA-08 0264

NKL 2

250 GD Z275

Art. No.	Dimensions [mm]							nH	nN	nH	EAN	Weight	Pallet	PU			
	W(B)	x	H	x	D(T)	x	T(S)	Ø 5	Ø5	Ø 11	4019346	kg					
30653I	32	x	114	x	80	x	2,0	8	8	-	101803	0.269	1200	50	■	■	
30654I	32	x	174	x	80	x	2,0	12	12	-	101810	0.420	1200	50	■	■	
30655I	38	x	111	x	80	x	2,0	8	8	-	101827	0.269	1200	50	■	■	
30601I	40	x	110	x	80	x	2,0	8	8	-	101070	0.269	1200	50	■	■	
30605I	40	x	140	x	80	x	2,0	10	10	-	101834	0.354	1200	50	■	■	
30656I	40	x	170	x	80	x	2,0	12	12	-	101841	0.420	1200	50	■	■	
30602I	45	x	108	x	80	x	2,0	8	8	-	101858	0.270	1200	50	■	■	
30606I	45	x	138	x	80	x	2,0	10	10	-	101865	0.355	1200	50	■	■	
30607I	48	x	136	x	80	x	2,0	10	10	-	101872	0.354	1200	50	■	■	
30614I	48	x	166	x	80	x	2,0	12	12	-	101889	0.420	1200	50	■	■	
30603IKO	51	x	105	x	80	x	2,0	8	8	-	101087	0.270	1200	50	■	■	
30608IKO	51	x	135	x	80	x	2,0	10	10	-	101094	0.355	1200	50	■	■	
30615IKO	51	x	165	x	80	x	2,0	12	12	-	101896	0.421	1200	50	■	■	
30623IKO	51	x	195	x	80	x	2,0	14	14	-	101902	0.487	600	25	■	■	
30502IKO	60	x	100	x	80	x	2,0	8	8	4xØ9*	101018	0.282	1200	50	■	■	
30609IKO	60	x	130	x	80	x	2,0	10	10	4*	101100	0.354	1200	50	■	■	
30616IKO	60	x	160	x	80	x	2,0	12	12	4*	101117	0.420	1200	50	■	■	
30624IKO	60	x	190	x	80	x	2,0	14	14	4*	101919	0.486	600	25	■	■	
30604IKO	64	x	98	x	80	x	2,0	8	8	4xØ9*	101926	0.269	1200	50	■	■	
30610IKO	64	x	128	x	80	x	2,0	10	10	4*	101933	0.354	1200	50	■	■	
30611IKO	70	x	125	x	80	x	2,0	10	10	4*	101025	0.354	1200	50	■	■	
30617IKO	70	x	155	x	80	x	2,0	12	12	4*	101124	0.420	1200	50	■	■	
30612IKO	73	x	124	x	80	x	2,0	18	10	4*	101940	0.355	1200	50	■	■	
30618IKO	73	x	154	x	80	x	2,0	22	12	4*	101957	0.421	1200	50	■	■	
30625IKO	73	x	184	x	80	x	2,0	26	14	4*	101964	0.487	600	25	■	■	
30613IKO	76	x	122	x	80	x	2,0	18	10	4*	101971	0.354	1200	50	■	■	
30619IKO	76	x	152	x	80	x	2,0	22	12	4*	101001	0.420	600	25	■	■	
30626IKO	76	x	182	x	80	x	2,0	26	14	4*	101988	0.486	600	25	■	■	
30505IKO	80	x	120	x	80	x	2,0	18	10	4	101032	0.354	1200	50	■	■	■
30620IKO	80	x	150	x	80	x	2,0	22	12	4	101223	0.420	1200	50	■	■	■
30627IKO	80	x	180	x	80	x	2,0	26	14	6	101131	0.486	600	25	■	■	■
30631IKO	80	x	210	x	80	x	2,0	30	16	6	101230	0.553	600	25	■	■	■
30621IKO	90	x	145	x	80	x	2,0	22	12	4	101995	0.420	1200	50	■	■	■
30622IKO	98	x	141	x	80	x	2,0	22	12	4	101513	0.420	1200	50	■	■	■
30644IKO	100	x	90	x	80	x	2,0	12	6	2	101315	0.332	1200	50	■	■	■
30508IKO	100	x	140	x	80	x	2,0	22	12	4	101049	0.420	1200	50	■	■	■
30628IKO	100	x	170	x	80	x	2,0	26	14	6	101193	0.486	600	25	■	■	■
30632IKO	100	x	200	x	80	x	2,0	30	16	6	101247	0.553	600	25	■	■	■
30629IKO	115	x	163	x	80	x	2,0	26	14	4	101520	0.487	600	25	■	■	■
10110040IKO	120	x	120	x	80	x	2,0	18	10	4	101285	0.398	600	25	■	■	■
30511IKO	120	x	160	x	80	x	2,0	26	14	6	101056	0.486	600	25	■	■	■
30634IKO	120	x	190	x	80	x	2,0	30	16	6	101254	0.553	600	25	■	■	■
30636IKO	140	x	140	x	80	x	2,0	22	12	4	101278	0.464	600	25	■	■	■
30513IKO	140	x	160	x	80	x	2,0	26	14	4	101209	0.534	600	25	■	■	■
30514IKO	140	x	180	x	80	x	2,0	30	16	6	101063	0.553	600	25	■	■	■

■ Standard dimensions

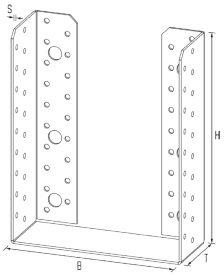
Further dimensions available on request

*With approval only for timber/timber connection

Joist hangers in stainless steel V4A on page 292

TYPE 04 I COMBI

Art. No.				Timber / Timber																Timber / OSB								Timber / Concrete			
				Full nail fitting								Partial nail fitting								Full screw fitting				Partial screw fitting							
				GH 4.0x40					GH 4.0x60			GH 4.0x40			GH 4.0x60					GH 5.0x25				GH 5.0x25				Ø11	1 pair of dowels		
	W	H	T	n_H	n_N	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	n_H	n_N	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	n_H	n_N	$F_{1,k}$ ↓	$F_{2,k}$ ↙	n_H	n_N	$F_{1,k}$ ↓	$F_{2,k}$ ↙	n_H	$F_{1,k}$ ↓	$F_{v,Ek}$ ↓	$F_{ax,Ek}$ ←
30653I	32	114	2,0	-	-	-	-	-	-	-	-	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30654I	32	174	2,0	-	-	-	-	-	-	-	-	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30655I	38	111	2,0	-	-	-	-	-	-	-	-	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30601I	40	110	2,0	-	-	-	-	-	-	-	-	8	4	8,7	3,3	1,9	-	-	-	-	-	-	-	8	4	2,5	1,6	-	-	-	-
30605I	40	140	2,0	-	-	-	-	-	-	-	-	10	5	12,1	4,9	2,2	-	-	-	-	-	-	-	10	5	3,7	1,8	-	-	-	-
30656I	40	170	2,0	-	-	-	-	-	-	-	-	12	6	15,0	7,4	2,4	-	-	-	-	-	-	-	12	6	5,5	1,9	-	-	-	-
30602I	45	108	2,0	-	-	-	-	-	-	-	-	8	4	8,5	3,4	2,1	-	-	-	-	-	-	-	8	4	3,2	1,8	-	-	-	-
30606I	45	138	2,0	-	-	-	-	-	-	-	-	10	6	11,9	5,0	2,3	-	-	-	-	-	-	-	10	6	5,1	2,3	-	-	-	-
30607I	48	136	2,0	-	-	-	-	-	-	-	-	10	6	11,7	5,0	2,5	-	-	-	-	-	-	-	10	6	5,1	2,4	-	-	-	-
30614I	48	166	2,0	-	-	-	-	-	-	-	-	12	6	15,0	7,6	2,7	-	-	-	-	-	-	-	12	6	5,3	2,4	-	-	-	-
30603IKO	51	105	2,0	-	-	-	-	-	-	-	-	8	4	8,2	3,5	2,2	-	-	-	-	-	-	-	8	4	3,2	2,0	4x9*	-	-	-
30608IKO	51	135	2,0	-	-	-	-	-	-	-	-	10	6	11,6	5,1	2,5	-	-	-	-	-	-	-	10	6	5,1	2,5	4*	-	-	-
30615IKO	51	165	2,0	-	-	-	-	-	-	-	-	12	6	15,0	7,7	2,8	-	-	-	-	-	-	-	12	6	5,3	2,5	4*	-	-	-
30623IKO	51	195	2,0	-	-	-	-	-	-	-	-	14	8	16,9	10,6	3,1	-	-	-	-	-	-	-	14	8	8,9	2,8	4*	-	-	-
30502IKO	60	100	2,0	-	-	-	-	-	-	-	-	8	4	7,6	3,7	2,6	11,6	6,1	3,5	-	-	-	-	8	4	3,2	2,2	4x9*	-	-	-
30609IKO	60	130	2,0	-	-	-	-	-	-	-	-	10	6	11,1	5,3	3,4	16,5	8,6	3,9	-	-	-	-	10	6	5,1	2,8	4*	-	-	-
30616IKO	60	160	2,0	-	-	-	-	-	-	-	-	12	6	15,0	7,9	3,4	18,9	12,6	4,4	-	-	-	-	12	6	5,3	2,8	4*	-	-	-
30624IKO	60	190	2,0	-	-	-	-	-	-	-	-	14	8	18,8	10,8	4,0	21,3	16,5	4,7	-	-	-	-	14	8	8,9	3,3	4*	-	-	-
30604IKO	64	98	2,0	-	-	-	-	-	-	-	-	8	4	7,4	3,8	2,7	11,3	6,2	3,6	-	-	-	-	8	4	3,2	2,3	4x9*	-	-	-
30610IKO	64	128	2,0	-	-	-	-	-	-	-	-	10	6	10,9	5,4	3,6	16,2	8,7	4,1	-	-	-	-	10	6	5,1	2,9	4*	-	-	-
30611IKO	70	125	2,0	-	-	-	-	-	-	-	-	10	6	10,5	5,5	3,7	15,8	8,9	4,4	-	-	-	-	10	6	5,1	3,1	4*	-	-	-
30617IKO	70	155	2,0	-	-	-	-	-	-	-	-	12	6	15,0	8,2	3,8	18,9	13,0	4,9	-	-	-	-	12	6	5,3	3,1	4*	-	-	-
30612IKO	73	124	2,0	-	-	-	-	-	-	-	-	10	6	10,4	5,6	3,8	15,6	9,0	4,5	-	-	-	-	10	6	5,1	3,1	4*	-	-	-
30618IKO	73	154	2,0	-	-	-	-	-	-	-	-	12	6	15,0	8,2	3,8	18,9	13,1	5,0	-	-	-	-	12	6	5,3	3,2	4*	-	-	-
30625IKO	73	184	2,0	-	-	-	-	-	-	-	-	14	8	18,8	11,2	4,5	21,3	16,5	5,4	-	-	-	-	14	8	8,9	3,7	4*	-	-	-
30613IKO	76	122	2,0	-	-	-	-	-	-	-	-	10	6	10,2	5,7	3,9	15,4	9,1	5,5	-	-	-	-	10	6	5,1	3,2	4*	-	-	-
30619IKO	76	152	2,0	-	-	-	-	-	-	-	-	12	6	15,0	8,3	3,9	18,9	13,2	5,6	-	-	-	-	12	6	5,3	3,3	4*	-	-	-
30626IKO	76	182	2,0	-	-	-	-	-	-	-	-	14	8	18,8	11,3	4,7	23,6	17,6	6,5	-	-	-	-	14	8	8,9	3,8	4*	-	-	-
30505IKO	80	120	2,0	18	10	18,3	10,4	6,7	27,5	16,7	9,6	10	6	10,4	6,1	4,0	15,6	9,7	5,8	18	10	7,7	5,6	10	6	5,3	3,3	4	13,2	6,6	2,4
30620IKO	80	150	2,0	22	12	26,3	14,9	7,6	33,1	23,6	10,7	12	6	14,8	8,4	4,0	18,9	13,4	5,8	22	12	11,1	6,3	12	6	5,3	3,3	4	13,2	6,6	1,8
30627IKO	80	180	2,0	26	14	30,0	20,5	8,4	37,8	32,1	11,7	14	8	18,8	11,4	4,8	23,6	17,7	6,7	26	14	14,8	6,9	14	8	8,9	4,0	6	13,2	6,6	1,4
30631IKO	80	210	2,0	30	16	33,8	26,3	9,1	42,5	37,8	12,5	16	8	18,8	14,4	4,8	23,6	18,9	6,7	30	16	18,4	7,5	16	8	8,9	4,0	6	13,2	6,6	1,2
30621IKO	90	145	2,0	22	12	25,7	15,4	8,0	33,1	24,4	11,6	12	6	14,2	8,7	4,2	18,9	13,8	6,2	22	12	11,1	6,7	12	6	5,3	3,5	4	13,2	6,6	1,9
30622IKO	98	141	2,0	22	12	24,7	15,8	8,3	33,1	25,0	12,1	12	6	13,7	8,9	4,3	18,9	14,1	6,4	22	12	11,1	7,0	12	6	5,3	3,7	4	13,2	6,6	1,9
30644IKO	100	90	2,0	16	6	10,5	11,3	4,7	16,0	12,0	7,6	6	4	5,7	1,5	3,1	8,7	2,4	4,8	12	6	3,3	4,0	6	4	3,0	2,7	2	13,2	6,6	3,6
30508IKO	100	140	2,0	22	12	24,5	15,9	8,4	33,1	25,1	12,3	12	6	13,6	9,0	4,4	18,9	14,2	6,5	22	12	11,1	7,0	12	6	5,3	3,7	4	13,2	6,6	1,9
30628IKO	100	170	2,0	26	14	30,0	21,6	9,4	37,8	33,1	13,5	14	8	18,5	12,0	5,4	23,6	18,6	7,7	26	14	14,8	7,8	14	8	8,9	4,5	6	13,2	6,6	1,5
30632IKO	100	200	2,0	30	16	33,8	27,4	10,2	42,5	37,8	14,6	16	8	18,8	15,0	5,4	23,6	18,9	7,7	30	16	18,4	8,5	16	8	8,9	4,5	6	13,2	6,6	1,2
30629IKO	115	163	2,0	26	14	30,0	22,4	9,9	37,8	33,1	14,5	14	8	17,7	12,4	5,7	23,6	18,9	8,3	26	14	14,8	8,3	14	8	8,9	4,8	4	13,2	6,6	1,6
10110040IKO	120	120	2,0	18	10	18,3	10,4	7,7	27,5	16,7	11,7	10	6	10,4	6,1	4,6	15,6	9,7	7,0	18	10	7,7	6,6	10	6	5,3	3,9	4	13,2	6,6	2,4
30511IKO	120	160	2,0	26	14	30,0	22,8	10,1	37,8	33,1	14,9	14	8	17,3	12,6	5,8	23,6	18,9	8,5	26	14	14,8	8,5	14	8	8,9	4,9	6	13,2	6,6	1,6
30634IKO	120	190	2,0	30	16	33,8	28,6	11,1	42,5	37,8	16,2	16	8	18,8	15,0	5,8	23,6	18,9	8,5	30	16	18,4	9,3	16	8	8,9	4,9	6	13,2	6,6	1,3
30636IKO	140	140	2,0	22	12	25,0	16,3	9,4	33,1	25,7	14,3	12	6	13,8	9,3	4,8	18,9	14,2	7,4	22	12	11,3	8,0	12	6	5,4	4,1	4	13,2	6,6	1,9
30513IKO	140	160	2,0	26	14	30,0	22,8	10,6	37,8	33,1	16,0	14	8	17,3	12,6	6,1	23,6	18,9	9,1	26	14	14,8	9,0	14	8	8,9	5,1	4	13,2	6,6	13,2
30514IKO	140	180	2,0	30	16	33,8	29,9	11,8	42,5	37,8	17,5	16	8	18,8	15,0	6,1	23,6	18,9	9,1	30	16	18,4	10,0	16	8	8,9	5,1	6	13,2	6,6	1,4



KONSTRULINE DCSTATIK ETA-08 0264

NKL 2 250 GD Z275

1

JOIST HANGER

TYPE 05 I COMBI EXTRA THICK

Art. No.	Dimensions [mm]							nH	nN	nH	EAN	Weight	Pallet	PU			
	W(B)	x	H	x	D(T)	x	T(S)	Ø 5	Ø5	Ø 13	4019346	kg					
40501IKO	100	x	240	x	61	x	2,5	46	30	6	017883	0.995	480	20	■		■
40502IKO	100	x	280	x	61	x	2,5	54	34	6	017890	1.133	480	20	■		■
40503IKO	100	x	300	x	61	x	2,5	58	36	6	017906	1.201	480	20	■		■
40504IKO	100	x	320	x	61	x	2,5	62	38	6	017913	1.270	480	20	■		■
40505IKO	120	x	240	x	61	x	2,5	46	30	6	101506	1.030	480	20	■		■
40506IKO	120	x	280	x	61	x	2,5	54	34	6	017920	1.167	480	20	■		■
40507IKO	120	x	300	x	61	x	2,5	58	36	6	017937	1.236	480	20	■		■
40508IKO	120	x	320	x	61	x	2,5	62	38	6	017944	1.304	480	20	■		■
40513IKO	140	x	200	x	61	x	2,5	38	22	6	018170	0.927	480	20	■		■
40509IKO	140	x	240	x	61	x	2,5	46	30	6	100738	1.064	480	20	■		■
40549IKO	140	x	260	x	61	x	2,5	50	32	6	018187	1.133	480	20	■		■
40510IKO	140	x	280	x	61	x	2,5	54	34	6	017951	1.201	480	20	■		■
40511IKO	140	x	300	x	61	x	2,5	58	36	6	017968	1.270	480	20	■		■
40512IKO	140	x	320	x	61	x	2,5	62	38	6	017975	1.338	480	20	■		■
40516IKO	160	x	160	x	61	x	2,5	30	18	4	100745	0.824	360	15	■		■
40517IKO	160	x	200	x	61	x	2,5	38	22	6	100752	0.961	360	15	■		■
40518IKO	160	x	240	x	61	x	2,5	46	30	6	017982	1.098	360	15	■		■
40561IKO	160	x	260	x	61	x	2,5	50	32	6	018194	1.168	360	15	■		■
40519IKO	160	x	280	x	61	x	2,5	54	34	6	017999	1.236	360	15	■		■
40532IKO	160	x	300	x	61	x	2,5	58	36	6	018200	1.305	360	15	■		■
40520IKO	160	x	320	x	61	x	2,5	62	38	6	018002	1.373	360	15	■		■
40542IKO	180	x	180	x	61	x	2,5	34	20	4	102220	0.925	240	10	■		■
40521IKO	180	x	200	x	61	x	2,5	38	22	6	018019	0.995	240	10	■		■
40522IKO	180	x	220	x	61	x	2,5	42	26	6	100714	1.064	240	10	■		■
40523IKO	180	x	240	x	61	x	2,5	46	30	6	018026	1.133	240	10	■		■
40524IKO	180	x	280	x	61	x	2,5	54	34	6	018033	1.270	240	10	■		■
40555IKO	180	x	320	x	61	x	2,5	62	38	6	020319	1.408	240	10	■		■
40527IKO	200	x	200	x	61	x	2,5	38	22	6	017685	1.030	240	10	■		■
40525IKO	200	x	240	x	61	x	2,5	46	30	6	100769	1.167	240	10	■		■
40529IKO	220	x	260	x	61	x	2,5	50	32	6	018040	1.202	240	10	■		■
40533IKO	240	x	280	x	61	x	2,5	54	34	6	018057	1.441	240	10	■		■

Standard dimensions

Further dimensions available on request

TYPE 05 I COMBI EXTRA THICK

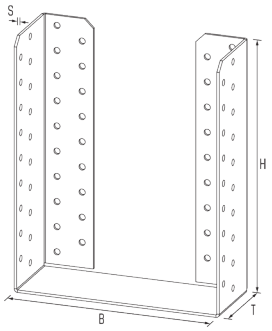
Timber / Timber — Timber / Concrete

Art. No.				Full nail fitting										Partial nail fitting										Ø13	1 pair of dowels		
						GH 4.0x40				GH 4.0x60						GH 4.0x40				GH 4.0x60							
	W	H	T	n_H	n_N	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	$F_{3,k}$ ←	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	$F_{3,k}$ ←	n_H	n_N	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	$F_{3,k}$ ←	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	$F_{3,k}$ ←	n_H	$F_{1,k}$ ↓	$F_{V,Ek}$ ↓	$F_{ax,Ek}$ ←
40501IKO	100	240	2,5	46	30	56,1	55,2	14,7	-	75,6	70,9	19,9	-	24	16	27,6	27,2	7,9	-	40,7	37,8	10,7	-	6	19,8	9,9	2,4
40502IKO	100	280	2,5	54	34	67,1	63,4	15,1	-	85,1	80,4	20,3	-	28	18	35,3	33,6	8,1	-	47,3	42,5	10,8	-	6	19,8	9,9	2,0
40503IKO	100	300	2,5	58	36	70,9	67,1	15,3	-	89,8	85,1	20,4	-	30	18	37,3	33,6	8,1	-	47,3	42,5	10,8	-	6	19,8	9,9	1,8
40504IKO	100	320	2,5	62	38	74,6	70,9	15,5	-	94,6	89,8	20,6	-	32	20	41,0	37,3	8,2	-	52,0	47,3	10,9	-	6	19,8	9,9	1,7
40505IKO	120	240	2,5	46	30	56,1	55,2	16,6	-	75,6	70,9	22,9	-	24	16	27,6	27,2	8,9	-	40,7	37,8	12,3	-	6	19,8	9,9	2,4
40506IKO	120	280	2,5	54	34	67,1	63,4	17,3	-	85,1	80,4	23,5	-	28	18	35,3	33,6	9,2	-	47,3	42,5	12,6	-	6	19,8	9,9	2,0
40507IKO	120	300	2,5	58	36	70,9	67,1	17,5	-	89,8	85,1	23,8	-	30	18	37,3	33,6	9,2	-	47,3	42,5	12,6	-	6	19,8	9,9	1,8
40508IKO	120	320	2,5	62	38	74,6	70,9	17,8	-	94,6	89,8	24,0	-	32	20	41,0	37,3	9,4	-	52,0	47,3	12,7	-	6	19,8	9,9	1,7
40513IKO	140	200	2,5	38	22	40,1	39,2	14,4	-	56,7	52,0	20,8	-	20	12	20,3	19,9	7,9	-	30,7	28,4	11,4	-	6	19,8	9,9	2,9
40509IKO	140	240	2,5	46	30	56,1	55,2	18,1	-	75,6	70,9	25,6	-	24	16	27,6	27,2	9,7	-	40,7	37,8	13,7	-	6	19,8	9,9	2,4
40549IKO	140	260	2,5	50	32	63,4	59,7	18,6	-	80,4	75,6	26,0	-	26	16	31,4	29,8	9,7	-	42,5	37,8	13,7	-	6	19,8	9,9	2,1
40510IKO	140	280	2,5	54	34	67,1	63,4	19,1	-	85,1	80,4	26,4	-	28	18	35,3	33,6	10,2	-	47,3	42,5	14,1	-	6	19,8	9,9	2,0
40511IKO	140	300	2,5	58	36	70,9	67,1	19,5	-	89,8	85,1	26,8	-	30	18	37,3	33,6	10,2	-	47,3	42,5	14,1	-	6	19,8	9,9	1,8
40512IKO	140	320	2,5	62	38	74,6	70,9	19,8	-	94,6	89,8	27,1	-	32	20	41,0	37,3	10,5	-	52,0	47,3	14,4	-	6	19,8	9,9	1,7
40516IKO	160	160	2,5	30	18	27,0	26,1	13,3	-	41,6	40,4	19,9	-	16	10	13,7	13,2	7,4	-	21,2	20,6	11,1	-	4	19,8	9,9	3,9
40517IKO	160	200	2,5	38	22	40,1	39,2	15,3	-	56,7	52,0	22,4	-	20	12	20,3	19,9	8,4	-	30,7	28,4	12,3	-	6	19,8	9,9	2,9
40518IKO	160	240	2,5	46	30	56,1	55,2	19,4	-	75,6	70,9	27,9	-	24	16	27,6	27,2	10,4	-	40,7	37,8	15,0	-	6	19,8	9,9	2,4
40561IKO	160	260	2,5	50	32	63,4	59,7	20,0	-	80,4	75,6	28,5	-	26	16	31,4	29,8	10,4	-	42,5	37,8	15,0	-	6	19,8	9,9	2,1
40519IKO	160	280	2,5	54	34	67,1	63,4	20,6	-	85,1	80,4	29,0	-	28	18	35,3	33,6	11,0	-	47,3	42,5	15,5	-	6	19,8	9,9	2,0
40532IKO	160	300	2,5	58	36	70,9	67,1	21,1	-	89,8	85,1	29,5	-	30	18	37,3	33,6	11,0	-	47,3	42,5	15,5	-	6	19,8	9,9	1,8
40520IKO	160	320	2,5	62	38	74,6	70,9	21,6	-	94,6	89,8	30,0	-	32	20	41,0	37,3	11,4	-	52,0	47,3	15,9	-	6	19,8	9,9	1,7
40542IKO	180	180	2,5	34	20	33,3	32,5	14,9	-	50,7	47,3	22,4	-	18	10	16,9	16,5	7,7	-	25,9	23,6	11,7	-	4	19,8	9,9	3,3
40521IKO	180	200	2,5	38	22	40,1	39,2	16,0	-	56,7	52,0	23,8	-	20	12	20,3	19,9	8,7	-	30,7	28,4	13,0	-	6	19,8	9,9	2,9
40522IKO	180	220	2,5	42	26	48,0	47,1	18,3	-	66,2	61,5	27,0	-	22	14	23,9	23,5	10,2	-	35,7	33,1	15,2	-	6	19,8	9,9	2,6
40523IKO	180	240	2,5	46	30	56,1	55,2	20,5	-	75,6	70,9	29,9	-	24	16	27,6	27,2	11,0	-	40,7	37,8	16,0	-	6	19,8	9,9	2,4
40524IKO	180	280	2,5	54	34	67,1	63,4	21,9	-	85,1	80,4	31,3	-	28	18	35,3	33,6	11,7	-	47,3	42,5	16,7	-	6	19,8	9,9	2,0
40555IKO	180	320	2,5	62	38	74,6	70,9	23,1	-	94,6	89,8	32,6	-	32	20	41,0	37,3	12,2	-	52,0	47,3	17,3	-	6	19,8	9,9	1,7
40527IKO	200	200	2,5	38	22	40,1	39,2	16,5	-	56,7	52,0	25,0	-	20	12	20,3	19,9	9,0	-	30,7	28,4	13,7	-	6	19,8	9,9	2,9
40525IKO	200	240	2,5	46	30	56,1	55,2	21,4	-	75,6	70,9	31,6	-	24	16	27,6	27,2	11,5	-	40,7	37,8	16,9	-	6	19,8	9,9	2,4
40529IKO	220	260	2,5	50	32	63,4	59,7	23,0	-	80,4	75,6	34,2	-	26	16	31,4	29,8	11,8	-	42,5	37,8	17,7	-	6	19,8	9,9	2,1
40533IKO	240	280	2,5	54	34	67,1	63,4	24,7	-	85,1	80,4	36,7	-	28	18	35,3	33,6	13,1	-	47,3	42,5	19,6	-	6	19,8	9,9	2,0

1

JOIST HANGER

TYPE 05 I GREENLINE



GREENLINE DCSTATIK ETA-08 0264

NKL 2 250 GD Z275

Art. No.	Dimensions [mm]							nH	nN	EAN	Weight	Pallet	PU			
	W(B)	x	H	x	D(T)	x	T(S)	Ø 5	Ø5	4019346	kg					
405012I	100	x	240	x	61	x	2,0	46	30	503386	0.860	480	20	■		
405022I	100	x	280	x	61	x	2,0	54	34	503393	0.970	480	20	■		
405032I	100	x	300	x	61	x	2,0	58	36	501306	1.030	480	20	■		
405042I	100	x	320	x	61	x	2,0	62	38	501313	1.090	480	20	■		
405052I	120	x	240	x	61	x	2,0	46	30	501320	0.890	480	20	■		
405062I	120	x	280	x	61	x	2,0	54	34	501337	1.000	480	20	■		
405072I	120	x	300	x	61	x	2,0	58	36	501344	1.060	480	20	■		
405082I	120	x	320	x	61	x	2,0	62	38	501351	1.120	480	20	■		
405132I	140	x	200	x	61	x	2,0	38	22	501573	0.810	480	20	■		
405092I	140	x	240	x	61	x	2,0	46	30	501375	0.910	480	20	■		
405492I	140	x	260	x	61	x	2,0	50	32	501580	0.980	480	20	■		
405102I	140	x	280	x	61	x	2,0	54	34	501382	1.030	480	20	■		
405112I	140	x	300	x	61	x	2,0	58	36	501399	1.090	480	20	■		
405122I	140	x	320	x	61	x	2,0	62	38	502006	1.150	480	15	■		
405162I	160	x	160	x	61	x	2,0	30	18	502013	0.710	360	15	■		
405172I	160	x	200	x	61	x	2,0	38	22	502020	0.830	360	15	■		
405182I	160	x	240	x	61	x	2,0	46	30	502037	0.940	360	15	■		
405612I	160	x	260	x	61	x	2,0	50	32	501597	1.010	360	15	■		
405192I	160	x	280	x	61	x	2,0	54	34	502044	1.060	360	15	■		
405322I	160	x	300	x	61	x	2,0	58	36	501603	1.130	360	15	■		
405202I	160	x	320	x	61	x	2,0	62	38	502051	0.892	360	15	■		
405422I	180	x	180	x	61	x	2,0	34	20	502198	0.810	240	10	■		
405212I	180	x	200	x	61	x	2,0	38	22	502068	0.860	240	10	■		
405222I	180	x	220	x	61	x	2,0	42	26	502075	0.910	240	10	■		
405232I	180	x	240	x	61	x	2,0	46	30	502082	0.970	240	10	■		
405242I	180	x	280	x	61	x	2,0	54	34	502099	1.090	240	10	■		
405552I	180	x	320	x	61	x	2,0	62	38	020302	1.220	240	10	■		
405272I	200	x	200	x	61	x	2,0	38	22	502709	0.890	240	10	■		
405252I	200	x	240	x	61	x	2,0	46	30	502716	1.000	240	10	■		
405292I	220	x	260	x	61	x	2,0	50	32	502730	1.090	240	10	■		
405332I	240	x	280	x	61	x	2,0	54	34	502747	1.180	240	10	■		

Standard dimensions

Further dimensions available on request

TYPE 05 I GREENLINE

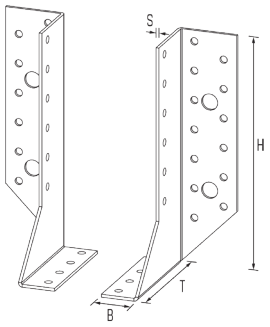
Timber / Timber

Art. No.				Full nail fitting										Partial nail fitting									
						GH 4.0x40				GH 4.0x60						GH 4.0x40				GH 4.0x60			
	W	H	T	n_H	n_N	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	$F_{3,k}$ ←	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	$F_{3,k}$ ←	n_H	n_N	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	$F_{3,k}$ ←	$F_{1,k}$ ↓	$F_{1,k}$ ↑	$F_{2,k}$ ↙	$F_{3,k}$ ←
405012I	100	240	2,0	24	30	56,1	55,2	14,7	-	75,6	70,9	19,9	-	24	16	27,6	27,2	7,9	-	40,7	37,8	10,7	-
405022I	100	280	2,0	28	34	67,1	63,4	15,1	-	85,1	80,4	20,3	-	28	18	35,3	33,6	8,1	-	47,3	42,5	10,8	-
405032I	100	300	2,0	30	36	70,9	67,1	15,3	-	89,8	85,1	20,4	-	30	18	37,3	33,6	8,1	-	47,3	42,5	10,8	-
405042I	100	320	2,0	32	38	74,6	70,9	15,5	-	94,6	89,8	20,6	-	32	20	41,0	37,3	8,2	-	52,0	47,3	10,9	-
405052I	120	240	2,0	24	30	56,1	55,2	16,6	-	75,6	70,9	22,9	-	24	16	27,6	27,2	8,9	-	40,7	37,8	12,3	-
405062I	120	280	2,0	28	34	67,1	63,4	17,3	-	85,1	80,4	23,5	-	28	18	35,3	33,6	9,2	-	47,3	42,5	12,6	-
405072I	120	300	2,0	30	36	70,9	67,1	17,5	-	89,8	85,1	23,8	-	30	18	37,3	33,6	9,2	-	47,3	42,5	12,6	-
405082I	120	320	2,0	32	38	74,6	70,9	17,8	-	94,6	89,8	24,0	-	32	20	41,0	37,3	9,4	-	52,0	47,3	12,7	-
405132I	140	200	2,0	20	22	40,1	39,2	14,4	-	56,7	52,0	20,8	-	20	12	20,3	19,9	7,9	-	30,7	28,4	11,4	-
405092I	140	240	2,0	24	30	56,1	55,2	18,1	-	75,6	70,9	25,6	-	24	16	27,6	27,2	9,7	-	40,7	37,8	13,7	-
405492I	140	260	2,0	26	32	63,4	59,7	18,6	-	80,4	75,6	26,0	-	26	16	31,4	29,8	9,7	-	42,5	37,8	13,7	-
405102I	140	280	2,0	28	34	67,1	63,4	19,1	-	85,1	80,4	26,4	-	28	18	35,3	33,6	10,2	-	47,3	42,5	14,1	-
405112I	140	300	2,0	30	36	70,9	67,1	19,5	-	89,8	85,1	26,8	-	30	18	37,3	33,6	10,2	-	47,3	42,5	14,1	-
405122I	140	320	2,0	32	38	74,6	70,9	19,8	-	94,6	89,8	27,1	-	32	20	41,0	37,3	10,5	-	52,0	47,3	14,4	-
405162I	160	160	2,0	16	18	27,0	26,1	13,3	-	41,6	40,4	19,9	-	16	10	13,7	13,2	7,4	-	21,2	20,6	11,1	-
405172I	160	200	2,0	20	22	40,1	39,2	15,3	-	56,7	52,0	22,4	-	20	12	20,3	19,9	8,4	-	30,7	28,4	12,3	-
405182I	160	240	2,0	24	30	56,1	55,2	19,4	-	75,6	70,9	27,9	-	24	16	27,6	27,2	10,4	-	40,7	37,8	15,0	-
405612I	160	260	2,0	26	32	63,4	59,7	20,0	-	80,4	75,6	28,5	-	26	16	31,4	29,8	10,4	-	42,5	37,8	15,0	-
405192I	160	280	2,0	28	34	67,1	63,4	20,6	-	85,1	80,4	29,0	-	28	18	35,3	33,6	11,0	-	47,3	42,5	15,5	-
405322I	160	300	2,0	30	36	70,9	67,1	21,1	-	89,8	85,1	29,5	-	30	18	37,3	33,6	11,0	-	47,3	42,5	15,5	-
405202I	160	320	2,0	32	38	74,6	70,9	21,6	-	94,6	89,8	30,0	-	32	20	41,0	37,3	11,4	-	52,0	47,3	15,9	-
405422I	180	180	2,0	18	20	33,3	32,5	14,9	-	50,7	47,3	22,4	-	18	10	16,9	16,5	7,7	-	25,9	23,6	11,7	-
405212I	180	200	2,0	20	22	40,1	39,2	16,0	-	56,7	52,0	23,8	-	20	12	20,3	19,9	8,7	-	30,7	28,4	13,0	-
405222I	180	220	2,0	22	26	48,0	47,1	18,3	-	66,2	61,5	27,0	-	22	14	23,9	23,5	10,2	-	35,7	33,1	15,2	-
405232I	180	240	2,0	24	30	56,1	55,2	20,5	-	75,6	70,9	29,9	-	24	16	27,6	27,2	11,0	-	40,7	37,8	16,0	-
405242I	180	280	2,0	28	34	67,1	63,4	21,9	-	85,1	80,4	31,3	-	28	18	35,3	33,6	11,7	-	47,3	42,5	16,7	-
405552I	180	320	2,0	32	38	74,6	70,9	23,1	-	94,6	89,8	32,6	-	32	20	41,0	37,3	12,2	-	52,0	47,3	17,3	-
405272I	200	200	2,0	20	22	40,1	39,2	16,5	-	56,7	52,0	25,0	-	20	12	20,3	19,9	9,0	-	30,7	28,4	13,7	-
405252I	200	240	2,0	24	30	56,1	55,2	21,4	-	75,6	70,9	31,6	-	24	16	27,6	27,2	11,5	-	40,7	37,8	16,9	-
405292I	220	260	2,0	26	32	63,4	59,7	23,0	-	80,4	75,6	34,2	-	26	16	31,4	29,8	11,8	-	42,5	37,8	17,7	-
405332I	240	280	2,0	28	34	67,1	63,4	24,7	-	85,1	80,4	36,7	-	28	18	35,3	33,6	13,1	-	47,3	42,5	19,6	-

1

JOIST HANGER

2-PIECE



ETA-08 0264

NKL 2

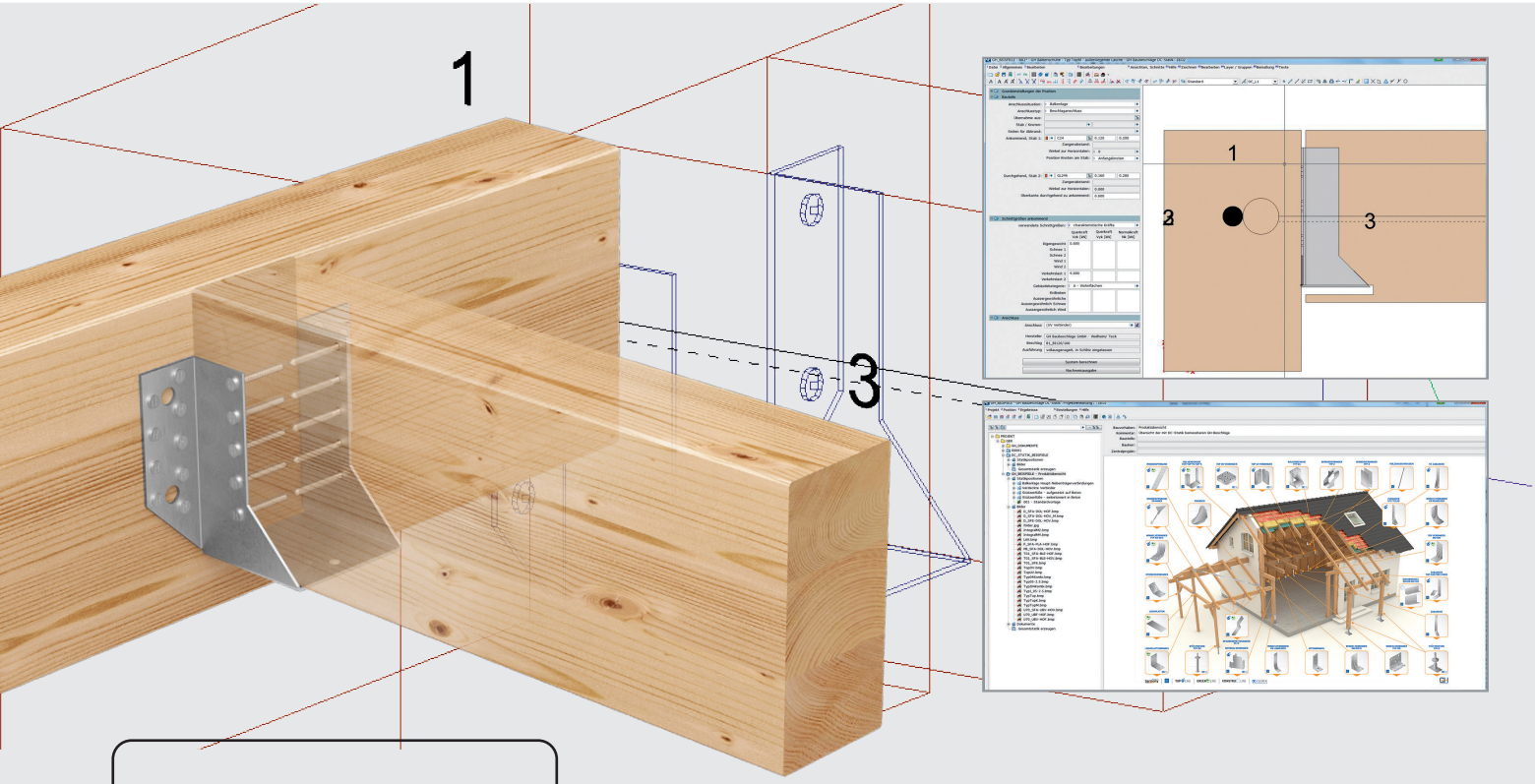
250 GD Z275

Art. No.	Dimensions [mm]							nH	nN	nH	EAN	Weight	Pallet	PU			
	W(B)	x	H	x	D(T)	x	T(S)	Ø 5	Ø5	Ø 11	4019346	kg		Pair			
802	25	x	80	x	80	x	2,0	10	4	2	102053	0.260	1800	25	■		■
102	25	x	100	x	80	x	2,0	14	6	2	102060	0.300	1800	25	■		■
122	25	x	120	x	80	x	2,0	18	8	4	102008	0.340	1800	25	■		■
142	25	x	140	x	80	x	2,0	22	10	4	102015	0.380	1350	25	■		■
162	25	x	160	x	80	x	2,0	26	12	4	102022	0.420	1350	25	■		■
182	25	x	180	x	80	x	2,0	30	14	6	102039	0.460	1350	25	■		■
202	25	x	200	x	80	x	2,0	34	16	6	102046	0.500	1350	25	■		■

DCSTATIK

EXTENSIVE DESIGN OF OUR GH TIMBER CONNECTORS*

WITH THE GH DC STATICS



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*Joist hangers, timber/timber, integral connectors, UV connector timber/timber, OV connector, stanchion

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2

02 CONCEALED CONNECTORS

TOPLINE KONSTRULINE DCSTATIK

CONCEALED CONNECTORS

(Invisible connectors)

TOP UV CONCEALED CONNECTORS

- Invisible dovetail connection
- Safety catch
- Optimised hole pattern
- For loading in 4 load directions
- Quick assembly of secondary beams
- Conical dovetail guide pulls together
- Milling radii

up to 72 kN

Basics of statics **from page 68** / Products & statics **from page 66**

CONCEALED CONNECTORS TOP OV

„Simple and ingenious“
More flexibility in connection technology

- **In the factory:** Simply mill out the connection form or attach and mount on the secondary beam with a maximum of 4 tensile and 2 pressure screws.
- **On the building site:** Insert the secondary beam in the recess of the main beam or only place it down. Turn 2 pressure screws into the main beam/support.

up to 27 kN

Basics of statics **from page 84** / Products & statics **from page 82**

BEAM HANGER

- Connection to timber, concrete and masonry
- Type alu combi without holes for rod dowels. By drilling through the secondary beam and connector, you receive a connection with a perfect fit.
- Type alu SD 12 and SD 16 with assembly fix tab.

up to 258 kN

Basics of statics **from page 90** / Products & statics **from page 88**

INTEGRAL CONNECTORS

- GH integral connectors type M, 2- and 4-row with assembly fix tab for concealed connections with connections between the main/secondary beam and connections to the columns.
  For both versions, the secondary beam with pre-fitted rod dowel is suspended in the assembly fix tab.
- 2-row integral connectors with embossed reinforcement studs. This gives you the necessary accuracy of fit and the same slot width as with a 4-row integral connector.
- 4-row integral connections with even higher load-bearing capacities!

up to 58 kN

Basics of statics **from page 90** / Products & statics **from page 88**

CONCEALED CONNECTORS

2 ASSORTMENT

							Basics Statics & Diagrams from page	Products & Statics from page
TOP UV CONNECTORS TIMBER/TIMBER		CE	Al Aluminium	NKL 2			65	66
TOP UVB CONNECTORS TIMBER/CONCRETE		CE	Al Aluminium	NKL 2			65 / 68	78
TOP OV CONNECTORS		CE	Al Aluminium	NKL 2			65 / 84	82
BEAM HANGER TYPE ALU COMBI		CE	Al Aluminium	NKL 2			65 / 90	88
BEAM HANGER TYPE ALU COMBI SD 12		CE	Al Aluminium	NKL 2			65 / 90	88
BEAM HANGER TYPE ALU COMBI SD 16		CE	Al Aluminium	NKL 2			65 / 90	88
INTEGRAL CONNECTOR 2-ROW TYPE M		CE	250 GD Z275	NKL 2			65 / 90	88
INTEGRAL CONNECTOR 4-ROW TYPE M		CE	250 GD Z275	NKL 2			65 / 90	88
INTEGRAL CONNECTOR ANGLED CONNECTION			250 GD Z275	NKL 2				102

CE symbol

Steel with indication of the steel quality and galvanisation

Aluminium

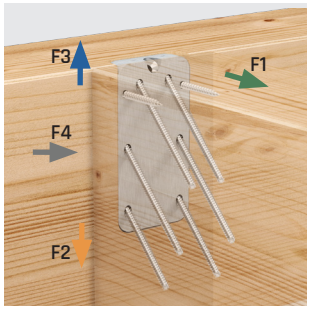
Timber/timber connection

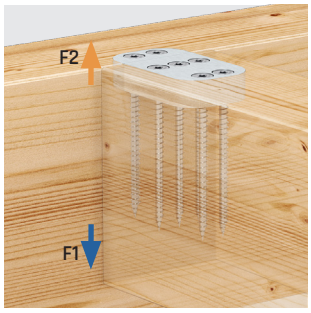
Timber/concrete-connection

Usage class 1
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 65% for a few weeks per year, e.g. in the case of buildings that are closed on all sides and heated. Comment: In UC 1, the average moisture content of most softwoods does not exceed 12 %.

Usage class 2
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 85% for a few weeks per year, e.g. in the case of open buildings covered by a roof. Comment: In UC 2, the average moisture content of most softwoods does not exceed 20 %.

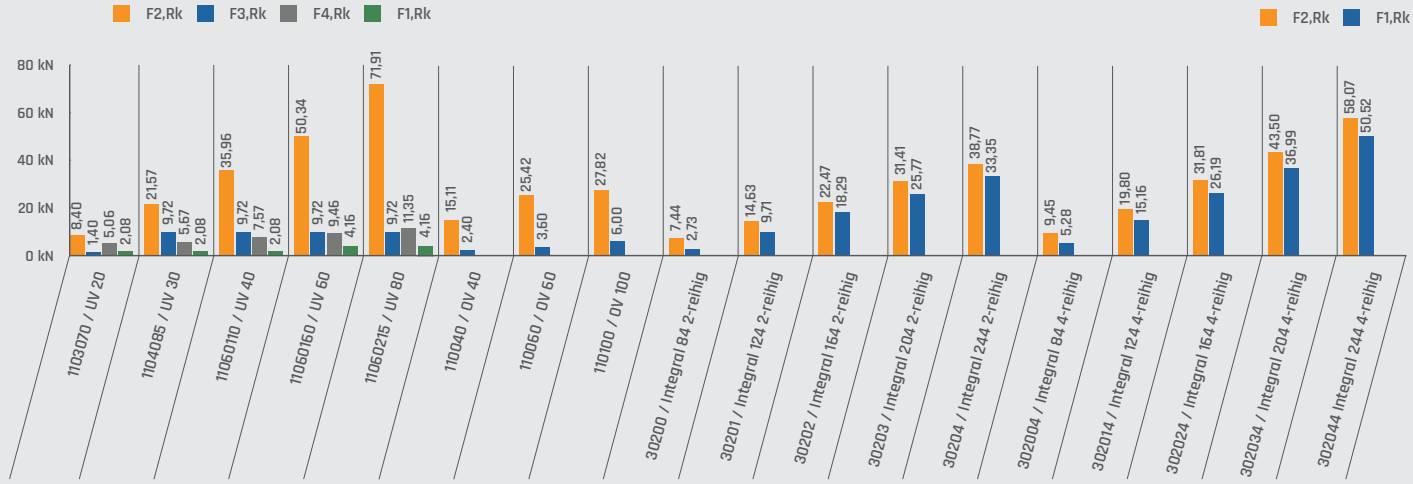
Usage class 3
Includes climatic conditions that lead to higher moisture contents than in UC 2, e.g. structures that are exposed to the weather without protection. Eurocode 5 / DIN EN 1995-1-1 section 2.3.1.3

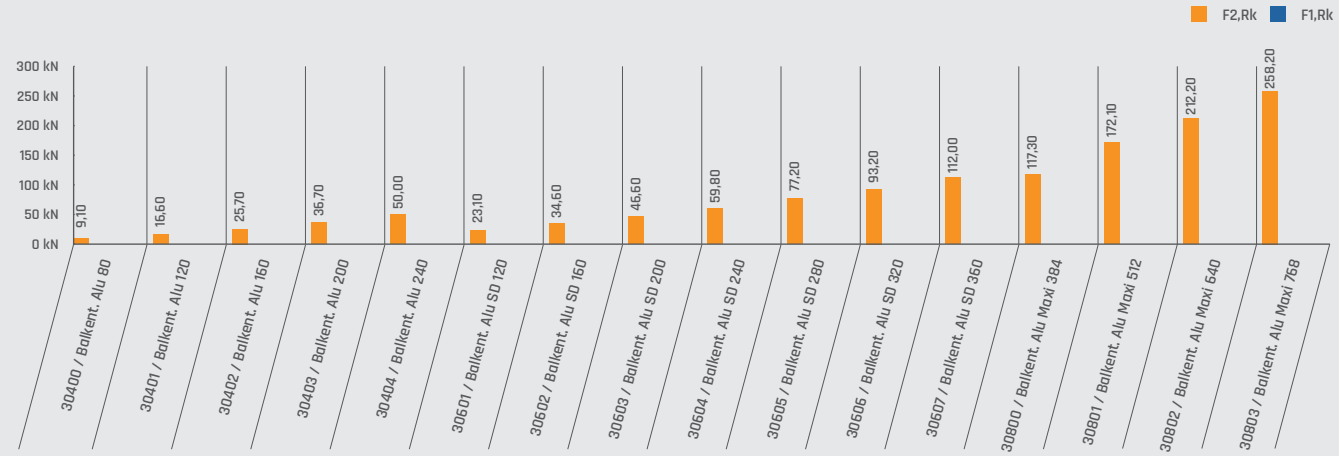




CONCEALED CONNECTORS

STATICS DIAGRAM 2





TOP UV CONNECTORS

2

1. For invisible connections in timber/timber and timber/concrete
2. Optimised hole pattern in 5 different sizes
3. Dovetail guide with conical guide
4. From timber cross-sections 45 mm x 100 mm
5. Time-saving quick assembly

ADVANTAGES

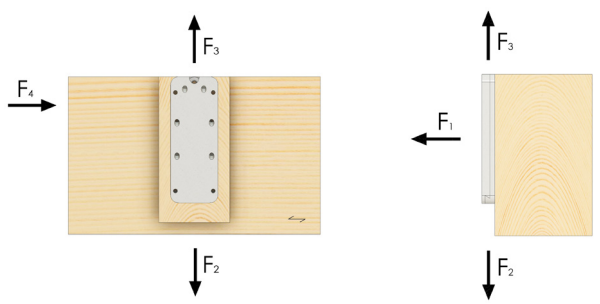
- Invisible dovetail connection
- Connection of secondary beams made of timber to timber, concrete
- For loading in up to 4 load directions
- With safety catch in all connection variants
- Quick assembly of secondary beams
- Connectors pull together with the large conical gliding surfaces
- The connection can be removed again as required
- The load capacity is determined by the number of screws on the main beam and the screw length on the secondary beam

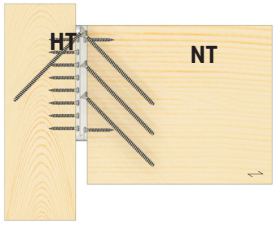
APPLICATIONS

- Right-angled
- Titled at right angles - upwards +90° / downwards -30°
- Angled connections - to the left +45° / to the right -45°
- Bar connections
- Column connections, with and without shadow joint
- Connections over the intermediate layer
- Connections possible directly to the timber board materials such as OSB

LOAD DIRECTIONS

- F_2 for pressure (in push-in direction, Z-axis)
- F_3 for lifting (opposite to push-in direction, Z-axis)
- F_4 2-axis (angled installation, Y-axis)
- F_1 for pull-out (X-axis)





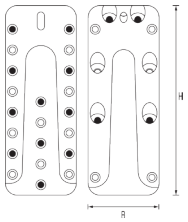
TOPLINE DCSTATIK ETA-11 0036

NKL 2 Aluminium

TOP UV CONNETORS

TOP UV

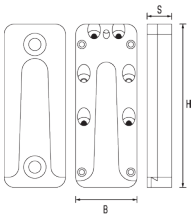
Art. No.	Type	Dimensions [mm]					nH	nN	EAN	Weight	Pallet	PU
		W(B)	x	H	x	T(S)	Ø 5	Ø 6.2	4019346	kg		
1103070	UV 20	30	x	70	x	16,0	6(8)	6(7)x Ø4,0	018910	0.071	2400	25
1104085	UV 30	40	x	85	x	16,0	9(11)	4(5)	018927	0.123	2400	25
11060110	UV 40	60	x	115	x	16,0	15(17)	6(7)	018903	0.260	2400	25
11060160	UV 60	60	x	160	x	16,0	21(25)	6(7)	018941	0.384	960	10
11060215	UV 80	60	x	215	x	16,0	30(34)	8(9)	018965	0.515	960	10



Number of screws required:
nH = maximum number of connecting elements in the main beam
nN = maximum number of connecting elements in the secondary beam

TOP UVB

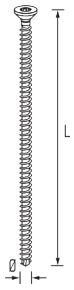
Art. No.	Type	Dimensions [mm]					nH	nN	nN	EAN	Weight	Pallet	PU
		W(B)	x	H	x	T(S)	Ø 12	Ø 6	Ø 5	4019346	kg		
12060115	UVB 40	60	x	115	x	24,0	2	6	2	018934	0.400	2400	10
12060160	UVB 60	60	x	160	x	24,0	2	6	4	018958	0.574	960	10
12060215	UVB 80	60	x	215	x	24,0	3	8	4	018972	0.774	960	10



Number of screws required:
nH = maximum number of connecting elements in the main beam
nN maximum number of connecting elements in the secondary beam

TOP UV full thread screw for UV connectors type 30 - type 80

Art. No.	Dimensions [mm]			TX	EAN	Weight	Pallet	PU
	Ø	x	L		4019346	kg		
116100	6,0	x	100	TX30	019009	1.178	39000	100
116120	6,0	x	120	TX30	019016	1.387	39000	100
116140	6,0	x	140	TX30	019023	1.629	39000	100
116160	6,0	x	160	TX30	019030	1.851	26800	100
116200	6,0	x	200	TX30	019047	2.313	26800	100

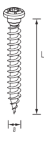


GH S Drive screw for UV connector type 20

Art. No.	Dimensions [mm]			TX	EAN	Weight	Pallet	PU
	Ø	x	L		4019346	kg		
90140050	4,0	x	50/30	TX20	521533	0.255	145000	500
90140060	4,0	x	60/35	TX20	521540	0.302	110000	500
90140070	4,0	x	70/35	TX20	521557	0.349	72000	200

GH screw

Art. No.	Dimensions [mm]			TX	EAN	Weight	Pallet	PU
	Ø	x	L		4019346	kg		
505050	5,0	x	50	TX20	400029	0.427	72000	200
505060	5,0	x	60	TX20	400036	0.480	58000	200
505070	5,0	x	70	TX20	400043	0.554	58000	200



TOP UV CONNECTORS

2 TECHNICAL FEATURES

Geometry

W	Width (mm)
H	Height (mm)
T	Material thickness (mm)

Tables

n_{HT}	Number of holes in main beam
n_{NT}	Number of holes in secondary beam
n_v	Number of connecting elements for full screw fitting
n_T	Number of connecting elements for partial screw fitting
HT	Main beam
NT	Secondary beam
H_{HT}	Minimum height of main beam
B_{HT}	Minimum width of main beam
H_{NT}	Minimum height of secondary beam
B_{NT}	Minimum width of secondary beam

Verbindungsmittel Beton/Stahl

Bo	Dowels/bolts

Timber connecting element

Ø [mm]	Diameter of connecting element
L [mm]	Length of connecting element
	Grain direction of component

Force directions

F_1	Force at a right angle to the connector level
F_2	Force in insertion direction (main load)
F_3	Force against insertion direction (lifting load)
F_4	Force at right-angle to insertion direction in Connector level (horizontal load)

Design

$F_{i,Ed}$	Design value of impact
$F_{i,Rd}$	Design value of load capacity
$F_{i,Rk}$	Characteristic value of load capacity
i	Index of force direction
k_{mod}	Modification factor
γ_M	Partial safety factor

Dowel measurement

$F_{Bo,lat}$	Force at right angles to the bolt axis (shearing)
$F_{Bo,ax}$	Force in bolt axis
H	Spacing of the two outer bolts/dowels
$f_{2/3}$	Spacing of the two outer bolts/dowels
f_4	Spacing of the two outer bolts/dowels
n_{Bo}	Spacing of the two outer bolts/dowels

User video
for our TOP UV connectors

Aluminium

Usage class 1
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 65% for a few weeks per year, e.g. in the case of buildings that are closed on all sides and heated. Comment: In UC 1, the average moisture content of most softwoods does not exceed 12 %.

Usage class 2
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 85% for a few weeks per year, e.g. in the case of open buildings covered by a roof. Comment: In UC 2, the average moisture content of most softwoods does not exceed 20 %.

Usage class 3
Includes climatic conditions that lead to higher moisture contents than in UC 2, e.g. structures that are exposed to the weather without protection. Eurocode 5 / DIN EN 1995-1-1 section 2.3.1.3

TOP UV CONNECTORS

APPLICATIONS 2

Application:
Timber-timber/steel/concrete connection
Construction beech and other materials according to the approval

Materials: Al Aluminium

Material thicknesses:
16 / 24 mm

90° connection

HT / NT

Intermediate layer with OSB

HT / NT

Points downwards

HT / NT

Points upwards

HT / NT

Angled connection

HT / NT

Angled connection

HT / NT

Flush column connection

HT / NT

Column connection inlaid

HT / NT

Concrete connection butt

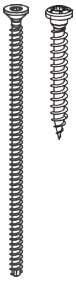
HT / NT

Concrete connection inlaid

HT / NT

For use in usage classes

NKL 1 NKL 2

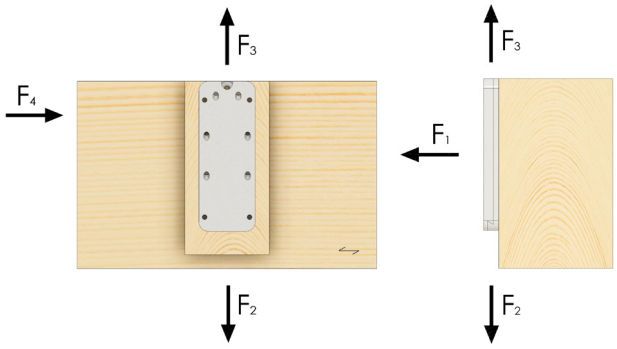


Connecting element
Timber - timber
Main beam: GH screws Ø 5.0 x 50 / 60 / 70 mm
Secondary beam: UV VG Ø 6.0 x 100 / 120 / 140 / 160 / 200 mm
UV 20: GHS Drive Ø 4.0 mm

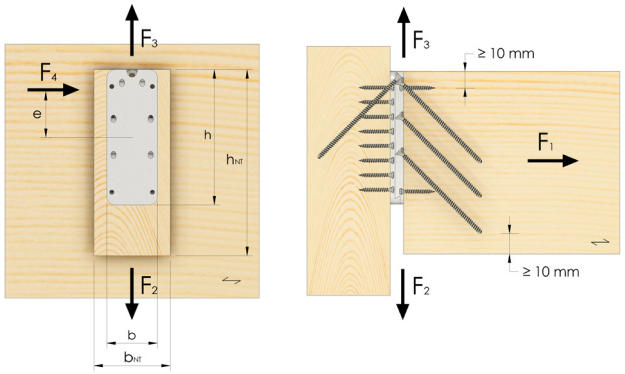
Timber - concrete/ steel
Main beam: Dowel or bolt M10 or Ø 10 with countersunk head
Secondary beam: UV VG Ø 6.0 x 100 / 120 / 140 / 160 / 200 mm

2

Load directions



Load attack points



F_1 takes effect in the centre of the TOP UV connector.
F_2 and F_3 take effect in the centre of the TOP UV connector.
F_4 takes effect at spacing e from the centre of the TOP UV connector. In the design tables, the values for e = 0 mm and e = h/2 are indicated. Load capacities for other spacing e can be calculated according to ETA-11/0036.

Timber/timber connection

Load case F_3
When connecting timber to timber, an additional UV fully threaded screw is always required after hanging the connector.
When connecting wood - concrete/steel, always use 2 M6 x 20 locking screws with washers.

One-sided connection
With one-sided connection to a main beam, the moment $M_{ec} = F_{2/3,E} \times (B_{HT} / 2 + e)$ must be considered for the load capacity proof of the main beam. With $F_{2/3}$ support force of the secondary beam, B_{HT} - width of the main beam and e – spacing of support force from the component edge, e = 9 mm for connection timber/timber with screws, e = 17 mm for connection timber/concrete or timber/steel with dowels/bolts

Two-sided connection
In the case of connections on both sides with different loads on the secondary beam connections (difference in forces > 20 %), the moment from the differential forces of the secondary beam connections should be applied when designing the main beam.

Connection over intermediate layers
If there is an intermediate layer between the joist hangers and the main beam, the length of the connecting centre must be selected so that the fastener is anchored to the main beam at the lengths given above.

Proof of load capacity

$$\left(\frac{F_{1,Ed}}{F_{1,Rd}}+\frac{F_{2/3,Ed}}{F_{2/3,Rd}}\right)^2+\left(\frac{F_{4,Ed}}{F_{4,Rd}}\right)^2 \le 1$$

Connection timber/concrete, steel

Dowel design

Stress on the dowel/bolt for connection timber - concrete/ steel
Forces in most stressed dowel/bolt

Load case	F_1	F_2 and F_3	F_4
$F_{B,lat}$	0	$F_{2/3} / n_B$	$F_4 \times (1/n_B + e/H) = f_4 \times F_4$
$F_{B,ax}$	F_1 / n_B	$f_{2/3} \times F_{2/3}$	$1{,}2 \times F_4 / n_B$

Design value of load capacity

Full and partial screw fitting

$F_{i,Rd} = F_{i,Rk} \times k_{mod} / \gamma_{M,Holz}$ mit $\gamma_{M,Holz} = 1{,}3$

Load case F_3 timber-concrete/steel: $F_{3,Rd} = 6 / 1.25 = 4.8$ kN

Factors for connection timber-concrete/steel

Type		UV-B 40	UV-B 60	UV-B 80	
n_B		2	2	3	2
$f_{2/3}$		0.299	0.192	0.106	0.133
f_4	e = 0 mm	0.500	0.500	0.333	0.500
	e = h/2	1.267	1.167	0.948	1.114

Proof of load capacity

$$\left(\frac{F_{1,Ed}}{F_{1,Rd}}+\frac{F_{2/3,Ed}}{F_{2/3,Rd}}\right)^2+\left(\frac{F_{4,Ed}}{F_{4,Rd}}\right)^2 \le 1$$

General information

The load capacities in the table apply to timbers with a characteristic raw density of ρ_k 350 kg/m³.
For timber with a high raw density, the values in the table can be used to be on the safe side.

The height of the secondary beam must be selected so that the top screw Ø 5 mm in the secondary beam is at least 10 mm below the top of the secondary beam and the lowest screw tip in the secondary beam is at least 10 mm above the underside of the secondary beam.
The spacing between a TOP UV connector and a component surface may be max. 1 mm.

Design example timber/timber connection UV 80

Main beam: BSH GL24h 14/40; secondary beam: NH C24 10/28
Connection forces:
$F_{2,Ed}$ = 32.0 kN; $F_{4,Ed}$ = 1.20 kN; NKL 1, KLED mittel bzw. k_{mod} = 0.8; Last $F_{4,Ed}$
Attacks the secondary beam top edge.

Determination of spacing "e" between the connector's centre of gravity and the attack point of load F_4
e = h /2 = 215 / 2 = 108 mm, with connector top edge flush with the top edge of the secondary beam

Necessary characteristic load capacities of a connector

$F_{2,Rk,erf} = F_{2,Ed} / k_{mod} \times \gamma_M$ = 32.0 / 0.8 x 1.3 = 52.0 kN

$F_{4,Rk,erf} = F_{4,Ed} / k_{mod} \times \gamma_M$ = 1.20 / 0.8 x 1.3 = 1.95 kN

A higher load-bearing capacity is selected due to the biaxial load.
TOP UV 80 fully screw fitted with screws 5.0 x 60 mm and 6.0 x 160 mm

Design value of load capacities from the table values

$F_{2,Rd} = F_{2,Rk} \times k_{mod} / \gamma_M$ = 68.0 x 0.8 / 1.3 = 41.8 kN

$F_{4,Rd} = F_{2,Rk} \times k_{mod} / \gamma_M$ = 3.53 x 0.8 / 1.3 = 2.17 kN

Proof of load capacity

$$\left(\frac{F_{1,Ed}}{F_{1,Rd}} + \frac{F_{2/3,Ed}}{F_{2/3,Rd}}\right)^2 + \left(\frac{F_{4,Ed}}{F_{4,Rd}}\right)^2 \leq 1 \qquad \left(\frac{32{,}0}{41{,}8}\right)^2 + \left(\frac{1{,}20}{2{,}17}\right)^2 = 0.89$$

Connecting element:

Main beam:	GH screws 5.0 x 60	30	units
	VG screws 6.0 x 160	1	units
Secondary beam:	GH screws 5.0 x 60	4	units
	VG screws 6.0 x 160	8	units

Design example timber/concrete connection UV-B 80

Main beam: Reinforced concrete wall; secondary beam: NH C24 10/28
Proof of load capacity same as timber-timber connection

Determination of forces for the concrete with the maximum stress

Anchor forces from load $F_{2,Ed}$:

$F_{B,2,lat,Ed} = F_{2/3,Ed} / n_B$ = 32.0 / 3 = 10.7 kN

$F_{B,2,ax,Ed} = f_{2/3} \times F_{2/3,Ed}$ = 0.106 x 32.0 = 3.39 kN

Anchor forces from load $F_{4,Ed}$:

$F_{B,4,lat,Ed} = f_4 \times F_{4,Ed}$ = 0.948 x 1.20 = 1.14 kN

$F_{B,4,ax,Ed}$ = 1,2 x $F_{4,Ed} / n_B$ = 1.2 x 1.20 / 3 = 0.48 kN

Addition of anchor forces:

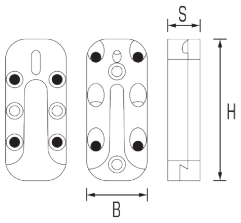
$F_{B,lat,Ed}$ = 10.7 + 1.14 = 11.8 kN

$F_{B,ax,Ed}$ = 3.39 + 0.48 = 3.87 kN

The load capacity of the concrete anchor must be verified for the impacts $F_{B,lat,Ed}$ = 11.8 kN and $F_{B,ax}$ = 3.87 kN.

Connecting element:

Concrete:	Concrete anchor M10	3	units
Secondary beam:	GH screws 5.0 x 60	4	units
	VG screws 6.0 x 160	8	units



TOPLINE DCSTATIK ETA-11 0036

TOP UV CONNECORS

2

UV 20 TIMBER/TIMBER

NKL 2 Aluminium

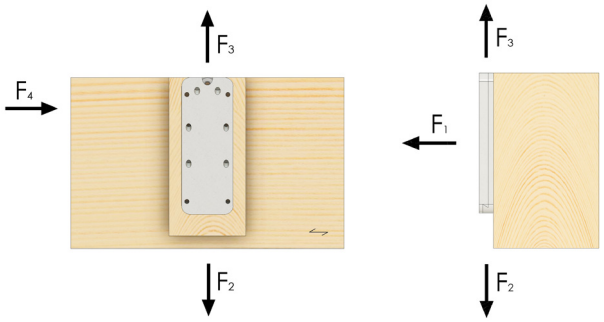
Timber / Timber

Art. No.	Type	Dimensions [mm] W(B) x H x T(S)	Milled groove [mm] Width	Depth	EAN 4019346	Weight kg	Pallet	PU
1103070	UV 20	30 x 70 x 16,0	30	16	018910	0.071	2400	25

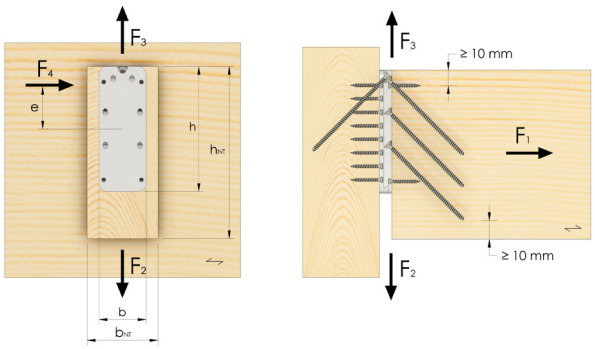
GH screw S Drive Ø x L	Full NT $n_{45°}$	Partial NT $n_{45°}$	Minimum timber cross-diameter $W(B)_{NT}$	H_{NT}	EAN	Weight	Pallet	PU
90140050 4,0 x 50/30	6(+1)	4(+1)	45	100	521533	0.255	145000	500
90140060 4,0 x 60/35	6(+1)	4(+1)	45	105	521540	0.302	110000	500
90140070 4,0 x 70/35	6(+1)	4(+1)	45	115	521557	0.349	72000	200

GH screw Ø x L	Full NT $n_{90°}$	Full HT $n_{90°}$	Partial NT $n_{90°}$	Partial HT $n_{90°}$	EAN	Weight	Pallet	PU
505050 5,0 x 50	2	6	2	4	400029	0.427	72000	200
505060 5,0 x 60	2	6	2	4	400036	0.480	58000	200
505070 5,0 x 70	2	6	2	4	400043	0.554	58000	200

Load directions



Load attack points



Statics TOP UV 20

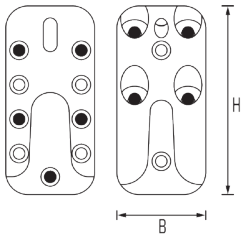
Timber / Timber

Art. No.	W(B)	H	T(S)	Secondary beam GH 4.0xL [mm]	Main beam GH 5.0xL [mm] 50 $F_{1,R}$	$F_{2,Rk}$	$F_{3,Rk}$	$F_{4,Rk}$ e=0 mm	$F_{4,Rk}$ e=35 mm	60 $F_{1,R}$	$F_{2,Rk}$	$F_{3,Rk}$	$F_{4,Rk}$ e=0 mm	$F_{4,Rk}$ e=35 mm	70 $F_{1,R}$	$F_{2,Rk}$	$F_{3,Rk}$	$F_{4,Rk}$ e=0 mm	$F_{4,Rk}$ e=35 mm
Full screw fitting				50	1,45	8,40	1,40	5,06	1,75	1,76	8,40	1,40	5,06	1,75	2,08	8,40	1,40	5,06	1,75
1103070	30	70	16,0	60	1,45	9,67	1,61	5,20	1,80	1,76	9,67	1,61	5,20	1,80	2,08	9,67	1,61	5,20	1,80
				70	1,45	12,2	2,04	5,49	1,90	1,76	12,2	2,04	5,49	1,90	2,08	12,2	2,04	5,49	1,90
Partial screw fitting				50	1,45	5,60	1,40	3,79	1,52	1,76	5,60	1,40	3,79	1,52	2,08	5,60	1,40	3,79	1,52
1103070	30	70	16,0	60	1,45	6,45	1,61	3,90	1,57	1,76	6,45	1,61	3,90	1,57	2,08	6,45	1,61	3,90	1,57
				70	1,45	8,15	2,04	4,12	1,65	1,76	8,15	2,04	4,12	1,65	2,08	8,15	2,04	4,12	1,65

Table values apply to partially threaded screws with the following thread lengths and pull-out parameters:
4 x 50: l_g = 33 mm, 4 x 60: l_g = 38 mm, 4 x 70: l_g = 48 mm, $f_{ax,k}$ = 12 N/mm² (r_a = 350 kg/m³)

TOPLINE DCSTATIK ETA-11 0036

NKL 2 Aluminium



TOP UV CONNECTORS

UV 30 TIMBER/TIMBER 2

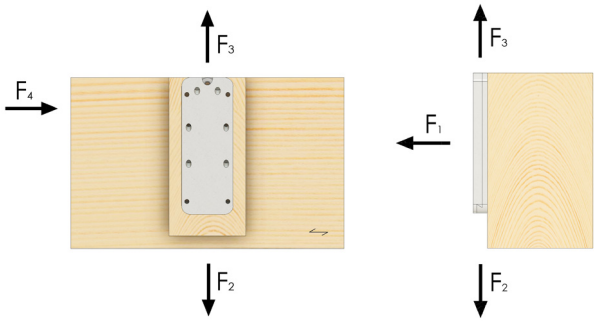
Timber / Timber

Art. No.	Type	Dimensions [mm] W(B) x H x T(S)	Milled groove [mm] Width	Depth	EAN 4019346	Weight kg	Pallet	PU
1104085	UV 30	40 x 85 x 16,0	40	16,0	018927	0.123	2400	25

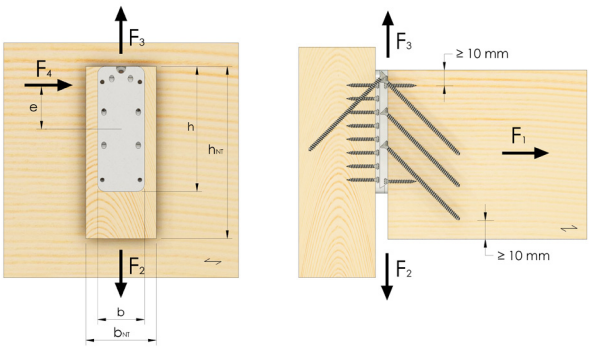
TOP UV full thread screw Ø x L	Full NT $n_{45°}$	Partial NT $n_{45°}$	Minimum timber cross-diameter B_{NT}	H_{NT}	EAN	Weight	Pallet	PU
116100 6,0 x 100	4(+1)	4(+1)	60	120	019009	1.178	39000	100
116120 6,0 x 120	4(+1)	4(+1)	60	130	019016	1.387	39000	100
116140 6,0 x 140	4(+1)	4(+1)	60	145	019023	1.629	39000	100
116160 6,0 x 160	4(+1)	4(+1)	60	160	019030	1.851	26800	100
116200 6,0 x 200	4(+1)	4(+1)	60	190	019047	2.313	26800	100

GH screw Ø x L	Full NT $n_{90°}$	Full HT $n_{90°}$	Partial NT $n_{90°}$	Partial HT $n_{90°}$	EAN	Weight	Pallet	PU
505050 5,0 x 50	2	9	2	5	400029	0.427	72000	200
505060 5,0 x 60	2	9	2	5	400036	0.480	58000	200
505070 5,0 x 70	2	9	2	5	400043	0.554	58000	200

Load directions



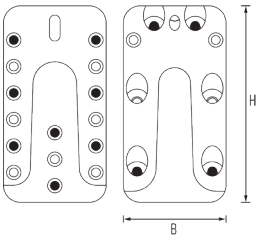
Load attack points



Statics TOP UV 30

Timber / Timber

Art. No.	W(B)	H	T(S)	Secondary beam GH VG 6.0xL [mm]	Main beam GH 5.0xL [mm] 50 $F_{1,R}$	$F_{2,Rk}$	$F_{3,Rk}$	50 e=0 mm $F_{4,Rk}$	50 e=43 mm $F_{4,Rk}$	60 $F_{1,R}$	$F_{2,Rk}$	$F_{3,Rk}$	60 e=0 mm $F_{4,Rk}$	60 e=43 mm $F_{4,Rk}$	70 $F_{1,R}$	$F_{2,Rk}$	$F_{3,Rk}$	70 e=0 mm $F_{4,Rk}$	70 e=43 mm $F_{4,Rk}$
Full screw fitting				100	1,45	19,21	5,31	5,20	1,50	1,76	20,39	5,31	5,44	1,57	2,08	21,22	5,31	5,67	1,64
				120	1,45	19,21	6,53	5,20	1,50	1,76	20,39	6,53	5,44	1,57	2,08	21,57	6,53	5,67	1,64
1104085	40	85	16,0	140	1,45	19,21	7,50	5,20	1,50	1,76	20,39	7,50	5,44	1,57	2,08	21,57	7,50	5,67	1,64
				160	1,45	19,21	8,72	5,20	1,50	1,76	20,39	8,72	5,44	1,57	2,08	21,57	8,72	5,67	1,64
				180	1,45	19,21	9,72	5,20	1,50	1,76	20,39	9,72	5,44	1,57	2,08	21,57	9,72	5,67	1,64
				200	1,45	19,21	9,72	5,20	1,50	1,76	20,39	9,72	5,44	1,57	2,08	21,57	9,72	5,67	1,64
Partial screw fitting				100	1,45	10,67	5,31	5,20	1,50	1,76	11,33	5,31	5,44	1,57	2,08	11,99	5,31	5,67	1,64
				120	1,45	10,67	6,53	5,20	1,50	1,76	11,33	6,53	5,44	1,57	2,08	11,99	6,53	5,67	1,64
1104085	40	85	16,0	140	1,45	10,67	7,50	5,20	1,50	1,76	11,33	7,50	5,44	1,57	2,08	11,99	7,50	5,67	1,64
				160	1,45	10,67	8,72	5,20	1,50	1,76	11,33	8,72	5,44	1,57	2,08	11,99	8,72	5,67	1,64
				180	1,45	10,67	9,72	5,20	1,50	1,76	11,33	9,72	5,44	1,57	2,08	11,99	9,72	5,67	1,64
				200	1,45	10,67	9,72	5,20	1,50	1,76	11,33	9,72	5,44	1,57	2,08	11,99	9,72	5,67	1,64



TOPLINE DCSTATIK ETA-11 0036

NKL 2 Aluminium

TOP UV CONNECTORS

2 UV 40 TIMBER/TIMBER

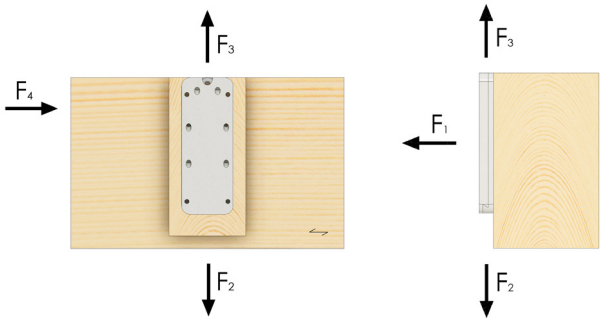
Timber / Timber

Art. No.	Type	Dimensions [mm] W(B) x H x T(S)	Milled groove [mm] Width	Depth	EAN 4019346	Weight kg	Pallet	PU
11060110	UV 40	60 x 115 x 16,0	60	16,0	018903	0.260	2400	25

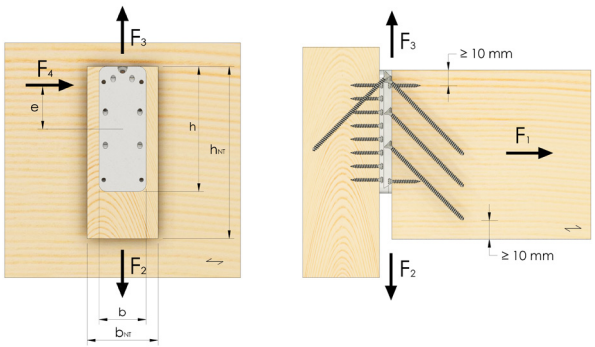
TOP UV full thread screw Ø x L	Full NT $n_{45°}$	Partial NT $n_{45°}$	Minimum timber cross-diameter B_{NT}	H_{NT}				
116100	6,0 x 100	6(+1)	4(+1)	80	175	019009	1.178	39000	100
116120	6,0 x 120	6(+1)	4(+1)	80	185	019016	1.387	39000	100
116140	6,0 x 140	6(+1)	4(+1)	80	200	019023	1.629	39000	100
116160	6,0 x 160	6(+1)	4(+1)	80	215	019030	1.851	26800	100
116200	6,0 x 200	6(+1)	4(+1)	80	245	019047	2.313	26800	100

GH screw Ø x L	Full NT $n_{90°}$	Full HT $n_{90°}$	Partial NT $n_{90°}$	Partial HT $n_{90°}$				
505050	5,0 x 50	2	15	2	8	400029	0.427	72000	200
505060	5,0 x 60	2	15	2	8	400036	0.480	58000	200
505070	5,0 x 70	2	15	2	8	400043	0.554	58000	200

Load directions



Load attack points



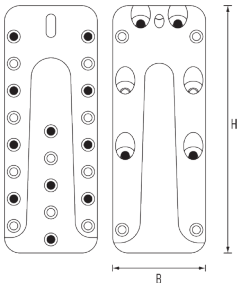
Statics TOP UV 40

Timber / Timber

Art. No.	W(B)	H	T(S)	Secondary beam GH VG 6,0xL [mm]	Main beam GH 5.0xL [mm] 50 $F_{1,R}$	$F_{2,Rk}$	$F_{3,Rk}$	e=0 mm $F_{4,Rk}$	e=43 mm $F_{4,Rk}$	60 $F_{1,R}$	$F_{2,Rk}$	$F_{3,Rk}$	e=0 mm $F_{4,Rk}$	e=43 mm $F_{4,Rk}$	70 $F_{1,R}$	$F_{2,Rk}$	$F_{3,Rk}$	e=0 mm $F_{4,Rk}$	e=43 mm $F_{4,Rk}$
Full screw fitting				100	1,45	31,84	5,31	6,94	2,59	1,76	31,84	5,31	7,25	2,70	2,08	31,84	5,31	7,57	2,82
				120	1,45	32,01	6,53	6,94	2,59	1,76	33,98	6,53	7,25	2,70	2,08	35,96	6,53	7,57	2,82
11060110	60	115	16,0	140	1,45	32,01	7,50	6,94	2,59	1,76	33,98	7,50	7,25	2,70	2,08	35,96	7,50	7,57	2,82
				160	1,45	32,01	8,72	6,94	2,59	1,76	33,98	8,72	7,25	2,70	2,08	35,96	8,72	7,57	2,82
				180	1,45	32,01	9,72	6,94	2,59	1,76	33,98	9,72	7,25	2,70	2,08	35,96	9,72	7,57	2,82
				200	1,45	32,01	9,72	6,94	2,59	1,76	33,98	9,72	7,25	2,70	2,08	35,96	9,72	7,57	2,82
Partial screw fitting				100	1,45	17,07	5,31	5,20	2,18	1,76	18,12	5,31	5,44	2,28	2,08	19,18	5,31	5,67	2,38
				120	1,45	17,07	6,53	5,20	2,18	1,76	18,12	6,53	5,44	2,28	2,08	19,18	6,53	5,67	2,38
11060110	60	115	16,0	140	1,45	17,07	7,50	5,20	2,18	1,76	18,12	7,50	5,44	2,28	2,08	19,18	7,50	5,67	2,38
				160	1,45	17,07	8,72	5,20	2,18	1,76	18,12	8,72	5,44	2,28	2,08	19,18	8,72	5,67	2,38
				180	1,45	17,07	9,72	5,20	2,18	1,76	18,12	9,72	5,44	2,28	2,08	19,18	9,72	5,67	2,38
				200	1,45	17,07	9,72	5,20	2,18	1,76	18,12	9,72	5,44	2,28	2,08	19,18	9,72	5,67	2,38

TOPLINE DCSTATIK ETA-11 0036

NKL 2 Aluminium



TOP UV CONNECTORS

UV 60 TIMBER/TIMBER 2

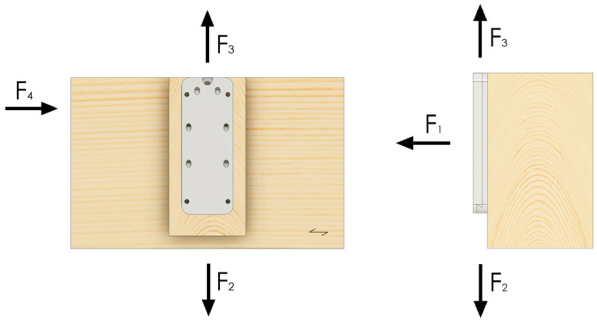
Timber / Timber

Art. No.	Type	Dimensions [mm] W(B) x H x T(S)	Milled groove [mm] Width	Depth	EAN 4019346	Weight kg	Pallet	PU
11060160	UV 60	60 x 160 x 16,0	60	16,0	018941	0.384	960	10

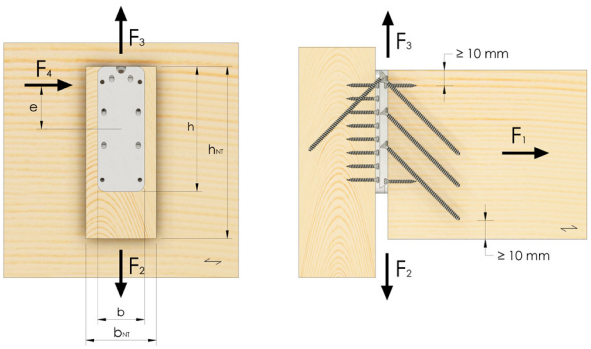
TOP UV full thread screw Ø x L	Full NT $n_{45°}$	Partial NT $n_{45°}$	Minimum timber cross-diameter B_{NT}	H_{NT}	EAN	Weight	Pallet	PU
116100 6,0 x 100	6(+1)	4(+1)	80	175	019009	1.178	39000	100
116120 6,0 x 120	6(+1)	4(+1)	80	185	019016	1.387	39000	100
116140 6,0 x 140	6(+1)	4(+1)	80	200	019023	1.629	39000	100
116160 6,0 x 160	6(+1)	4(+1)	80	215	019030	1.851	26800	100
116200 6,0 x 200	6(+1)	4(+1)	80	245	019047	2.313	26800	100

GH screw Ø x L	Full NT $n_{90°}$	Full HT $n_{90°}$	Partial NT $n_{90°}$	Partial HT $n_{90°}$	EAN	Weight	Pallet	PU
505050 5,0 x 50	4	21	4	11	400029	0.427	72000	200
505060 5,0 x 60	4	21	4	11	400036	0.480	58000	200
505070 5,0 x 70	4	21	4	11	400043	0.554	58000	200

Load directions



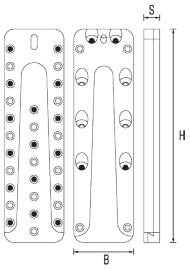
Load attack points



Statics TOP UV 60

Timber / Timber

Art. No.	B	H	S	Secondary beam GH VG 6.0xL [mm]	Main beam GH 5.0xL [mm] 50 $F_{1,R}$	$F_{2,Rk}$	$F_{3,Rk}$	e=0 mm $F_{4,Rk}$	e=43 mm $F_{4,Rk}$	60 $F_{1,R}$	$F_{2,Rk}$	$F_{3,Rk}$	e=0 mm $F_{4,Rk}$	e=43 mm $F_{4,Rk}$	70 $F_{1,R}$	$F_{2,Rk}$	$F_{3,Rk}$	e=0 mm $F_{4,Rk}$	e=43 mm $F_{4,Rk}$
Secondary beam				100	2,90	31,84	5,31	8,67	3,01	3,53	31,84	5,31	9,06	3,15	4,16	31,84	5,31	9,46	3,28
				120	2,90	39,15	6,53	8,67	3,01	3,53	39,15	6,53	9,06	3,15	4,16	39,15	6,53	9,46	3,28
11060160	60	160	16,0	140	2,90	44,81	7,50	8,67	3,01	3,53	45,01	7,50	9,06	3,15	4,16	45,01	7,50	9,46	3,28
				160	2,90	44,81	8,72	8,67	3,01	3,53	47,57	8,72	9,06	3,15	4,16	50,34	8,72	9,46	3,28
				180	2,90	44,81	9,72	8,67	3,01	3,53	47,57	9,72	9,06	3,15	4,16	50,34	9,72	9,46	3,28
				200	2,90	44,81	9,72	8,67	3,01	3,53	47,57	9,72	9,06	3,15	4,16	50,34	9,72	9,46	3,28
Partial screw fitting				100	2,90	21,22	5,31	6,94	2,71	3,53	21,22	5,31	7,25	2,83	4,16	21,22	5,31	7,57	2,95
				120	2,90	23,47	6,53	6,94	2,71	3,53	24,92	6,53	7,25	2,83	4,16	26,10	6,53	7,57	2,95
11060160	60	160	16,0	140	2,90	23,47	7,50	6,94	2,71	3,53	24,92	7,50	7,25	2,83	4,16	26,37	7,50	7,57	2,95
				160	2,90	23,47	8,72	6,94	2,71	3,53	24,92	8,72	7,25	2,83	4,16	26,37	8,72	7,57	2,95
				180	2,90	23,47	9,72	6,94	2,71	3,53	24,92	9,72	7,25	2,83	4,16	26,37	9,72	7,57	2,95
				200	2,90	23,47	9,72	6,94	2,71	3,53	24,92	9,72	7,25	2,83	4,16	26,37	9,72	7,57	2,95



TOPLINE DCSTATIK ETA-11 0036

NKL 2 Aluminium

TOP UV CONNECTORS

2

UV 80 TIMBER/TIMBER

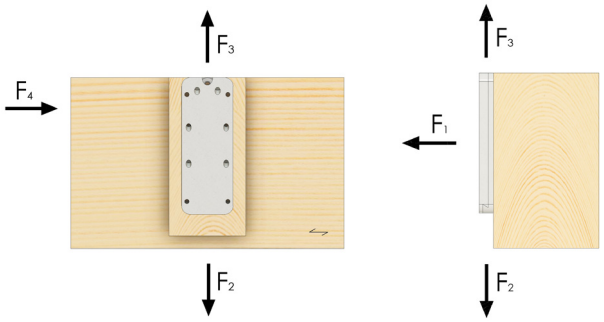
Timber / Timber

Art. No.	Type	Dimensions [mm] W(B) x H x T(S)	Milled groove [mm] Width	Depth	EAN 4019346	Weight kg	Pallet	PU
11060215	UV 80	60 x 215 x 16,0	60	16,0	018965	0.515	960	10

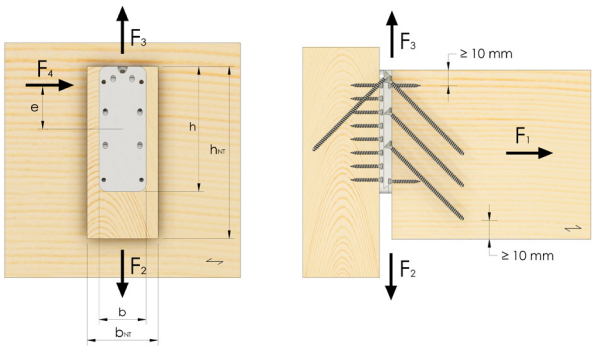
TOP UV full thread screw Ø x L	Full NT $n_{45°}$	Partial NT $n_{45°}$	Minimum timber cross-diameter B_{NT}	H_{NT}				
116100	6,0 x 100	8(+1)	4(+1)	80	215	019009	1.178	39000	100
116120	6,0 x 120	8(+1)	4(+1)	80	230	019016	1.387	39000	100
116140	6,0 x 140	8(+1)	4(+1)	80	245	019023	1.629	39000	100
116160	6,0 x 160	8(+1)	4(+1)	80	260	019030	1.851	26800	100
116200	6,0 x 200	8(+1)	4(+1)	80	285	019047	2.313	26800	100

GH screw Ø x L	Full NT $n_{90°}$	$n_{90°}$	Partial NT $n_{90°}$	HT $n_{90°}$				
505050	5,0 x 50	4	30	4	16	400029	0.427	72000	200
505060	5,0 x 60	4	30	4	16	400036	0.480	58000	200
505070	5,0 x 70	4	30	4	16	400043	0.554	58000	200

Load directions



Load attack points



Statics TOP UV 80

Timber / Timber

Art. No.	W(B)	H	T(S)	Secondary beam GH VG 6.0xL [mm]	Main beam GH 5.0xL [mm] 50 $F_{1,R}$	$F_{2,Rk}$	$F_{3,Rk}$	e=0 mm $F_{4,Rk}$	e=43 mm $F_{4,Rk}$	60 $F_{1,R}$	$F_{2,Rk}$	$F_{3,Rk}$	e=0 mm $F_{4,Rk}$	e=43 mm $F_{4,Rk}$	70 $F_{1,R}$	$F_{2,Rk}$	$F_{3,Rk}$	e=0 mm $F_{4,Rk}$	e=43 mm $F_{4,Rk}$
Full screw fitting																			
11060215	60	215	16,0	100	2,90	42,45	5,31	10,40	3,37	3,53	42,45	5,31	10,88	3,53	4,16	42,45	5,31	11,35	3,68
				120	2,90	52,21	6,53	10,40	3,37	3,53	52,21	6,53	10,88	3,53	4,16	52,21	6,53	11,35	3,68
				140	2,90	60,01	7,50	10,40	3,37	3,53	60,01	7,50	10,88	3,53	4,16	60,01	7,50	11,35	3,68
				160	2,90	64,02	8,72	10,40	3,37	3,53	67,95	8,72	10,88	3,53	4,16	69,77	8,72	11,35	3,68
				180	2,90	64,02	9,72	10,40	3,37	3,53	67,95	9,72	10,88	3,53	4,16	71,91	9,72	11,35	3,68
				200	2,90	64,02	9,72	10,40	3,37	3,53	67,95	9,72	10,88	3,53	4,16	71,91	9,72	11,35	3,68
Partial screw fitting																			
11060215	60	215	16,0	100	2,90	21,22	5,31	6,94	2,78	3,53	21,22	5,31	7,25	2,90	4,16	21,22	5,31	7,57	3,03
				120	2,90	26,10	6,53	6,94	2,78	3,53	26,10	6,53	7,25	2,90	4,16	26,10	6,53	7,57	3,03
				140	2,90	30,01	7,50	6,94	2,78	3,53	30,01	7,50	7,25	2,90	4,16	30,01	7,50	7,57	3,03
				160	2,90	34,14	8,72	6,94	2,78	3,53	34,89	8,72	7,25	2,90	4,16	34,89	8,72	7,57	3,03
				180	2,90	34,14	9,72	6,94	2,78	3,53	36,24	9,72	7,25	2,90	4,16	38,35	9,72	7,57	3,03
				200	2,90	34,14	9,72	6,94	2,78	3,53	36,24	9,72	7,25	2,90	4,16	38,35	9,72	7,57	3,03

Design example timber/concrete connection UV-B 80

Main beam: Reinforced concrete wall; secondary beam: NH C24 10/28
Proof of load capacity same as timber-timber connection

Determination of forces for the concrete with the maximum stress

Anchor forces from load $F_{2,Ed}$: $F_{B,2,lat,Ed} = F_{2/3,Ed} / n_B = 32,0 / 3 = 10,7$ kN

$F_{B,2,ax,Ed} = f_{2/3} \times F_{2/3,Ed} = 0,106 \times 32,0 = 3,39$ kN

Anchor forces from load $F_{4,Ed}$: $F_{B,4,lat,Ed} = f_4 \times F_{4,Ed} = 0,948 \times 1,20 = 1,14$ kN

$F_{B,4,ax,Ed} = 1,2 \times F_{4,Ed} / n_B = 1,2 \times 1,20 / 3 = 0,48$ kN

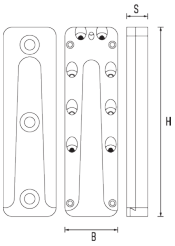
Addition of anchor forces: $F_{B,lat,Ed} = 10,7 + 1,14 = 11,8$ kN

$F_{B,ax,Ed} = 3,39 + 0,48 = 3,87$ kN

The load capacity of the concrete anchor must be verified for the impacts $F_{B,lat,Ed} = 11.8$ kN and $F_{B,ax} = 3.87$ kN.

Connecting element:

Concrete:	Concrete anchor M10	3	units
Secondary beam:	GH screws 5.0 x 60	4	units
	VG screws 6.0 x 160	8	units



TOPLINE DCSTATIK ETA-11 0036

NKL 2 Aluminium

TOP UVB CONNECTORS

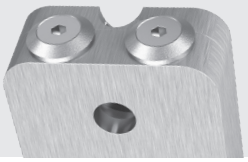
2 UVB 40 TIMBER/CONCRETE

Timber / Concrete

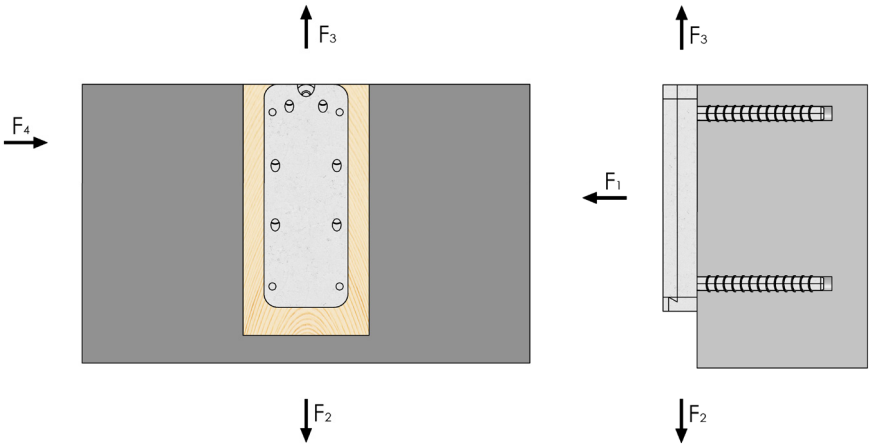
Art. No.	Type	Dimensions [mm] W(B) x H x T(S)	Milled groove [mm] Width	Depth	EAN 4019346	Weight kg	Pallet	PU
12060115	UVB 40	60 x 115 x 24,0	60	24,0	018934	0.400	2400	10

TOP UV full thread screw Ø x L	Full NT $n_{45°}$	Partial NT $n_{45°}$	Minimum timber cross-diameter B_{NT}	H_{NT}				
116100 6,0 x 100	6	4	80	175	019009	1.178	39000	100
116120 6,0 x 120	6	4	80	185	019016	1.387	39000	100
116140 6,0 x 140	6	4	80	200	019023	1.629	39000	100
116160 6,0 x 160	6	4	80	215	019030	1.851	26800	100
116200 6,0 x 200	6	4	80	245	019047	2.313	26800	100
GH screw Ø x L	**Full NT $n_{90°}$**	**Partial NT $n_{90°}$**						
505050 5,0 x 50	2	2			400029	0.427	72000	200
505060 5,0 x 60	2	2			400036	0.480	58000	200
505070 5,0 x 70	2	2			400043	0.554	58000	200

Incl. screws and washers for safety catch

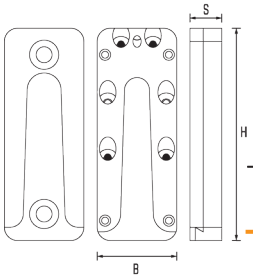


Load directions



TOPLINE DCSTATIK ETA-11 0036

NKL 2 Aluminium



TOP UVB CONNECTORS

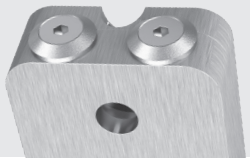
UVB 60 TIMBER/CONCRETE 2

Timber | Concrete

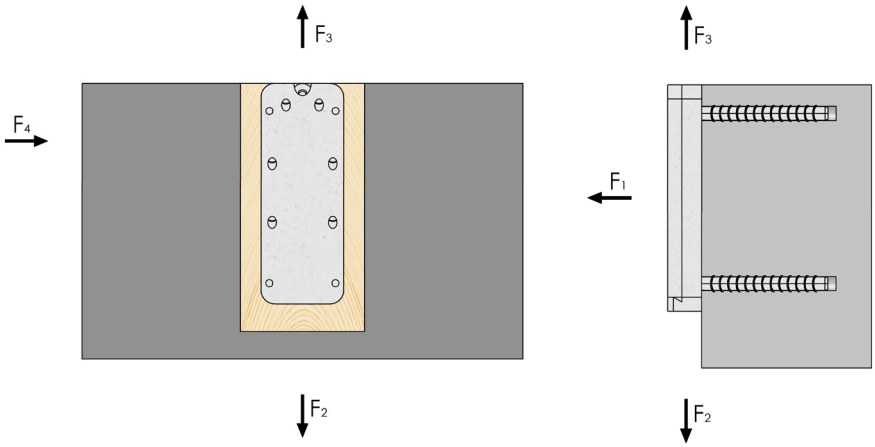
Art. No.	Type	Dimensions [mm] W(B) x H x T(S)	Milled groove [mm] Width	Depth	EAN 4019346	Weight kg	Pallet	PU
12060160	UVB 60	60 x 160 x 24,0	60	24,0	018958	0.574	960	10

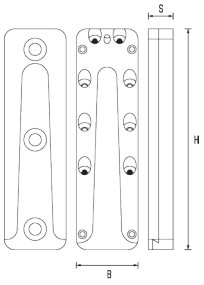
TOP UV full thread screw Ø x L	Full NT $n_{45°}$	Partial NT $n_{45°}$	Minimum timber cross-diameter B_{NT}	H_{NT}	EAN	Weight	Pallet	PU
116100 6,0 x 100	6	4	80	175	019009	1.178	39000	100
116120 6,0 x 120	6	4	80	185	019016	1.387	39000	100
116140 6,0 x 140	6	4	80	200	019023	1.629	39000	100
116160 6,0 x 160	6	4	80	215	019030	1.851	26800	100
116200 6,0 x 200	6	4	80	245	019047	2.313	26800	100
GH screw Ø x L	**Full NT $n_{90°}$**	**Partial NT $n_{90°}$**						
505050 5,0 x 50	4	4			400029	0.427	72000	200
505060 5,0 x 60	4	4			400036	0.480	58000	200
505070 5,0 x 70	4	4			400043	0.554	58000	200

Incl. screws and washers for safety catch



Load directions





TOPLINE DCSTATIK ETA-11 0036

TOP UVB CONNECTORS

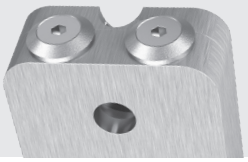
NKL 2 Aluminium

2 UVB 80 TIMBER/CONCRETE

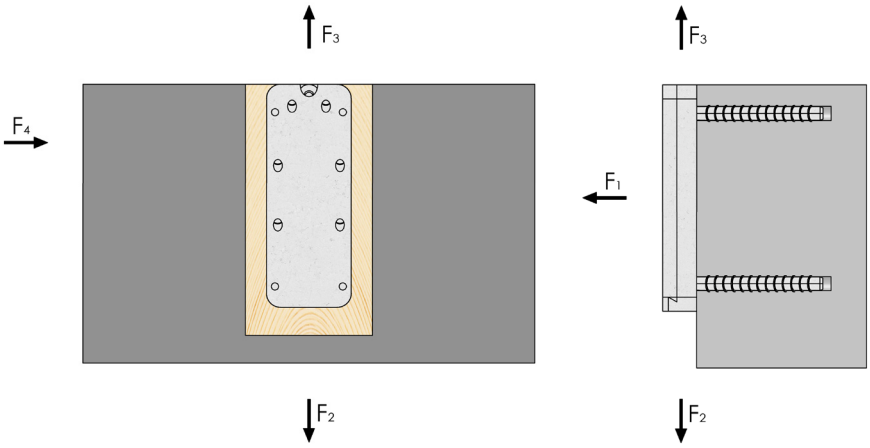
Timber / Concrete

Art. No.	Type	Dimensions [mm] W(B) x H x T(S)	Milled groove [mm] Width	Depth			EAN 4019346	Weight kg	Pallet	PU
12060215	UVB 80	60 x 215 x 24,0	60	24,0			018972	0.774	960	10
TOP UV full thread screw		**Ø x L**	**Full NT $n_{45°}$**	**Partial NT $n_{45°}$**	**Minimum timber cross-diameter B_{NT}**	**H_{NT}**				
116100		6,0 x 100	8	4	80	175	019009	1.178	39000	100
116120		6,0 x 120	8	4	80	185	019016	1.387	39000	100
116140		6,0 x 140	8	4	80	200	019023	1.629	39000	100
116160		6,0 x 160	8	4	80	215	019030	1.851	26800	100
116200		6,0 x 200	8	4	80	245	019047	2.313	26800	100
GH screw		**Ø x L**	**Full NT $n_{90°}$**	**Partial NT $n_{90°}$**						
505050		5,0 x 50	4	4			400029	0.427	72000	200
505060		5,0 x 60	4	4			400036	0.480	58000	200
505070		5,0 x 70	4	4			400043	0.554	58000	200

Incl. screws and washers for safety catch



Load directions



PAY ATTENTION TO THE CE SYMBOL WHEN BUYING TIMBER CONNECTORS

TIPP

The **CE symbol** on the timber connectors from **GH Baubeschläge** is your warranty for safe and tested connectors that comply with the building regulations for the whole of Europe and promises you additional safety under building law.

In our modern production facilities, which are located exclusively in Germany and are which are certified to **ISO 9001:2008** and also subject to external auditing, we can manufacture to a high production standard with great flexibility.

Almost the entire range of GH timber connectors have European technical approvals.

Your GH advantage:

- High quality standard through certification and monitoring
- Pioneering innovations (TOPline)
- Ecological, resource-saving and economical (GREENline)
- Approved products for your safety
- Technical hotline
- CE symbol
- Product training for retail and trade
- ISO 9001:2008 certified production locations in Germany
- Flexible production "Made in Germany"

TOP OV CONNECTORS

2 “SIMPLE AND INGENIOUS”

ADVANTAGES

- Cost savings due to reduction of working time
- No templates required
- Does not weaken the timber cross-section
- For narrow cross-sections (from 60 mm)
- No one-sided load on the main beam
- Connections on both sides possible due to the low contact surface
- For complete ceiling elements in timber framework construction

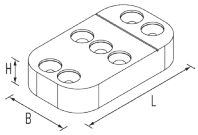
TWO STEPS TO SUCCESS

- In the factory:
  Mill in TOP OV connectors or only position. Mount the TOP OV connectors with maximum 4 tensile and 2 pressure screws on the secondary beam

- On the building site:
  Place the secondary beam in or on the main beam and turn in 2 pressure screws

TOPLINE DCSTATIK ETA-12 0171

NKL 2 Aluminium

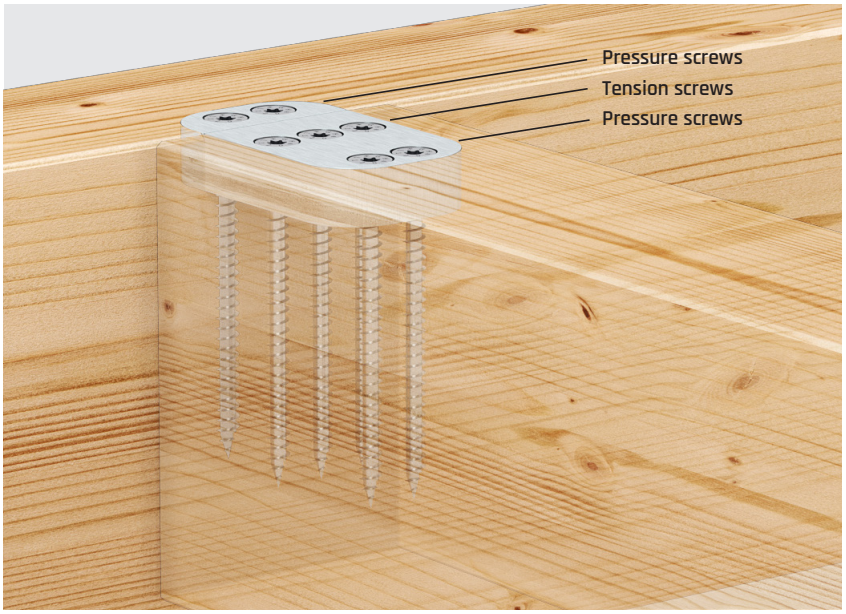


TOP OV CONNECTORS

TIMBER/TIMBER 2

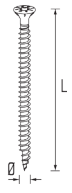
Art. No.	Type	Dimensions [mm]					nH	nN	EAN	Weight	Pallet	PU
		W(B)	x	L	x	H			4019346	kg		
110040	OV 40	40	x	104	x	20	1	3	017692	0.200	480	10
110060	OV 60	60	x	104	x	20	2	5	017708	0.304	480	10
110100	OV 100	100	x	104	x	20	2	6	017722	0.537	480	10

Number of screws required: nH = maximum number of connecting elements in the main beam
nN = maximum number of connecting elements in the secondary beam



TOPLINE DCSTATIK ETA-12 0171

NKL 2 Stahl VZ



TOP-OV

FULL THREAD SCREWS

Art. No.	Dimensions [mm]				EAN	Weight	Pallet	PU
	Ø	x	L	TX	4019346	kg		
110120	8,0	x	120	TX40	017739	3.000	14500	50
110160	8,0	x	160	TX40	017753	3.520	11000	50
110200	8,0	x	200	TX40	017777	4.370	11000	50

TOP OV CONNECTORS

2 TECHNICAL FEATURES

Geometry

W(B)	Width (mm)
H	Height (mm)
T(S)	Material thickness (mm)

Tables

n_{HT}	Number of holes in main beam
n_{NT}	Number of holes in secondary beam
n_v	Number of connecting elements for full screw fitting
HT	Main beam
NT	Secondary beam
H_{HT}	Minimum height of main beam
B_{HT}	Minimum width of main beam
H_{NT}	Minimum height of secondary beam
B_{NT}	Minimum width of secondary beam

Timber connecting element

Ø [mm]	Diameter of connecting element
L [mm]	Length of connecting element
	Grain direction of component

Force directions

$F_{Z,c,Rk}$ ↓	Pressure load directly downward (main load)
$F_{Z,t,RK}$ ↑	Upwards directed, lifting load

User video
for our TOP OV connectors

Aluminium

Usage class 1
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 65% for a few weeks per year, e.g. in the case of buildings that are closed on all sides and heated. Comment: In UC 1, the average moisture content of most softwoods does not exceed 12 %.

Usage class 2
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 85% for a few weeks per year, e.g. in the case of open buildings covered by a roof. Comment: In UC 2, the average moisture content of most softwoods does not exceed 20 %.

Usage class 3
Includes climatic conditions that lead to higher moisture contents than in UC 2, e.g. structures that are exposed to the weather without protection. Eurocode 5 / DIN EN 1995-1-1 section 2.3.1.3

TOP OV CONNECTORS

APPLICATIONS 2

Application:
Timber-timber/steel connection

Materials:

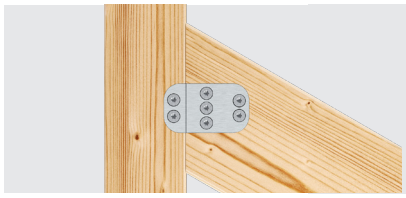
Material thickness:
20 mm

90° inlaid connection

HT / NT

90° butt connection

HT / NT



Angled connection

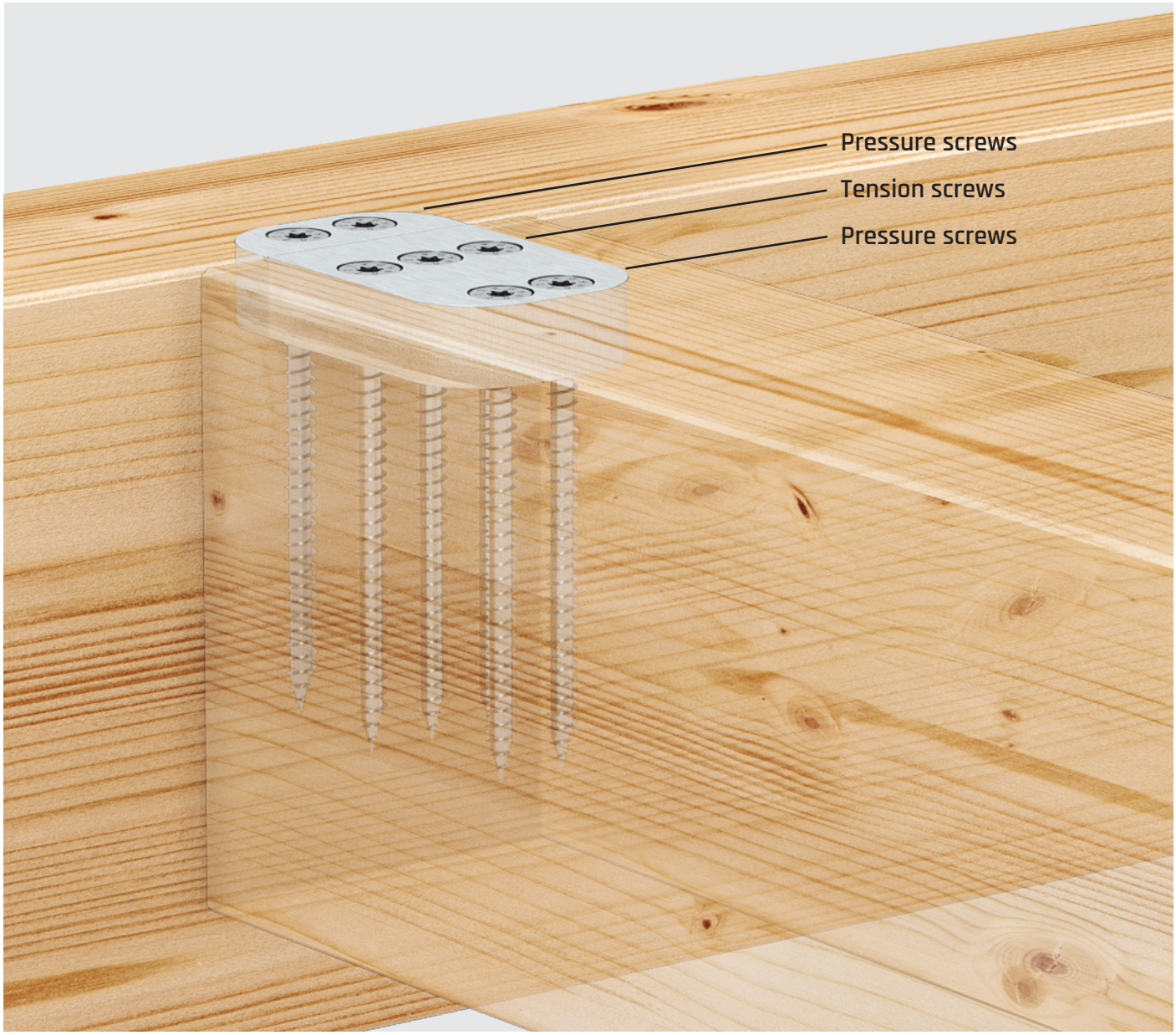
HT / NT

For use in usage classes

Connecting element:
GH OV full thread screws Ø 8.0 x 120 / 140 / 160 / 200 / 220 mm

TOP OV CONNECTORS

2 “SIMPLE AND INGENIOUS”

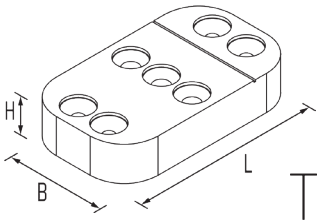


Function of pressure screws
When turning in the OV full thread screws, a thread cuts into the OV connector.
This creates a flush-fitting connection between the OV connector and the OV screw.

Effect of pressure screws
Due to the flush-fit connection, load Fz,down is transferred from the secondary beam via the OV screws into the main beam.

STATICS

TOPLINE DCSTATIK ETA-12 0171



NKL 2 Aluminium

TOP OV CONNECTORS

TIMBER/TIMBER 2

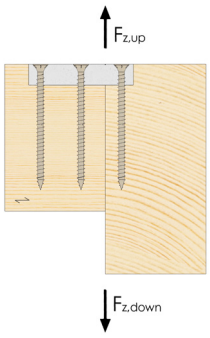
Timber / Timber

Art. No.	Type	Dimensions [mm]					nH	nN	B_{NT}	EAN	Weight	Pallet	PU
		W(B)	x	L	x	H				4019346	kg		
110040	OV 40	40	x	104	x	20	1	3	60	017692	0.200	480	10
110060	OV 60	60	x	104	x	20	2	5	80	017708	0.304	480	10
110100	OV 100	100	x	104	x	20	2	6	120	017722	0.537	480	10

Art. No.	Dimensions [mm]			Minimum height of secondary beam					
	Ø	x	L	OV applied $H_{min\ [mm]}$	OV inlaid $H_{min\ [mm]}$				
110120	8,0	x	120	130	150	017739	3.000	14500	50
110160	8,0	x	160	170	190	017753	3.520	11000	50
110200	8,0	x	200	210	230	017777	4.370	11000	50

nH = number of connectors in the main beam
nN = maximum number of connecting elements in the secondary beam
B_{NT} = minimum width of secondary beam

Load directions



Proof of load capacity
See statics table. For more detailed information on design, see ETA-12/0171

Proof of load capacity
The pressure load-bearing capacity of the screws (OV pressure screws) is limited depending on the diameter. This limit is lower than the tensile load capacity (OV tension screws).

The load-bearing capacity for buckling is a pure steel component and is therefore not dependent on the KLED. In the design situation, the thread load-bearing capacity is always lower than the buckling load-bearing capacity (k_mod). With the characteristic load-bearing capacity, buckling is already decisive with shorter screws.

General information
One-sided connection
The main beam must be secured against twisting.

The load capacities in the table apply to timbers with a characteristic raw density of ρ_k at least 350 kg/m³. For timber with a high raw density, the values in the table can be used to be on the safe side.

Timber / Timber

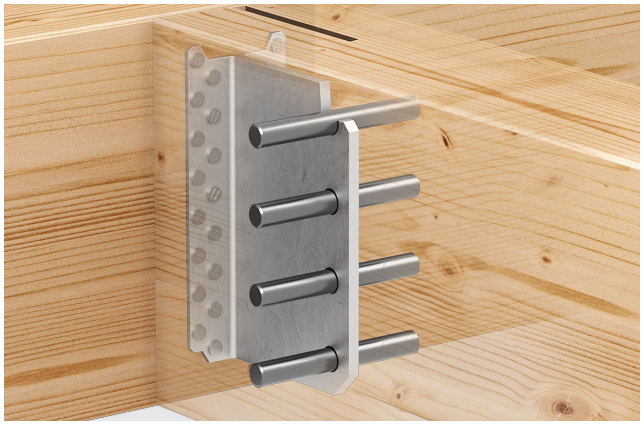
Art. No.	Type	W(B)	L	H	n_{HT}	n_{NT}		GH VG screw 8.0 x L [mm] 120	160	200
110040	OV 40	40	104	20	1	3	$F_{Z,c,Rk}$	10,06	13,62	15,11
							$F_{Z,t,Rk}$	2,40	2,40	2,40
110060	OV 60	60	104	20	2	5	$F_{Z,c,Rk}$	15,10	20,44	25,42
							$F_{Z,t,Rk}$	3,60	3,60	3,60
110100	OV 100	100	104	20	2	6	$F_{Z,c,Rk}$	20,13	27,25	27,82
							$F_{Z,t,Rk}$	6,00	6,00	6,00

2

INTEGRAL CONNECTORS/BEAM HANGERS

ADVANTAGES OF INTEGRAL CONNECTORS

- Assembly fix tab for simple, quick assembly
- Invisible, attractive look
- Customised angled connection of 30° to 90°.



ADVANTAGES OF BEAM HANGERS

- For connection to timber and concrete
- Simple, quick assembly
- Invisible, attractive look
- Narrow geometry
- Angled connections possible
- Fire resistant requirements are met

INTEGRAL CONNECTORS/BEAM HANGERS

2 TECHNICAL FEATURES

Geometry

H	Height (mm)
D(T)	Depth (mm)
W(B)	Width (mm)
T(S)	Material thickness (mm)

Tables

HT	Main beam
H_{NT}	Minimum height of secondary beam
NT	Secondary beam
B_{NT}	Minimum width of secondary beam
n_{HT}	Number of holes in main beam
n_{NT}	Number of holes in secondary beam
n_{a}	Number of connecting elements
$n_{a\,Ø}$	Number of connecting elements with Ø
L_S	Length of self-drilling rod dowels

Timber connecting element

Ø [mm]	Diameter of connecting element
L [mm]	Length of connecting element
	Grain direction of component

Connecting element concrete/ steel

Bo	Dowel/bolt

Force directions

$F_{2,Rk}$ ↓	Force in insertion direction (main load)
$F_{1,rk}$ ↑	Force against insertion direction (lifting load)

Aluminium

Steel with indication of the steel quality and galvanisation

Timber/timber connection

Timber/concrete connection

Usage class 1
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 65% for a few weeks per year, e.g. in the case of buildings that are closed on all sides and heated. Comment: In UC 1, the average moisture content of most softwoods does not exceed 12 %.

Usage class 2
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 85% for a few weeks per year, e.g. in the case of open buildings covered by a roof. Comment: In UC 2, the average moisture content of most softwoods does not exceed 20 %.

Usage class 3
Includes climatic conditions that lead to higher moisture contents than in UC 2, e.g. structures that are exposed to the weather without protection. Eurocode 5 / DIN EN 1995-1-1 section 2.3.1.3

INTEGRAL CONNECTORS/BEAM HANGERS

APPLICATIONS 2

Application:
Connection timber-timber/concrete*/ steel*

*Beam hangers only

Materials: 250 GD Z275 | Al Aluminium

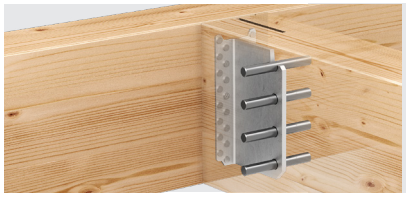
Material thickness:
Integral connectors 3,0/6,0 mm
Beam hangers 6,0/10,0 mm

Integral connectors 2-row

HT / NT

Beam hangers on timber

HT / NT



Integral connectors 4-row

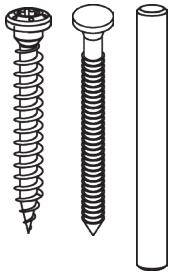
HT / NT

Beam hangers on concrete

HT / NT

For use in usage classes

NKL 1 NKL 2



Connecting element:
GH threaded nails Ø 4,0 X 35 / 40 / 50 / 60 / 75 / 100 mm
Ø 6,0 x 60 / 80 / 100 mm*
GH screws Ø 5,0 x 25 / 35 / 40 / 50 / 60 / 70 mm
Rod dowels
Bolts, dowels, concrete anchors Ø8, Ø 16*

*Only joist hanger type Combi Maxi SD 16

Connecting elements from page 274

INTEGRAL CONNECTORS/BEAM HANGERS

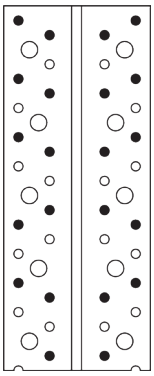
2

LOAD DIRECTIONS

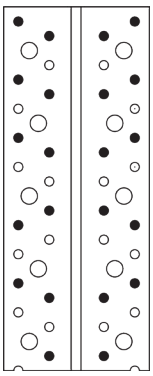
Timber/timber connection
Partial and full nail fitting or partial and full screw fitting

Nail patterns

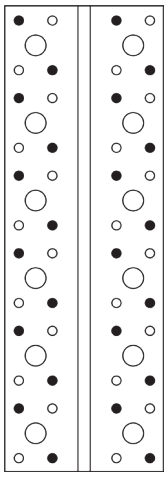
Beam hanger Alu Combi



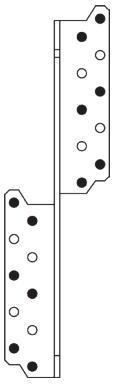
Beam hanger Alu Combi SD



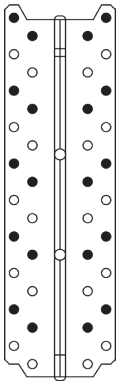
Beam hanger Alu Combi Maxi SD



Integral connectors 2-row



Integral connectors 4-row

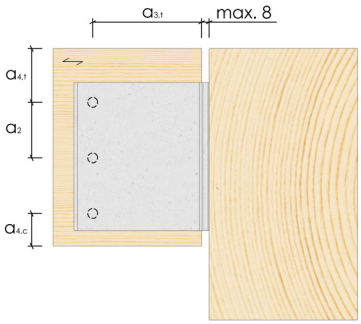


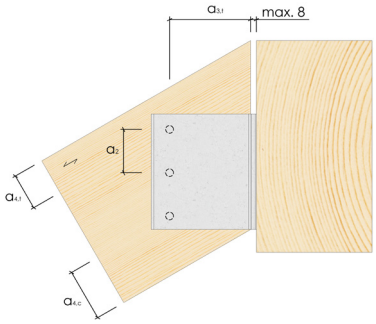
Connection over intermediate layers
The characteristic load capacities for the connection indicated in the tables also apply to an intermediate layer.

The following conditions must be met:
The intermediate layer must be connected to the timber component without being able to be moved.
The integration depth of the connecting element in the timber component must be the same or greater.
For this, a correspondingly long connecting element must be used.
The characteristic perforation strength $f_{h,k}$ of the connecting element in the intermediate layer must be the same of greater.

INTEGRAL CONNECTORS/BEAM HANGERS

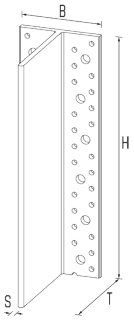
MINIMUM AND EDGE SPACING 2





			Rod dowels Ø 12 mm
a_2	Right angle to the grain direction	3d	36 mm
$a_{3,t}$	End grain with stress	max (7d; 80 mm)	84 mm
$a_{4,t}$	Loaded edge	max [(2+2sinα) d; 3d]	48 mm
$a_{4,c}$	Unloaded edge	3d	36 mm

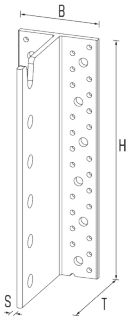
Connection to masonry, concrete or steel
Proof of the dowel's load-bearing capacity must be provided separately in accordance with the manufacturer's specifications.



BEAM HANGERS

2 TYPE ALU COMBI

Art. No.	Dimensions [mm]							nH	nH	EAN	Weight	Pallet	PU		
	H	x	W(B)	x	D(T)	x	T(S)	Ø 5	Ø 9	4019346	kg				
30400	80	x	80	x	109,4	x	6,0	14	4	105207	0.232	750	25	■	■
30401	120	x	80	x	109,4	x	6,0	22	6	105214	0.337	750	25	■	■
30402	160	x	80	x	109,4	x	6,0	30	8	105221	0.454	750	25	■	■
30403	200	x	80	x	109,4	x	6,0	38	10	105238	0.562	450	15	■	■
30404	240	x	80	x	109,4	x	6,0	46	12	105245	0.674	450	15	■	■
30422	2200	x	80	x	109,4	x	6,0	362	110	105252	6.178	48	1	■	■



BEAM HANGERS

TYPE ALU COMBI SD Ø12

Art. No.	Dimensions [mm]							nH		nBo	EAN	Weight	Pallet	PU		
	H	x	W(B)	x	D(T)	x	T(S)	Ø 5	Ø 9	Ø 13	4019346	kg				
30601	120	x	80	x	109,4	x	6,0	22	6	3	104309	0.350	600	25	■	■
30602	160	x	80	x	109,4	x	6,0	30	8	4	104316	0.460	600	25	■	■
30603	200	x	80	x	109,4	x	6,0	38	10	5	104323	0.570	360	15	■	■
30604	240	x	80	x	109,4	x	6,0	46	12	6	104330	0.690	360	15	■	■
30605	280	x	80	x	109,4	x	6,0	54	14	7	104347	0.770	360	15	■	■
30606	320	x	80	x	109,4	x	6,0	62	16	8	104354	0.850	192	8	■	■
30607	360	x	80	x	109,4	x	6,0	70	18	9	104361	0.920	192	8	■	■

TYPE ALU COMBI 2

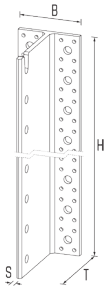
Timber / Timber

Art. No.	Dimensions [mm]				Secondary beam				Main beam		
	H	W(B)	D(T)	T(S)	H_{NT}	B_{NT}	$n_{a,Ø7}$	L_S	n_a	4.0x60	$F_{2,rk}$
30400	80	80	109,4	6,0	120	120	3	113	14	Full	9,10
									10	Partial	7,40
30401	120	80	109,4	6,0	160	120	4	113	22	Full	16,60
									14	Partial	14,60
30402	160	80	109,4	6,0	200	120	5	113	30	Full	25,70
									18	Partial	20,60
30403	200	80	109,4	6,0	240	120	7	113	38	Full	36,70
									22	Partial	27,20
30404	240	80	109,4	6,0	280	120	9	113	46	Full	50,00
									26	Partial	34,40

TYPE ALU COMBI SD Ø12

Timber / Timber

Art. No.	Dimensions [mm]				Secondary beam			Main beam		
	H	W(B)	D(T)	T(S)	H_{NT}	B_{NT}	$n_{a,Ø12}$	n_a	4.0x60	$F_{2,rk}$
30601	120	80	109,4	6,0	160	120	3	22	Full	23,10
								14	Partial	18,10
30602	160	80	109,4	6,0	200	120	4	30	Full	34,60
								18	Partial	26,20
30603	200	80	109,4	6,0	240	120	5	38	Full	46,60
								22	Partial	34,60
30604	240	80	109,4	6,0	280	120	6	46	Full	59,80
								26	Partial	43,70
30605	280	80	109,4	6,0	320	140	7	54	Full	77,20
								30	Partial	53,50
30606	320	80	109,4	6,0	360	140	8	62	Full	93,20
								34	Partial	63,70
30607	360	80	109,4	6,0	400	160	9	70	Full	112,00
								38	Partial	79,40



KONSTRULINE

ETA-16
0044

NKL 2

Al
Aluminium

BEAM HANGERS

2 TYPE ALU COMBI MAXI SD Ø16

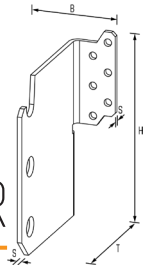
Art. No.	Dimensions [mm]							nH		nN	EAN	Weight	Pallet	PU		
	H	x	W(B)	x	D(T)	x	T(S)	Ø 7,5	Ø 17	Ø 17	4019346	kg				
30800	384	x	130	x	172	x	10,0	48	12	6	104378	3.160	96	1	■	■
30801	512	x	130	x	172	x	10,0	64	16	8	104385	4.200	80	1	■	■
30802	640	x	130	x	172	x	10,0	80	20	10	104392	5.220	64	1	■	■
30803	768	x	130	x	172	x	10,0	96	24	12	104408	6.280	48	1	■	■
30822	2176	x	130	x	172	x	10,0	272	68	34	104415	17.400		1	■	■

TYPE ALU COMBI MAXI SD Ø16

2

Timber / Timber

Art. No.	Dimensions [mm]				Secondary beam			Main beam		
	H	W(B)	D(T)	T(S)	H_{NT}	B_{NT}	$n_{a,Ø16}$	n_a	6.0x100	$F_{2,rk}$
30800	384	130	172	10,0	432	160	6	48	Full	117,30
								24	Partial	58,60
30801	512	130	172	10,0	560	160	8	64	Full	172,10
								32	Partial	95,90
30802	640	130	172	10,0	688	160	10	80	Full	212,20
								40	Partial	136,70
30803	768	130	172	10,0	816	160	12	96	Full	258,20
								48	Partial	179,30



TOPLINE DCSTATIK ETA-10 0009

INTEGRAL CONNECTOR

NKL 2 250 GD Z275

2 2-ROW TYPE M (ASSEMBLY FIX TAB)

Art. No.	Type	Dimensions [mm]							nH	nBo	EAN	Weight	Pallet	PU		
		H	x	W(B)	x	D(T)	x	T(S)	Ø 5	Ø 13	4019346	kg				
30200	MO	84	x	60	x	98	x	3,0 / 6,0	8	2	105061	0.195	1200	25	■	
30201	MI	124	x	60	x	98	x	3,0 / 6,0	12	3	105078	0.295	900	25	■	
30202	MII	164	x	60	x	98	x	3,0 / 6,0	16	4	105085	0.395	1000	25	■	
30203	MIII	204	x	60	x	98	x	3,0 / 6,0	20	5	105092	0.495	600	25	■	
30204	MIIII	244	x	60	x	98	x	3,0 / 6,0	24	6	105108	0.595	600	25	■	

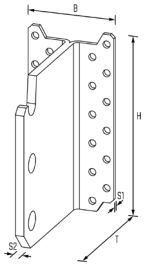
Slot width in secondary beam: 6.0 mm

2-ROW TYPE M (ASSEMBLY FIX TAB)

2

Timber / Timber

Art. No.	Dimensions [mm]				Secondary beam			Main beam			
	H	W(B)	D(T)	T(S)	H_{NT}	B_{NT}	$n_{a,ø12}$	n_a	4.0x60	F2,rk	F1,rk
30200	84	60	98	3,0	108	60	2	8	Full	6,17	2,73
							2	4	Partial	2,93	1,15
						80	2	8	Full	6,38	2,73
							2	4	Partial	3,03	1,15
						100	2	8	Full	6,83	2,73
							2	4	Partial	3,24	1,15
						120	2	8	Full	7,44	2,73
							2	4	Partial	3,53	1,15
30201	124	60	98	3,0	144	60	3	12	Full	12,14	8,06
							3	8	Partial	10,05	6,80
						80	3	12	Full	12,54	8,32
							3	8	Partial	10,38	7,03
						100	3	12	Full	13,44	8,92
							3	8	Partial	11,12	7,53
						120	3	12	Full	14,63	9,71
							3	8	Partial	12,11	8,20
30202	164	60	98	3,0	180	60	4	16	Full	19,36	15,17
							4	8	Partial	13,78	10,57
						80	4	16	Full	20,00	15,67
							4	8	Partial	13,78	10,92
						100	4	16	Full	21,43	16,80
							4	8	Partial	13,78	11,70
						120	4	16	Full	22,47	18,29
							4	8	Partial	13,78	12,56
30203	204	60	98	3,0	216	60	5	20	Full	26,06	23,65
							5	12	Partial	20,66	16,22
						80	5	20	Full	26,92	24,43
							5	12	Partial	20,66	16,76
						100	5	20	Full	28,84	25,77
							5	12	Partial	20,66	17,96
						120	5	20	Full	31,41	25,77
							5	12	Partial	20,66	19,55
30204	244	60	98	3,0	252	60	6	24	Full	34,85	33,07
							6	12	Partial	20,66	20,66
						80	6	24	Full	36,00	33,35
							6	12	Partial	20,66	20,66
						100	6	24	Full	38,57	33,35
							6	12	Partial	20,66	20,66
						120	6	24	Full	38,77	33,35
							6	12	Partial	20,66	20,66



DCSTATIK

ETA-10 0009

NKL 2

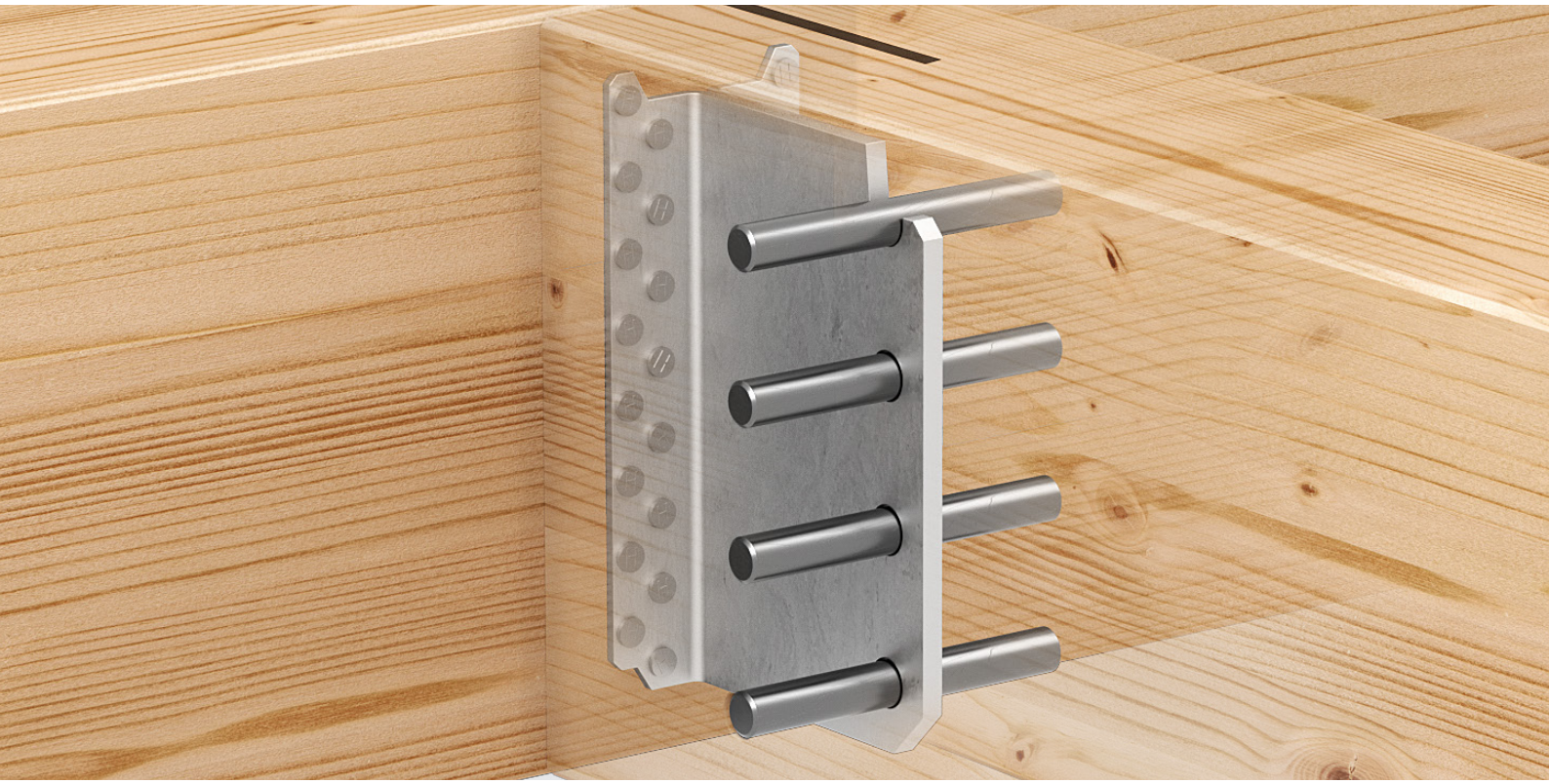
250 GD Z275

INTEGRAL FASTENER

2 4-ROW TYPE M (ASSEMBLY FIX TAB)

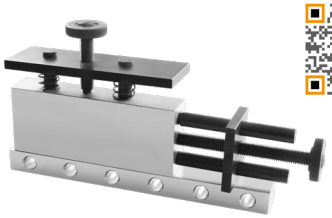
Art. No.	Type	Dimensions [mm]									nH	nBo	EAN	Weight	Pallet	PU		
		H	x	W(B)	x	D(T)	x	T1(S1)	x	T2(S2)	Ø 5	Ø 13	4019346	kg				
302004	M0-4	84	x	60	x	98	x	3	x	6	16	2	479704	0.390	1000	25	■	
302014	MI-4	124	x	60	x	98	x	3	x	6	24	3	479711	0.590	1000	25	■	
302024	MII-4	164	x	60	x	98	x	3	x	6	32	4	479728	0.790	1000	25	■	
302034	MIII-4	204	x	60	x	98	x	3	x	6	40	5	479735	0.990	600	25	■	
302044	MIIII-4	244	x	60	x	98	x	3	x	6	48	6	479742	1.190	600	25	■	

Slot width in secondary beam: 6.0 mm



TOOLS

INTEGRAL CONNECTOR DRILLING TEMPLATE



Art. No.	EAN	Weight	PU
	4019346	kg	
33000120	000731	2.100	1

4-ROW TYPE M (ASSEMBLY FIX TAB)

Timber / Timber

Art. No.	Dimensions [mm]				Secondary beam			Main beam			
	H	W(B)	D(T)	T(S)	H_{NT}	B_{NT}	$n_{a,ø12}$	n_a	4.0x60	F2,rk	F1,rk
302004	84	60	98	6,0	108	60	2	16	Full	9,00	5,28
							2	8	Partial	6,70	1,57
						80	2	16	Full	9,30	5,28
							2	8	Partial	6,92	1,57
						100	2	16	Full	9,45	5,28
							2	8	Partial	7,41	1,57
						120	2	16	Full	9,45	5,28
							2	8	Partial	8,07	1,57
302014	124	60	98	6,0	144	60	3	24	Full	16,43	13,92
							3	12	Partial	12,98	7,32
						80	3	24	Full	16,97	14,38
							3	12	Partial	13,40	7,57
						100	3	24	Full	18,19	15,16
							3	12	Partial	14,36	8,11
						120	3	24	Full	19,80	15,16
							3	12	Partial	15,27	8,83
302024	164	60	98	6,0	180	60	4	32	Full	27,31	23,75
							4	16	Partial	19,36	12,98
						80	4	32	Full	28,21	24,54
							4	16	Partial	20,00	13,40
						100	4	32	Full	30,23	26,19
							4	16	Partial	21,43	14,36
						120	4	32	Full	31,81	26,19
							4	16	Partial	23,34	15,64
302034	204	60	98	6,0	216	60	5	40	Full	39,76	36,31
							5	20	Partial	26,06	20,61
						80	5	40	Full	41,08	36,99
							5	20	Partial	26,92	21,30
						100	5	40	Full	43,50	36,99
							5	20	Partial	28,84	22,82
						120	5	40	Full	43,50	36,99
							5	20	Partial	31,41	24,85
302044	244	60	98	6,0	252	60	6	48	Full	50,33	46,77
							6	24	Partial	33,17	29,30
						80	6	48	Full	52,00	48,32
							6	24	Partial	34,27	30,27
						100	6	48	Full	55,72	50,52
							6	24	Partial	36,72	32,44
						120	6	48	Full	58,07	50,52
							6	24	Partial	39,99	34,86

INTEGRAL CONNECTOR

2 TYPE M FOR ANGLED CONNECTION FROM 30° - 90°

NKL 2

250 GD Z275

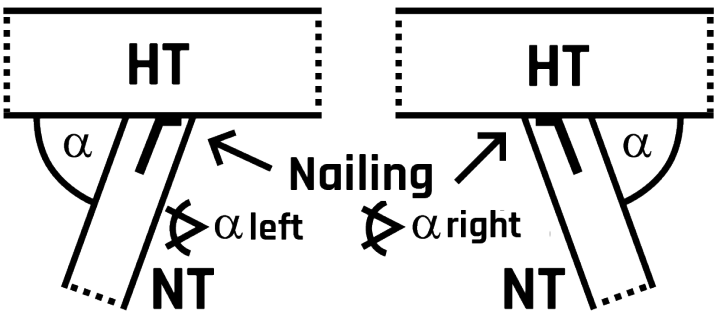
Art. No.	Type	Dimensions [mm]							nH	nBo	EAN	Weight	PU		
		H	x	W(B)	x	D(T)	x	T(S)	Ø 5	Ø 13	4019346	kg			
30200R	0-R	84	x	30	x	98	x	3,0 / 6,0	8	2	105306	0.195	1	■	
30200L	0-L	84	x	30	x	98	x	3,0 / 6,0	8	2	595053	0.195	1	■	
30201R	I-R	124	x	30	x	98	x	3,0 / 6,0	12	3	105320	0.295	1	■	
30201L	I-L	124	x	30	x	98	x	3,0 / 6,0	12	3	595060	0.295	1	■	
30202R	II-R	164	x	30	x	98	x	3,0 / 6,0	16	4	105344	0.395	1	■	
30202L	II-R	164	x	30	x	98	x	3,0 / 6,0	16	4	595077	0.395	1	■	
30203R	III-R	204	x	30	x	98	x	3,0 / 6,0	20	5	105368	0.495	1	■	
30203L	III-R	204	x	30	x	98	x	3,0 / 6,0	20	5	595084	0.495	1	■	
30204R	IIII-R	244	x	30	x	98	x	3,0 / 6,0	24	6	105382	0.595	1	■	
30204L	IIII-L	244	x	30	x	98	x	3,0 / 6,0	24	6	595091	0.595	1	■	

Slot width in secondary beam: 6.0 mm

Set up costs per degree and attachment direction

30210	Set up costs										105405		1		

Angled connections left/right of 30° - 90° are available



CUSTOMISED PRODUCTION

WITHIN 24 HOURS WITH MODERN MACHINES

CUSTOMISE PARTS ACCORDING TO DRAWING WITHIN 24 HOURS.

Our special service also includes the manufacture of **customised parts according to drawings**, which we produce by keeping perforated sheet metal panels and cut-to-size parts in stock, with prefabricated semi-finished products for joist hangers and many other parts lists with modern machinery. With our welding robot, Trumpf laser, folding benches, impact shears and several small punching machines, we can produce everything the carpenter needs in the shortest possible time in order to be able to react quickly to changes in the building without the risk of costly downtime.

Whether it's 1 piece or 100 pieces, we can generally produce customised parts on request within 24 hours and send them in consultation directly to your customer's building site.

GREENLINE

ECOLOGICAL, RESOURCE-SAVING AND ECONOMICAL

The **GH** "**GREEN**LINE" product series has been committed for the past 14 years, alongside the successful innovative **"TOP**LINE" series, to an increasingly important aspect for the future with the aim manufacturing products with almost unchanged or even better static values in a resource-saving way.

Because huge emissions of approx. 1.7 tonnes CO2 per tonne of steel are generated in steel production, we already started years ago to search for ways of achieving a reduction in emissions.

Thanks to new production processes and special materials with higher strength, we have been able to offer **GREEN**LINE articles with reduced cross-sections, and thereby save approx. **7,300 tonnes of CO2 in the past 14 years** in comparison to the previous conventional standard products.

To make things clearer, this corresponds to annual emissions savings of CO2 for the energy needs of around 1000 German citizens. (Source: https://de.statista.com/IEA)

In addition to making ecological sense, this is also economically advantageous for everyone involved and saves transport costs that have not yet been included in the calculation.

As the first manufacturer with joist hangers in 1.5 mm and the already established bracing strip in 1.5 mm, more **GREEN**LINE products followed over the years such as standard angle brackets, KR brackets, rafter anchors and nail plates.

In most cases, we have also succeeded in achieving the same or even better static values than conventional standard connectors, and at even more lucrative value for money.

ANGLE BRACKETS TYPE KR 90 E

ETA-09 0324 · S. 124

JOIST HANGERS TOP/TOP-M

ETA-08 0264 · DC · S. 32

JOIST HANGER TOP K 50

ETA-08 0264 · DC · S. 36

JOIST HANGER TYPE 04 INTERNAL

ETA-08 0264 · DC · S. 50

JOIST HANGER TYPE 04 EXTERNAL

ETA-08 0264 · DC · S. 38

ANGLE BRACKETS TYPE 70/90/105

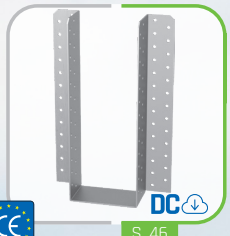
ETA-13 0900 · S. 122

JOIST HANGER TYPE 05 INTERNAL

ETA-08 0264 · DC · S. 56

MADE IN GERMANY

JOIST HANGER TYPE 05 EXTERNAL



ETA-08 0264 · DC · S. 46

CONNECTORS TOP 80/120 VARIO

ETA-09 0322 · S. 184

CONNECTORS TOP 80/120

ETA-09 0322 · S. 120

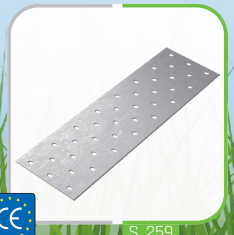
RAFTER ANCHOR RL-D

ETA-10 0007 · S. 228

BRACING STRIP TYPE Z

EN 14545 · S. 266

NAIL PLATES



EN 14545 · S. 259

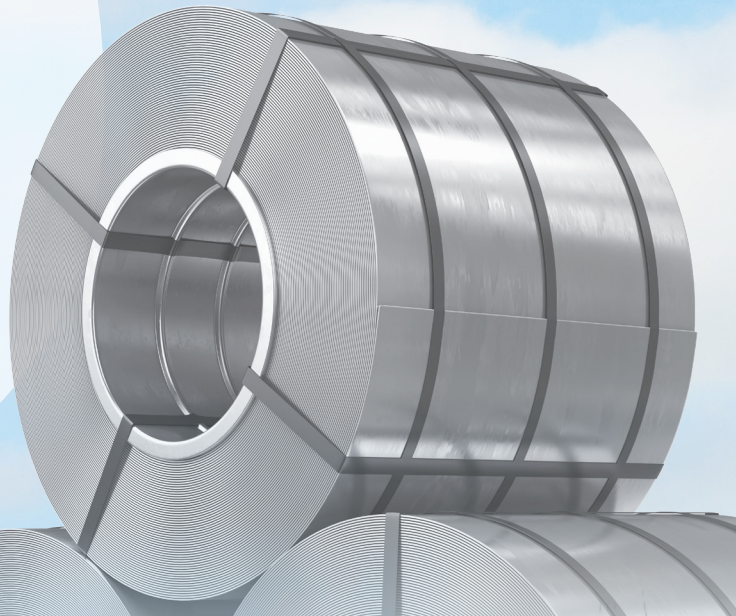
WE HAVE BEEN PRODUCING CO2 NEUTRAL FOR MORE THAN 14 YEARS

Covering an area of approx. **4300 square metres**, which is around the size of a football pitch, our photovoltaic system produces approx. **300,000 kWh per year**, which goes far beyond our own needs for production and management in Weilheim.
This corresponds to an average annual consumption of around 85 households.

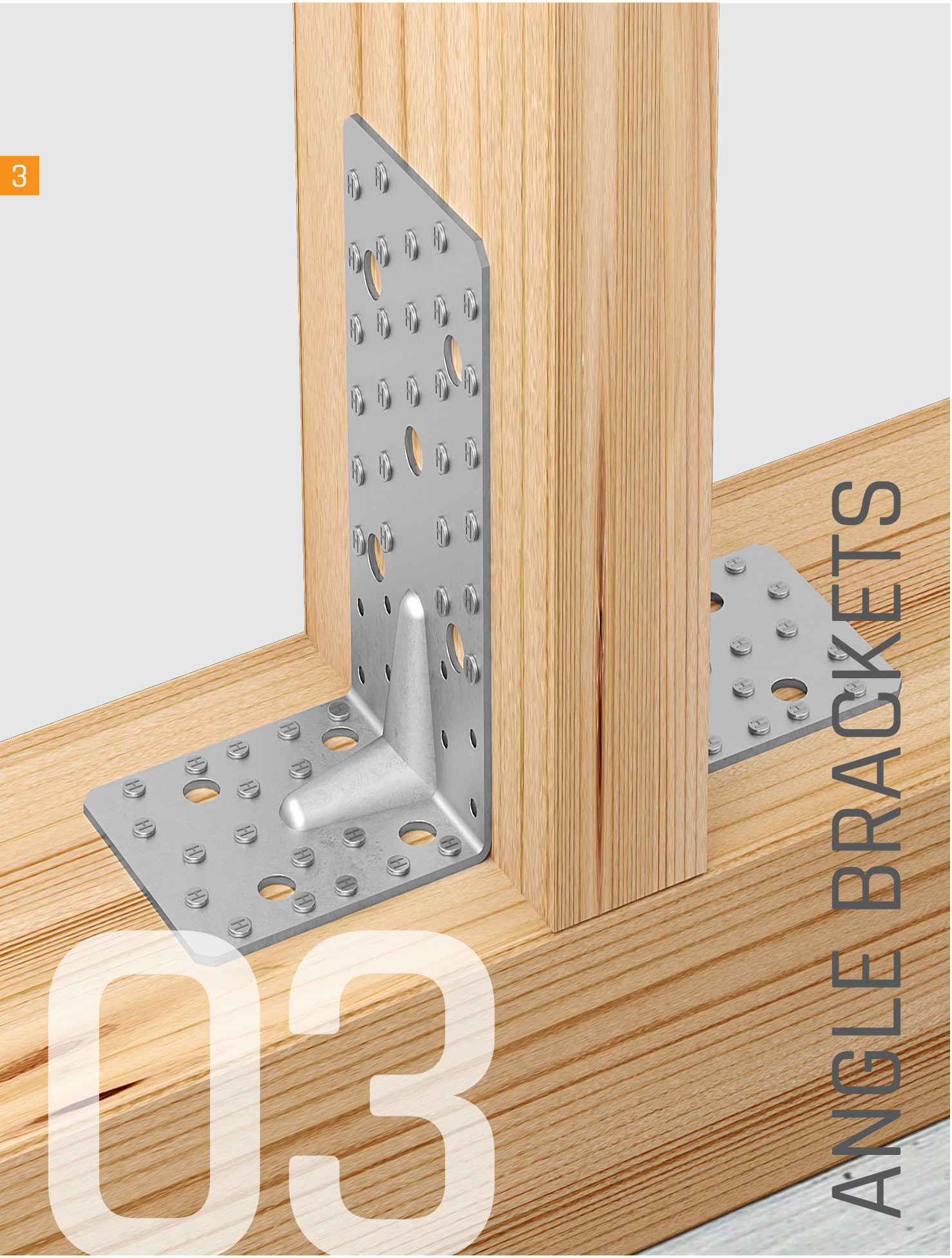
Since 2020, we have started switching to electric or hybrid company vehicles and, as part of this process, we have already installed two charging stations at our company headquarters in Weilheim, which are available to our visitors and employees.

In order to take another huge step towards the low-emissions production of tomorrow, in future we will be using so-called **"green steel"** in our production.
In the coming years, this steel is set to replace conventional steel production with a high proportion of coal, at least in Germany, with low-emission or even emission-free manufacturing processes.

IN 14 YEARS: 7,300 T CO2 AVOIDED. THAT CORRPONDS TO 4,300,000 KG MATERIAL SAVINGS!



SUSTAINABILITY IS MORE THAN JUST A WORD!



03 ANGLE BRACKETS

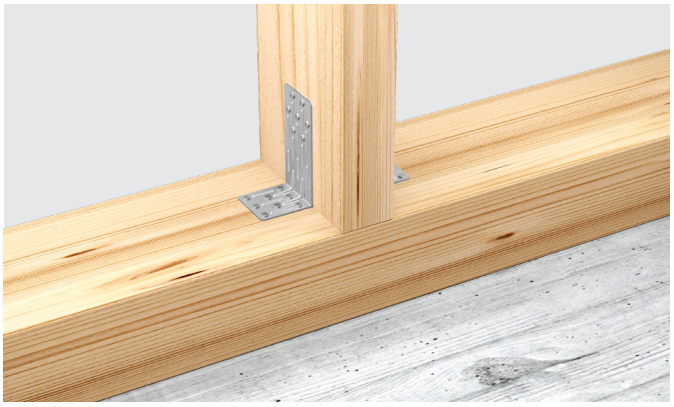
GREENLINE TOPLINE

ANGLE BRACKETS

ANGLE BRACKETS TOP 80 / TOP 120

Advantages

- No bothersome centre rib during processing
- Optimised hole pattern
- Full nail fitting always possible
- High stability due to special, discreet corrugation
- Type 80 as an alternative to the “size 90 bracket”
- **GREEN**LINE = resource-saving manufacturing

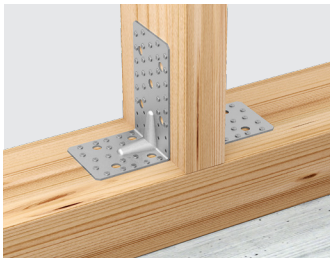


Introduction to statics **from page 110** / Products & statics **from page 120**

ANGLE BRACKET 110/170 S

Advantages

- Universal use for higher loads
- 9 bolt holes Ø 13 mm
- Perfectly suited to take loads F_2 and F_3



Introduction to statics **from page 110** / Products & statics **from page 132**

ANGLE BRACKET TOP KR 90E (EXTRA)

Advantages

- 40 % lighter in comparison to 90 x 90 x 65 x 2.5 mm
- High stability due to raised edge on both sides
- Versatile in use
- Alternative to different brackets such as 70 x 70 x 55 mm and 90 x 90 x 65 mm (for use under consideration of the necessary loads)
- Very good for loads due to the outer rib F_2/F_3 and F_1 suitable

Introduction to statics **from page 110** / Products & statics **from page 124**

ANGLE BRACKETS KR

Advantages

- For connections between timber/timber; timber/concrete For use on timber/masonry etc.
- Due to the ribs in the bending radius, KR angle brackets are very sturdy, economical and affordable in use for extreme loads
- By making use of the Greenline series, you receive products with resource-saving manufacturing. This gives you an ecologically and economic advantage

Introduction to statics **from page 110** / Products & statics **from page 134**

ANGLE BRACKETS

ASSORTMENT

		Height [mm]	Length [mm]	Width [mm]	Basics Statik & Diagramme from page	Products & Statik from page	Products Made of V4A from page
ANGLE BRACKET TOP 80/120		80-120	60	55	110	120	
ANGLE BRACKET 70X70X2.0		70	70	55	110	122	293
ANGLE BRACKET 70X70 GREENLINE		70	70	55	110	122	
ANGLE BRACKET TOP KR90E		95	85	65	110	124	
ANGLE BRACKET 90X90X2.5		90	90	65	110	128	293
ANGLE BRACKET 90X90 GREENLINE		90	90	65	110	126	
ANGLE BRACKET 100X100X3.0		100	100	90	110	130	293
ANGLE BRACKET 100X100 GREENLINE		105	105	90	110	130	
STRUT CONNECTOR 135 DEGREES		90-100	90-100	65-90		132	
ANGLE BRACKET TYPE 110/170L		170	110	95	110	132	
ANGLE BRACKET KR 3 MM		95-285	88	65	110	134	
ANGLE BRACKET KR 4 MM		95-285	88	65	110	134	
ANGLE BRACKET TYPE 50/80		90	50	50-80	110	138	
ANGLE BRACKET TYPE 110		90	50	110	110	138	
ANGLE BRACKET TYPE 55/80		80	60	55	110	140	
ANGLE BRACKET TYPE 60/100		100	60	60	110	140	
CONSOLE ANGLE		120-200	54	60	110	142	
ANGLE BRACKET TYPE 40/45		50-90	50-90	40-45	110	144	
ANGLE BRACKET TYPE 40/90		90	90	40	110	146	294
ANGLE BRACKET TYPE 40/120		120	95	40	110	146	
ANGLE BRACKET TYPE 692		65	65	90	110	146	

ANGLE BRACKETS

ASSORTMENT

		Height	Length	Width	Basics Statics & Diagrams from page	Products & Statics from page	Products Made of V4A from page
NAIL PLATE BRACKET		40-200	40-100	20-100		**148**	**294**
EXTRA THICK 4 MM		130-160	70	80-100	**110**	**150**	
MOUNTING BRACKET		90	60	60	**110**	**152**	
ENTRANCE DOOR BRACKET		70	30	60		**158**	
Z-CONNECTOR		40	75	30		**158**	
CHAIR BRACKET		25-120	25-120	15-20		**159**	
ANGLE BRACKET THICK 3-5 MM		40-180	40-180	20		**159**	
CONCRETE BRACKET		75-150	75	60		**156**	
CORNER ANGLE BRACKET		40	40	100-250		**158**	

CE symbol

Steel with indication of the steel quality and galvanisation

Stainless steel with material number

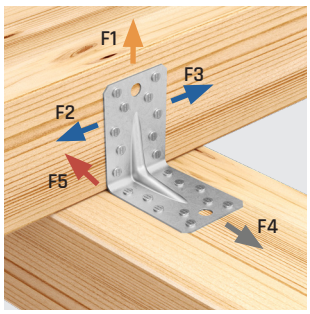
Timber/timber connection

Timber/concrete-connection

Usage class 1
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 65% for a few weeks per year, e.g. in the case of buildings that are closed on all sides and heated.
Comment: In UC 1, the average moisture content of most softwoods does not exceed 12 %.

Usage class 2
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 85% for a few weeks per year, e.g. in the case of open buildings covered by a roof.
Comment: In UC 2, the average moisture content of most softwoods does not exceed 20 %.

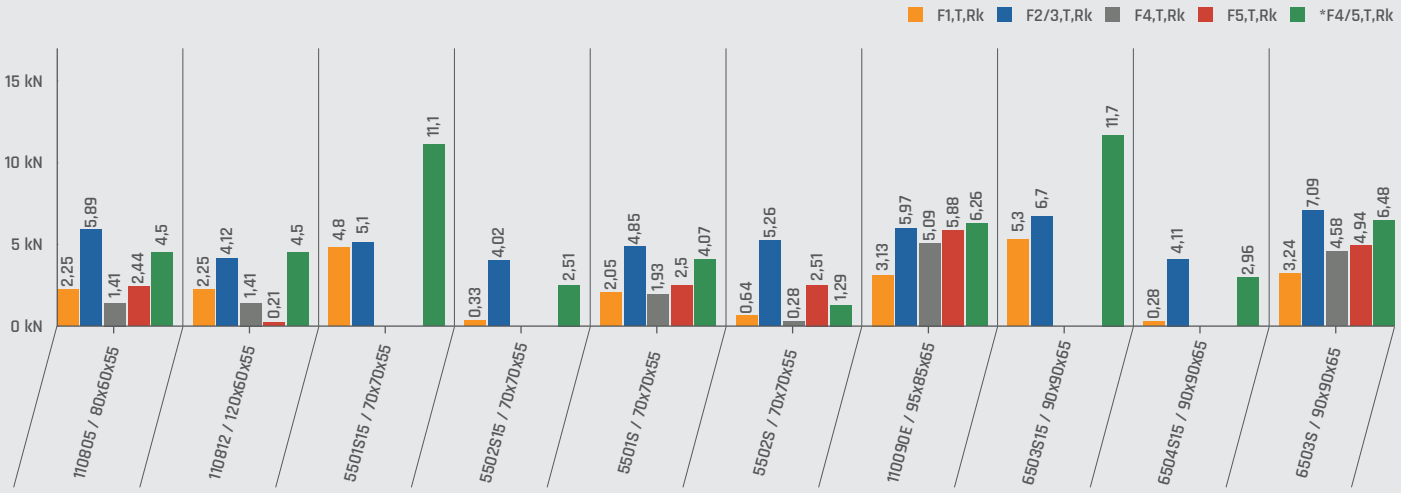
Usage class 3
Includes climatic conditions that lead to higher moisture contents than in UC 2, e.g. structures that are exposed to the weather without protection.
Eurocode 5 / DIN EN 1995-1-1 section 2.3.1.3

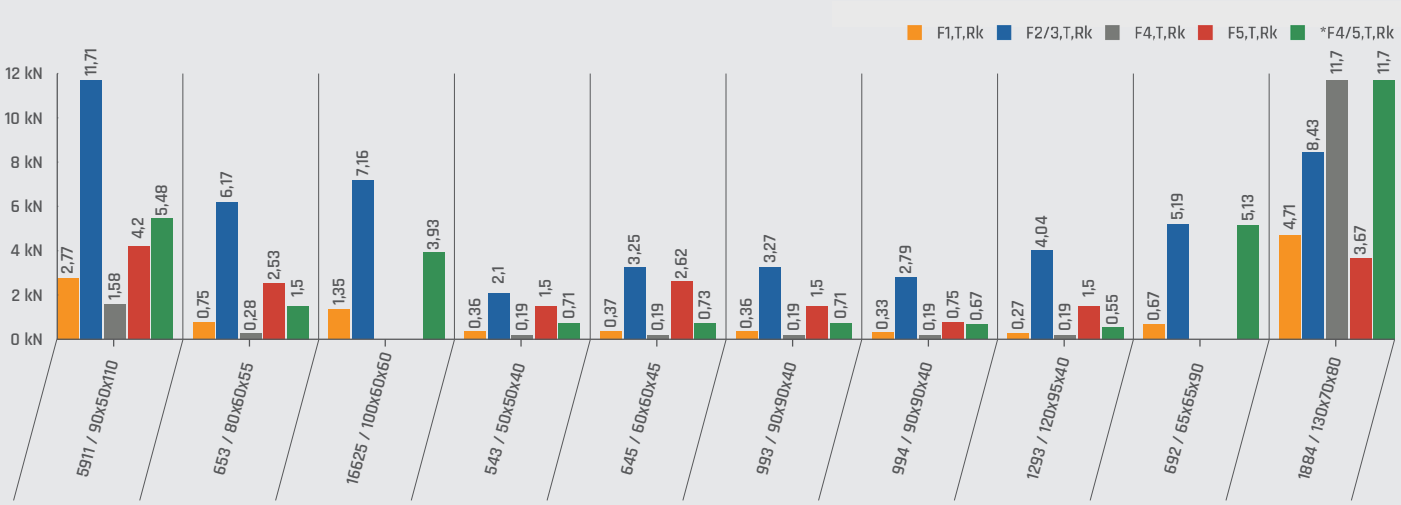


ANGLE BRACKETS

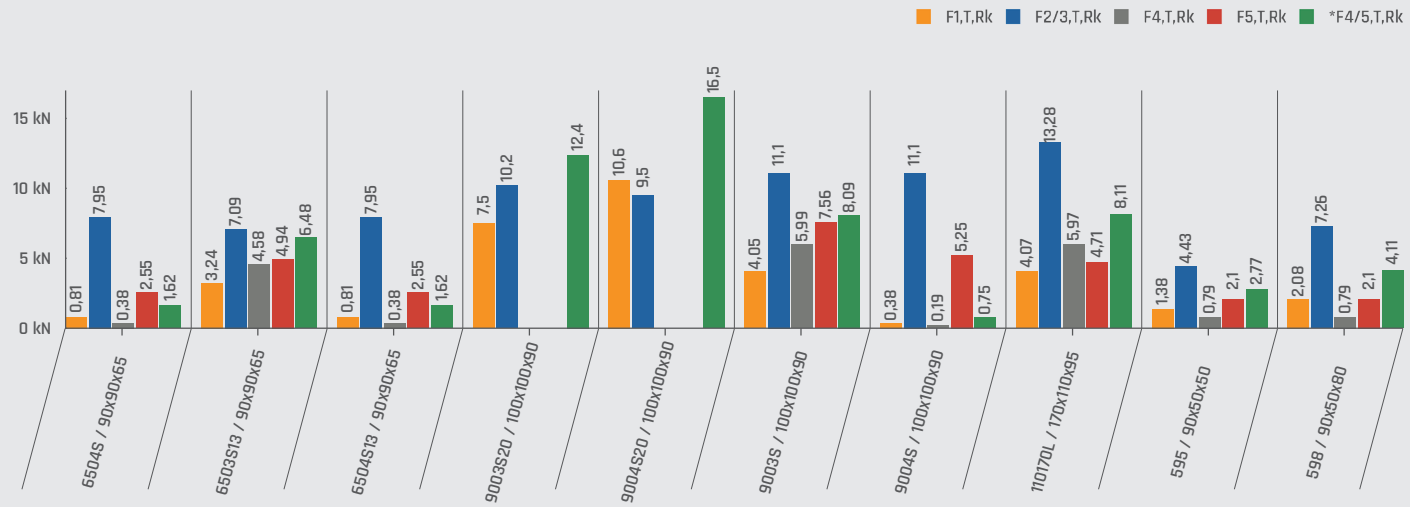
STATICS DIAGRAM

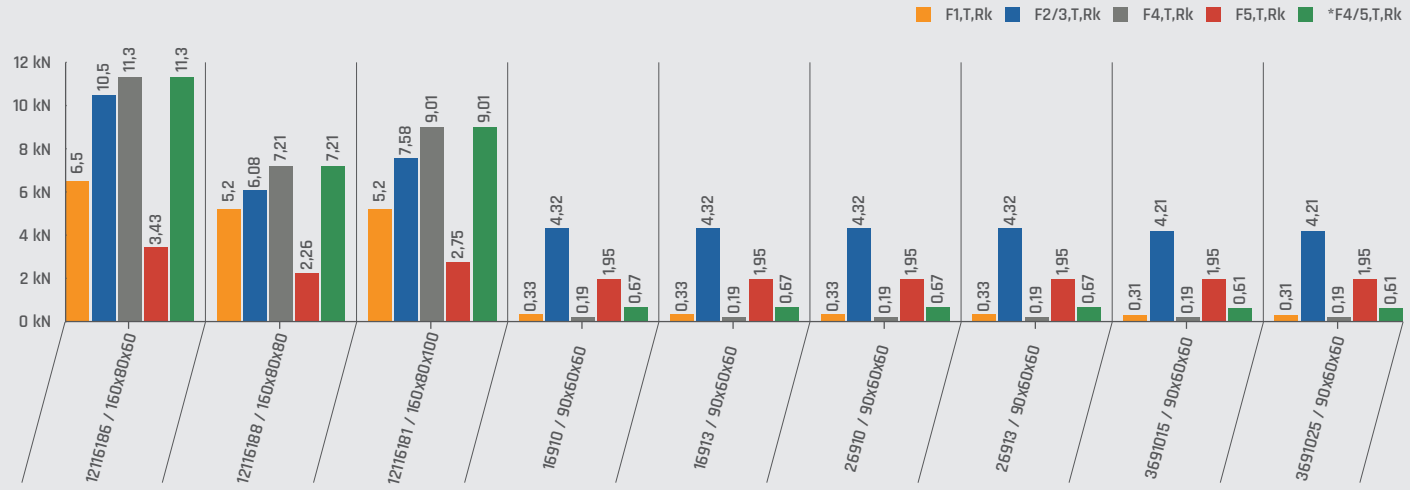
3





3


F1,T,Rk
F2/3,T,Rk
F4,T,Rk
F5,T,Rk
*F4/5,T,Rk
15 kN
10 kN
5 kN
0 kN
0,81
7,95
0,38
2,55
1,62
3,24
7,09
4,58
4,94
6,48
0,81
7,95
0,38
2,55
1,62
7,5
10,2
12,4
10,6
9,5
16,5
4,05
11,1
5,99
7,55
8,09
0,38
11,1
0,19
5,25
0,75
4,07
13,28
5,97
4,71
8,11
1,38
4,43
0,79
2,1
2,77
2,08
7,26
0,79
2,1
4,11
6504S / 90x90x65
6503S13 / 90x90x65
6504S13 / 90x90x65
9003S20 / 100x100x90
9004S20 / 100x100x90
9003S / 100x100x90
9004S / 100x100x90
110170L / 170x110x95
595 / 90x50x50
598 / 90x50x80


F1,T,Rk
F2/3,T,Rk
F4,T,Rk
F5,T,Rk
*F4/5,T,Rk
12 kN
10 kN
8 kN
6 kN
4 kN
2 kN
0 kN
6,5
10,5
11,3
3,43
11,3
5,2
6,08
7,21
2,25
7,21
5,2
7,58
9,01
2,75
9,01
0,33
4,32
0,19
1,95
0,67
0,33
4,32
0,19
1,95
0,67
0,33
4,32
0,19
1,95
0,67
0,33
4,32
0,19
1,95
0,67
0,31
4,21
0,19
1,95
0,61
0,31
4,21
0,19
1,95
0,61
12116186 / 160x80x60
12116188 / 160x80x80
12116181 / 160x80x100
16910 / 90x60x60
16913 / 90x60x60
26910 / 90x60x60
26913 / 90x60x60
3691015 / 90x60x60
3691025 / 90x60x60

ANGLE BRACKETS

TECHNICAL FEATURES

3

Geometry

H	Height (mm)
L	Length (mm)
B	Width (mm)
S	Material thickness (mm)

Tables

n_a	Number of connecting elements
NB	Nail pattern
Full	Maximum number of connecting elements
Partial	Minimum number of connecting elements

Timber connecting element

$Ø_{[mm]}$	Diameter of connecting element
$L_{[mm]}$	Length of connecting element
	Grain direction in the wood component

Connecting element concrete/ steel

Bo	Dowels/bolts

Load directions

F_1	Force at a right angle to the connector level, lifting force
F_2	Force in rod direction
F_3	Force in rod direction
F_4	Force in direction of the angle bracket
F_5	Force away from the angle bracket

CE symbol

Steel with indication of the steel quality and galvanisation

Stainless steel with material number

Timber/timber connection

Timber/concrete-connection

Usage class 1
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 65% for a few weeks per year, e.g. in the case of buildings that are closed on all sides and heated.
Comment: In UC 1, the average moisture content of most softwoods does not exceed 12 %.

Usage class 2
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 85% for a few weeks per year, e.g. in the case of open buildings covered by a roof.
Comment: In UC 2, the average moisture content of most softwoods does not exceed 20 %.

Usage class 3
Includes climatic conditions that lead to higher moisture contents than in UC 2, e.g. structures that are exposed to the weather without protection.
Eurocode 5 / DIN EN 1995-1-1 section 2.3.1.3

Design

$F_{1,Ed}$	Design load for load direction 1 in kN
$F_{2/3,Ed}$	Design load for load direction 2 or 3 in kN
$F_{4,Ed}$	Design load for load direction 4 in kN
$F_{5,Ed}$	Design load for load direction 5 in kN
$F_{4/5,Ed}$	Design load for load direction 4 or 5 in kN
$F_{1,Rk}$	Characteristic value of the load capacity in load direction 1 for one or for two angle brackets in kN
$F_{2/3,Rk}$	Characteristic value of the load capacity in load direction 2 or 3 for one or for two angle brackets in kN
$F_{4,Rk}$	Characteristic value of the load capacity in load direction 4 for one angle bracket in kN
$F_{5,Rk}$	Characteristic value of the load capacity in load direction 5 for one angle bracket in kN
$F_{4/5,Rk}$	Characteristic value of the load capacity in load direction 4 or 5 for two angle brackets in kN
$F_{1,Rd}$	Design value of the load capacity in load direction 1 for one or for two angle brackets in kN
$F_{2/3,Rd}$	Design value of the load capacity in load direction 2 or 3 for one or for two angle brackets in kN
$F_{4,Rd}$	Characteristic value of the load capacity in load direction 4 for one angle bracket in kN
$F_{5,Rd}$	Characteristic value of the load capacity in load direction 5 for one angle bracket in kN
$F_{4/5,Rd}$	Characteristic value of the load capacity in load direction 4 or 5 for two angle brackets in kN
$F_{i,Ed}$	Design value of load capacity for one or two angle brackets for the respective load direction “i” (i = 1 to 5) in kN
$F_{i,Rk,T}$	Characteristic value of the load-bearing capacity of the sheet steel-timber connection with GH threaded/anchor nails for the ‘i’ (i = 1 to 5) in kN respective load direction ‘i’ (i = 1 to 5) in kN
$F_{i,Rk,S}$	Characteristic value for steel load capacity of the bracket (table value **„S“** oder $F_{Rk,S}$ bzw. $F_{Rd,S}$) for the respective load direction “i” (i = 1 to 5) in kN
k_{mod}	Modification factor for load impact duration and usage class
$\gamma_{M,T}$	Partial safety factor for timber (for Germany: 1.3)
$\gamma_{M,S}$	Partial safety factor for steel for cross-section stresses (for Germany: 1.0)

Dowel design

$k_{i,t,ax}$	Coefficient for calculating the axial load-bearing capacity per bolt, for connecting the bracket to concrete or steel components for the respective Load direction “i” (i = 1 to 5)
$k_{i,t,v}$	Coefficient for calculating the shear load-bearing capacity per bolt, for connecting the bracket to concrete or steel components for the respective Load direction “i” (i = 1 to 5)
$F_{i,Ed}$	Design load on one or two angle brackets for the respective load direction “i” (i = 1 to 5) in kN
$F_{i,Rd}$	Design value of load capacity on one or two angle brackets for the respective load direction “i” (i = 1 to 5) in kN
$F_{i,Ed,B}$	Design value for one bolt or one anchor for the respective load direction “i” (i = 1 to 5) in kN
$F_{i,Rd,B}$	Design value of the load-bearing capacity of the entire connection to concrete or steel with bolts or anchors for the respective Load direction ‘i’ (i = 1 to 5) in kN (calculation must be carried out separately and is based on the respective approval and standard of the bolts or anchors)

ANGLE BRACKETS

APPLICATIONS

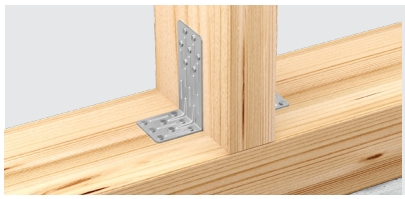
3

Application:
Timber/timber; timber/concrete, steel connections

Materials:

350 GD Z275 | 250 GD Z275 | 235 JR feuerverzinkt | A4 1.4571

Material thicknesses:
1.5 / 2.0 / 2.5 / 3.0 / 4.0 / 6.0 / 8.0 mm
More on request.



Sleeper **Style**

Sleeper **Style**

Sleeper **Concrete**

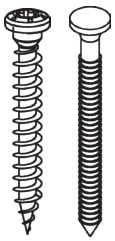
Cross

Sleeper **Concrete**

BSH **Concrete**

For use in usage classes

NKL 1 | NKL 2 | NKL 3



Connecting element:

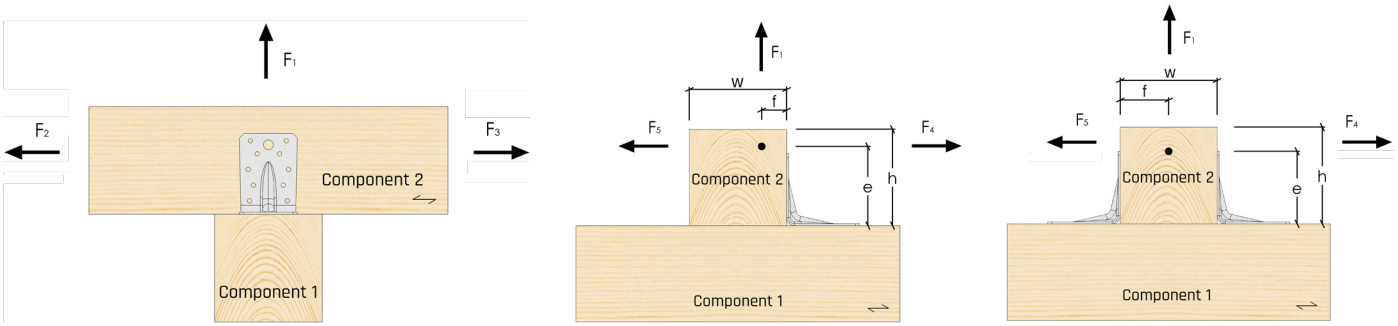
GH threaded nails 4.0 x 35 / 40 / 50 / 60 / 75 / 100 mm
GH screws 5.0 x 25 / 35 / 40 / 50 / 60 / 70 mm

Bolt, dowel or concrete anchor M10, M12

Connecting elements from page 274

ANGLE BRACKETS

LOAD DIRECTIONS



Load F_1:

For the load-bearing capacity of a bracket, the load is applied at spacing f from the contact surface between the bracket and the timber beam is applied (Figure 2). If it is assumed that the timber component is prevented from rotating or if two console angles are arranged, then the eccentricity is f = 0.

Load $F_{2/3}$

Calculation of the load-bearing capacity of one or two angle brackets that are loaded with a force in the direction of the axis of component 2 (Fig. 1).

Load F_4 / F_5 / $F_{4/5}$

In all three cases, the load is applied at a distance e from the contact surface between component 1 and component 2 (Figure 2).
The load cases are considered as a combination of two base load cases.
The first base load case is the lateral load with forces n F_4, F_5 or $F_{4/5}$ with e = 0.
For the arrangement with an angle bracket, the rotation of component 2 is taken into account.
For the arrangement with two angle brackets, the rotation of component 2 is prevented and the load on the beam due to the moment is calculated as the lifting force F_1 = $F_{4/5}$ x e/w. w is thereby the width of component 2

Nail patterns

Partial and full nail fitting or partial and full screw fitting
See nail pattern for the product

Connection over intermediate layers

The characteristic load capacities for the connection with angle brackets indicated in the tables also apply to an intermediate layer between the angle bracket and timber component. The following conditions must be met:

- The intermediate layer must be connected to the timber component without being able to be moved.
- The insert depth of the profiled area of the nail or the thread length of the screw in the timber component must be the same or greater.
- For this, a correspondingly long connecting element must be used.
- The characteristic perforation strength $f_{h,k}$ of the connecting element in the intermediate layer must be the same of greater.

Determination of load capacity

The load capacity of connections with angle brackets $F_{i,Rd}$ for the respective load direction "i" (i = 1 to 5) corresponds to the smallest value of:

- The load capacity of the steel sheet-timber connection with GH threaded/anchor nails $F_{i,Rd,T}$,
- Steel load capacity of the bracket $Fi_{,Rd,S}$,
- Load-bearing capacity of the connection to concrete or steel with bolts or anchors under consideration of the coefficient $k_{i,t,ax}$ or $k_{i,t,v}$, see section 4.

$$F_{i,Rd} = \min\left\{\frac{k_{mod} \cdot F_{i,Rk,T}}{\gamma_{M,T}}; \frac{F_{i,Rk,S}}{\gamma_{M,S}}; F_{i,Rd,B}\right\}$$

The increased load capacity values of the GH threaded/anchor nails according to ETA-13/0523 apply.
The values of EN14592 apply to angle brackets made of stainless steel.

Connection timber- concrete/ steel

The design load of the respective load direction "i" (i = 1 to 5) $F_{i,Ed,B}$ for one bolt or for one anchor is calculated as follows:

$F_{i,Ed,B} = k_{i,t,ax} \times F_{i,Ed}$ for axial stress on the bolt or anchor
$F_{i,Ed,B} = k_{i,t,v} \times F_{i,Ed}$ for lateral stress on the bolt or anchor

Load in one direction

In case of sole impact of load components F_1, $F_{2/3}$, $F4$ or F_5 or $F_{4/5}$ the proof of interaction must be provided in the following form:

3

$$\frac{F_{i,Ed}}{F_{i,Rd}} \leq 1$$

Load in several directions

In case of simultaneous impact of load components F_1, $F_{2/3}$, F_4 or F_5 and $F_{4/5}$ the proof of interaction must be provided as follows:
For a bracket, the loads F_4 and F_5 never take effect at the same time.

For one bracket:

$$\left(\frac{F_{1,Ed}}{F_{1,Rd}}\right)^2 + \left(\frac{F_{2/3,Ed}}{F_{2/3,Rd}}\right)^2 + \left(\frac{F_{4,Ed}}{F_{4,Rd}}\right)^2 + \left(\frac{F_{5,Ed}}{F_{5,Rd}}\right)^2 \leq 1$$

For two brackets:

$$\left(\frac{F_{1,Ed}}{F_{1,Rd}}\right)^2 + \left(\frac{F_{2/3,Ed}}{F_{2/3,Rd}}\right)^2 + \left(\frac{F_{4/5,Ed}}{F_{4/5,Rd}}\right)^2 \leq 1$$

General information

The load capacities apply to timbers with a characteristic raw density of 350 kg/m3.
Curvatures of the timber components and joist edges in the area of the angle brackets are not permitted - the wood must be sharp-edged in the area of the bracket.
There must be proof that no gaps occur in the timber component for all load directions according to EN 1995 or an equivalent national standard.

Minimum spacing according to EN 1995-1-1

[mm]		Force parallel to the grain	Force at a right angle to the grain	Force under the bracket a to the grain
		(α = 0°)	(α = 90°)	(α any)
a_1	in grain direction	28	14	(14+14 x cos α)
a_2	Right angle to the grain direction	14	14	14
$a_{3,t}$	End grain with stress	60	40	(40 + 20 x cos α)
$a_{3,c}$	End grain without stress	40	40	40
$a_{4,t}$	Loaded edge	20	28	(20 + 8 x sin α)
$a_{4,c}$	Unloaded edge	20	20	20

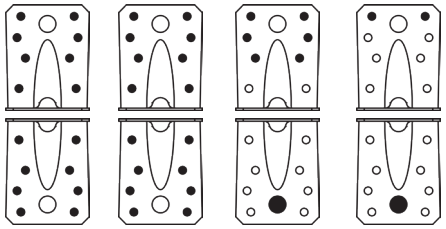
Nails Ø 4 mm, without pilot drilling, in nail plates, pk ≤ 420 kg/m³

ANGLE BRACKETS

HOLE PATTERNS

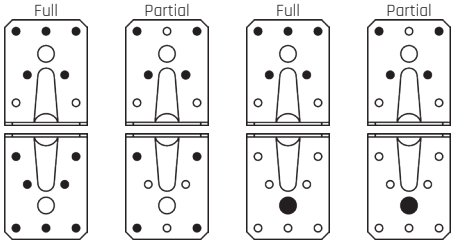
TYPE 55/70S 1.5 GREENLINE **with rib**
5501S15

Purlin/purlin | Column/purlin | Purlin/concrete | Column/concrete



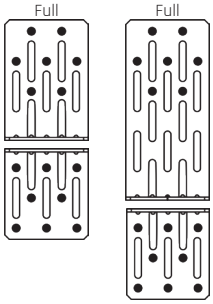
TYPE 55/70 2.0 with rib
5501S

Timber/timber Full | Timber/timber Partial | Timber/concrete Full | Timber/concrete Partial



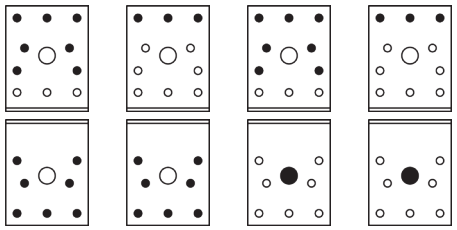
TOP 80
110805
Timber/timber Full

TOP 120
110812
Timber/timber Full



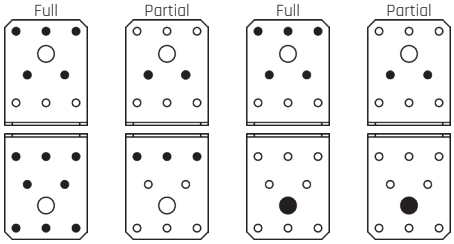
TYPE 55/70S 1.5 GREENLINE **without rib**
5502S15

Purlin/purlin | Column/purlin | Purlin/concrete | Column/concrete



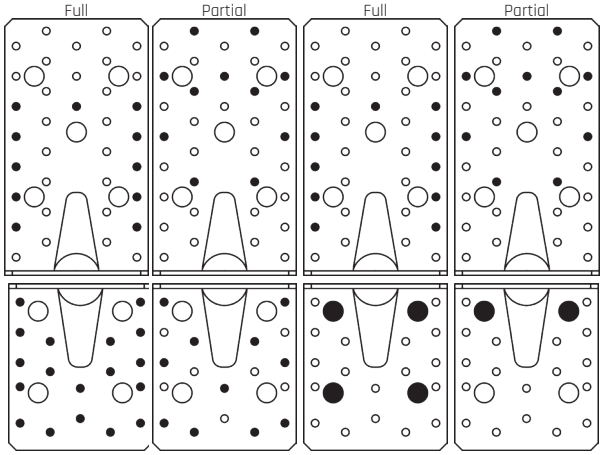
TYPE 55/70 2.0 without rib
5502

Timber/timber Full | Timber/timber Partial | Timber/concrete Full | Timber/concrete Partial



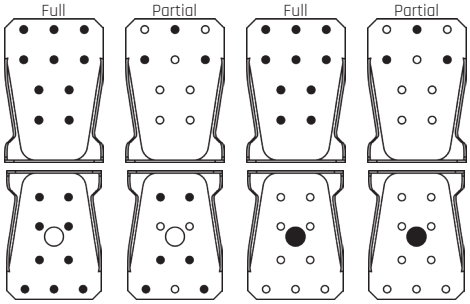
TYP 110/170L
110170L

Timber/timber Full | Timber/timber Partial | Timber/concrete Full | Timber/concrete Partial



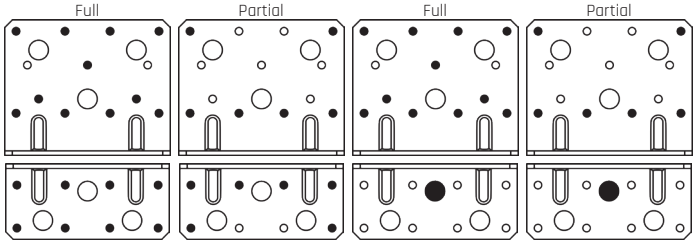
TOP KR 90 E (EXTRA)
110090E

Timber/timber Full | Timber/timber Partial | Timber/concrete Full | Timber/concrete Partial



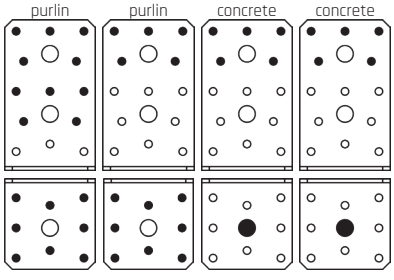
TYP 110
5911

Timber/timber Full | Timber/timber Partial | Timber/concrete Full | Timber/concrete Partial



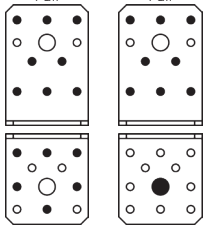
TYP 60/100
16625

Purlin/purlin | Column/purlin | Purlin/concrete | Column/concrete



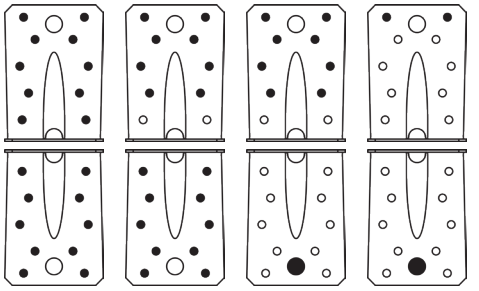
TYP 55/80
653

Timber/timber Full | Timber/concrete Full



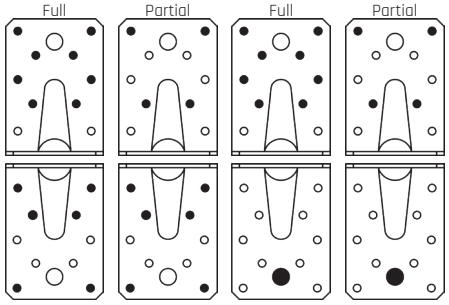
TYPE 65/90S 1.5 GREENLINE **with rib**
6503S15

Purlin/purlin | Column/purlin | Purlin/concrete | Column/concrete



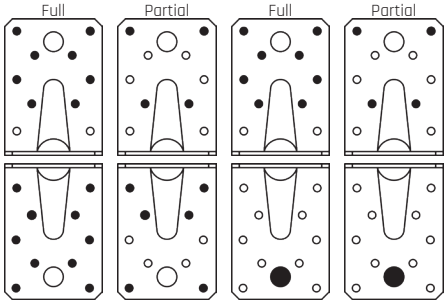
TYPE 65/90 2.5 with rib
6503S

Timber/timber Full | Timber/timber Partial | Timber/concrete Full | Timber/concrete Partial



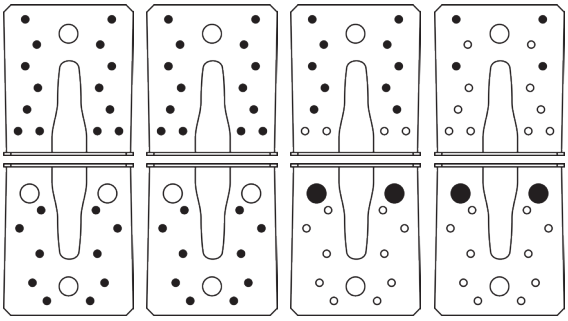
TYPE 65/90S13 with rib / hole Ø 13mm
6503S13

Timber/timber Full | Timber/timber Partial | Timber/concrete Full | Timber/concrete Partial



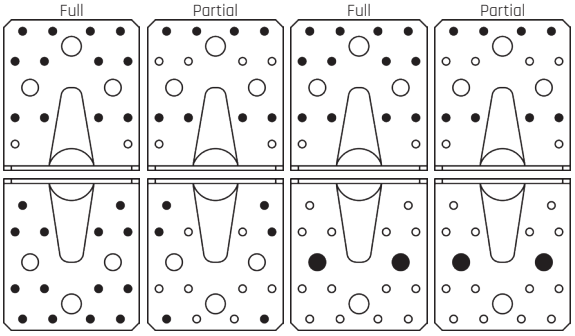
TYPE 90/100S 1.5 GREENLINE **with rib**
9003S20

Purlin/purlin | Column/purlin | Purlin/concrete | Column/concrete



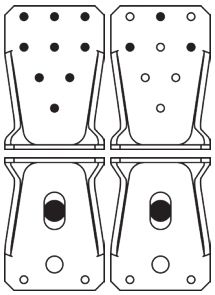
TYPE 90/100S 3.0 with rib
9003S

Timber/timber Full | Timber/timber Partial | Timber/concrete Full | Timber/concrete Partial



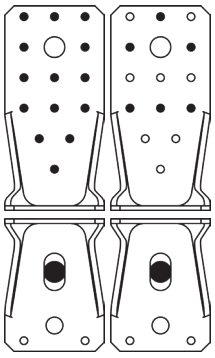
KR slotted hole 95 mm
1100953L / 110953L

Full | Partial



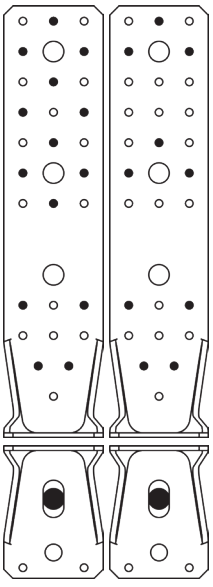
KR slotted hole 135 mm
1101353L / 110135L

Full | Partial



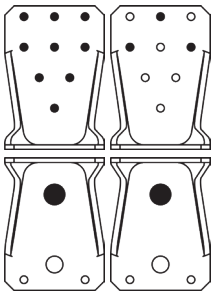
KR slotted hole 285 mm
1102853L / 110285L

Full | Partial



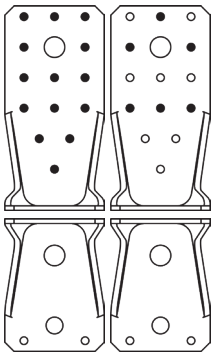
KR round hole 95 mm
1100953 / 110095

Full | Partial



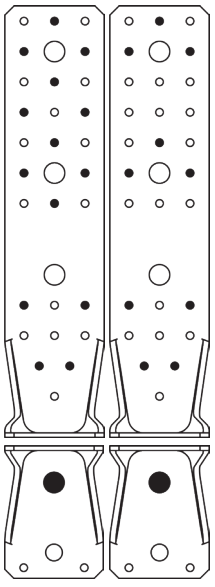
KR round hole 135 mm
1101353 / 110135

Full | Partial

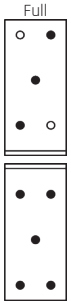


KR round hole 285 mm
1102853 / 110285

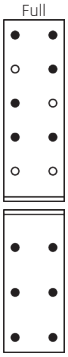
Full | Partial



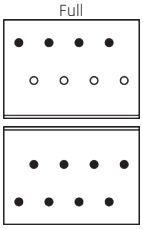
TYPE 40/90
994
Timber/timber
Full



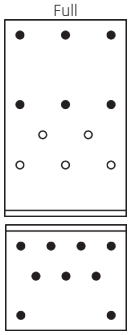
TYPE 40/120
1293
Timber/timber
Full



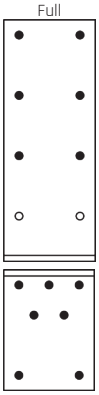
TYPE 692
692
Timber/timber
Full



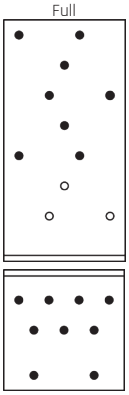
Extra thick
1884
Timber/timber
Full



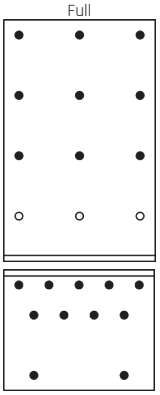
Extra thick
12116186
Timber/timber
Full



Extra thick
12116188
Timber/timber
Full

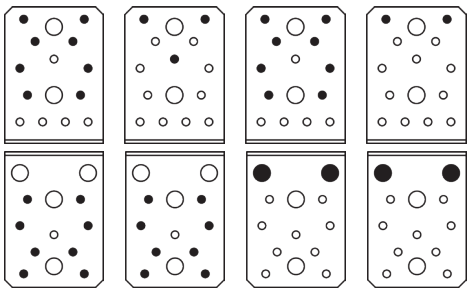


Extra thick
12116181
Timber/timber
Full



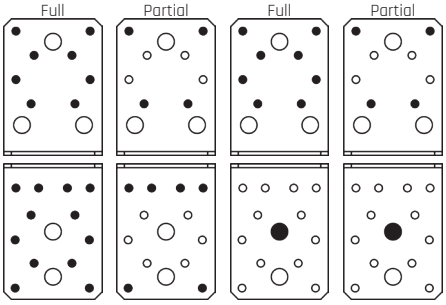
TYPE 65/90S 1.5 GREENLINE **without rib**
6504S15

Purlin/purlin | Column/purlin | Purlin/concrete | Column/concrete



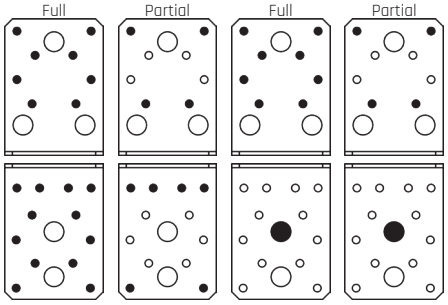
TYPE 65/90 2.5 without rib
6504S

Timber/timber Full | Timber/timber Partial | Timber/concrete Full | Timber/concrete Partial



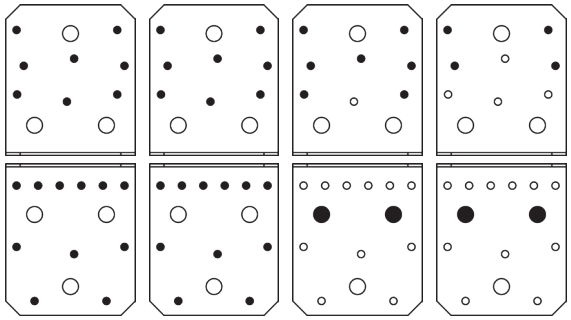
TYPE 65/90S13 without rib / hole Ø 13mm
6504S13

Timber/timber Full | Timber/timber Partial | Timber/concrete Full | Timber/concrete Partial



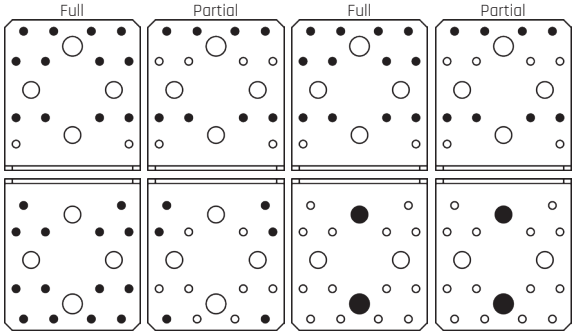
TYP 90/100S 1.5 GREENLINE **without rib**
9004S20

Purlin/purlin | Column/purlin | Purlin/concrete | Column/concrete



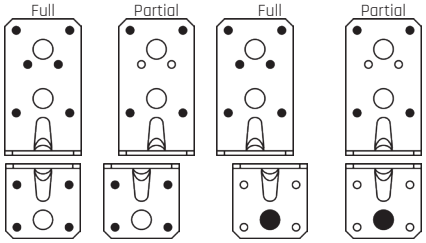
TYPE 90/100S 3.0 without rib
9004S

Timber/timber Full | Timber/timber Partial | Timber/concrete Full | Timber/concrete Partial



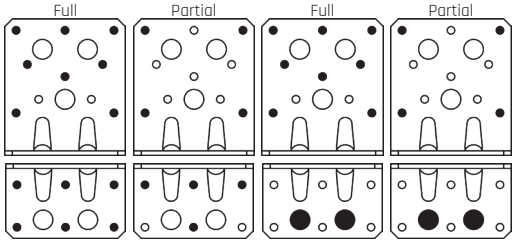
TYPE 50
595

Timber/timber Full | Timber/timber Partial | Timber/concrete Full | Timber/concrete Partial



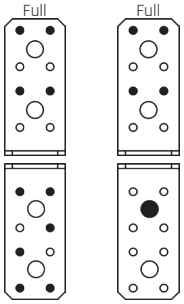
TYPE 80
598

Timber/timber Full | Timber/timber Partial | Timber/concrete Full | Timber/concrete Partial



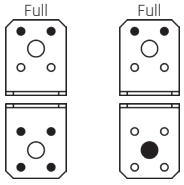
TYPE 40
993

Timber/timber Full | Timber/concrete Full



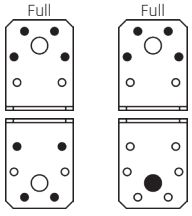
TYPE 40
543

Timber/timber Full | Timber/concrete Full



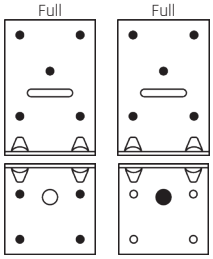
TYPE 45
645

Timber/timber Full | Timber/concrete Full



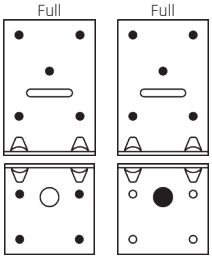
TYPE RL
16910

Timber/timber Full | Timber/concrete Full



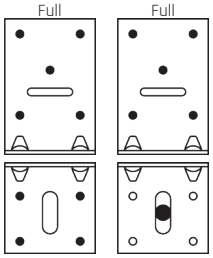
TYPE RL
16913

Timber/timber Full | Timber/concrete Full



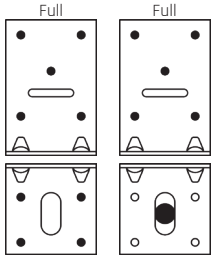
TYPE LL
26910

Timber/timber Full | Timber/concrete Full



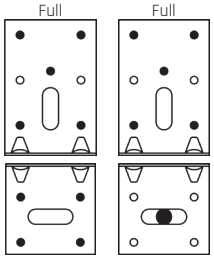
TYP LL
26913

Timber/timber Full | Timber/concrete Full



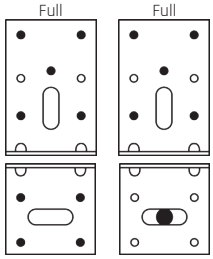
TYPE LLG
3691015

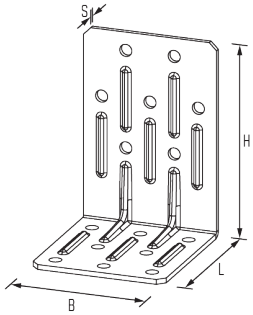
Timber/timber Full | Timber/concrete Full



TYPE LLG
3691025

Timber/timber Full | Timber/concrete Full





TOPLINE GREENLINE ETA-09 0322

NKL 2 250 GD Z275

ANGLE BRACKETS

TOP 80 / TOP 120

3

Art. No.	Dimensions [mm]							nN	EAN	Weight	Pallet	PU		
	H	x	L	x	W(B)	x	T(S)	Ø 5	4019346	kg				
110805	80	x	60	x	55	x	2,0	15	110805	0.106	7200	100	■	
110812	120	x	60	x	55	x	2,0	15	110812	0.136	6000	100	■	

The TOP 80 and TOP 120 angle brackets are characterised by their high stability, which is achieved by the special ribs that do not interfere with processing. Full nail fitting is always possible due to the optimised hole pattern.

Assembly

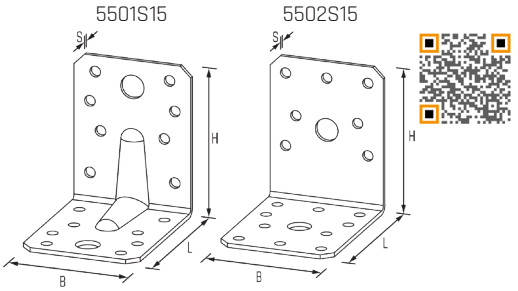
- Short leg on the continuous timber
- From a timber width of 80 mm.
- To timber/timber, timber/board materials

TOP 80 / TOP 120

Timber / Timber

Art. No.	Dimensions [mm]				n_a	NB	VM	$F_{1,T,Rk}$	$F_{1,S,Rk}$	$F_{2/3,T,Rk}$	$F_{4,T,Rk}$	$F_{4,S,RK}$	$F_{5,T,Rk}$	$F_{5,S,Rk}$	$*F_{4/5,T,Rk}$	$*F_{4/5,S,Rk}$
	H	L	W(B)	T(S)												
110805	80	60	55	2,0	15	Full	4.0x40	1,35	1,71	4,46	0,84	0,66	1,46	1,07	2,69	3,42
							4.0x60	2,25	1,71	5,89	1,41	0,66	2,44	1,07	4,50	3,42
					-	Partial	4.0x40	-	-	-	-	-	-	-	-	-
							4.0x60	-	-	-	-	-	-	-	-	-
110812	120	60	55	2,0	15	Full	4.0x40	1,35	1,71	3,04	0,84	1,07	0,13	0,04	2,69	3,42
							4.0x60	2,25	1,71	4,12	1,41	1,07	0,21	0,04	4,50	3,42
					-	Partial	4.0x40	-	-	-	-	-	-	-	-	-
								-	-	-	-	-	-	-	-	-

Values are valid for 1 angle bracket (* 2 angle brackets opposite each other), GH nail, ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm, unit of length in mm, unit for force in kN.
For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ can be doubled.



GREENLINE

ETA-13
0900

NKL 2

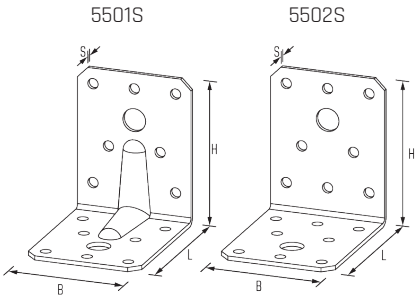
350
GD
Z275

ANGLE BRACKETS

TYPE 55/70 1.5

3

Art. No.	Rib	Dimensions [mm]							nN	nBo	EAN	Weight	Pallet	PU		
		H	x	L	x	W(B)	x	T(S)	Ø 5	Ø 11	4019346	kg				
5501S15	with	70	x	70	x	55	x	1,5	16	2	024607	0.077	4800	100	■	■
5502S15	without	70	x	70	x	55	x	1,5	17	2	024614	0.077	4800	100	■	■



ETA-09
0323

NKL 2

250
GD
Z275

ANGLE BRACKETS

TYPE 55/70 2.0

Art. No.	Rib	Dimensions [mm]							nN	nBo	EAN	Weight	Pallet	PU		
		H	x	L	x	W(B)	x	T(S)	Ø 5	Ø 11	4019346	kg				
5501S	mit	70	x	70	x	55	x	2,0	14	2	110089	0.102	4800	100	■	■
5502S	ohne	70	x	70	x	55	x	2,0	14	2	110072	0.102	4800	100	■	■

TYPE 55/70 1.5

Timber / Timber

Art. No.	H	L	W(B)	T(S)	n_a	NB	VM	$F_{1,T,Rk}$	$F_{2/3,T,Rk}$	$*F_{4/5,T,Rk}$
5501S15	70	70	55	1,5	16	Full	4.0x40	-	-	-
							4.0x60	4,80	5,10	11,10
					-	Partial	4.0x40	-	-	-
							4.0x60	-	-	-
5502S15	70	70	55	1,5	14	Full	4.0x40	0,33	4,02	2,51
							4.0x60	-	-	-
					-	Partial	4.0x40	-	-	-
							4.0x60	-	-	-

Values for 1 angle bracket (* 2 angle brackets opposite each other), ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm. For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ can be doubled.

TYPE 55/70 2.0

Timber / Timber

Art. No.	H	L	W(B)	T(S)	n_a	NB	VM	$F_{1,T,Rk}$	$F_{1,S,Rk}$	$F_{2/3,T,Rk}$	$F_{4,T,Rk}$	$F_{4,S,RK}$	$F_{5,T,Rk}$	$F_{5,S,Rk}$	$*F_{4/5,T,Rk}$	$*F_{4/5,S,Rk}$
5501S	70	70	55	2,0	12	Full	4.0x40	1,23	2,11	3,68	1,16	2,00	1,50	2,87	2,45	4,21
							4.0x60	2,05	2,11	4,85	1,93	2,00	2,50	2,87	4,07	4,21
					8	Partial	4.0x40	1,09	4,63	3,01	1,02	2,87	1,50	2,87	2,16	9,26
							4.0x60	1,81	4,63	3,91	1,70	2,87	2,49	2,87	3,57	9,26
5502S	70	70	55	2,0	13	Full	4.0x40	0,39	0,12	3,92	0,17	0,05	1,51	0,32	0,77	0,25
							4.0x60	0,64	0,12	5,26	0,28	0,05	2,51	0,32	1,29	0,25
					5	Partial	4.0x40	0,39	0,12	2,21	0,17	0,05	1,51	0,32	0,77	0,25
							4.0x60	0,64	0,12	3,04	0,28	0,05	2,51	0,32	1,29	0,25

Values for 1 angle bracket (* 2 angle brackets opposite each other), ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm. For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ verdoppelt werden.

TYPE 55/70 1.5

Timber / Concrete

Art.-Nr.	H	L	W(B)	T(S)	n_a	NB	VM	$F_{1,T,Rk}$	$F_{1,Bo,ax,rk}$	$F_{2/3,T,RK}$	$F_{2/3,Bo,sx,rk}$	$F_{4,T,Rk}$	$F_{4,Bo,sx,rk}$	$F_{5;T;Rk}$	$F_{5;Bo,ax,rk}$	$F_{5;Bo,sx,rk}$	$*F_{4/5,T,Rk}$	$F_{4/5;Bo,ax,rk}$	$F_{4/5;Bo,ax,rk}$
5501S15	70	70	55	1,5	6	Full	4.0x40	0,18	1,56	1,05	1,05	3,63	3,63	1,16	0,84	1,16	4,37	0,83	3,19
							4.0x60	-	-	-	-	-	-	-	-	-	-	-	-
					-	Partial	4.0x40	-	-	-	-	-	-	-	-	-	-	-	-
							4.0x60	-	-	-	-	-	-	-	-	-	-	-	-
5502S15	70	70	55	1,5	7	Full	4.0x40	0,29	0,70	1,68	1,68	-	-	-	-	-	2,29	0,27	1,83
							4.0x60	-	-	-	-	-	-	-	-	-	-	-	-
					-	Partial	4.0x40	-	-	-	-	-	-	-	-	-	-	-	-
							4.0x60	-	-	-	-	-	-	-	-	-	-	-	-

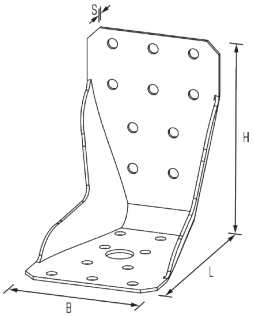
Values for 1 angle bracket (* 2 angle brackets opposite each other), ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm. For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ vcan be doubled and the values $F_{1,v,k}$, $F_{1,ax,k}$, $F_{2/3,v,k}$ halved

TYPE 55/70 2.0

Timber / Concrete

Art.-Nr.	H	L	W(B)	T(S)	n_a	NB	VM	$F_{1,T,Rk}$	$F_{1,S,Rk}$	$k_{1,t,ax}$	$F_{2/3,T,RK}$	$k_{2/3,t,v}$	$F_{4,T,Rk}$	$F_{4,S,Rk}$	$k_{4,t,v}$	$k_{4,t,ax}$	$F_{5,T,Rk}$	$F_{5,S,Rk}$	$k_{5,t,v}$	$k_{5,t,ax}$	$*F_{4/5,T,Rk}$	$*F_{4/5,S,Rk}$	$k_{4/5,t,v}$	$k_{4/5,t,ax}$
5501S	70	70	55	2,0	5	Full	4.0x40	9,45	0,25	9,64	1,30	1,00	4,05	0,33	1,00	7,27	1,50	2,87	1,00	0,31	9,00	0,50	1,00	4,82
							4.0x60	11,82	0,25	9,64	2,00	1,00	6,75	0,33	1,00	7,27	2,50	2,87	1,00	0,31	15,00	0,50	1,00	4,82
					4	Partial	4.0x40	7,56	0,25	9,64	1,13	1,00	4,05	0,33	1,00	7,27	1,50	2,87	1,00	0,31	7,20	0,50	1,00	4,82
							4.0x60	9,46	0,25	9,64	1,74	1,00	6,75	0,33	1,00	7,27	2,49	2,87	1,00	0,31	12,00	0,50	1,00	4,82
5502S	70	70	55	2,0	5	Full	4.0x40	9,45	0,03	9,64	1,30	1,00	1,13	0,04	1,00	7,27	1,51	0,32	1,00	0,31	9,00	0,06	1,00	4,82
							4.0x60	11,82	0,03	9,64	2,00	1,00	1,88	0,04	1,00	7,27	2,51	0,32	1,00	0,31	15,00	0,06	1,00	4,82
					2	Partial	4.0x40	3,78	0,03	9,64	0,44	1,00	1,13	0,04	1,00	7,27	1,51	0,32	1,00	0,31	3,60	0,06	1,00	4,82
							4.0x60	4,73	0,03	9,64	0,71	1,00	1,88	0,04	1,00	7,27	2,51	0,32	1,00	0,31	6,00	0,06	1,00	4,82

Values for 1 angle bracket (* 2 angle brackets opposite each other), ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm. For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ vcan be doubled and the values $F_{1,v,k}$, $F_{1,ax,k}$, $F_{2/3,v,k}$ halved.



TOPLINE GREENLINE ETA-09 0324

NKL 2 250 GD Z275

ANGLE BRACKETS

TOP KR 90 E

3

Art. No.	Dimensions [mm]							nN	nBo	EAN	Weight	Pallet	PU		
	H	x	L	x	W(B)	x	T(S)	Ø 5	Ø 13	4019346	kg				
110090E	95	x	85	x	65	x	1,5	19	1	110898	0.121	4000	100	■	■

TIPP

Advantages of angle brackets TOP KR 90 E

- 40 % lighter in comparison to 90 x 90 x 65 x 2.5 mm
- Hole 13 mm
- High stability due to raised edge on both sides
- Versatile in use

YOU CAN USE THE TOP KR 90 E ANGLE BRACKET AS AN ALTERNATIVE TO THE SIZE 70" OR "SIZE 90" BRACKET.

The **TOP KR 90 E** angle bracket has good stability and is versatile in use due to the raised edges on both sides.
Taking the necessary loads into account, it can be used as an alternative for different brackets, such as the 70 x 70 x 55 mm or the 90 x 90 x 65 mm.
This results in low stocking costs.

Due to the nail pattern for timber/timber connections and the outer ribs on both sides, the **TOP KR 90 E** is very suitable for loads F_2/F_3 and F_1.
Fastening can be done with both GH threaded nails and the GH screw. Connection to concrete is also possible through the 13 mm hole.

TOP KR 90 E

Timber / Timber

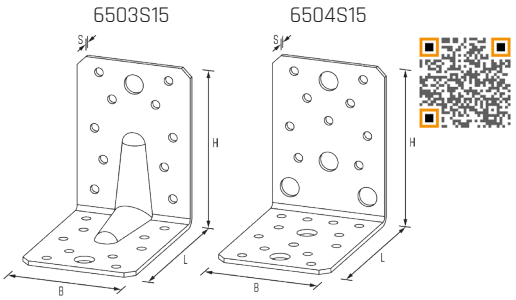
Art. No.	H	L	W(B)	T(S)	n_a	NB	VM	$F_{1,T,Rk}$	$F_{1,S,Rk}$	$F_{2/3,T,Rk}$	$F_{4,T,Rk}$	$F_{4,S,RK}$	$F_{5,T,Rk}$	$F_{5,S,Rk}$	$*F_{4/5,T,Rk}$	$*F_{4/5,S,Rk}$
110090E	95	85	65	1,5	19	Full	4.0x40	1,88	2,09	4,76	3,00	3,40	3,53	2,63	3,73	4,19
							4.0x60	3,13	2,09	5,97	5,09	3,40	5,88	2,63	6,26	4,19
					9	Partial	4.0x40	1,34	2,48	1,99	2,14	3,44	0,15	0,17	2,67	4,95
							4.0x60	2,24	2,48	2,76	3,61	3,44	0,25	0,17	4,43	4,95

Values are valid for 1 angle bracket (* 2 angle brackets opposite each other), GH nail, ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm, unit of length in mm, unit for force in kN.
For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ can be doubled.

Timber / Concrete

Art. No.	H	L	B	S	n_a	NB	VM	$F_{1,T,Rk}$	$F_{1,S,Rk}$	$k_{1,t,ax}$	$F_{2/3,T,RK}$	$k_{2/3,t,v}$	$F_{4,T,Rk}$	$F_{4,S,Rk}$	$k_{4,t,v}$	$k_{4,t,ax}$	$F_{5,T,Rk}$	$F_{5,S,Rk}$	$k_{5,t,v}$	$k_{5,t,ax}$	$*F_{4/5,T,Rk}$	$*F_{4/5,S,Rk}$	$k_{4/5,t,v}$	$k_{4/5,t,ax}$
110090E	95	85	65	1,5	10	Full	4.0x40	18,9	0,94	3,25	2,56	1,00	-	1,53	1,00	2,00	3,53	2,63	1,00	0,32	18,00	1,88	1,00	1,62
							4.0x60	23,64	0,94	3,25	3,89	1,00	-	1,53	1,00	2,00	5,88	2,63	1,00	0,32	30,00	1,88	1,00	1,62
					3	Partial	4.0x40	5,67	0,94	3,25	0,76	1,00	-	1,53	1,00	2,00	0,15	0,17	1,00	0,32	5,40	1,88	1,00	1,62
							4.0x60	7,09	0,94	3,25	1,10	1,00	-	1,53	1,00	2,00	0,25	0,17	1,00	0,32	9,00	1,88	1,00	1,62

Values are valid for 1 angle bracket (* 2 angle brackets opposite each other), GH nail, ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm, unit of length in mm, unit for force in kN.
For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ can be doubled and the values $F_{1,v,k}$, $F_{1,ax,k}$, $F_{2/3,v,k}$ halved.



GREENLINE

ETA-13 0900

NKL 2

350 GD Z275

ANGLE BRACKETS

TYPE 65/90 1.5

3

Art. No.	Rib	Dimensions [mm]							nN	nBo	EAN	Weight	Pallet	PU		
		H	x	L	x	W(B)	x	T(S)	Ø 5	Ø 11	4019346	kg				
6503S15	with	90	x	90	x	65	x	1,5	20	2	024621	0.114	4800	100	■	■
6504S15	without	90	x	90	x	65	x	1,5	22	6	024638	0.114	4800	100	■	■

GREENLINE

ECOLOGICAL, RESOURCE-SAVING AND ECONOMICAL

The **GH "Green**line" product series, alongside the successfully innovative **„Top**line" series, has been committed for the past 14 years to an increasingly important aspect for the future with the aim manufacturing products with almost unchanged or even better static values in a resource-saving way.

Because huge emissions of approx. 1.7 tons CO_2 per ton of steel are generated in steel production, we already started years ago to search for ways of achieving a reduction in emissions.

Thanks to new production processes and special materials with more strength, we have been able to save approx. **7300 tons of CO_2 in the past 14 years** with **Green**line articles with reduced cross-sections in comparison to former conventional standard products.

To make things clearer, this corresponds to annual emissions savings of CO_2 for the energy needs of around 1000 German citizens
(Source: https://de.statista.com/IEA).

In addition to making ecological sense, this is also economically advantageous for everyone involved and saves transport costs that have not yet been included in the calculation.

As the first manufacturer with joist hangers in 1.5 mm and the already established bracing strip in 1.5 mm, more **Green**line products followed over the years such as standard angle brackets, KR brackets, rafter anchors and nail plates.

In most cases, we have also succeeded in achieving the same or even better static values than conventional standard angle brackets, and at even more lucrative value for money.

TYPE 65/90 1.5

Timber / Timber

Art. No.	H	L	W(B)	T(S)	n_a	NB	VM	$F_{1,T,Rk}$	$F_{2/3,T,Rk}$	$*F_{4/5,T,Rk}$
6503S15	90	90	65	1,5	18	Full	4.0x40	-	-	-
							4.0x60	5,30	6,70	11,70
					-	Partial	4.0x40	-	-	-
							4.0x60	-	-	-
6504S15	90	90	65	1,5	16	Full	4.0x40	0,28	4,11	2,96
							4.0x60	-	-	-
					-	Partial	4.0x40	-	-	-
							4.0x60	-	-	-

Values are valid for 1 angle bracket (* 2 angle brackets opposite each other), GH nail, ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm, unit of length in mm, unit for force in kN.
For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ can be doubled.

Timber / Concrete

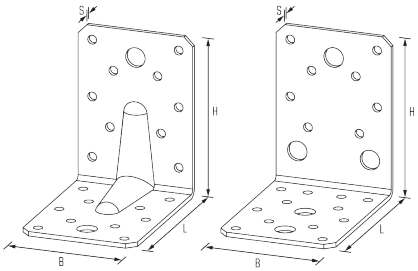
Art. No.	H	L	W(B)	T(S)	n_a	NB	VM	$F_{1,T,Rk}$	$F_{1,Bo,ax,rk}$	$F_{2/3,T,RK}$	$F_{2/3,Bo,sx,rk}$	$F_{4,T,Rk}$	$F_{4,Bo,sx,rk}$	$F_{5;T;Rk}$	$F_{5;Bo,ax,rk}$	$F_{5;Bo,sx,rk}$	$*F_{4/5,T,Rk}$	$F_{4/5;Bo,ax,rk}$	$F_{4/5;Bo,ax,rk}$
6503S15	90	90	65	1,5	8	Full	4.0x40	0,15	1,59	1,05	1,05	4,54	4,54	0,96	0,56	0,96	6,06	1,03	4,61
							4.0x60	-	-	-	-	-	-	-	-	-	-	-	-
					-	Partial	4.0x40	-	-	-	-	-	-	-	-	-	-	-	-
							4.0x60	-	-	-	-	-	-	-	-	-	-	-	-
6504S15	90	90	65	1,5	8	Full	4.0x40	1,64	1,98	3,44	2,06	-	-	-	-	-	2,71	0,27	1,17
							4.0x60	-	-	-	-	-	-	-	-	-	-	-	-
					-	Partial	4.0x40	-	-	-	-	-	-	-	-	-	-	-	-
							4.0x60	-	-	-	-	-	-	-	-	-	-	-	-

Values are valid for 1 angle bracket (* 2 angle brackets opposite each other), GH nail, ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm, unit of length in mm, unit for force in kN.
For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ can be doubled and the values $F_{1,v,k}$, $F_{1,ax,k}$, $F_{2/3,v,k}$ halved.

ANGLE BRACKETS

TYPE 65/90 2.5

6503S 6504S



ETA-09 0323

NKL 2

250 GD Z275

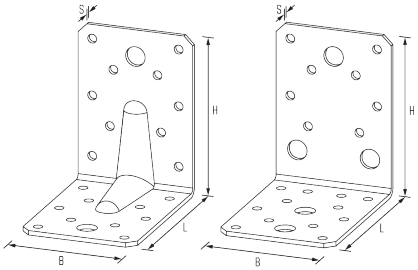
3

Art. No.	Rib	Dimensions [mm]							nN	nBo	EAN	Weight	Pallet	PU		
		H	x	L	x	W(B)	x	T(S)	Ø 5	Ø 11	4019346	kg				
6503S	with	90	x	90	x	65	x	2,5	20	2	110119	0.190	4800	100	■	■
6504S	without	90	x	90	x	65	x	2,5	22	5	110126	0.190	4800	100	■	■

ANGLE BRACKETS

TYPE 65/90 2.5 S13

6503S13 6504S13



ETA-09 0323

NKL 2

250 GD Z275

Art. No.	Rib	Dimensions [mm]							nN	nBo	EAN	Weight	Pallet	PU		
		H	x	L	x	W(B)	x	T(S)	Ø 5	Ø 13	4019346	kg				
6503S13	with	90	x	90	x	65	x	2,5	20	2	110614	0.194	4800	100	■	■
6504S13	without	90	x	90	x	65	x	2,5	22	5	110621	0.207	4800	100	■	■

TYP 65/90 2,5

Timber / Timber

Art. No.	H	L	W(B)	T(S)	n_a	NB	VM	$F_{1,T,Rk}$	$F_{1,s,Rk}$	$F_{2/3,T,Rk}$	$F_{4,T,Rk}$	$F_{4,S,RK}$	$F_{5,T,Rk}$	$F_{5,S,Rk}$	$*F_{4/5,T,Rk}$	$*F_{4/5,S,Rk}$
6503S	90	90	65	2,5	18	Full	4.0x40	1,94	0,38	5,46	2,75	0,53	2,96	0,57	3,89	0,75
							4.0x60	3,24	0,38	7,09	4,58	0,53	4,94	0,57	6,48	0,75
					10	Partial	4.0x40	1,83	0,59	3,53	2,59	0,60	2,45	0,66	3,67	1,17
							4.0x60	3,05	0,59	4,65	4,31	0,60	4,09	0,60	6,11	1,17
6504S	90	90	65	2,5	20	Full	4.0x40	0,49	0,20	6,00	0,22	0,09	1,53	0,60	0,97	0,40
							4.0x60	0,81	0,20	7,95	0,38	0,09	2,55	0,60	1,62	0,40
					10	Partial	4.0x40	0,49	0,20	3,58	0,22	0,09	1,53	0,60	0,97	0,40
							4.0x60	0,81	0,20	4,75	0,38	0,09	2,55	0,60	1,62	0,40

Values are valid for 1 angle bracket (* 2 angle brackets opposite each other), GH nail, ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm, unit of length in mm, unit for force in kN.
For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ can be doubled.

Timber / Concrete

Art. No.	H	L	W(B)	T(S)	n_a	NB	VM	$F_{1,T,Rk}$	$F_{1,S,Rk}$	$k_{1,t,ax}$	$F_{2/3,T,RK}$	$k_{2/3,t,v}$	$F_{4,T,Rk}$	$F_{4,S,Rk}$	$k_{4,t,v}$	$k_{4,t,ax}$	$F_{5,T,Rk}$	$F_{5,S,Rk}$	$k_{5,t,v}$	$k_{5,t,ax}$	$*F_{4/5,T,Rk}$	$*F_{4/5,S,Rk}$	$k_{4/5,t,v}$	$k_{4/5,t,ax}$
6503S	90	90	65	2,5	8	Full	4.0x40	15,12	0,02	14,64	1,76	1,00	-	0,04	1,00	7,27	2,96	0,57	1,00	0,26	14,40	0,04	1,00	7,32
							4.0x60	18,91	0,02	14,64	2,76	1,00	-	0,04	1,00	7,27	4,94	0,57	1,00	0,26	24,00	0,04	1,00	7,32
					4	Partial	4.0x40	7,56	0,02	14,64	0,92	1,00	-	0,04	1,00	7,27	2,45	0,60	1,00	0,26	7,20	0,04	1,00	7,32
							4.0x60	9,46	0,02	14,64	1,47	1,00	-	0,04	1,00	7,27	4,09	0,60	1,00	0,26	12,00	0,04	1,00	7,32
6504S	90	90	65	2,5	8	Full	4.0x40	15,12	0,06	9,18	2,57	1,00	1,29	0,07	1,00	7,27	1,53	0,60	1,00	0,32	14,40	0,12	1,00	4,59
							4.0x60	18,91	0,06	9,18	3,78	1,00	2,14	0,07	1,00	7,27	2,55	0,60	1,00	0,32	24,00	0,12	1,00	4,59
					4	Partial	4.0x40	7,56	0,06	9,18	1,40	1,00	1,29	0,07	1,00	7,27	1,53	0,60	1,00	0,32	7,20	0,12	1,00	4,59
							4.0x60	9,46	0,06	9,18	2,12	1,00	2,14	0,07	1,00	7,27	2,55	0,60	1,00	0,32	12,00	0,12	1,00	4,59

Values are valid for 1 angle bracket (* 2 angle brackets opposite each other), GH nail, ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm, unit of length in mm, unit for force in kN.
For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ can be doubled and the values $F_{1,v,k}$, $F_{1,ax,k}$, $F_{2/3,v,k}$ halved.

TYP 65/90 2,5 S13

Timber / Timber

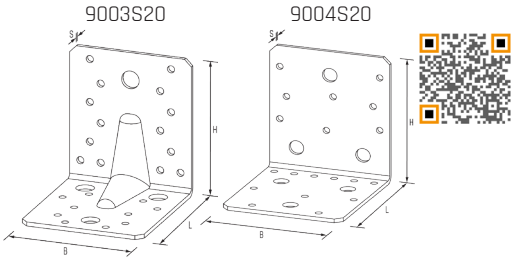
Art. No.	H	L	W(B)	T(S)	n_a	NB	VM	$F_{1,T,Rk}$	$F_{1,s,Rk}$	$F_{2/3,T,Rk}$	$F_{4,T,Rk}$	$F_{4,S,RK}$	$F_{5,T,Rk}$	$F_{5,S,Rk}$	$*F_{4/5,T,Rk}$	$*F_{4/5,S,Rk}$
6503S13	90	90	65	2,5	18	Full	4.0x40	1,94	0,38	5,46	2,75	0,53	2,96	0,57	3,89	0,75
							4.0x60	3,24	0,38	7,09	4,58	0,53	4,94	0,57	6,48	0,75
					10	Partial	4.0x40	1,83	0,59	3,53	2,59	0,60	2,45	0,60	3,67	1,17
							4.0x60	3,05	0,59	4,65	4,31	0,60	4,09	0,60	6,11	1,17
6504S13	90	90	65	2,5	20	Full	4.0x40	0,49	0,20	6,00	0,22	0,09	1,53	0,60	0,97	0,40
							4.0x60	0,81	0,20	7,95	0,38	0,09	2,55	0,60	1,62	0,40
					10	Partial	4.0x40	0,49	0,20	3,58	0,22	0,09	1,53	0,60	0,97	0,40
							4.0x60	0,81	0,20	4,75	0,38	0,09	2,55	0,60	1,62	0,40

Values are valid for 1 angle bracket (* 2 angle brackets opposite each other), GH nail, ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm, unit of length in mm, unit for force in kN.
For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ can be doubled.

Timber / Concrete

Art. No.	H	L	W(B)	T(S)	n_a	NB	VM	$F_{1,T,Rk}$	$F_{1,S,Rk}$	$k_{1,t,ax}$	$F_{2/3,T,RK}$	$k_{2/3,t,v}$	$F_{4,T,Rk}$	$F_{4,S,Rk}$	$k_{4,t,v}$	$k_{4,t,ax}$	$F_{5,T,Rk}$	$F_{5,S,Rk}$	$k_{5,t,v}$	$k_{5,t,ax}$	$*F_{4/5,T,Rk}$	$*F_{4/5,S,Rk}$	$k_{4/5,t,v}$	$k_{4/5,t,ax}$
6503S13	90	90	65	2,5	8	Full	4.0x40	15,12	0,03	12,54	1,76	1,00	-	0,05	1,00	6,15	2,96	0,57	1,00	0,26	14,40	0,05	1,00	6,27
							4.0x60	18,91	0,03	12,54	2,76	1,00	-	0,05	1,00	6,15	4,94	0,57	1,00	0,26	24,00	0,05	1,00	6,27
					4	Partial	4.0x40	7,56	0,03	12,54	0,92	1,00	-	0,05	1,00	6,15	2,45	0,60	1,00	0,26	7,20	0,05	1,00	6,27
							4.0x60	9,46	0,03	12,54	1,47	1,00	-	0,05	1,00	6,15	4,09	0,60	1,00	0,26	12,00	0,05	1,00	6,27
6504S13	90	90	65	2,5	8	Full	4.0x40	15,12	0,07	7,92	2,57	1,00	1,29	0,09	1,00	6,15	1,53	0,60	1,00	0,32	14,40	0,13	1,00	3,96
							4.0x60	18,91	0,07	7,92	3,78	1,00	2,14	0,09	1,00	6,15	2,55	0,60	1,00	0,32	24,00	0,13	1,00	3,96
					4	Partial	4.0x40	7,56	0,07	7,92	1,40	1,00	1,29	0,09	1,00	6,15	1,53	0,60	1,00	0,32	7,20	0,13	1,00	3,96
							4.0x60	9,46	0,07	7,92	2,12	1,00	2,14	0,09	1,00	6,15	2,55	0,60	1,00	0,32	12,00	0,13	1,00	3,96

Values are valid for 1 angle bracket (* 2 angle brackets opposite each other), GH nail, ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm, unit of length in mm, unit for force in kN.
For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ can be doubled and the values $F_{1,v,k}$, $F_{1,ax,k}$, $F_{2/3,v,k}$ halved.



GREENLINE

ETA-13
0900

NKL 2

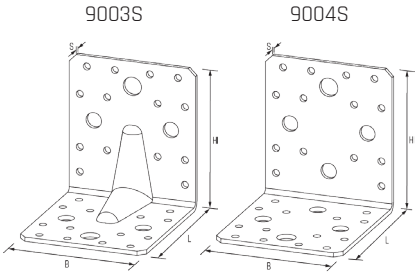
350
GD
Z275

ANGLE BRACKETS

TYPE 90/100 2.0

3

Art. No.	Rib	Dimensions [mm]							nN	nBo	nBo	EAN	Weight	Pallet	PU		
		H	x	L	x	W(B)	x	T(S)	Ø 5	Ø 11	Ø 13	4019346	kg				
9003S20	with	105	x	105	x	90	x	2,0	24	0	4	024669	0.235	3000	50	■	■
9004S20	without	105	x	105	x	90	x	2,0	19	6	0	024676	0.235	3000	50	■	■



ETA-09
0323

NKL 2

250
GD
Z275

ANGLE BRACKETS

TYPE 90/100 3.0

Art. No.	Rib	Dimensions [mm]							nN	nBo	nBo	EAN	Weight	Pallet	PU		
		H	x	L	x	W(B)	x	T(S)	Ø 5	Ø 11	Ø 13	4019346	kg				
9003S	with	100	x	100	x	90	x	3,0	28	4	2	110034	0.360	3000	50	■	■
9004S	without	100	x	100	x	90	x	3,0	28	6	2	110041	0.360	3000	50	■	■

3

TYPE 90/100 2.0

Timber / Timber

Art. No.	H	L	W(B)	T(S)	n_a	NB	VM	$F_{1,T,Rk}$	$F_{2/3,T,Rk}$	$*F_{4/5,T,Rk}$
9003S20	105	105	90	2,0	19	Full	4.0x40	-	-	-
							4.0x60	7,50	10,20	12,40
					-	Partial	4.0x40	-	-	-
							4.0x60	-	-	-
9004S20	105	105	90	2,0	15	Full	4.0x40	-	-	-
							4.0x60	10,60	9,50	16,50
					-	Partial	4.0x40	-	-	-
							4.0x60	-	-	-

Values are valid for 1 angle bracket (* 2 angle brackets opposite each other), GH nail, ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm, unit of length in mm, unit for force in kN.
For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ can be doubled.

TYPE 90/100 3.0

Timber / Timber

Art. No.	H	L	W(B)	T(S)	n_a	NB	VM	$F_{1,T,Rk}$	$F_{1,s,Rk}$	$F_{2/3,T,Rk}$	$F_{4,T,Rk}$	$F_{4,S,RK}$	$F_{5,T,Rk}$	$F_{5,S,Rk}$	$*F_{4/5,T,Rk}$	$*F_{4/5,S,Rk}$
9003S	100	100	90	3,0	26	Full	4.0x40	2,43	0,74	8,69	3,59	1,00	4,54	1,00	4,85	1,48
							4.0x60	4,05	0,74	11,10	5,99	1,00	7,56	1,00	8,09	1,48
					14	Partial	4.0x40	1,85	0,91	5,41	2,73	1,00	4,54	1,00	3,70	1,81
							4.0x60	3,08	0,91	6,76	4,56	1,00	7,56	1,00	6,16	1,81
9004S	100	100	90	3,0	26	Full	4.0x40	0,22	0,34	8,69	0,11	0,17	3,15	1,19	0,45	0,68
							4.0x60	0,38	0,34	11,10	0,19	0,17	5,25	1,19	0,75	0,68
					14	Partial	4.0x40	0,22	0,34	5,41	0,11	0,17	3,15	1,19	0,45	0,68
							4.0x60	0,38	0,34	6,76	0,19	0,17	5,25	1,19	0,75	0,68

Values are valid for 1 angle bracket (* 2 angle brackets opposite each other), GH nail, ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm, unit of length in mm, unit for force in kN.
For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ can be doubled.

TYPE 90/100 2.0

Timber / Concrete

Art. No.	H	L	W(B)	T(S)	n_a	NB	VM	$F_{1,T,Rk}$	$F_{1,Bo,ax,rk}$	$F_{2/3,T,RK}$	$F_{2/3,Bo,sx,rk}$	$F_{4,T,Rk}$	$F_{4,Bo,sx,rk}$	$F_{5;T;Rk}$	$F_{5;Bo,ax,rk}$	$F_{5;Bo,sx,rk}$	$*F_{4/5,T,Rk}$	$F_{4/5;Bo,ax,rk}$	$F_{4/5;Bo,ax,rk}$
9003S20	105	105	90	2,0	10	Full	4.0x40	9,48	12,00	6,21	3,91	5,44	2,72	1,62	1,26	0,81	5,78	0,40	2,60
							4.0x60	-	-	-	-	-	-	-	-	-	-	-	-
					-	Partial	4.0x40	-	-	-	-	-	-	-	-	-	-	-	-
							4.0x60	-	-	-	-	-	-	-	-	-	-	-	-
9004S20	105	105	90	2,0	8	Full	4.0x40	1,04	1,60	5,15	4,43	-	-	-	-	-	5,71	0,34	2,40
							4.0x60	-	-	-	-	-	-	-	-	-	-	-	-
					-	Partial	4.0x40	-	-	-	-	-	-	-	-	-	-	-	-
							4.0x60	-	-	-	-	-	-	-	-	-	-	-	-

Values are valid for 1 angle bracket (* 2 angle brackets opposite each other), GH nail, ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm, unit of length in mm, unit for force in kN.
For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ can be doubled and the values $F_{1,v,k}$, $F_{1,ax,k}$, $F_{2/3,v,k}$ halved.

TYPE 90/100 3.0

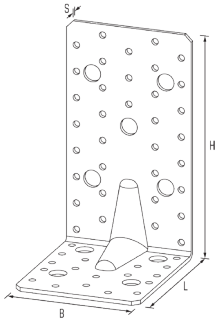
Timber / Concrete

Art. No.	H	L	W(B)	T(S)	n_a	NB	VM	$F_{1,T,Rk}$	$F_{1,S,Rk}$	$k_{1,t,ax}$	$F_{2/3,T,RK}$	$k_{2/3,t,v}$	$F_{4,T,Rk}$	$F_{4,S,Rk}$	$k_{4,t,v}$	$k_{4,t,ax}$	$F_{5,T,Rk}$	$F_{5,S,Rk}$	$k_{5,t,v}$	$k_{5,t,ax}$	$*F_{4/5,T,Rk}$	$*F_{4/5,S,Rk}$	$k_{4/5,t,v}$	$k_{4/5,t,ax}$
9003S	100	100	90	3,0	12	Full	4.0x40	22,68	0,07	5,45	4,49	0,50	-	0,10	0,50	3,64	4,54	1,00	0,50	0,15	21,60	0,13	0,50	2,73
							4.0x60	28,37	0,07	5,45	6,55	0,50	-	0,10	0,50	3,64	7,56	1,00	0,50	0,15	36,00	0,13	0,50	2,73
					8	Partial	4.0x40	15,12	0,07	5,45	3,14	0,50	-	0,10	0,50	3,64	4,54	1,00	0,50	0,15	14,40	0,13	0,50	2,73
							4.0x60	18,91	0,07	5,45	4,71	0,50	-	0,10	0,50	3,64	7,56	1,00	0,50	0,15	24,00	0,13	0,50	2,73
9004S	100	100	90	3,0	12	Full	4.0x40	22,68	0,36	5,45	4,54	0,50	3,60	0,27	0,50	7,27	3,15	1,19	0,50	0,38	21,60	0,71	0,50	2,73
							4.0x60	28,37	0,36	5,45	6,61	0,50	6,00	0,27	0,50	7,27	5,25	1,19	0,50	0,38	36,00	0,71	0,50	2,73
					8	Partial	4.0x40	15,12	0,36	5,45	4,70	1,00	3,60	0,27	1,00	7,27	3,15	1,19	1,00	0,38	14,40	0,71	1,00	2,73
							4.0x60	18,91	0,36	5,45	6,34	1,00	6,00	0,27	1,00	7,27	5,25	1,19	1,00	0,38	24,00	0,71	1,00	2,73

Values are valid for 1 angle bracket (* 2 angle brackets opposite each other), GH nail, ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm, unit of length in mm, unit for force in kN.
For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ can be doubled and the values $F_{1,v,k}$, $F_{1,ax,k}$, $F_{2/3,v,k}$ halved.

ANGLE BRACKETS

TYPE 110/170L



ETA-09 0322

NKL 2

250 GD Z275

3

Art. No.	Dimensions [mm]							nN	nBo	EAN	Weight	Pallet	PU		
	H	x	L	x	W(B)	x	T(S)	Ø 5	Ø 13	4019346	kg				
110170L	170	x	110	x	95	x	3,0	53	9	215593	0.557	1500	25	■	■

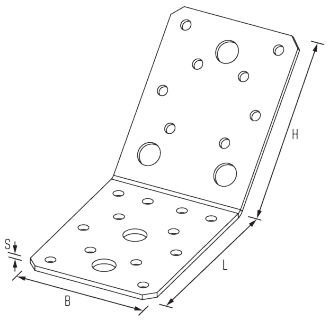
The unequal-legged 3 mm thick angle bracket 110/170 S with its 9 x Ø 13 mm holes can be used very universally for higher loads, e.g. for securing high sleepers. The bracket is also perfect for taking loads F_2 and F_3. Standard connections such as pole/column, wall bar/column, sleeper/concrete, etc.

Connection methods

- Timber/timber
- Timber/concrete, masonry
- Timber/steel
- Timber/Halfen rail

STRUT CONNECTORS

135 DEGREE



ETA-09 0322

NKL 2

250 GD Z275

Art. No.	Dimensions [mm]							nN	nN	nBo	nBo	EAN	Weight	Pallet	PU		
	H	x	L	x	W(B)	x	T(S)	Ø 5	Ø 7	Ø 11	Ø 13	4019346	kg				
1867	90	x	90	x	65	x	2,5	20	8	2	-	130124	0.190	4500	100	■	■
2197	100	x	100	x	90	x	3,0	28	-	6	2	130131	0.352	2400	40	■	■

Strut connectors have an angle of 135° and are used to connect timber constructions.

TYPE 110/170L

Timber / Timber

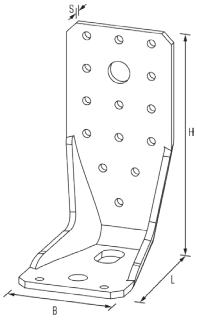
Art. No.	H	L	W(B)	T(S)	n_a	NB	VM	$F_{1,T,Rk}$	$F_{1,S,Rk}$	$F_{2/3,T,Rk}$	$F_{4,T,Rk}$	$F_{4,S,RK}$	$F_{5,T,Rk}$	$F_{5,S,Rk}$	$*F_{4/5,T,Rk}$	$*F_{4/5,S,Rk}$
110170L	170	110	95	3,0	35	Full	4.0x40	2,44	5,89	10,36	3,59	8,71	2,83	9,06	4,87	11,77
							4.0x60	4,07	5,89	13,28	5,97	8,71	4,71	9,06	8,11	11,77
					22	Partial	4.0x40	1,84	6,01	5,87	2,70	8,90	0,16	0,66	3,67	12,02
							4.0x60	3,07	6,01	7,71	4,48	8,90	0,27	0,66	6,10	12,02

Values are valid for 1 angle bracket (* 2 angle brackets opposite each other), GH nail, ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm, unit of length in mm, unit for force in kN.
For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ can be doubled.

Timber / Concrete

Art. No.	H	L	B	S	n_a	NB	VM	$F_{1,T,Rk}$	$F_{1,S,Rk}$	$k_{1,t,ax}$	$F_{2/3,T,RK}$	$k_{2/3,t,v}$	$F_{4,T,Rk}$	$F_{4,S,Rk}$	$k_{4,t,v}$	$k_{4,t,ax}$	$F_{5,T,Rk}$	$F_{5,S,Rk}$	$k_{5,t,v}$	$k_{5,t,ax}$	$*F_{4/5,T,Rk}$	$*F_{4/5,S,Rk}$	$k_{4/5,t,v}$	$k_{4/5,t,ax}$
110170L	170	110	95	3,0	17	Full	4.0x40	32,13	14,55	0,77	7,04	0,25	-	11,83	0,25	0,52	2,83	9,06	0,25	0,20	27,63	29,09	0,25	0,39
							4.0x60	40,19	14,55	0,77	9,61	0,25	-	11,83	0,25	0,52	4,71	9,06	0,25	0,20	51,00	29,09	0,25	0,39
					11	Partial	4.0x40	20,79	14,55	0,77	4,45	0,50	-	11,83	0,50	0,52	0,16	0,66	0,50	0,20	17,88	29,09	0,50	0,39
							4.0x60	26,00	14,55	0,77	5,64	0,50	-	11,83	0,50	0,52	0,27	0,66	0,50	0,20	27,86	29,09	0,50	0,39

Values are valid for 1 angle bracket (* 2 angle brackets opposite each other), GH nail, ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm, unit of length in mm, unit for force in kN.
For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ can be doubled and the values $F_{1,v,k}$, $F_{1,ax,k}$, $F_{2/3,v,k}$ halved.



GREENLINE ETA-09 0324

NKL 2 250 GD Z275

ANGLE BRACKETS

KR SLOTTED HOLE 3.0 GREENLINE

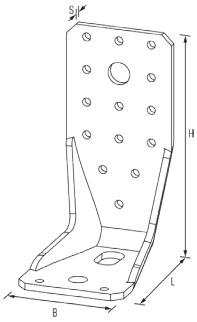
3

Art. No.	Dimensions [mm]							$H_{,nN}$	$H_{,nBo}$	$L_{,nN}$	$L_{,nBo}$	$L_{,nBo}$	EAN	Weight	Pallet	PU		
	H	x	L	x	W(B)	x	T(S)	Ø 5	Ø 13,5	Ø 5	13x24,5	Ø 11	4019346	kg				
1100953L	95	x	88	x	65	x	3,0	11	-	2	1	1	110997	0.242	1200	25		■
1101353L	135	x	88	x	65	x	3,0	16	1	2	1	1	111000	0.304	1200	25		■
1102853L	285	x	88	x	65	x	3,0	28	3	2	1	1	111017	0.522	600	25		■

GREENLINE

GREENLINE KR brackets in 3 mm are statically almost identical to the KR brackets in 4 mm.

KR brackets in 3 and 4 mm with round hole or slotted hole are used for connections between wood/wood; wood/concrete; wood/steel and wood/masonry. Due to the ribs in the bending radius, KR connectors are extremely sturdy and can be used cost-effectively for high loads. These properties are primarily required for connections to columns, sleepers, timber trusses and beams. The 4 mm KR brackets are subsequently galvanised.



ETA-09 0324

NKL 2 235 JR verzinkt

ANGLE BRACKETS

KR SLOTTED HOLE 4.0

Art. No.	Dimensions [mm]							$H_{,nN}$	$H_{,nBo}$	$L_{,nN}$	$L_{,nBo}$	$L_{,nBo}$	EAN	Weight	Pallet	PU		
	H	x	L	x	W(B)	x	T(S)	Ø 5	Ø 13,5	Ø 5	13x24,5	Ø 11	4019346	kg				
110095L	95	x	88	x	65	x	4,0	11	-	2	1	1	110911	0.319	1200	25		■
110135L	135	x	88	x	65	x	4,0	16	1	2	1	1	110935	0.398	1200	25		■
110285L	285	x	88	x	65	x	4,0	28	3	2	1	1	110959	0.722	600	25		■

3

KR SLOTTED HOLE 3.0

Timber | Concrete

Art. No.	H	L	W(B)	T(S)	n_a	NB	VM	$F_{1,T,Rk}$	$F_{1,S,Rk}$	$k_{1,t,ax}$	$F_{2/3,T,RK}$	$k_{2/3,t,v}$	$F_{4,T,Rk}$	$F_{4,S,Rk}$	$k_{4,t,v}$	$k_{4,t,ax}$	$F_{5,T,Rk}$	$F_{5,S,Rk}$	$k_{5,t,v}$	$k_{5,t,ax}$	$*F_{4/5,T,Rk}$	$*F_{4/5,S,Rk}$	$k_{4/5,t,v}$	$k_{4/5,t,ax}$
1100953L	95	88	65	3,0	9	Full	4.0x40	17,01	2,63	2,74	2,40	1,00	-	-	-	-	-	-	-	-	-	-	-	-
							4.0x60	21,28	2,63	2,74	3,56	1,00	-	-	-	-	-	-	-	-	-	-	-	-
					3	Partial	4.0x40	5,67	2,63	2,74	0,79	1,00	-	-	-	-	-	-	-	-	-	-	-	-
							4.0x60	7,09	2,63	2,74	1,14	1,00	-	-	-	-	-	-	-	-	-	-	-	-
1101353L	135	88	65	3,0	14	Full	4.0x40	26,46	2,63	2,74	3,84	1,00	-	-	-	-	-	-	-	-	-	-	-	-
							4.0x60	33,10	2,63	2,74	5,62	1,00	-	-	-	-	-	-	-	-	-	-	-	-
					6	Partial	4.0x40	11,34	2,63	2,74	1,71	1,00	-	-	-	-	-	-	-	-	-	-	-	-
							4.0x60	14,18	2,63	2,74	2,50	1,00	-	-	-	-	-	-	-	-	-	-	-	-
1102853L	285	88	65	3,0	14	Full	4.0x40	26,46	2,63	2,74	4,08	1,00	-	-	-	-	-	-	-	-	-	-	-	-
							4.0x60	33,10	2,63	2,74	5,88	1,00	-	-	-	-	-	-	-	-	-	-	-	-
					10	Partial	4.0x40	18,90	2,63	2,74	3,08	1,00	-	-	-	-	-	-	-	-	-	-	-	-
							4.0x60	23,64	2,63	2,74	4,67	1,00	-	-	-	-	-	-	-	-	-	-	-	-

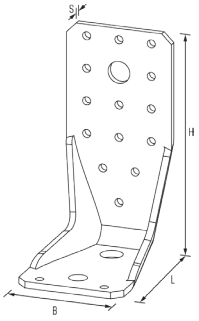
Values are valid for 1 angle bracket (* 2 angle brackets opposite each other), GH nail, ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm, unit of length in mm, unit for force in kN.
For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ can be doubled and the values $F_{1,v,k}$, $F_{1,ax,k}$, $F_{2/3,v,k}$ halved.

KR SLOTTED HOLE 4.0

Timber | Concrete

Art. No.	H	L	W(B)	T(S)	n_a	NB	VM	$F_{1,T,Rk}$	$F_{1,S,Rk}$	$k_{1,t,ax}$	$F_{2/3,T,RK}$	$k_{2/3,t,v}$	$F_{4,T,Rk}$	$F_{4,S,Rk}$	$k_{4,t,v}$	$k_{4,t,ax}$	$F_{5,T,Rk}$	$F_{5,S,Rk}$	$k_{5,t,v}$	$k_{5,t,ax}$	$*F_{4/5,T,Rk}$	$*F_{4/5,S,Rk}$	$k_{4/5,t,v}$	$k_{4/5,t,ax}$
110095L	95	88	65	4,0	9	Full	4.0x40	17,01	3,58	2,74	2,40	1,00	-	-	-	-	-	-	-	-	-	-	-	-
							4.0x60	21,28	3,58	2,74	3,56	1,00	-	-	-	-	-	-	-	-	-	-	-	-
					3	Partial	4.0x40	5,67	3,58	2,74	0,79	1,00	-	-	-	-	-	-	-	-	-	-	-	-
							4.0x60	7,09	3,58	2,74	1,14	1,00	-	-	-	-	-	-	-	-	-	-	-	-
110135L	135	88	65	4,0	14	Full	4.0x40	26,46	3,58	2,74	3,84	1,00	-	-	-	-	-	-	-	-	-	-	-	-
							4.0x60	33,1	3,58	2,74	5,62	1,00	-	-	-	-	-	-	-	-	-	-	-	-
					6	Partial	4.0x40	11,34	3,58	2,74	1,71	1,00	-	-	-	-	-	-	-	-	-	-	-	-
							4.0x60	14,18	3,58	2,74	2,50	1,00	-	-	-	-	-	-	-	-	-	-	-	-
110285L	285	88	65	4,0	14	Full	4.0x40	26,46	3,58	2,74	4,08	1,00	-	-	-	-	-	-	-	-	-	-	-	-
							4.0x60	33,10	3,58	2,74	5,88	1,00	-	-	-	-	-	-	-	-	-	-	-	-
					10	Partial	4.0x40	18,90	3,58	2,74	3,08	1,00	-	-	-	-	-	-	-	-	-	-	-	-
							4.0x60	23,64	3,58	2,74	4,67	1,00	-	-	-	-	-	-	-	-	-	-	-	-

Values are valid for 1 angle bracket (* 2 angle brackets opposite each other), GH nail, ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm, unit of length in mm, unit for force in kN.
For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ can be doubled and the values $F_{1,v,k}$, $F_{1,ax,k}$, $F_{2/3,v,k}$ halved.



GREENLINE ETA-09 0324

NKL 2 250 GD Z275

ANGLE BRACKETS

KR ROUND HOLE 3.0 GREENLINE

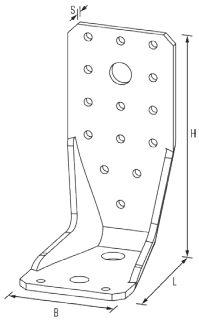
3

Art. No.	Dimensions [mm]							$H_{,nN}$	$H_{,nBo}$	$L_{,nN}$	$L_{,nBo}$	$L_{,nBo}$	EAN	Weight	Pallet	PU		
	H	x	L	x	W(B)	x	T(S)	Ø 5	Ø 13,5	Ø 5	Ø 13,5	Ø 11	4019346	kg				
1100953	95	x	88	x	65	x	3,0	11	-	2	1	1	110966	0.245	1200	25		■
1101353	135	x	88	x	65	x	3,0	16	1	2	1	1	110973	0.308	1200	25		■
1102853	285	x	88	x	65	x	3,0	28	3	2	1	1	110980	0.534	600	25		■

GREENLINE

GREENLINE KR brackets in 3 mm are statically almost identical to the KR brackets in 4 mm.

KR brackets in 3 and 4 mm with round hole or slotted hole are used for connections between wood/wood; wood/concrete; wood/steel and wood/masonry. Due to the ribs in the bending radius, KR connectors are extremely sturdy and can be used cost-effectively for high loads. These properties are primarily required for connections to columns, sleepers, timber trusses and beams. The 4 mm KR brackets are subsequently galvanised.



ETA-09 0324

NKL 2 235 JR verzinkt

ANGLE BRACKETS

KR ROUND HOLE 4.0

Art. No.	Dimensions [mm]							$H_{,nN}$	$H_{,nBo}$	$L_{,nN}$	$L_{,nBo}$	$L_{,nBo}$	EAN	Weight	Pallet	PU		
	H	x	L	x	W(B)	x	T(S)	Ø 5	Ø 13,5	Ø 5	Ø 13,5	Ø 11	4019346	kg				
110095	95	x	88	x	65	x	4,0	11	-	2	1	1	110904	0.319	1200	25		■
110135	135	x	88	x	65	x	4,0	16	1	2	1	1	110928	0.398	1200	25		■
110285	285	x	88	x	65	x	4,0	28	3	2	1	1	110942	0.722	600	25		■

3

KR ROUND HOLE 3.0

Timber / Concrete

Art.-Nr.	H	L	W(B)	T(S)	n_a	NB	VM	$F_{1,T,Rk}$	$F_{1,S,Rk}$	$k_{1,t,ax}$	$F_{2/3,T,RK}$	$k_{2/3,t,v}$	$F_{4,T,Rk}$	$F_{4,S,Rk}$	$k_{4,t,v}$	$k_{4,t,ax}$	$F_{5,T,Rk}$	$F_{5,S,Rk}$	$k_{5,t,v}$	$k_{5,t,ax}$	$*F_{4/5,T,Rk}$	$*F_{4/5,S,Rk}$	$k_{4/5,t,v}$	$k_{4/5,t,ax}$
1100953	95	88	65	3,0	9	Full	4.0x40	17,01	7,32	1,62	3,11	1,00	-	7,43	1,00	1,00	2,27	4,23	1,00	0,38	14,63	14,64	1,00	0,81
							4.0x60	21,28	7,32	1,62	3,98	1,00	-	7,43	1,00	1,00	3,79	4,23	1,00	0,38	27,00	14,63	1,00	0,81
					3	Partial	4.0x40	5,67	7,32	1,62	0,98	1,00	-	7,43	1,00	1,00	0,15	0,36	1,00	0,38	4,87	14,64	1,00	0,81
							4.0x60	7,09	7,32	1,62	1,31	1,00	-	7,43	1,00	1,00	0,25	0,36	1,00	0,38	7,60	14,64	1,00	0,81
1101353	135	88	65	3,0	14	Full	4.0x40	26,46	7,32	1,62	4,92	1,00	-	7,43	1,00	1,00	2,47	3,49	1,00	0,38	25,20	14,63	1,00	0,81
							4.0x60	33,10	7,32	1,62	6,38	1,00	-	7,43	1,00	1,00	4,12	3,49	1,00	0,38	42,00	14,63	1,00	0,81
					6	Partial	4.0x40	11,34	7,32	1,62	2,19	1,00	-	7,43	1,00	1,00	0,22	0,36	1,00	0,38	9,75	14,64	1,00	0,81
							4.0x60	14,18	7,32	1,62	2,80	1,00	-	7,43	1,00	1,00	0,37	0,36	1,00	0,38	15,78	14,63	1,00	0,81
1102853	285	88	65	3,0	14	Full	4.0x40	26,46	7,32	1,62	4,95	1,00	-	7,43	1,00	1,00	1,22	4,21	1,00	0,38	25,20	14,63	1,00	0,81
							4.0x60	33,10	7,32	1,62	6,50	1,00	-	7,43	1,00	1,00	2,04	4,21	1,00	0,38	42,00	14,63	1,00	0,81
					10	Partial	4.0x40	18,90	7,32	1,62	4,20	1,00	-	7,43	1,00	1,00	1,22	4,21	1,00	0,38	18,00	14,63	1,00	0,81
							4.0x60	23,64	7,32	1,62	5,95	1,00	-	7,43	1,00	1,00	2,04	4,21	1,00	0,38	30,00	14,63	1,00	0,81

Values are valid for 1 angle bracket (* 2 angle brackets opposite each other), GH nail, ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm, unit of length in mm, unit for force in kN.
For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ can be doubled and the values $F_{1,v,k}$, $F_{1,ax,k}$, $F_{2/3,v,k}$ halved.

KR ROUND HOLE 4.0

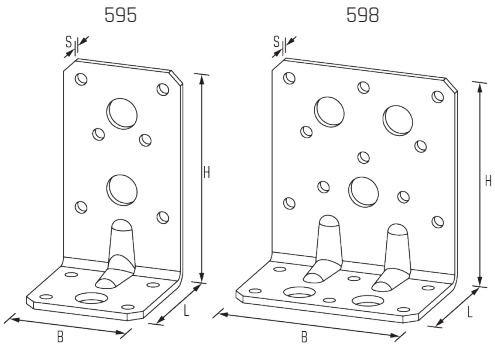
Timber / Concrete

Art. No.	H	L	W(B)	T(S)	n_a	NB	VM	$F_{1,T,Rk}$	$F_{1,S,Rk}$	$k_{1,t,ax}$	$F_{2/3,T,RK}$	$k_{2/3,t,v}$	$F_{4,T,Rk}$	$F_{4,S,Rk}$	$k_{4,t,v}$	$k_{4,t,ax}$	$F_{5,T,Rk}$	$F_{5,S,Rk}$	$k_{5,t,v}$	$k_{5,t,ax}$	$*F_{4/5,T,Rk}$	$*F_{4/5,S,Rk}$	$k_{4/5,t,v}$	$k_{4/5,t,ax}$
110095	95	88	65	4,0	9	Full	4.0x40	17,01	9,96	1,62	3,11	1,00	-	10,12	1,00	1,00	2,27	5,76	1,00	0,38	14,63	19,92	1,00	0,81
							4.0x60	21,28	9,96	1,62	3,98	1,00	-	10,12	1,00	1,00	3,79	5,76	1,00	0,38	26,09	19,92	1,00	0,81
					3	Partial	4.0x40	5,67	9,96	1,62	0,98	1,00	-	10,12	1,00	1,00	0,15	0,49	1,00	0,38	4,87	19,92	1,00	0,81
							4.0x60	7,09	9,96	1,62	1,31	1,00	-	10,12	1,00	1,00	0,25	0,49	1,00	0,38	7,60	19,92	1,00	0,81
110135	135	88	65	4,0	14	Full	4.0x40	26,46	9,96	1,62	4,92	1,00	-	10,12	1,00	1,00	2,47	4,75	1,00	0,38	25,20	19,92	1,00	0,81
							4.0x60	33,10	9,96	1,62	6,38	1,00	-	10,12	1,00	1,00	4,12	4,75	1,00	0,38	42,00	19,92	1,00	0,81
					6	Partial	4.0x40	11,34	9,96	1,62	2,19	1,00	-	10,12	1,00	1,00	0,22	0,49	1,00	0,38	9,75	19,92	1,00	0,81
							4.0x60	14,18	9,96	1,62	2,80	1,00	-	10,12	1,00	1,00	0,37	0,49	1,00	0,38	15,2	19,92	1,00	0,81
110285	285	88	65	4,0	14	Full	4.0x40	26,46	9,96	1,62	4,95	1,00	-	10,12	1,00	1,00	1,22	5,73	1,00	0,38	25,2	19,92	1,00	0,81
							4.0x60	33,10	9,96	1,62	6,50	1,00	-	10,12	1,00	1,00	2,04	5,73	1,00	0,38	42,00	19,92	1,00	0,81
					10	Partial	4.0x40	18,90	9,96	1,62	4,20	1,00	-	10,12	1,00	1,00	1,22	5,73	1,00	0,38	16,25	19,92	1,00	0,81
							4.0x60	23,64	9,96	1,62	5,95	1,00	-	10,12	1,00	1,00	2,04	5,73	1,00	0,38	30,00	19,92	1,00	0,81

Values are valid for 1 angle bracket (* 2 angle brackets opposite each other), GH nail, ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm, unit of length in mm, unit for force in kN.
For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ can be doubled and the values $F_{1,v,k}$, $F_{1,ax,k}$, $F_{2/3,v,k}$ halved.21

ANGLE BRACKETS

TYPE 50/80



ETA-09 0322

NKL 2

250 GD Z275

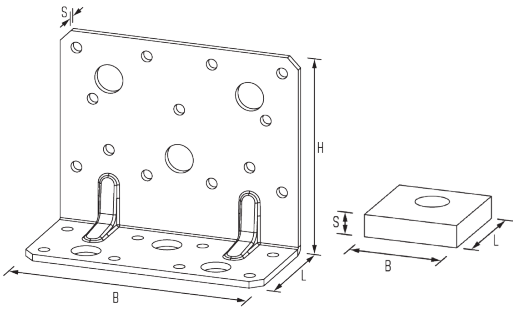
3

Art. No.	Dimensions [mm]							nN	nBo	EAN	Weight	Pallet	PU		
	H	x	L	x	W(B)	x	T(S)	Ø 5	Ø 13	4019346	kg				
595	90	x	50	x	50	x	3,0	10	3	110096	0.144	6000	100	■	■
598	90	x	50	x	80	x	3,0	16	5	110300	0.231	3000	100	■	■

Angle brackets type 50 and type 80 are strong unequal-legged brackets and are suitable for timber/timber connections or for fastening timber constructions to concrete/steel or masonry.

ANGLE BRACKETS

TYPE 110



ETA-09 0322

NKL 2

250 GD Z275

Art. No.	Dimensions [mm]							nN	nBo	EAN	Weight	Pallet	PU		
	H	x	L	x	B	x	S	Ø 5	Ø 13	4019346	kg				
5911	90	x	50	x	110	x	3,0	21	6	110317	0.317	1500	50	■	■
59114	-	x	40	x	43	x	10,0	-	1xØ14	217740	0.107	5000	50	■	■

Angle bracket type 110 is a strong unequal-legged bracket and suitable for timber/timber connections or for fastening timber constructions to concrete/steel or masonry.
With an additional pressure plate, even higher load absorptions are possible.

TYPE 50/80

Timber / Timber

Art. No.	H	L	W(B)	T(S)	n_a	NB	VM	$F_{1,T,Rk}$	$F_{1,S,Rk}$	$F_{2/3,T,Rk}$	$F_{4,T,Rk}$	$F_{4,S,RK}$	$F_{5,T,Rk}$	$F_{5,S,Rk}$	$*F_{4/5,T,Rk}$	$*F_{4/5,S,Rk}$
595	90	50	50	3,0	10	Full	4.0x40	0,83	1,29	3,49	0,47	0,37	1,26	0,98	1,65	2,59
							4.0x60	1,38	1,29	4,43	0,79	0,37	2,10	0,98	2,77	2,59
					8	Partial	4.0x40	0,83	1,29	3,24	0,47	0,37	1,26	0,98	1,65	2,59
							4.0x60	1,38	1,29	4,14	0,79	0,37	2,10	0,98	2,77	2,59
598	90	50	80	3,0	14	Full	4.0x40	1,25	2,21	5,64	0,47	0,63	1,26	1,68	2,48	4,42
							4.0x60	2,08	2,21	7,26	0,79	0,63	2,10	1,67	4,11	4,42
					8	Partial	4.0x40	1,25	2,21	4,07	0,47	0,63	1,25	1,68	2,46	4,42
							4.0x60	2,08	2,21	5,22	0,79	0,63	2,10	1,67	4,06	4,42

Values are valid for 1 angle bracket (* 2 angle brackets opposite each other), GH nail ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm, unit of length in mm, unit for force in kN. For 2 opposite
For angle brackets, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ can be doubled.

Timber / Concrete

Art. No.	H	L	W(B)	T(S)	n_a	NB	VM	$F_{1,T,Rk}$	$F_{1,S,Rk}$	$k_{1,t,ax}$	$F_{2/3,T,RK}$	$k_{2/3,t,v}$	$F_{4,T,Rk}$	$F_{4,S,Rk}$	$k_{4,t,v}$	$k_{4,t,ax}$	$F_{5,T,Rk}$	$F_{5,S,Rk}$	$k_{5,t,v}$	$k_{5,t,ax}$	$*F_{4/5,T,Rk}$	$*F_{4/5,S,Rk}$	$k_{4/5,t,v}$	$k_{4/5,t,ax}$
595	90	50	50	3,0	6	Full	4.0x40	11,34	0,15	6,77	1,84	1,00	0,47	0,17	1,00	6,15	1,26	0,98	1,00	0,34	10,8	0,31	1,00	3,38
							4.0x60	14,18	0,15	6,77	2,74	1,00	0,79	0,17	1,00	6,15	2,10	0,98	1,00	0,34	18,00	0,31	1,00	3,38
					4	Partial	4.0x40	7,56	0,15	6,77	1,45	1,00	0,47	0,17	1,00	6,15	1,26	0,98	1,00	0,34	7,20	0,31	1,00	3,38
							4.0x60	9,46	0,15	6,77	2,21	1,00	0,79	0,17	1,00	6,15	2,10	0,98	1,00	0,34	12,00	0,31	1,00	3,38
598	90	50	80	3,0	8	Full	4.0x40	15,12	0,26	3,38	3,51	0,50	0,47	0,29	0,50	3,08	1,26	1,68	0,50	0,17	14,40	0,53	0,50	1,69
							4.0x60	18,91	0,26	3,38	4,92	0,50	0,79	0,29	0,50	3,08	2,10	1,67	0,50	0,17	24,00	0,53	0,50	1,69
					4	Partial	4.0x40	7,56	0,26	3,38	2,36	0,50	0,47	0,29	0,50	3,08	1,25	1,68	0,50	0,17	7,20	0,53	0,50	1,69
							4.0x60	9,46	0,26	3,38	3,41	0,50	0,79	0,29	0,50	3,08	2,10	1,67	0,50	0,17	12,00	0,53	0,50	1,69

Values are valid for 1 angle bracket (* 2 angle brackets opposite each other), GH nail, ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm, unit of length in mm, unit for force in kN.
For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ can be doubled and the values $F_{1,v,k}$, $F_{1,ax,k}$, $F_{2/3,v,k}$ halved.

TYPE 110

Timber / Timber

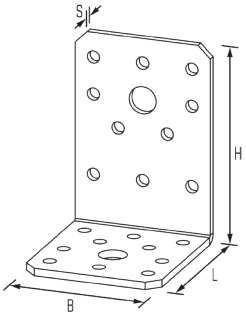
Art. No.	H	L	W(B)	T(S)	n_a	NB	VM	$F_{1,T,Rk}$	$F_{1,S,Rk}$	$F_{2/3,T,Rk}$	$F_{4,T,Rk}$	$F_{4,S,RK}$	$F_{5,T,Rk}$	$F_{5,S,Rk}$	$*F_{4/5,T,Rk}$	$*F_{4/5,S,Rk}$
5911	90	50	110	3,0	19	Full	4.0x40	1,66	2,77	9,28	0,95	0,79	4,20	2,10	3,30	5,54
							4.0x60	2,77	2,77	11,71	1,58	0,79	2,52	2,10	5,48	5,54
					12	Partial	4.0x40	1,66	2,77	6,93	0,95	0,79	4,20	2,10	3,29	5,54
							4.0x60	2,77	2,77	8,99	1,58	0,79	2,10	2,10	5,44	5,54

Values are valid for 1 angle bracket (* 2 angle brackets opposite each other), GH nail, ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm, unit of length in mm, unit for force in kN.
For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ can be doubled.

Timber / Concrete

Art. No.	H	L	W(B)	T(S)	n_a	NB	VM	$F_{1,T,Rk}$	$F_{1,S,Rk}$	$k_{1,t,ax}$	$F_{2/3,T,RK}$	$k_{2/3,t,v}$	$F_{4,T,Rk}$	$F_{4,S,Rk}$	$k_{4,t,v}$	$k_{4,t,ax}$	$F_{5,T,Rk}$	$F_{5,S,Rk}$	$k_{5,t,v}$	$k_{5,t,ax}$	$*F_{4/5,T,Rk}$	$*F_{4/5,S,Rk}$	$k_{4/5,t,v}$	$k_{4/5,t,ax}$
5911	90	50	110	3,0	11	Full	4.0x40	20,79	1,44	3,25	7,81	1,00	0,95	0,79	1,00	5,00	2,52	2,10	1,00	0,41	19,80	2,87	1,00	1,62
							4.0x60	26,00	1,44	3,25	10,14	1,00	1,58	0,79	1,00	5,00	4,20	2,10	1,00	0,41	33,00	2,87	1,00	1,62
					6	Partial	4.0x40	11,34	1,44	3,25	5,12	1,00	0,95	0,79	1,00	5,00	2,52	2,10	1,00	0,41	10,80	2,87	1,00	1,62
							4.0x60	14,18	1,44	3,25	6,67	1,00	1,58	0,79	1,00	5,00	4,20	2,10	1,00	0,41	18,00	2,87	1,00	1,62

alues are valid for 1 angle bracket (* 2 angle brackets opposite each other), GH nail, ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm, unit of length in mm, unit for force in kN.
For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ can be doubled and the values $F_{1,v,k}$, $F_{1,ax,k}$, $F_{2/3,v,k}$ halved.



ANGLE BRACKETS

TYPE 55/80

ETA-09 0322

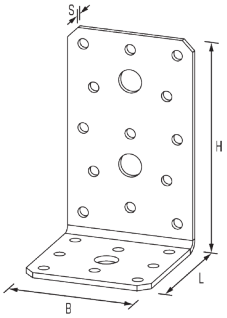
NKL 2

250 GD Z275

3

Art. No.	Dimensions [mm]							nN	nBo	EAN	Weight	Pallet	PU		
	H	x	L	x	W(B)	x	T(S)	Ø 5	Ø 11	4019346	kg				
653	80	x	60	x	55	x	3,0	20	2	110249	0.159	4800	100	■	■

The type 55/80 angle bracket is an unequal-leg bracket with a wide range of applications and is suitable for timber/timber, timber/concrete, timber/masonry and timber/steel connections.



ANGLE BRACKETS

TYPE 60/100

ETA-13 0900

NKL 2

250 GD Z275

Art. No.	Dimensions [mm]							nN	nBo	EAN	Weight	Pallet	PU		
	H	x	L	x	W(B)	x	T(S)	Ø 5	Ø 11	4019346	kg				
16625	100	x	60	x	60	x	2,5	21	3	101780	0.163	2400	100	■	■

The type 60/100 angle bracket is an unequal-leg bracket and is suitable for timber/timber, timber/concrete, timber/masonry and timber/steel connections.

TYPE 55/80

Timber / Timber

Art. No.	H	L	W(B)	T(S)	n_a	NB	VM	$F_{1,T,Rk}$	$F_{1,S,Rk}$	$F_{2/3,T,Rk}$	$F_{4,T,Rk}$	$F_{4,S,RK}$	$F_{5,T,Rk}$	$F_{5,S,Rk}$	$*F_{4/5,T,Rk}$	$*F_{4/5,S,Rk}$
653	80	60	55	3,0	14	Full	4.0x40	0,45	0,39	4,93	0,17	0,15	1,52	0,73	0,90	0,78
							4.0x60	0,75	0,39	6,17	0,28	0,15	2,53	0,73	1,50	0,78
					-	Partial	4,0x40	-	-	-	-	-	-	-	-	-
							4.0x60	-	-	-	-	-	-	-	-	-

Values are valid for 1 angle bracket (* 2 angle brackets opposite each other), GH nail, ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm, unit of length in mm, unit for force in kN.
For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ can be doubled.

Timber / Concrete

Art. No.	H	L	B	S	n_a	NB	VM	$F_{1,T,Rk}$	$F_{1,S,Rk}$	$k_{1,t,ax}$	$F_{2/3,T,RK}$	$k_{2/3,t,v}$	$F_{4,T,Rk}$	$F_{4,S,Rk}$	$k_{4,t,v}$	$k_{4,t,ax}$	$F_{5,T,Rk}$	$F_{5,S,Rk}$	$k_{5,t,v}$	$k_{5,t,ax}$	$*F_{4/5,T,Rk}$	$*F_{4/5,S,Rk}$	$k_{4/5,t,v}$	$k_{4/5,t,ax}$
653	80	60	55	3,0	8	Full	4.0x40	15,12	0,11	7,36	2,69	1,00	0,45	0,11	1,00	7,27	1,52	0,73	1,00	0,35	14,40	0,23	1,00	3,68
							4.0x60	18,91	0,11	7,36	4,05	1,00	0,75	0,11	1,00	7,27	2,53	0,73	1,00	0,35	24,00	0,23	1,00	3,68
					-	Partial	4.0x40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
							4.0x60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Values are valid for 1 angle bracket (* 2 angle brackets opposite each other), GH nail, ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm, unit of length in mm, unit for force in kN.
For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ an be doubled and the values $F_{1,v,k}$, $F_{1,ax,k}$, $F_{2/3,v,k}$ halved.

TYPE 60/100

Timber / Timber

Art. No.	H	L	W(B)	T(S)	n_a	NB	VM	$F_{1,T,Rk}$	$F_{2/3,T,Rk}$	$*F_{4/5,T,Rk}$
16625	100	60	60	2,5	19	Full	4.0x40	1,35	5,56	3,78
							4.0x60	1,35	7,16	3,93
					-	Partial	4.0x40	-	-	-
							4.0x60	-	-	-

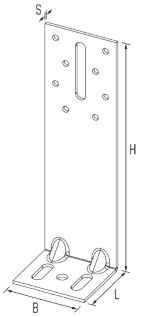
Values are valid for 1 angle bracket (* 2 angle brackets opposite each other), GH nail, ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm, unit of length in mm, unit for force in kN.
For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ can be doubled.

Timber / Concrete

Art. No.	H	L	W(B)	T(S)	n_a	NB	VM	$F_{1,T,Rk}$	$F_{1,Bo,ax,rk}$	$F_{2/3,T,RK}$	$F_{2/3,Bo,sx,rk}$	$*F_{4/5,T,Rk}$	$F_{4/5,Bo,ax,rk}$	$F_{4/5,Bo,sx,rk}$
16625	100	60	60	2,5	10	Full	4.0x40	-	-	3,22	3,22	3,35	0,57	2,55
							4.0x60	-	-	4,62	4,62	3,47	0,62	2,53
					5	Partial	4.0x40	0,54	0,70	-	-	-	-	-
							4.0x60	0,54	0,70	-	-	-	-	-

Values are valid for 1 angle bracket (* 2 angle brackets opposite each other), GH nail, ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm, unit of length in mm, unit for force in kN.
For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ vcan be doubled and the values $F_{1,v,k}$, $F_{1,ax,k}$, $F_{2/3,v,k}$ halved.

CONSOLE ANGLE



ETA-13
0900

NKL 2

350
GD
Z275

3

Art. No.	Dimensions [mm]							nN	nBo	EAN	Weight	Pallet	PU		
	H	x	L	x	W(B)	x	T(S)	Ø 5	Ø 8,5	4019346	kg				
1205460	120	x	54	x	60	x	2,5	8	1	004104	0.198	3000	100	■	■
1405460	140	x	54	x	60	x	2,5	8	1	004111	0.221	3000	100	■	■
1605460	160	x	54	x	60	x	2,5	8	1	004128	0.244	3000	100	■	■
1805460	180	x	54	x	60	x	2,5	8	1	004135	0.268	3000	100	■	■
2005460	200	x	54	x	60	x	2,5	8	1	004142	0.291	3000	100	■	■

Console angles are used for façades placed in front of timber sub-structures. The necessary bracket size must be chosen in relation to the insulation thickness. The short leg is for fastening to the façade. The long leg is for fixing the frame left (substructure) with screws or nails (under compliance with the necessary minimum edge spacing).

The slotted holes in both legs enable precise and perpendicular alignment.

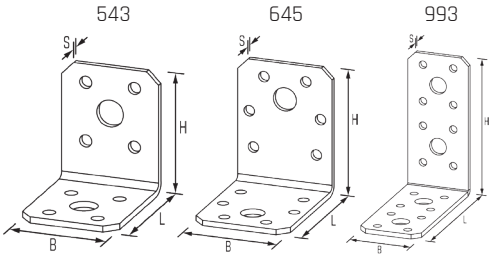
Other areas of use are, for example, substructures where subsequent alignment is an advantage.

CONSOLE ANGLES

Timber | Concrete

Art. No.	H	L	W(B)	T(S)	n_a	NB	VM	$F_{1,T,Rk}$	$F_{1,Bo,ax,rk}$	$F_{2/3,T,RK}$	$F_{2/3,Bo,sx,rk}$
1205460	120	54	60	2,5	8	Full	4.0x40	-	-	2,30	2,30
							4.0x60	-	-	3,30	3,30
					6	Partial	4.0x40	0,40	1,20	-	-
							4.0x60	0,40	1,20	-	-
1405460	140	54	60	2,5	8	Full	4.0x40	0,40	1,20	2,10	2,10
							4.0x60	0,40	1,20	2,90	2,90
					-	Partial	4.0x40	-	-	-	-
							4.0x60	-	-	-	-
1605460	160	54	60	2,5	8	Full	4.0x40	0,40	1,20	1,90	1,90
							4.0x60	0,40	1,20	2,60	2,60
					-	Partial	4.0x40	-	-	-	-
							4.0x60	-	-	-	-
1805460	180	54	60	2,5	8	Full	4.0x40	0,40	1,20	1,70	1,70
							4.0x60	0,40	1,20	2,30	2,30
					-	Partial	4.0x40	-	-	-	-
							4.0x60	-	-	-	-
2005460	200	54	60	2,5	8	Full	4.0x40	0,40	1,20	1,60	1,60
							4.0x60	0,40	1,20	2,10	2,10
					-	Partial	4.0x40	-	-	-	-
							4.0x60	-	-	-	-

Values are valid for 1 angle bracket (* 2 angle brackets opposite each other), GH nail, ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm, unit of length in mm, unit for force in kN.
For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ can be doubled and the values $F_{1,v,k}$, $F_{1,ax,k}$, $F_{2/3,v,k}$ halved.



ETA-09 0322

NKL 2

250 GD Z275

ANGLE BRACKETS

TYPE 40/45

3

Art. No.	Dimensions [mm]							nN	nBo	EAN	Weight	Pallet	PU		
	H	x	L	x	W(B)	x	T(S)	Ø 5	Ø 11	4019346	kg				
543	50	x	50	x	40	x	2,5	8	2	110058	0.069	10800	150	■	■
645	60	x	60	x	45	x	2,5	12	2	110232	0.093	3600	50	■	■
993	90	x	90	x	40	x	3,0	16	4	110065	0.148	5100	100	■	■

Angle brackets type 40 and type 45 are equal-legged brackets and are suitable for timber/timber connections or for fastening timber constructions to concrete/steel or masonry.

TYPE 40/45

Timber / Timber

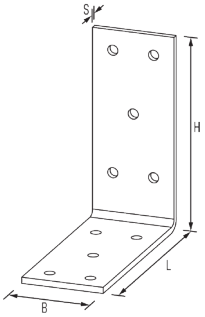
Art. No.	H	L	W(B)	T(S)	n_a	NB	VM	$F_{1,T,Rk}$	$F_{1,S,Rk}$	$F_{2/3,T,Rk}$	$F_{4,T,Rk}$	$F_{4,S,RK}$	$F_{5,T,Rk}$	$F_{5,S,Rk}$	$*F_{4/5,T,Rk}$	$*F_{4/5,S,Rk}$
543	50	50	40	2,5	6	Full	4.0x40	0,21	0,09	1,51	0,11	0,05	0,90	0,17	0,43	0,19
							4.0x60	0,36	0,09	2,10	0,19	0,05	1,50	0,17	0,71	0,19
					-	Partial	4.0x40	-	-	-	-	-	-	-	-	-
							4.0x60	-	-	-	-	-	-	-	-	-
645	60	60	45	2,5	8	Full	4.0x40	0,22	0,11	2,51	0,11	0,06	1,58	0,41	0,44	0,22
							4.0x60	0,37	0,11	3,25	0,19	0,06	2,62	0,41	0,73	0,22
					-	Partial	4.0x40	-	-	-	-	-	-	-	-	-
							4.0x60	-	-	-	-	-	-	-	-	-
993	90	90	40	3,0	10	Full	4.0x40	0,21	0,14	2,48	0,11	0,07	0,90	0,25	0,43	0,27
							4.0x60	0,36	0,14	3,27	0,19	0,07	1,50	0,25	0,71	0,27
					-	Partial	4.0x40	-	-	-	-	-	-	-	-	-
								-	-	-	-	-	-	-	-	-

Values are valid for 1 angle bracket (* 2 angle brackets opposite each other), GH nail, ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm, unit of length in mm, unit for force in kN.
For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ can be doubled.

Timber / Concrete

Art. No.	H	L	W(B)	T(S)	n_a	NB	VM	$F_{1,T,Rk}$	$F_{1,S,Rk}$	$k_{1,t,ax}$	$F_{2/3,T,RK}$	$k_{2/3,t,v}$	$F_{4,T,Rk}$	$F_{4,S,Rk}$	$k_{4,t,v}$	$k_{4,t,ax}$	$F_{5,T,Rk}$	$F_{5,S,Rk}$	$k_{5,t,v}$	$k_{5,t,ax}$	$*F_{4/5,T,Rk}$	$*F_{4/5,S,Rk}$	$k_{4/5,t,v}$	$k_{4/5,t,ax}$
543	50	50	40	2,5	2	Full	4.0x40	3,78	0,07	6,64	0,48	1,00	-	0,07	1,00	7,27	0,90	0,17	1,00	0,36	3,60	0,14	1,00	3,32
							4.0x60	4,73	0,07	6,64	0,72	1,00	-	0,07	1,00	7,27	1,50	0,17	1,00	0,36	6,00	0,14	1,00	3,32
					-	Partial	4.0x40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
							4.0x60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
645	60	60	45	2,5	4	Full	4.0x40	7,56	0,04	8,82	1,05	1,00	1,80	0,05	1,00	7,27	1,58	0,41	1,00	0,33	7,20	0,09	1,00	4,41
							4.0x60	9,46	0,04	8,82	1,60	1,00	3,00	0,05	1,00	7,27	2,62	0,41	1,00	0,33	12,00	0,09	1,00	4,41
					-	Partial	4.0x40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
							4.0x60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
993	90	90	40	3,0	4	Full	4.0x40	7,56	0,11	6,45	1,03	1,00	-	0,10	1,00	7,27	0,90	0,25	1,00	0,36	7,20	0,22	1,00	3,23
							4.0x60	9,46	0,11	6,45	1,57	1,00	-	0,10	1,00	7,27	1,50	0,25	1,00	0,36	12,00	0,22	1,00	3,23
					-	Partial	4.0x40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
							4.0x60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Values are valid for 1 angle bracket (* 2 angle brackets opposite each other), GH nail, ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm, unit of length in mm, unit for force in kN.
For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ vcan be doubled and the values $F_{1,v,k}$, $F_{1,ax,k}$, $F_{2/3,v,k}$ halved.



ANGLE BRACKETS

TYPE 40/90

ETA-09 0322

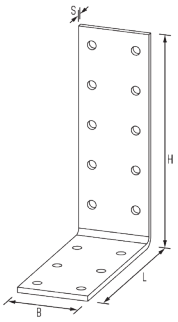
NKL 2

250 GD Z275

3

Art. No.	Dimensions [mm]							nN	EAN	Weight	Pallet	PU		
	H	x	L	x	W(B(	x	T(S)	Ø 5	4019346	kg				
994	90	x	90	x	40	x	3,0	10	110102	0.179	5100	100	■	

The angle bracket type 40/90 is a 3.0 mm thick equal-legged bracket.
Applications include purlins on laminated timber beams, wall bars on columns, etc.



ANGLE BRACKETS

TYPE 40/120

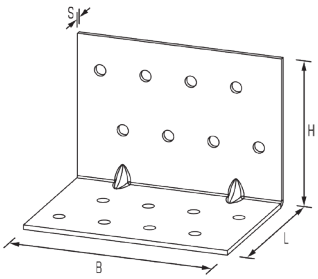
ETA-09 0322

NKL 2

250 GD Z275

Art. No.	Dimensions [mm]							nN	EAN	Weight	Pallet	PU		
	H	x	L	x	W(B)	x	T(S)	Ø 5	4019346	kg				
1293	120	x	95	x	40	x	3,0	16	110331	0.177	5100	100	■	

The angle bracket type 40/120 is a 3.0 mm thick unequal-legged bracket.
Applications include purlins on laminated timber beams, in timber constructions,
Pole connections on the sleeper, etc.



ANGLE BRACKETS

TYPE 692

ETA-13 0900

NKL 2

250 GD Z275

Art. No.	Dimensions [mm]							nN	EAN	Weight	Pallet	PU		
	H	x	L	x	W(B)	x	T(S)	Ø 5	4019346	kg				
692	65	x	65	x	90	x	2,0	16	110348	0.161	4000	100	■	

The angle bracket type 692 is a versatile bracket.
It is particularly suited to loads in the $F_{2/3}$ and $F_{4/5}$ direction due to the ribs.

STATICS

TYPE 40/90

Timber / Timber

Art. No.	H	L	W(B)	T(S)	n_a	NB	VM	$F_{1,T,Rk}$	$F_{1,S,Rk}$	$F_{2/3,T,Rk}$	$F_{4,T,Rk}$	$F_{4,S,RK}$	$F_{5,T,Rk}$	$F_{5,S,Rk}$	$*F_{4/5,T,Rk}$	$*F_{4/5,S,Rk}$
994	90	90	40	3,0	8	Full	4.0x40	0,20	0,12	2,12	0,11	0,07	0,45	0,53	0,40	0,23
							4.0x60	0,33	0,12	2,79	0,19	0,07	0,75	0,53	0,67	0,23
					-	Partial	4.0x40	-	-	-	-	-	-	-	-	-
							4.0x60	-	-	-	-	-	-	-	-	-

Values are valid for 1 angle bracket (* 2 angle brackets opposite each other), GH nail, ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm, unit of length in mm, unit for force in kN.
For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ can be doubled.

TYPE 40/120

Timber / Timber

Art. No.	H	L	W(B)	T(S)	n_a	NB	VM	$F_{1,T,Rk}$	$F_{1,S,Rk}$	$F_{2/3,T,Rk}$	$F_{4,T,Rk}$	$F_{4,S,RK}$	$F_{5,T,Rk}$	$F_{5,S,Rk}$	$*F_{4/5,T,Rk}$	$*F_{4/5,S,Rk}$
1293	120	95	40	3,0	12	Full	4.0x40	0,16	0,08	3,18	0,11	0,05	0,90	0,25	0,33	0,15
							4.0x60	0,27	0,08	4,04	0,19	0,05	1,50	0,25	0,55	0,15
					-	Partial	4.0x40	-	-	-	-	-	-	-	-	-
							4.0x60	-	-	-	-	-	-	-	-	-

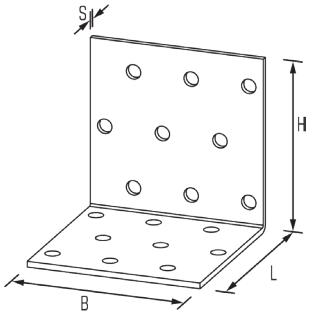
Values are valid for 1 angle bracket (* 2 angle brackets opposite each other), GH nail, ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm, unit of length in mm, unit for force in kN.
For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ can be doubled.

TYPE 692

Timber / Timber

Art. No.	H	L	W(B)	T(S)	n_a	NB	VM	$F_{1,T,Rk}$	$F_{2/3,T,Rk}$	$*F_{4/5,T,Rk}$
692	65	65	90	2,0	12	Full	4.0x40	0,67	3,82	5,01
							4.0x60	0,67	5,19	5,13
					-	Partial	4.0x40	-	-	-
							4.0x60	-	-	-

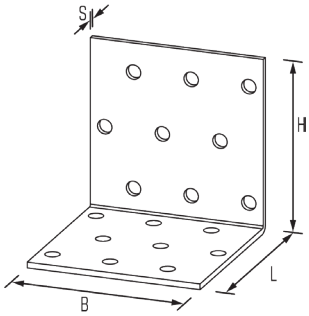
Values are valid for 1 angle bracket (* 2 angle brackets opposite each other), GH nail, ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm, unit of length in mm, unit for force in kN.
For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ can be doubled.



NAIL PLATE BRACKET

2,0 MM

Art. No.	Dimensions [mm]							nN	EAN	Weight	Pallet	PU		
	H	x	L	x	W(B)	x	T(S)	Ø 5	4019346	kg				
10499	40	x	40	x	20	x	2,0	4	120019	0.022	14000	200	■	
10500	40	x	40	x	40	x	2,0	8	120026	0.044	14000	200	■	
10501	40	x	40	x	60	x	2,0	12	120057	0.066	10500	150	■	
10521	50	x	50	x	40	x	2,0	8	120033	0.055	14000	200	■	
10502	60	x	60	x	40	x	2,0	12	120040	0.066	10500	150	■	
10503	60	x	60	x	50	x	2,0	12	120163	0.082	7000	100	■	
10504	60	x	60	x	60	x	2,0	18	120064	0.100	7000	100	■	
10518	60	x	60	x	80	x	2,0	24	120279	0.133	4000	100	■	
10519	80	x	80	x	60	x	2,0	24	120286	0.133	4800	100	■	
10527	80	x	80	x	80	x	2,0	32	120293	0.177	4050	50	■	



NAIL PLATE BRACKET

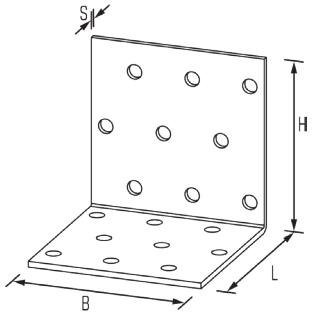
2,5 MM

Art. No.	Dimensions [mm]							nN	EAN	Weight	Pallet	PU		
	H	x	L	x	W(B)	x	T(S)	Ø 5	4019346	kg				
10522	40	x	40	x	60	x	2,5	12	120095	0.082	10500	150	■	
10523	50	x	50	x	40	x	2,5	8	120170	0.069	14000	200	■	
10524	60	x	60	x	40	x	2,5	12	120071	0.082	10500	150	■	
10525	60	x	60	x	50	x	2,5	12	120088	0.103	7000	100	■	
10526	60	x	60	x	60	x	2,5	18	120101	0.124	7000	100	■	
10505	60	x	60	x	80	x	2,5	24	120149	0.165	4000	100	■	
10506	60	x	60	x	100	x	2,5	30	120187	0.206	4000	100	■	
10507	80	x	80	x	60	x	2,5	24	120118	0.165	4800	100	■	
10508	80	x	80	x	80	x	2,5	32	120125	0.220	4050	50	■	
10509	80	x	80	x	100	x	2,5	40	120194	0.275	2550	50	■	
10513	90	x	90	x	40	x	2,5	16	120156	0.124	5100	100	■	
10510	100	x	100	x	60	x	2,5	30	120200	0.206	2400	50	■	
10511	100	x	100	x	80	x	2,5	40	120217	0.275	2550	50	■	
10512	100	x	100	x	100	x	2,5	50	120132	0.343	2550	50	■	

ETA-13
0900

250
GD
Z275

NKL 2



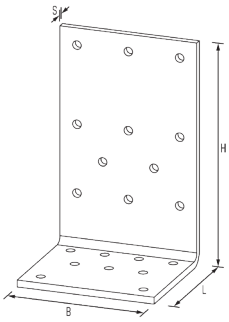
NAIL PLATE BRACKET

UNEQUAL-LEGGED

Art. No.	Dimensions [mm]							nN	EAN	Weight	Pallet	PU		
	H	x	L	x	W(B)	x	T(S)	Ø 5	4019346	kg				
10514	60	x	40	x	60	x	2,5	15	120309	0.103	5100	150	■	
10515	80	x	60	x	60	x	2,5	21	120316	0.144	4800	100	■	
10516	100	x	60	x	60	x	2,5	24	120323	0.165	4800	50	■	
10517	200	x	100	x	100	x	2,5	100	120330	0.515	1275	25	■	

Equal-legged and unequal-legged nail plate brackets are used in various connections. Whether its for roofing or interior fitting, landscaping or for simple cross or beam connection.

Nail plate brackets come in almost every size. Further dimensions can be produced at short notice.



ETA-13 0900

NKL 2

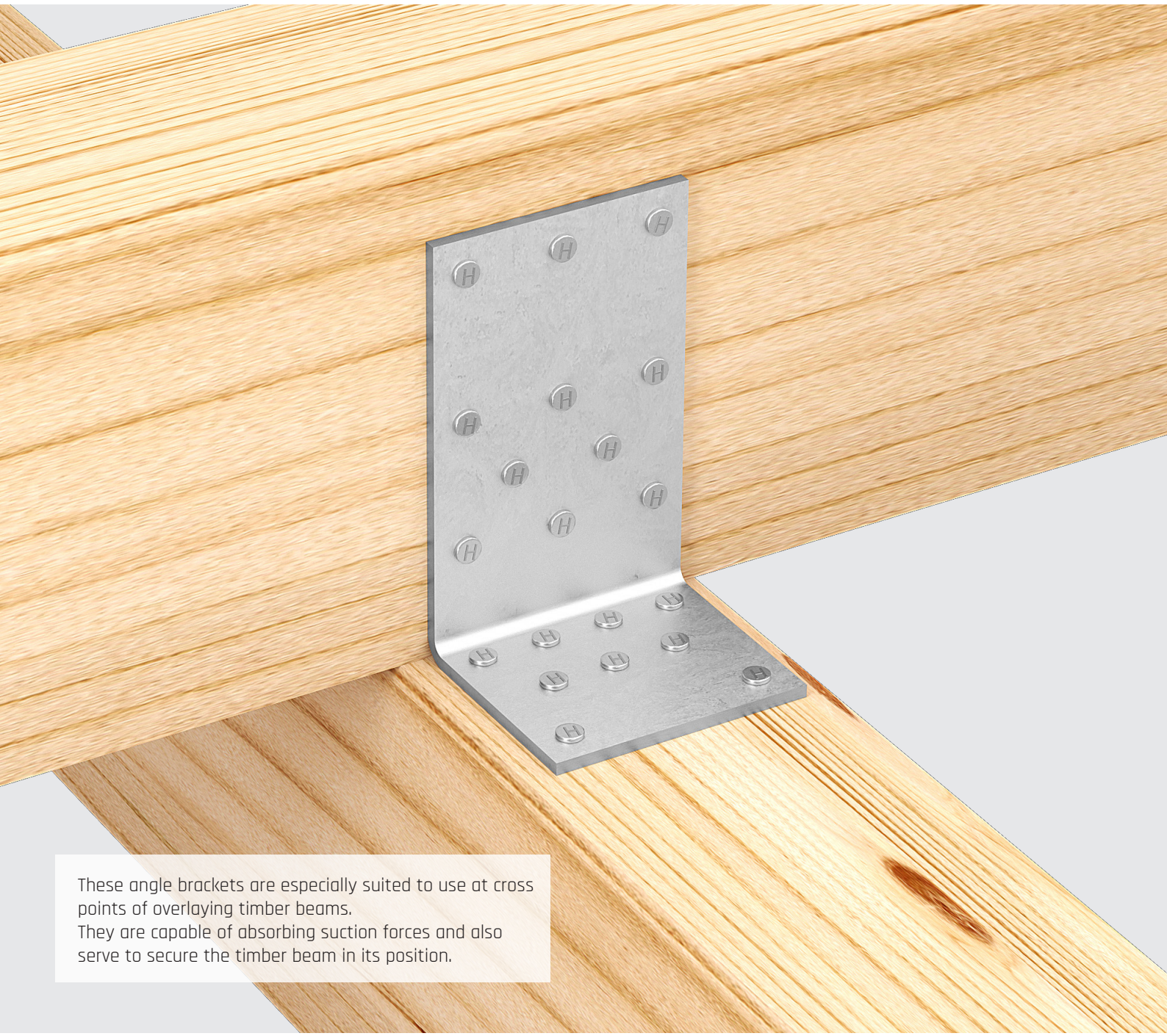
250 GD Z275

ANGLE BRACKETS

EXTRA THICK 4.0

3

Art. No.	Dimensions [mm]							nN	EAN	Weight	Pallet	PU		
	H	x	L	x	W(B)	x	T(S)	Ø 5	4019346	kg				
1884	130	x	70	x	80	x	4,0	20	110355	0.439	1275	25	■	
12116186	160	x	80	x	60	x	4,0	15	165706	0.430	1200	50	■	
12116188	160	x	80	x	80	x	4,0	20	165713	0.527	900	25	■	
12116181	160	x	80	x	100	x	4,0	33	165720	0.659	1050	25	■	



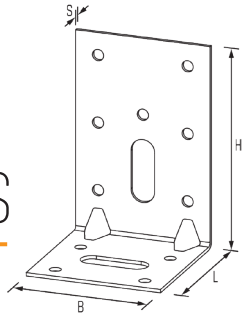
These angle brackets are especially suited to use at cross points of overlaying timber beams.
They are capable of absorbing suction forces and also serve to secure the timber beam in its position.

EXTRA THICK 4.0

Timber / Timber

Art. No.	H	L	W(B)	T(S)	n_a	NB	VM	$F_{1,T,Rk}$	$F_{2/3,T,Rk}$	$F_{4,T,Rk}$	$F_{5,T,Rk}$	$*F_{4/5,T,Rk}$
1884	130	70	80	4,0	15	Full	4.0x40	2,82	6,63	9,15	2,59	9,15
							4.0x60	4,71	8,43	11,70	3,67	11,70
					-	Partial	4.0x40	-	-	-	-	-
							4.0x60	-	-	-	-	-
12116186	160	80	60	4,0	12	Full	4.0x40	3,90	8,21	9,30	2,43	9,30
							4.0x60	6,50	10,50	11,30	3,43	11,30
					-	Partial	4.0x40	-	-	-	-	-
							4.0x60	-	-	-	-	-
12116188	160	80	80	4,0	17	Full	4.0x40	3,12	4,80	5,91	1,61	5,91
							4.0x60	5,20	6,08	7,21	2,26	7,21
					-	Partial	4.0x40	-	-	-	-	-
							4.0x60	-	-	-	-	-
12116181	160	80	100	4,0	20	Full	4.0x40	3,12	5,94	7,45	1,98	7,45
							4.0x60	5,20	7,58	9,01	2,75	9,01
					-	Partial	4.0x40	-	-	-	-	-
							4.0x60	-	-	-	-	-

Values are valid for 1 angle bracket (* 2 angle brackets opposite each other), GH nail, ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm, unit of length in mm, unit for force in kN.
For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ can be doubled.



ETA-09 0322

NKL 2

250 GD Z275

MOUNTING BRACKETS

TYPE LLG

3

Art. No.	Dimensions [mm]							nN	LL	LL	EAN	Weight	Pallet	PU		
	H	x	L	x	W(B)	x	T(S)	Ø 5	Ø	Ø	4019346	kg				
3691015	90	x	60	x	60	x	1,5	11	10,5x28	10x30	111505	0.092	4800	100	■	■
3691025	90	x	60	x	60	x	2,5	11	10,5x28	10x30	111512	0.154	4800	100	■	■

The angle brackets are mainly suitable for securing the position of columns on concrete slabs, steel beams and timber sleepers. They are also for securing the position of rafters on beams.

The bracket with the slotted hole has the advantage that the processing in the area of the connection allows greater variability. The optimum fit of the bracket is guaranteed by the slotted hole.

MOUNTING BRACKETS TYPE LLG

Timber / Timber

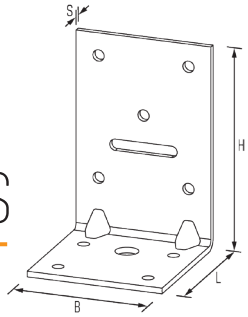
Art. No.	H	L	W(B)	T(S)	na	NB	VM	$F_{1,T,Rk}$	$F_{1,S,Rk}$	$F_{2/3,T,Rk}$	$F_{4,T,Rk}$	$F_{4,S,RK}$	$F_{5,T,Rk}$	$F_{5,S,Rk}$	$*F_{4/5,T,Rk}$	$*F_{4/5,S,Rk}$
3691015	90	60	60	1,5	9	Full	4.0x40	0,18	0,18	3,36	0,11	0,11	1,17	0,95	0,37	0,35
							4.0x60	0,31	0,18	4,21	0,19	0,11	1,95	0,95	0,61	0,35
					-	Partial	4.0x40	-	-	-	-	-	-	-	-	-
							4.0x60	-	-	-	-	-	-	-	-	-
3691025	90	60	60	2,5	9	Full	4.0x40	0,18	0,30	3,36	0,11	0,18	1,17	1,62	0,37	0,60
							4.0x60	0,31	0,30	4,21	0,19	0,18	1,95	1,62	0,61	0,60
					-	Partial	4.0x40	-	-	-	-	-	-	-	-	-
							4.0x60	-	-	-	-	-	-	-	-	-

Values are valid for 1 angle bracket (* 2 angle brackets opposite each other), GH nail, ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm, unit of length in mm, unit for force in kN.
For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ can be doubled.

Timber / Concrete

Art. No.	H	L	W(B)	T(S)	na	NB	VM	$F_{1,T,Rk}$	$F_{1,S,Rk}$	$k_{1,t,ax}$	$F_{2/3,T,RK}$	$k_{2/3,t,v}$	$F_{4,T,Rk}$	$F_{4,S,Rk}$	$k_{4,t,v}$	$k_{4,t,ax}$	$F_{5,T,Rk}$	$F_{5,S,Rk}$	$k_{5,t,v}$	$k_{5,t,ax}$	$*F_{4/5,T,Rk}$	$*F_{4/5,S,Rk}$	$k_{4/5,t,v}$	$k_{4/5,t,ax}$
3691015	90	60	60	1,5	5	Full	4.0x40	9,45	0,14	7,67	-	-	0,39	0,14	1,00	7,62	1,17	0,95	1,00	0,35	9,00	0,28	1,00	3,83
							4.0x60	11,82	0,14	7,67	-	-	0,65	0,14	1,00	7,62	1,95	0,95	1,00	0,35	15,00	0,28	1,00	3,83
					-	Partial	4.0x40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
							4.0x60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3691025	90	60	60	2,5	5	Full	4.0x40	9,45	0,24	7,67	-	-	0,39	0,24	1,00	7,62	1,17	1,62	1,00	0,35	9,00	0,48	1,00	3,83
							4.0x60	11,82	0,24	7,67	-	-	0,65	0,24	1,00	7,62	1,95	1,62	1,00	0,35	15,00	0,48	1,00	3,83
					-	Partial	4.0x40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
							4.0x60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

alues are valid for 1 angle bracket (* 2 angle brackets opposite each other), GH nail, ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm, unit of length in mm, unit for force in kN.
For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ can be doubled and the values $F_{1,v,k}$, $F_{1,ax,k}$, $F_{2/3,v,k}$ halved.



MOUNTING BRACKETS

TYPE RL

ETA-09 0322

NKL 2

250 GD Z275

3

Art. No.	Dimensions [mm]							nN	LL	LL	EAN	Weight	Pallet	PU		
	H	x	L	x	W(B)	x	T(S)	Ø 5	Ø	Ø	4019346	kg				
16910	90	x	60	x	60	x	2,5	9	1x10	5x30	110362	0.154	4800	100	■	■
16913	90	x	60	x	60	x	2,5	9	1x12	5x30	110379	0.154	4800	100	■	■

MOUNTING BRACKETS TYPE RL

Timber / Timber

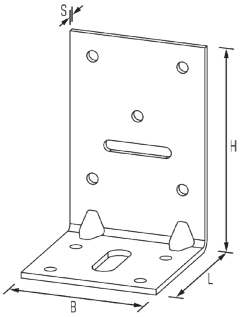
Art. No.	H	L	W(B)	T(S)	na	NB	VM	$F_{1,T,Rk}$	$F_{1,s,Rk}$	$F_{2/3,T,Rk}$	$F_{4,T,Rk}$	$F_{4,S,RK}$	$F_{5,T,Rk}$	$F_{5,S,Rk}$	$*F_{4/5,T,Rk}$	$*F_{4/5,S,Rk}$
16910	90	60	60	2,5	9	Full	4.0x40	0,20	0,36	3,43	0,11	0,20	1,17	1,62	0,40	0,72
							4.0x60	0,33	0,36	4,32	0,19	0,20	1,95	1,62	0,67	0,72
					-	Partial	4.0x40	-	-	-	-	-	-	-	-	-
							4.0x60	-	-	-	-	-	-	-	-	-
16913	90	60	60	2,5	9	Full	4.0x40	0,20	0,36	3,43	0,11	0,20	1,17	1,62	0,40	0,72
							4.0x60	0,33	0,36	4,32	0,19	0,20	1,95	1,62	0,67	0,72
					-	Partial	4.0x40	-	-	-	-	-	-	-	-	-
							4.0x60	-	-	-	-	-	-	-	-	-

Values are valid for 1 angle bracket (* 2 angle brackets opposite each other), GH nail, ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm, unit of length in mm, unit for force in kN.
For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ can be doubled.

Timber / Concrete

Art. No.	H	L	W(B)	T(S)	na	NB	VM	$F_{1,T,Rk}$	$F_{1,S,Rk}$	$k_{1,t,ax}$	$F_{2/3,T,RK}$	$k_{2/3,t,v}$	$F_{4,T,Rk}$	$F_{4,S,Rk}$	$k_{4,t,v}$	$k_{4,t,ax}$	$F_{5,T,Rk}$	$F_{5,S,Rk}$	$k_{5,t,v}$	$k_{5,t,ax}$	$*F_{4/5,T,Rk}$	$*F_{4/5,S,Rk}$	$k_{4/5,t,v}$	$k_{4/5,t,ax}$
16910	90	60	60	2,5	5	Full	4.0x40	9,45	0,55	5,40	2,44	1,00	0,39	0,37	1,00	8,00	1,17	1,62	1,00	0,39	9,00	1,09	1,00	2,70
							4.0x60	11,82	0,55	5,40	3,40	1,00	0,65	0,37	1,00	8,00	1,95	1,62	1,00	0,39	15,00	1,09	1,00	2,70
					-	Partial	4.0x40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
							4.0x60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16913	90	60	60	2,5	5	Full	4.0x40	9,45	0,63	4,67	2,44	1,00	0,39	0,44	1,00	6,67	1,17	1,62	1,00	0,39	9,00	1,26	1,00	2,33
							4.0x60	11,82	0,63	4,67	3,40	1,00	0,65	0,44	1,00	6,67	1,95	1,62	1,00	0,39	15,00	1,26	1,00	2,33
					-	Partial	4.0x40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
							4.0x60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

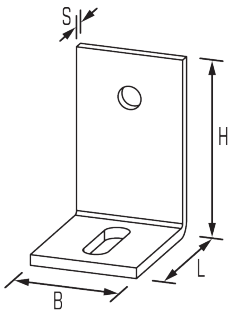
Values are valid for 1 angle bracket (* 2 angle brackets opposite each other), GH nail, ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm, unit of length in mm, unit for force in kN.
For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ can be doubled and the values $F_{1,v,k}$, $F_{1,ax,k}$, $F_{2/3,v,k}$ halved.



MOUNTING BRACKETS

TYPE LL

Art. No.	Dimensions [mm]							nN	LL	LL	EAN	Weight	Pallet	PU		
	H	x	L	x	W(B)	x	T(S)	Ø 5	Ø	Ø	4019346	kg				
26910	90	x	60	x	60	x	2,5	9	10x28	5x28	110386	0.154	4800	100	■	■
26913	90	x	60	x	60	x	2,5	9	13x28	5x28	110393	0.154	4800	100	■	■



CONCRETE BRACKETS

Art. No.	Dimensions [mm]								EAN	Weight	Pallet	PU		
	H	x	L	x	W(B)	x	T(S)	Ø	LL	4019346	kg					
110A	75	x	75	x	60	x	6,0	14	14x45	110485	0.371	2000	40		■
111A	100	x	75	x	60	x	6,0	14	14x45	110492	0.432	1440	20		■
112A	150	x	75	x	60	x	8,0	14	14x45	110508	0.741	1000	20		■
115AX	150	x	75	x	60	x	8,0	18	18x45	110003	0.741	1000	20		■

Concrete brackets are suited to fixing timber constructions on concrete. They are available in the standard version with a slotted hole and with an open slotted hole on request. Other dimensions are also available on request.

MOUNTING BRACKETS TYPE LL

Timber / Timber

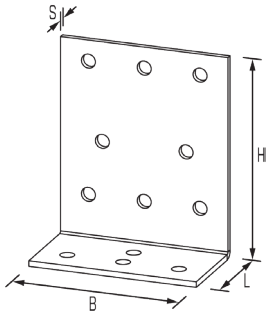
Art. No.	H	L	W(B)	T(S)	na	NB	VM	$F_{1,T,Rk}$	$F_{1,S,Rk}$	$F_{2/3,T,Rk}$	$F_{4,T,Rk}$	$F_{4,S,RK}$	$F_{5,T,Rk}$	$F_{5,S,Rk}$	$*F_{4/5,T,Rk}$	$*F_{4/5,S,Rk}$
26910	90	60	60	2,5	9	Full	4.0x40	0,20	0,36	3,43	0,11	0,20	1,17	1,62	0,40	0,72
							4.0x60	0,33	0,36	4,32	0,19	0,20	1,95	1,62	0,67	0,72
					-	Partial	4.0x40	-	-	-	-	-	-	-	-	-
							4.0x60	-	-	-	-	-	-	-	-	-
26913	90	60	60	2,5	9	Full	4.0x40	0,20	0,36	3,43	0,11	0,20	1,17	1,62	0,40	0,72
							4.0x60	0,33	0,36	4,32	0,19	0,20	1,95	1,62	0,67	0,72
					-	Partial	4.0x40	-	-	-	-	-	-	-	-	-
							4.0x60	-	-	-	-	-	-	-	-	-

Values are valid for 1 angle bracket (* 2 angle brackets opposite each other), GH nail, ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm, unit of length in mm, unit for force in kN.
For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ can be doubled.

Timber / Concrete

Art. No.	H	L	W(B)	T(S)	na	NB	VM	$F_{1,T,Rk}$	$F_{1,S,Rk}$	$k_{1,t,ax}$	$F_{2/3,T,RK}$	$k_{2/3,t,v}$	$F_{4,T,Rk}$	$F_{4,S,Rk}$	$k_{4,t,v}$	$k_{4,t,ax}$	$F_{5,T,Rk}$	$F_{5,S,Rk}$	$k_{5,t,v}$	$k_{5,t,ax}$	$*F_{4/5,T,Rk}$	$*F_{4/5,S,Rk}$	$k_{4/5,t,v}$	$k_{4/5,t,ax}$
26910	90	60	60	2,5	5	Full	4.0x40	9,45	0,16	9,40	1,65	1,00	-	-	-	-	-	-	-	-	-	-	-	-
							4.0x60	11,82	0,16	9,40	2,52	1,00	-	-	-	-	-	-	-	-	-	-	-	-
					-	Partial	4.0x40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
							4.0x60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26913	90	60	60	2,5	5	Full	4.0x40	9,45	0,22	7,23	1,70	1,00	-	-	-	-	-	-	-	-	-	-	-	-
							4.0x60	11,82	0,22	7,23	2,58	1,00	-	-	-	-	-	-	-	-	-	-	-	-
					-	Partial	4.0x40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
							4.0x60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Values are valid for 1 angle bracket (* 2 angle brackets opposite each other), GH nail, ρk = 350 kg/m³, f = 0 mm, e = 40 mm, b = 80 mm, unit of length in mm, unit for force in kN.
For 2 angle brackets opposite each other, the values $F_{1,T,Rk}$, $F_{1,S,Rk}$, $F_{2/3,T,Rk}$ can be doubled and the values $F_{1,v,k}$, $F_{1,ax,k}$, $F_{2/3,v,k}$ halved.



ENTRANCE DOOR BRACKETS

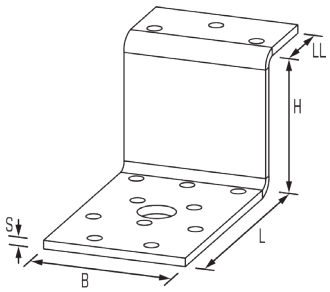
NKL 2

250 GD Z275

3

Art. No.	Dimensions [mm]								nN	EAN	Weight	Pallet	PU		
	H	x	L	x	W(B)	x	T(S)		Ø 5	4019346	kg				
20000022	70	x	30	x	60	x	2,0		12	110409	0.090	7000	100	■	■

Entrance door brackets are brackets for universal use for timber/timber fastening.



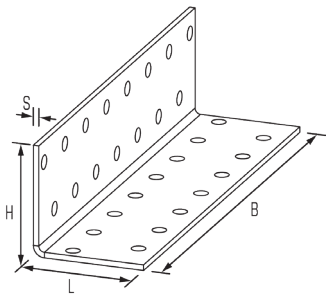
Z-CONNECTOR

NKL 2

250 GD Z275

Art. No.	Dimensions [mm]									nN	nBo	EAN	Weight	Pallet	PU		
	H	x	L	x	LL	x	W(B)	x	T(S)	Ø 5	Ø 13	4019346	kg				
34	40	x	75	x	50	x	30	x	3,0	13	1,00	190005	0.165	3400	100	■	■
35	50	x	75	x	50	x	30	x	3,0	13	1,00	190012	0.175	3400	100	■	■
36	60	x	75	x	50	x	30	x	3,0	13	1,00	190029	0.185	3400	100	■	■

Z-connectors are used, for example, to fasten OSB or corrugated beams to laminated timber beams.



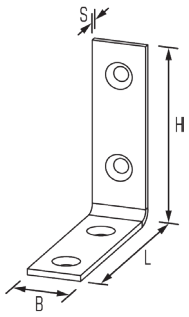
CORNER ANGLE BRACKETS

NKL 2

250 GD Z275

Art. No.	Dimensions [mm]							nN	EAN	Weight	Pallet	PU		
	H	x	L	x	W(B)	x	T(S)	Ø 5	4019346	kg				
11541	40	x	40	x	100	x	2,0	20	110447	0.120	3500	50	■	
11542	40	x	40	x	150	x	2,0	30	110454	0.185	3000	50	■	
11543	40	x	40	x	200	x	2,0	40	110461	0.235	3000	50	■	
11544	40	x	40	x	250	x	2,0	50	110478	0.295	2400	50	■	

Corner angle brackets are for fixing timber/timber connections.

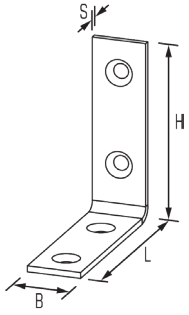


CHAIR BRACKETS

NKL 2 | 250 GD Z275

Art. No.	Dimensions [mm]							nN	EAN	Weight	Pallet	PU		
	H	x	L	x	W(B)	x	T(S)	Ø 5	4019346	kg				
10541	25	x	25	x	15	x	2,0	4,0	122013	0.010	60000	100	■	
10529	30	x	30	x	15	x	2,0	4,0	122020	0.012	40000	100	■	
10530	40	x	40	x	15	x	2,0	4,0	122037	0.016	40000	100	■	
10531	50	x	50	x	15	x	2,0	4,0	122044	0.021	30000	100	■	
10542	60	x	60	x	20	x	2,0	4,0	122051	0.033	10000	100	■	
10545	80	x	80	x	20	x	2,0	4,0	122068	0.044	10000	50	■	
10546	100	x	100	x	20	x	2,0	6,0	122075	0.055	10000	50	■	
10547	120	x	120	x	20	x	2,0	6,0	122082	0.066	7500	20	■	

Chair brackets are ideal for light timber constructions and for furniture connections.



ANGLE BRACKETS

3-5.0 THICK

NKL 2 | 250 GD Z275

Art. No.	Dimensions [mm]							nN	EAN	Weight	Pallet	PU		
	H	x	L	x	W(B)	x	T(S)	Ø 5	4019346	kg				
10550	40	x	40	x	20	x	3,0	4	166406	0.033	480	10	■	
10551	60	x	60	x	20	x	3,0	4	166413	0.049	480	20	■	
10535	80	x	80	x	20	x	5,0	4	110546	0.110	1400	20	■	
10536	100	x	100	x	20	x	5,0	4	110553	0.137	1400	20	■	
10537	120	x	120	x	20	x	5,0	4	110560	0.165	1400	20	■	
10538	140	x	140	x	20	x	5,0	4	110577	0.192	1080	20	■	
10539	160	x	160	x	20	x	5,0	4	110584	0.220	1200	20	■	
10540	180	x	180	x	20	x	5,0	4	110591	0.247	1200	20	■	

Thick brackets are used for lightweight timber construction and furniture building.

04 TENSION TIES

TENSION TIES

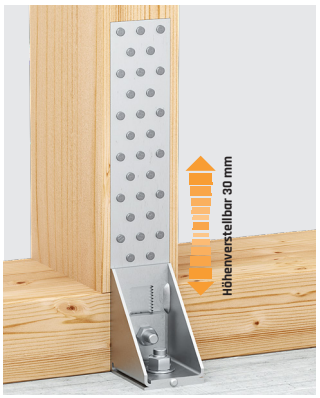
TENSION TIE HT

- Absorption of high tensile loads in timber framework construction
- Reduced overall height
- Short rib (150 mm)
- Optimised hole pattern
- They are also suitable for column connections
- Optional pressure platesl
- Use of pressure plates for tension loads up to 85 kN
- Without pressure plates for tension loads up to 42 kN

Basics of statics **from page 163** / Products & statics **from page 172**

TENSION TIEHT2

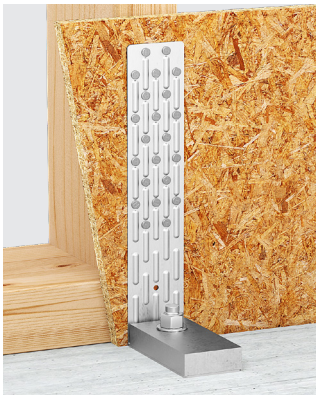
- Assembly of pull tab in wall production
- Interior walls can be fully panelled and completed
- No protruding parts during transport
- Simple and quick height compensation up to 30 mm possible on the building site
- Transfer of high tensile loads
- No improvement work on the building site



Basics of statics **from page 163** / Products & statics **from page 176**

TENSION TIE TOP 240 / TOP 280 VARIO

- Approved connection over intermediate layer
- Efficient wall or column connection on concrete
- Fast and practical processing
- Time savings - no more laborious marking and dowel drilling in advance
- Safe processing due to the coordinated system
- Direct connection to OSB boards between the timber beams is possible with GH screw



Basics of statics **from page 163** / Products & statics **from page 168**

CONNECTOR TOP 80 / TOP 120 VARIO

- No bothersome centre rib during processing
- Full nail fitting always possible
- High stability due to special, discreet corrugation
- Not a nail too many - optimal coordination of the bracket
- No fixing in the edge zone due to optimal hole pattern

Basics of statics **from page 163** / Products & statics **from page 184**

TENSION TIES

ASSORTMENT

4

							Basics Statics & Diagrams from page	Products & Statics from page
TENSION TIE TOP 240 / TOP 280 VARIO		CE	250 GD 2275	NKL 2			163	168
TENSION TIE HT		CE	355 MC galv. verzinkt	NKL 2			163	172
TENSION TIEHT2		CE	355 MC galv. verzinkt	NKL 2			163	176
TENSION TIE INCLUDING PRESSURE PLATE		CE	250 GD 2275	NKL 2			163	182
CONNECTOR TOP 80 / TOP 120 VARIO		CE	250 GD 2275	NKL 2			163	184
TENSION TIE HS		CE	250 GD 2275	NKL 2			163	186
TENSION TIE HB		CE	250 GD 2275	NKL 2			163	186
TENSION TIE HSB / FLAT STEEL ANCHOR		CE	250 GD 2275	NKL 2			163	188

CE symbol

Steel with indication of the steel quality and galvanisation

Timber/timber connection

Timber/concrete-connection

NKL 1

Usage class 1
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 65% for a few weeks per year, e.g. in the case of buildings that are closed on all sides and heated.
Comment: In UC 1, the average moisture content of most softwoods does not exceed 12 %.

NKL 2

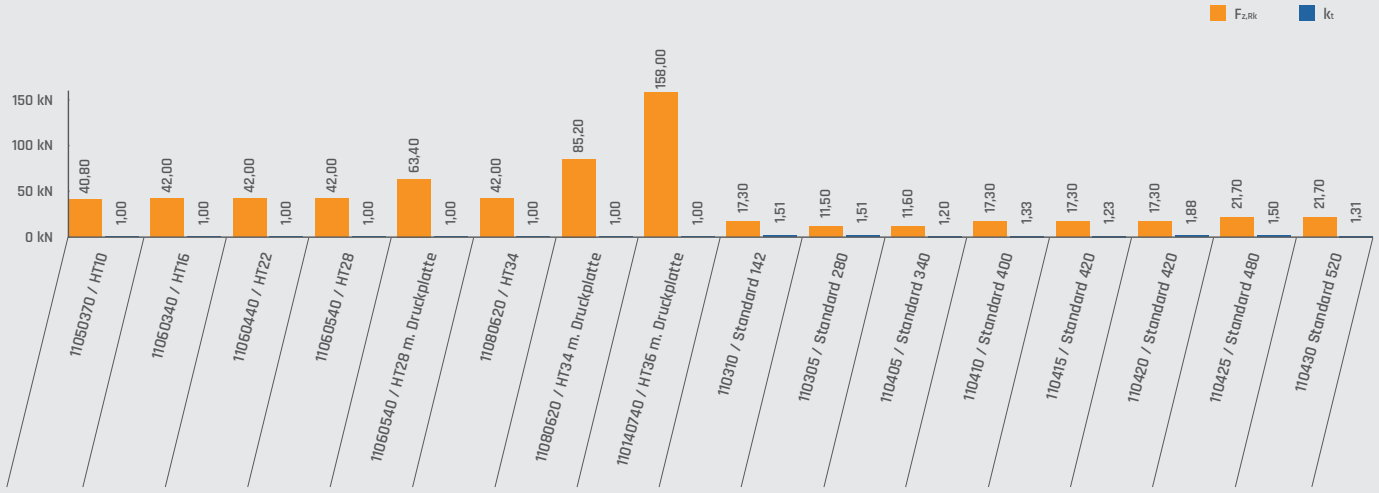
Usage class 2
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 85% for a few weeks per year, e.g. in the case of open buildings covered by a roof.
Comment: In UC 2, the average moisture content of most softwoods does not exceed 20 %.

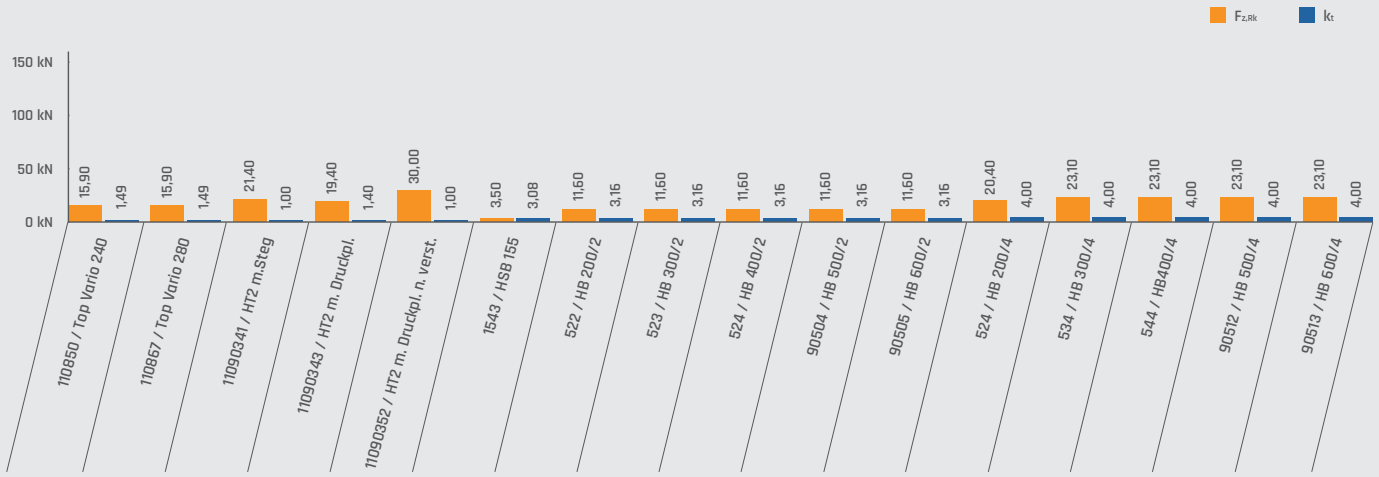
NKL 3

Usage class 3
Includes climatic conditions that lead to higher moisture contents than in UC 2, e.g. structures that are exposed to the weather without protection. Eurocode 5 / DIN EN 1995-1-1 section 2.3.1.3

TENSION TIES

STATICS DIAGRAM





TENSION TIES

TECHNICAL FEATURES

Geometry

H	Height (mm)
L	Length (mm)
W	Width (mm)
T	Material thickness (mm)

Tables

F_z	Max. load capacity in load direction [kN]
n	Number of holes Ø 5.0 mm
n_{Bo}	Number of holes for dowels/bolts with Ø [mm]
n_{erf}	Necessary number of nails/screws
$F_{Rd, Stahl}$	Design value of steel load capacity [kN]
k_t	Factor for impact on dowels/bolts
	Grain course

Timber connecting element

GH threaded nails ETA-13/0523 Ø 4.0 x L [mm]

GH wood connector screw ETA-13/0523 Ø 5.0 x L [mm]

Dowels/bolts

Load directions

$F_{1,k}$ Load away from baseplate

Design

$F_{z,Ed}$	Design value of impact in load direction F_z
$F_{z;Rk}$	Characteristic value of load capacity
$F_{z,Rd}$	Design value of load capacity
$F_{v,Rk}$	Characteristic value of load capacity of a Connecting element, nail or screw
n	Connecting element, nail or screw
k_{mod}	Chosen number of nails/screws
γ_M	Modification coefficient according to EN 1995-1-1
γ_{M0}	Partial safety factor for connections according to EN 1995-1-1
γ_{M2}	Partial safety factor according to EN 1993-1-1
$F_{Ed,Bo}$	Partial safety factor according to EN 1993-1-1 or EN 1993-1-8
$F_{Ed,Bo}$	Impact on the dowel/bolt in load direction Fz

Steel with indication of the steel quality and galvanisation

Timber/timber connection

Timber/concrete-connection

Usage class 1
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 65% for a few weeks per year, e.g. in the case of buildings that are closed on all sides and heated.
Comment: In UC 1, the average moisture content of most softwoods does not exceed 12 %.

Usage class 2
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 85% for a few weeks per year, e.g. in the case of open buildings covered by a roof.
Comment: In UC 2, the average moisture content of most softwoods does not exceed 20 %.

Usage class 3
Includes climatic conditions that lead to higher moisture contents than in UC 2, e.g. structures that are exposed to the weather without protection. Eurocode 5 / DIN EN 1995-1-1 section 2.3.1.3

TENSION TIES

APPLICATIONS

Application:
Absorption of tensile loads in timber construction

Materials:

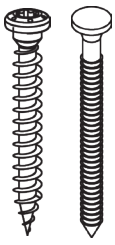
250 GD Z275

355 MC galv. verzinkt

Material thicknesses:
2,0 to 4,0 mm

Timber/concrete

Timber OSB / concrete



Connecting element:
GH threaded nails 4.0 x 35 / 40 / 50 / 60 / 75 / 100 mm
GH screws 5.0 x 25 / 35 / 40 / 50 / 60 / 70 mm

Bolt, dowel or concrete anchor M10 to M22

Connecting elements from page 274

For use in usage classes

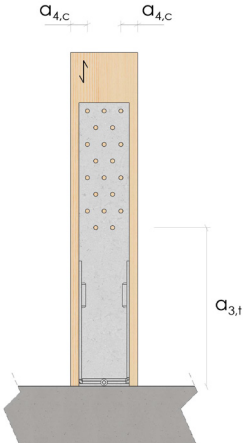
NKL 1

NKL 2

Load directions

Minimum and edge spacing

Column/style



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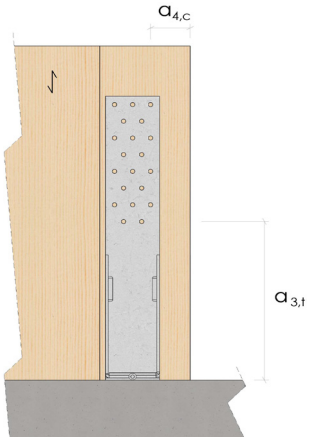


4

Minimum and edge spacing

		Parallel to the grain	Right-angled to the grain
$a_{3,t}$	End grain with stress	15d	10d
$a_{4,c}$	Unloaded edge	5d	5d

		Parallel to the grain	Right-angled to the grain
$a_{3,t}$	End grain with stress	12d	7d
$a_{4,c}$	Unloaded edge	3d	3d

Minimum spacing according to EN 1996-1-1, without pilot drilling, $\rho_k \leq 420$ kg/m^3

Connection to timber

Partial nail fitting or partial screw fitting
$n_{min.}$ 2, make sure that the load does not take effect eccentrically.

Full nail fitting or full screw fitting
$n_{max.}$ according to statics table, with compliance with minimum spacing

Connection over intermediate layers
The specified load-bearing capacities also apply to intermediate layers if the following requirements are met:

Intermediate layer
- OSB boards type OSB/3 and OSB/4 according to EN 13986 (EN 300) or approval
- Synthetic resin-bonded chipboard in accordance with EN 13986 (EN 312) or approval
- Solid wood panels according to EN 13986 (EN 13353) or approval
- Plywood according to EN 13986 (EN 636) or approval
- Plasterboards according to approval
- Fibreboards according to EN 13986 (EN 622-2 and 622-3) minimum raw density 650 kg/m^3

The value of the characteristic bearing strength of the intermediate layer must at least fulfil the value for solid softwood of strength class C24. The compressive strength of the intermediate layer when loaded at right angles to the connecting surface (for wood-based panels, compressive strength perpendicular to the board plane) must be at least equal to the value of the compressive strength perpendicular to the grain for solid softwood of strength class C24.

Connection of the intermediate layer
The intermediate layer must be force-fit to the timber component (non-moving intermediate layer).
In other cases and generally in the case of movable intermediate layers, the load-bearing capacity of the connecting element should be determined individually for the respective connection.

Connecting element for intermediate layers
The length must be selected so that the profiled length (insert depth) behind the intermediate layer corresponds at least to the length specified in the statics tables.

Connection to concrete

Proof of the load-bearing capacity for fixing the tension tie in the concrete must be carried out separately taking into account the k_t value in accordance with the requirements of the selected dowel.

Design tables

Maximum load capacities in kN
Characteristic raw density of timber: ρ_k = 350 kg/m³ (C24)
Information in the design tables
Characteristic value $F_{z,Rk}$ max.
Design value $F_{z,Rd}$ for KLED "short" and "very short"

Design of the connecting element
The necessary number of nails or screws can be calculated from the impact $F_{z,Ed}$ and the load capacity of a connecting element $F_{v,Rk}$:
$n_{erf} = F_{z,Ed} / (F_{v,Rk} \times k_{mod} / \gamma_{m)}$

Load capacity of the connecting element according to ETA-13/0523

	4.0 x 40 I 5.0 x 40	4.0 x 50 I 5.0 x 50	4.0 x 60 I 5.0 x 60
$F_{v,Rk}$ [kN]	1.83	2.14	2.27

Raw density of timber at least 350 g/m³

Design of the load capacity of the tension tie:

$F_{z,Rd} = \min \{n \times F_{v,Rk} \times k_{mod} / \gamma_M; F_{Rd,steel}\}$

The load-bearing capacity can be verified using the design value of the steel load-bearing capacity specified in the design table:

$F_{z,Ed} / F_{z,Rd} \leq 1$

Design value of steel load capacity $F_{Rd,steel}$ is based on the partial safety factors according to EN 1993-1-1 γ_{M0} = 1.0 and γ_{M2} = 1.25.
For two-piece tension ties HT2, the partial safety factor according to EN 1993-1-8 γ_{M2} = 1,25 is considered additionally.

Impact on the dowel

$F_{Ed,Bo} = F_{z,Ed} \cdot k_t$

Design examples

Connection of posts to C24, to concrete panel

Tension tie with pressure plate (110410), nails 4 x 40 mm.
Design value of impact: $F_{z,Ed}$ =14,7 kN; KLED short

Maximum load capacity
KLED short: n_{erf}: 14; $F_{z,Ed}$ =17.3 kN ≥ 14.7 kN = $F_{z,Ed}$

Alternative determination of the necessary nails 4 x 40 mm:
$n_{erf} = F_{z,Ed} / (F_{v,Rk} \times k_{mod} / \gamma_M) = 14,7 / (1,83 \times 0,9 / 1,3) = 11,6 \rightarrow n_{erf} = 12$

Alternative determination of the necessary nails 4 x 40 mm:
$F_{z,Rd} = \min \{n \times F_{v,Rk} \times k_{mod} / \gamma_M; F_{Rd,steel}\} = \min \{12 \times 1.83 \times 0.9 / 1.3; 17.3\} = \min \{15.2; 17.3\} = 15.2$ kN
According to DIN EN 1995-1-1: k_{mod} = 0.9 for KLED short and γ_M = 1.3

Proof of load capacity of the tension tie
$F_{z,Ed} / F_{z,Rd} = 14.7 / 15.2 = 0.97 \leq 1$

Impact on the dowel in concrete
$F_{Ed,Bo} = F_{Ed} \times k_t = 14.7 \times 1.33 = 19.6$ kN

GH-HT22 tension tie (11060441) with nails 4 x 50 mm
Design value of impact: $F_{z,Ed}$ = 31.2 kN class of load impact duration (KLED) medium

Necessary number of nails 4 x 50 mm
$n_{erf} = F_{z,Ed} / (F_{v,Rk} \times k_{mod} / \gamma_M) = 31.2 / (2.14 \times 0.8 / 1.3) = 23.7 \rightarrow n = 24$

Load capacity of the tension tie with 24 nails 4 x 50 mm:
$F_{z,Rd} = \{n \times F_{v,Rk} \times k_{mod} / \gamma_M; F_{Rd,steel}\} = \min \{24 \times 2.14 \times 0.8 / 1.3; 42.0\} = \min \{31.6; 42.0\} = 31.6$ kN
According to DIN EN 1995-1-1: k_{mod} = 0.8 for KLED medium and γ_M = 1.3

Proof of load capacity of the tension tie
$F_{z,Ed} / F_{z,Rd} = 31.2 / 31.6 = 0.99 \leq 1$

Impact on the dowel in concrete
$F_{Ed,Bo} = F_{Ed} \times k_t = 31.2 \times 1.0 = 31.2$ kN

TENSION TIES

TOPLINE

TYPE TOP 240 / 280 VARIO

TIPP

THE COMPLETE SET FOR FOOT ANCHORING IN TIMBER FRAMEWORK CONSTRUCTION

4

ADVANTAGES

- Approved connection over intermediate layer
- Efficient wall or column connection on concrete
- High degree of advance production possible in timber construction/timber framework construction
- Fast and practical processing
- Calculation advantage due to easy full assembly
- Time savings - no more laborious marking and dowel drilling in advance
- Safe processing due to the coordinated system
- Direct connection to OSB boards between the timber beams possible with GH screw

SUITABLE FOR FASTENING TO:

- OSB laminated particle board*
- Laminated particle board*
- Hard wood fibreboard*
- "Kerto" veneer wood*
- "MICRO LAM LVL 2.0"*
- Solid and plywood

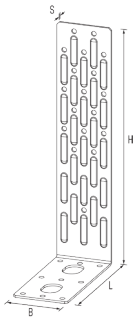
* Processing using a GH screw

TECHNICAL INFORMATION

- Coordinated system for GH tension ties and washers
- Clear static proof available
- Variable application options by rotating GH U-washer
- Flexible application option depending on the forces to be absorbed.

ACCESSORY ITEMS

- Pressure discs M12 and pressure discs M16 are for transferring the tensile forces from the bracket into the concrete with perfect statics.



TOPLINE

ETA-10 0010

NKL 2

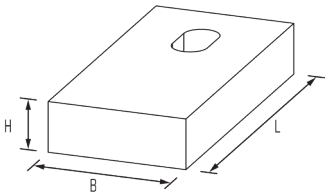
250 GD Z275

TENSION TIES

TOP 240/280 VARIO

Art. No.	Dimensions [mm]							n	nBo	EAN	Weight	Pallet	PU		
	H	x	L	x	W(B)	x	T(S)	Ø5	Ø18x26	4019346	kg				
110850	240	x	120	x	55	x	2,0	18+9	2	110850	0.272	1600	50		■
110867	280	x	120	x	55	x	2,0	23+9	2	110867	0.302	1200	50		■

4



NKL 2

235 JR verzinkt

TENSION TIES

TOP PRESSURE PLATE

Art. No.	Dimensions [mm]					n	EAN	Weight	Pallet	PU	
	L	x	W(B)	x	T(S)	Ø	4019346	kg			
111345	114	x	55	x	20	14x26	111345	0.861	1080	10	■
111352	114	x	55	x	20	18x26	111352	0.861	1080	10	■

TOP 240/280 VARIO

Timber | Concrete

Art. No.	H	L	W(B)	T(S)	n	n_{Bo}	charakt. / KLED	4.0x40 | 5.0x40		4.0x50 | 5,0x50		4.0x60 | 5.0x60		$F_{Rd,steel}$	k_t
					Ø 5	Ø18 x 26		$F_{z,Rk/Rd}$	n_{erf}	$F_{z,Rk/Rd}$	n_{erf}	$F_{z,Rk/Rd}$	n_{erf}		
110850	240	120	55	2,0	17	2	charact.	15,90	9	15,90	8	15,90	8	15,90	1,49
							Short	15,90	13	15,90	11	15,90	11		
							Very short	15,90	11	15,90	9	15,90	9		
110867	280	120	55	2,0	22	2	charact.	15,90	9	15,90	8	15,90	8	15,90	1,49
							Short	15,90	13	15,90	11	15,90	11		
							Very short	15,90	11	15,90	9	15,90	9		

NEW
optimised
bolt holes!
See page 174

TENSION TIES

TOPLINE KONSTRULINE

TYPE HT

1. Transfer of tensile forces, specially for timber framework construction
2. For use with new and existing timber constructions
3. Transfer of high forces into the concrete
4. Optional pressure plates for even higher tensile forces
5. For use on solid wood boards and in frame construction

ALWAYS THE RIGHT APPLICATION WITH VARYING PRESSURE PLATES

ADVANTAGES

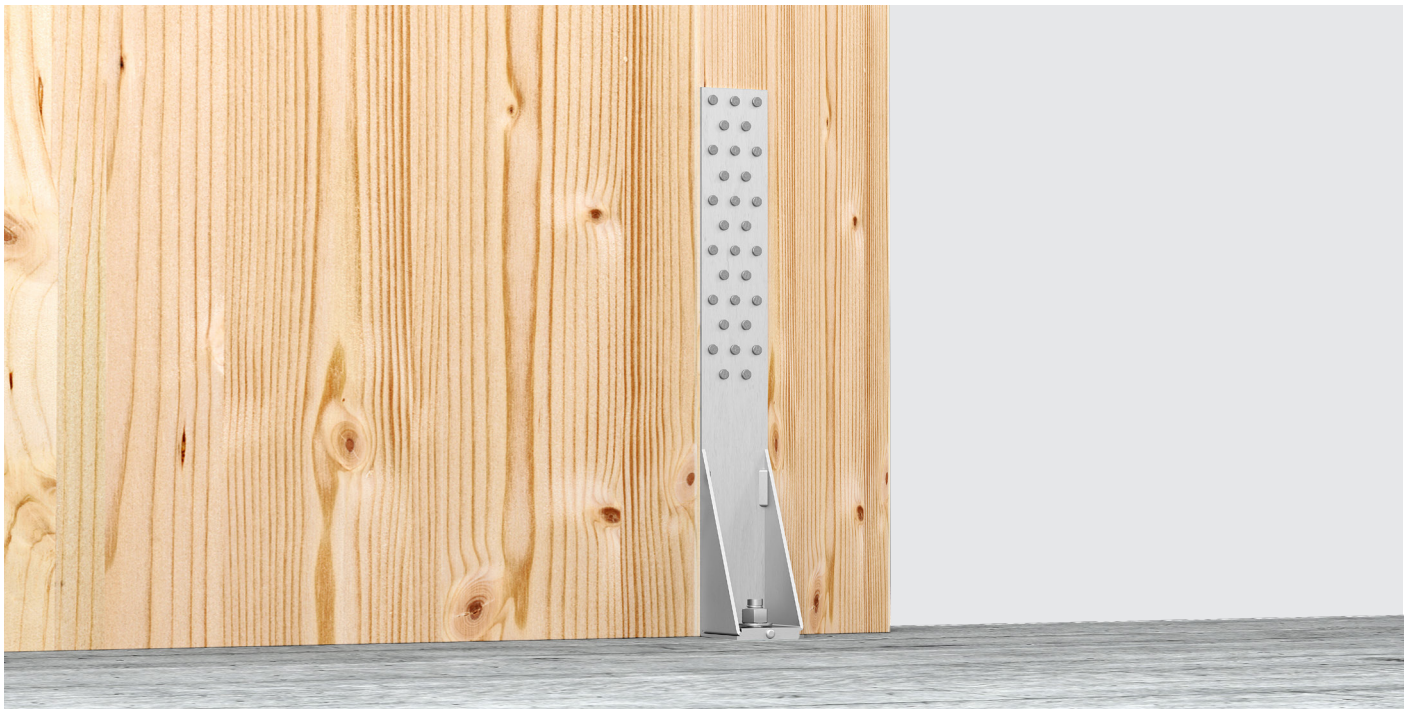
- Absorption of high tensile loads in timber framework construction
- Reduced overall height
- Short rib (150 mm)
- Optimised hole pattern
- GH HT are also suitable for column connections
- Fixing in timber, also over intermediate layers, with GH threaded nails 4.0 x 50 to 75 mm, or GH screws Ø 5.0 mm possible
- Optional pressure plates
- Use of pressure plates for tension loads up to 85 kN
- Without pressure plate for tension loads up to 42 kN
- Simple push-through assembly

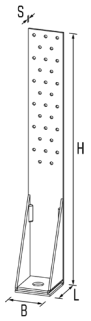
FASTENING ELEMENTS

- GH threaded nail or GH screws
- Ground fixing with bolt anchors or concrete screws

ACCESSORY ITEMS

- The optional pressure discs for HT 16 - HT 28 and pressure discs for HT 34 allow Tensile loads up to 85 kN





TOPLINE KONSTRULINE ETA-10 0010

TENSION TIES

NEW optimised bolt holes!

NKL 2 355 MC galv. verzinkt

HT

Art. No.	Type	Dimensions [mm]							n	nBo	EAN	Weight	Pallet	PU		
		H	x	L	x	W(B)	x	T(S)	Ø5	1x Ø	4019346	kg				
11050370	HT10	370	x	63	x	50	x	3,0	18	18	479643	0.831	240	10		■
11060341	HT16	340	x	63	x	60	x	3,0	20	18	479629	0.873	240	10		■
11060441	HT22	440	x	63	x	60	x	3,0	30	18	479636	1.100	240	10		■
11060541	HT28	540	x	63	x	60	x	3,0	45	22	479544	1.134	160	10		■
11080621	HT34	620	x	83	x	80	x	3,0	55	26	479551	1.800	170	10		■
110140740	HT36	740	x	83	x	140	x	3,0	75	29	479568	3.278	100	1		■

4

OPTIMISED HT TENSION TIE!

HT16 and HT22

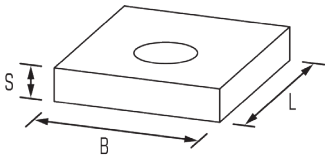
Simple push-through assembly when using bolt anchors. When installing with adhesive anchors/composite mortar, the drilled hole in the baseplate can be drilled directly through the pre-positioned HT tension tie.

HT28 and HT34

Larger bolts are possible, which means that higher loads can be transferred from the wall into the baseplate. The drilled hole in the baseplate is created directly by the pre-positioned HT tension tie.

The optimised hole diameters mean that dowels with a better load-bearing capacity can be used. This means that higher tensile loads can be transferred from the wall into the baseplate.

PRESSURE PLATES



NKL 2 235 JR verzinkt

HT

Art. No.	Dimensions [mm]					n	EAN	Weight	Pallet	PU		
	L	x	W(B)	x	T(S)	Ø	4019346	kg				
1105056	50	x	56	x	10	18	479605	0.200	960	10		■
1105057	50	x	56	x	10	22	479575	0.230	960	10		■
1107078	70	x	77	x	20	26	479582	0.763	960	10		■
11080130	80	x	130	x	40	29	479599	3.000	200	1		■

HT

Timber | Concrete

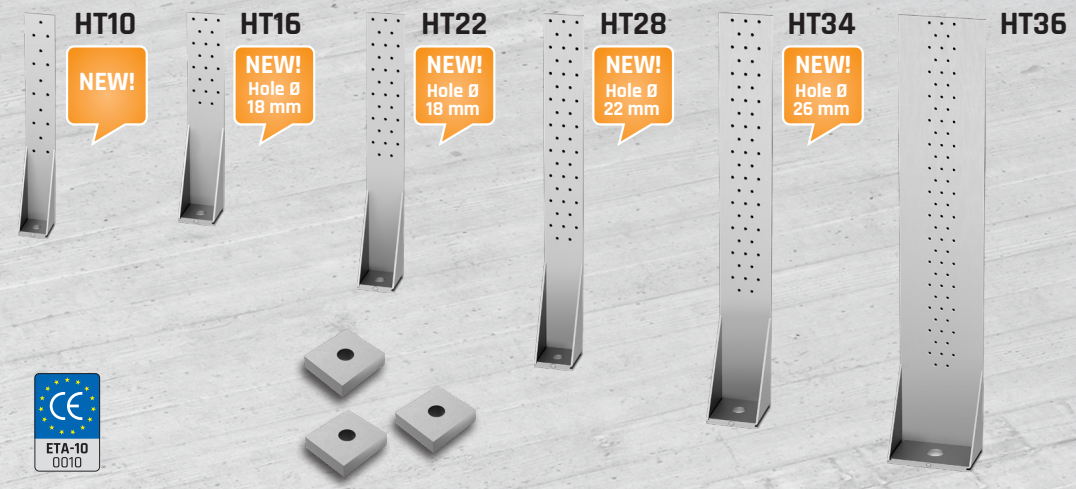
Art. No.		H	L	W(B)	T(S)	n Ø 5	nBo 1x Ø	charakt. / KLED	4.0x40 | 5.0x40 $F_{z,Rk/Rd}$	4.0x40 | 5.0x40 n_{erf}	4.0x50 | 5.0x50 $F_{z,Rk/Rd}$	4.0x50 | 5.0x50 n_{erf}	4,0x60 | 5,0x60 $F_{z,Rk/Rd}$	4,0x60 | 5,0x60 n_{erf}	$F_{Rd,steel}$	k_t
								charact.	32,90	18	38,40	18	40,80	18		
11050370	HT10	370	63	50	3,0	18	18	Short	22,80	18	26,60	18	28,20	18	42,00	1,00
								Very short	27,80	18	32,50	18	34,50	18		
								charact.	36,54	20	42,00	20	42,00	19		
11060341	HT16	340	63	60	3,0	20	18	Short	25,29	20	29,57	20	31,39	20	42,00	1,00
								Very short	30,92	20	36,14	20	38,36	20		
								charact.	42,00	23	42,00	20	42,00	19		
11060441	HT22	440	63	60	3,0	30	18	Short	37,94	30	42,00	29	42,00	27	42,00	1,00
								Very short	42,00	28	42,00	24	42,00	22		
								charact.	42,00	23	42,00	20	42,00	19		
11060541	HT28	540	63	60	3,0	45	22	Short	42,00	34	42,00	29	42,00	27	42,00	1,00
								Very short	42,00	28	42,00	24	42,00	22		
								charact.	63,40	35	63,40	30	63,40	28		
11060541 with pressure plate 1105056							---	Short	50,72	41	50,72	35	50,72	33	50,72	1,00
								Very short	50,72	33	50,72	29	50,72	27		
								charact.	42,00	23	42,00	20	42,00	19		
11080621	HT34	620	83	80	3,0	55	26	Short	42,00	34	42,00	29	42,00	27	42,00	1,00
								Very short	42,00	28	42,00	24	42,00	22		
								charact.	85,20	47	85,20	40	85,20	38		
11080621 with pressure plate 1107078							---	Short	68,16	54	68,16	47	68,16	44	68,16	1,00
								Very short	68,16	45	68,16	38	68,16	36		
								charact.	137,01	75	158,00	74	158,00	70		
110140740	HT36	740	83	140	3,0	75	29	Short	94,85	75	110,88	75	117,70	75	126,40	1,00
110140740 with pressure plate 11080130								Very short	115,93	75	126,40	70	126,40	66		

TENSION TIE **HT**

A SUCCESSFUL SERIES FROM GH

OPTIMISED HT TENSION TIES!

NEW! Simple push-through assembly



TOPLINE KONSTRULINE MADE IN GERMANY ETA-10 0010

TIPP
Height-adjustable 30 mm

TENSION TIES

TOPLINE KONSTRULINE

TYPE HT2 (TWO-PIECE)

1. Preliminary assembly already during production
2. No protruding parts during transport
3. Thanks to the patented system, any uneveness in the concrete slabcan be quickly and easily evened out
4. No more complex improvement work

THE PROBLEM-SOLVER AMONGST TENSION TIES

PATENT EP 2642035

4

ADVANTAGES

- Assembly of pull tab in wall production
- Interior walls can be fully panelled and completed
- No protruding parts during transport
- Simple and quick height compensation up to 30 mm possible on the building site
- Transfer of high tensile loads
- No improvement work on the building site

PRELIMINARY ASSEMBLY FOR WALL PRODUCTION

The pull tabs are pre-assembled during the production of the walls and the wall is completely sealed. For flush mounting of the panelling, a 3.0 mm deep cut-out is recommended in the sleeper.

FINAL ASSEMBLY ON THE BUILDING SITE

On the building site, the foot angle is mounted flush with the baseplate. Unevenness in the baseplate of up to 30 mm are quickly and easily adjusted via the interlocking and fixed with a M10 nut.

ASSEMBLY OPTIONS FOR PULL TABS

Left type or right type
The pull tab is attached to the left or right on the handle with GH grooved nails or GH screws.
For absolute wind tightness, only a milled recess of 3.0 mm in the sleeper is recommended.

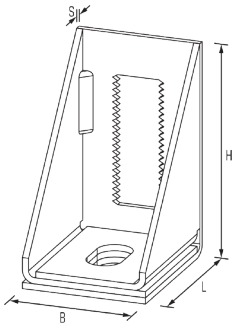
Straight type
The pull tab is mounted on the front of the handle.
A recess of at least 5.0 mm in the handle and sleeper, or in the OSB panel, is recommended. Alternatively, the pull tab can also be mounted over the intermediate in the handle.

All pull tabs and foot angles can be combined in any way.

FASTENING ELEMENTS

- GH threaded nail or GH screws
- Ground fixing with bolt anchors or concrete screws

User video to our HT2 tension ties



TOPLINE KONSTRULINE PATENT EP 2642035 CE ETA-10 0010

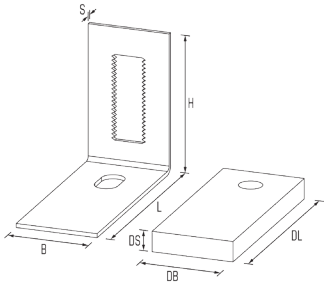
NKL 2 355 MC galv. verzinkt

TENSION TIE HT2

FOOT ANGLE WITH RIB

Art. No.	Dimensions [mm]							nBo	EAN	Weight	Pallet	PU		
	H	x	L	x	W(B)	x	T(S)	Ø 17	4019346	kg				
11090341	103	x	73	x	60	x	3,0	1	032701	0.640	480	10		■

4

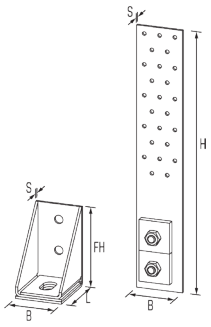


NKL 2 355 MC galv. verzinkt

TENSION TIE HT2

FOOT ANGLE WITH PRESSURE PLATE

Art. No.	Dimensions of foot [mm]							nBo	Dimensions of pressure plate [mm					nBo	EAN	Weight	Pallet	PU		
	H	x	L	x	W(B)	x	T(S)	Ø17x30	DL	x	DB	x	DS	Ø 17	4019346	kg				
11090343	103	x	144	x	60	x	3,0	1	140	x	60	x	15	1	032749	1.235	720	10		■



NKL 2 355 MC galv. verzinkt

TENSION TIE HT2

TENSION TIE SET (NOT HEIGHT-ADJUSTABLE)

Art. No.	Dimensions [mm]									n	nBo	EAN	Weight	Pallet	PU		
	H	x	L	x	W(B)	x	FH	x	T(S)	Ø5	Ø17x30	4019346	kg				
11090352	340	x	73	x	60	x	103	x	3,0	20	1	032763	0.632	480	10		■

FOOT ANGLE WITH RIB

Timber | Concrete

Art. No.	H	L	W(B)	T(S)	n Ø 5	nBo Ø17 x 30	charakt. / KLED	4.0x40 | 5.0x40 $F_{z,Rk/Rd}$	4.0x40 | 5.0x40 n_{erf}	4.0x50 | 5.0x50 $F_{z,Rk/Rd}$	4.0x50 | 5.0x50 n_{erf}	4.0x60 | 5.0x60 $F_{z,Rk/Rd}$	4.0x60 | 5.0x60 n_{erf}	$F_{Rd,steel}$	k_t
11090341	103	73	60	3,0	20	1	charact.	21,40	12	21,40	11	21,40	10	17,12	1,00
							Short	17,12	14	17,12	12	17,12	11		
							Very short	17,12	12	17,12	10	17,12	9		

4

FOOT ANGLE WITH PRESSURE PLATE

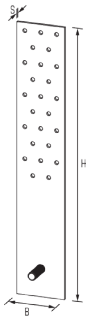
Timber | Concrete

Art. No.	H	L	W(B)	T(S)	n Ø 5	nBo Ø17 x 30	charakt. / KLED	4.0x40 | 5.0x40 $F_{z,Rk/Rd}$	4.0x40 | 5.0x40 n_{erf}	4.0x50 | 5.0x50 $F_{z,Rk/Rd}$	4.0x50 | 5.0x50 n_{erf}	4.0x60 | 5.0x60 $F_{z,Rk/Rd}$	4.0x60 | 5.0x60 n_{erf}	$F_{Rd,steel}$	k_t
11090343	103	144	60	3,0	20	1	charact.	19,40	11	19,40	10	19,40	9	17,12	1,40
							Short	17,12	14	17,12	12	17,12	11		
							Very short	17,12	12	17,12	10	17,12	9		

TENSION TIE SET (NOT HEIGHT-ADJUSTABLE)

Timber | Concrete

Art. No.	H	L	W(B)	T(S)	n Ø 5	nBo 17	charakt. / KLED	4.0x40 | 5.0x40 $F_{z,Rk/Rd}$	4.0x40 | 5.0x40 n_{erf}	4.0x50 | 5.0x50 $F_{z,Rk/Rd}$	4.0x50 | 5.0x50 n_{erf}	4.0x60 | 5.0x60 $F_{z,Rk/Rd}$	4.0x60 | 5.0x60 n_{erf}	$F_{Rd,steel}$	k_t
11090352	103	73	60	3,0	20	1	charact.	30,00	17	30,00	15	30,00	14	24,00	1,00
							Short	24,00	19	24,00	17	24,00	16		
							Very short	24,00	16	24,00	14	24,00	13		



TOPLINE KONSTRULINE PATENT EP 2642035 CE ETA-10 0010

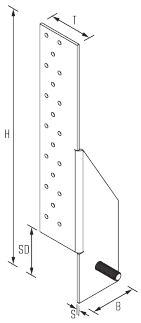
NKL 2 355 MC galv. verzinkt

TENSION TIE HT2

STRAIGHT PULL TAB

Art. No.	Dimensions [mm]						n	EAN	Weight	Pallet	PU		
	H	x	W(B)	x	T(S)		Ø5	4019346	kg				
11090340	340	x	60	x	3,0		20	032671	0.551	480	10		■

4

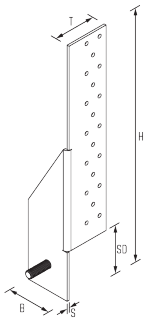


NKL 2 355 MC galv. verzinkt

TENSION TIE HT2

PULL TAB ANGLED LEFT

Art. No.	Dimensions [mm]									n	EAN	Weight	Pallet	PU		
	H	x	W(B)	x	D(T)	x	SD	x	T(S)	Ø5	4019346	kg				
11090340L	340	x	60	x	60	x	65	x	3,0	20	032688	0.648	480	10		■
11090350L	425	x	60	x	60	x	150	x	3,0	20	032725	0.756	240	10		■



NKL 2 355 MC galv. verzinkt

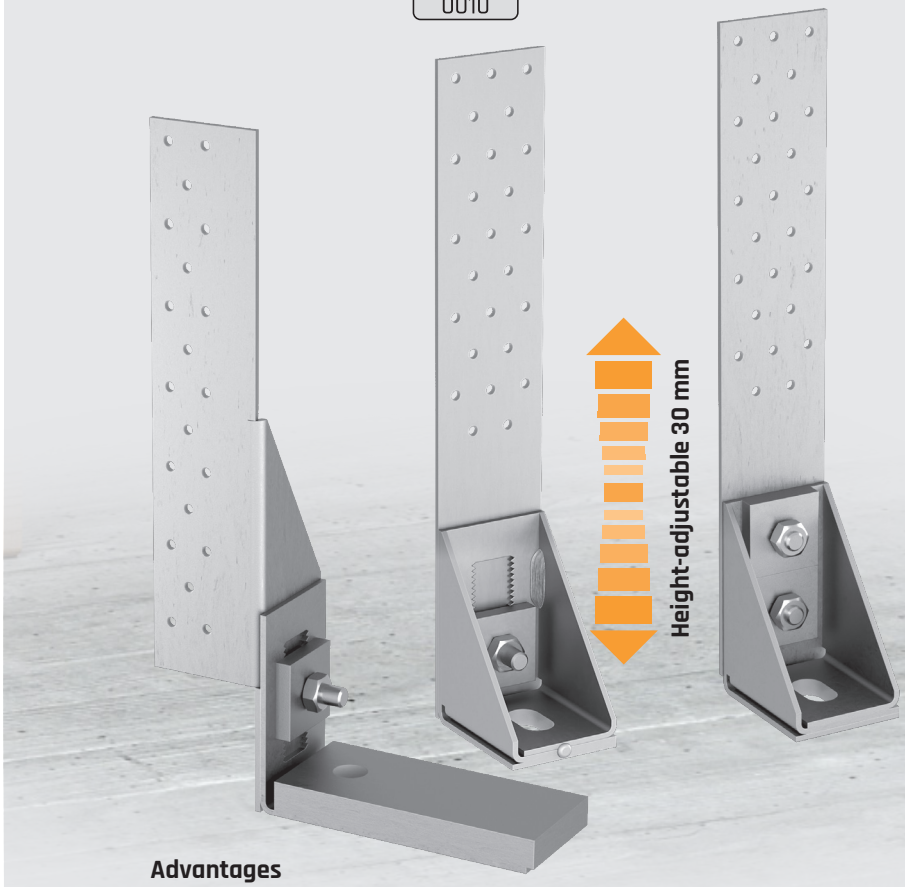
TENSION TIE HT2

PULL TAB ANGLED RIGHT

Art. No.	Dimensions [mm]									n	EAN	Weight	Pallet	PU		
	H	x	W(B)	x	D(T)	x	SD	x	T(S)	Ø5	4019346	kg				
11090340R	340	x	60	x	60	x	65	x	3,0	20	032695	0.648	480	10		■
11090350R	425	x	60	x	60	x	150	x	3,0	20	032732	0.756	240	10		■

TENSION TIE HT2

TOPLINE GERMANY ETA-10 0010



European patent EP 2 642 035

4

GH HT tension tie 2-piece
Preliminary assembly for wall production
The pull tabs are pre-assembled during the production of the walls and the wall is completely sealed.
For flush mounting of the panelling, a 3.0 mm deep cut-out is recommended in the sleeper.

Final assembly on the building site
On the building site, the foot angle is mounted flush with the baseplate. Unevenness in the baseplate of up to 30 mm are quickly and easily adjusted and fixed with a M10 nut.

Assembly options for pull tabs
Left type or right type
The pull tab is attached to the left or right on the handle with GH grooved nails or GH screws.
For absolute wind tightness, only a milled recess of 3.0 mm in the sleeper is recommended.

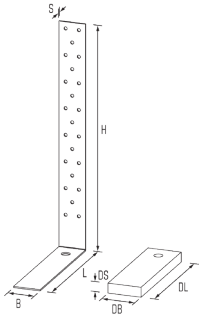
Straight type
The pull tab is mounted on the front of the handle. A recess of at least 5.0 mm in the handle + sleeper, or in the OSB panel, is recommended.
Alternatively, the pull tab can also be mounted over the intermediate in the handle.

All pull tabs and foot angles can be combined in any way.

Advantages
- Assembly of pull tab in wall production
- Interior walls can be fully panelled and completed
- No protruding parts during transport
- Simple and quick height compensation on the building site
- Transfer of high tensile loads
- No improvement work on the building site

Fastening elements
- Wall/column, also via the intermediate layer with GH threaded/anchor nails or GH screws ETA-13/0523

- Ground fixing with bolt anchor, concrete screw



ETA-10 0010

NKL 2

250 GD Z275

TENSION TIES

WITH PRESSURE PLATE

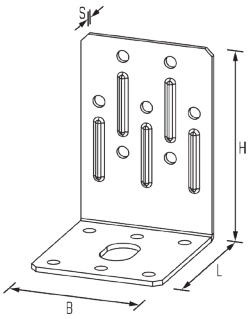
Art. No.	Dimensions [mm]							nBo	nN	Dimensions of pressure plate [mm]					EAN	Weight	Pallet	PU		
	H	x	L	x	W(B)	x	T(S)	1x Ø	Ø 5	DL	x	DB	x	DS	4019346	kg				
110310	142	x	93	x	60	x	2,0	12	17	90	x	50	x	12	007037	0.658	1000	20		■
110305	280	x	122	x	40	x	2,0	12	11	90	x	50	x	12	007020	0.650	400	10		■
110405	340	x	182	x	40	x	2,0	12	23	160	x	50	x	15	017791	1.270	400	10		■
110410	400	x	123	x	40	x	3,0	16	23	110	x	60	x	15	017807	1.270	400	10		■
110415	420	x	222	x	60	x	2,0	16	38	200	x	60	x	20	017814	2.490	160	10		■
110420	420	x	102	x	60	x	2,0	20	38	85	x	60	x	20	017821	1.290	320	10		■
110425	480	x	123	x	60	x	2,5	20	38	115	x	70	x	20	017838	1.970	320	10		■
110430	520	x	222	x	60	x	2,5	18	18	220	x	60	x	25	017494	3.500	480	4		■

The tension ties including pressure disc are used as a classic tension connection for timber components with connection to concrete.
Foot point anchors in timber frame construction are quickly and easily released with this system.
The large baseplates including the pressure plates the loads are statically verifiably transferred into the concrete and timber constructions can be optimally connected to the concrete substructure.

TENSION TIE WITH PRESSURE PLATE

Timber | Concrete

Art. No.	H	L	W(B)	T(S)	n Ø 5	nBo 1x Ø	charakt. / KLED	4.0x40 | 5.0x40		4.0x50 | 5.0x50		4.0x60 | 5.0x60			
								$F_{z,Rk/Rd}$	n_{erf}	$F_{z,Rk/Rd}$	n_{erf}	$F_{z,Rk/Rd}$	n_{erf}	$F_{Rd,steel}$	k_t
110310	142	93	60	2,0	17	15	charact.	16,44	9	17,30	9	17,30	8	17,30	1,51
							Short	11,38	9	13,31	9	14,12	9		
							Very short	13,91	9	16,26	9	17,26	9		
110305	280	122	40	2,0	11	15	charact.	11,50	7	11,50	6	11,50	6	11,50	1,51
							Short	11,50	10	11,50	8	11,50	8		
							Very short	11,50	8	11,50	7	11,00	6		
110405	340	182	40	2,0	23	13	charact.	11,60	7	11,60	6	11,60	6	11,60	1,20
							Short	11,60	10	11,60	8	11,60	8		
							Very short	11,60	8	11,60	7	11,60	7		
110410	400	123	40	3,0	23	18	charact.	17,30	10	17,30	9	17,30	8	17,30	1,33
							Short	17,30	14	17,30	12	17,30	12		
							Very short	17,30	12	17,30	10	17,30	10		
110415	420	222	60	2,0	38	18	charact.	17,30	10	17,30	9	17,30	8	17,30	1,23
							Short	17,30	14	17,30	12	17,30	12		
							Very short	17,30	12	17,30	10	17,30	10		
110420	420	102	60	2,0	38	22	charact.	17,30	10	17,30	9	17,30	8	17,30	1,88
							Short	17,30	14	17,30	12	17,30	12		
							Very short	17,30	12	17,30	10	17,30	10		
110425	480	123	60	2,5	38	22	charact.	21,70	12	21,70	11	21,70	10	21,70	1,50
							Short	21,70	18	21,70	15	21,70	14		
							Very short	21,70	15	21,70	13	21,70	12		
110430	520	222	60	2,5	18	18	charact.	21,70	12	21,70	11	21,70	10	21,70	1,31
							Short	21,70	18	21,70	15	21,70	14		
							Very short	21,70	15	21,70	13	21,70	12		



TOPLINE GREENLINE ETA-09 0322

NKL 2 250 GD Z275

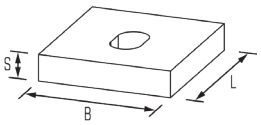
TENSION TIES

TOP VARIO 80 / 120

Art. No.	Dimensions [mm]							nN	nBo	EAN	Weight	Pallet	PU		
	H	x	L	x	W(B)	x	T(S)	Ø 5	Ø 13,5	4019346	kg				
110829	80	x	60	x	55	x	2,0	13	L=21	110829	0.115	6000	100		■
110836	120	x	60	x	55	x	2,0	13	L=21	110836	0.150	6000	100		■

4

PRESSURE PLATES



NKL 2 235 JR verzinkt

TOP VARIO

Art. No.	Dimensions [mm]					nBo	nBo	EAN	Weight	Pallet	PU		
	L	x	W(B)	x	T(S)	Ø 11,5	Ø 13,5	4019346	kg				
111307	56	x	50	x	10	-	L=26	111307	0.193	1100	50		■
111314	56	x	50	x	10	L=22	-	111314	0.198	1100	50		■

The TOP VARIO connectors are particularly suitable for applications: sleeper on concrete (tension + compression) and columns on concrete (compression only).

The technology:

- Planned force dissipation through optimised shaping technology/ beading = increased stability.
- Coordination of geometry/number of nails/thiCKness of U-washer and dowel load capactiy.
- No bothersome centre rib during processing.
- Full nail fitting always possible.
- High stability due to special, discreet corrugation.
- Not a nail too many - optimal coordination of the bracket.
- No fixing in the edge zone due to optimal hole pattern.

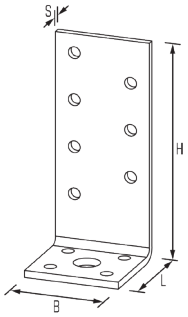
The special connector for concrete connection for tensile stress.

Pressure discs M10 and pressure discs M12 are for introducing the forces from the bracket with perfect statics into the concrete.

TOP VARIO 80 / 120

Timber | Concrete

Art. No.	H	L	W(B)	T(S)	na	NB	VM	$F_{1,T,Rk}$	$F_{1,S,Rk}$	$k_{1,t,ax}$	$F_{2/3,T,RK}$	$k_{2/3,t,v}$	$F_{4,T,Rk}$	$F_{4,S,Rk}$	$k_{4,t,v}$	$k_{4,t,ax}$	$F_{5,T,Rk}$	$F_{5,S,Rk}$	$k_{5,t,v}$	$k_{5,t,ax}$	$*F_{4/5,T,Rk}$	$*F_{4/5,S,Rk}$	$k_{4/5,t,v}$	$k_{4/5,t,ax}$
110829	80	60	55	2,0	7	Full	4.0x40	13,23	6,32	6,26	2,23	1,00	-	-	-	-	-	-	-	-	-	-	-	-
							4.0x60	16,55	6,32	6,26	3,41	1,00	-	-	-	-	-	-	-	-	-	-	-	-
					-	Partial	4.0x40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
							4.0x60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
110836	120	60	55	2,0	7	Full	4.0x40	13,23	6,32	6,26	1,82	1,00	-	-	-	-	-	-	-	-	-	-	-	-
							4.0x60	16,55	6,32	6,26	2,45	1,00	-	-	-	-	-	-	-	-	-	-	-	-
					-	Partial	4.0x40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
							4.0x60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



TENSION TIES

TYPE HS

ETA-13 0900

NKL 2

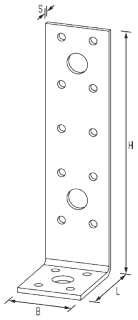
250 GD Z275

Art. No.	Dimensions [mm]							nN	nBo	EAN	Weight	Pallet	PU		
	H	x	L	x	W(B)	x	T(S)	Ø 5	Ø 11	4019346	kg				
943	90	x	35	x	40	x	3,0	11	1	110256	0.103	5400	100	■	■
944	110	x	35	x	40	x	3,0	13	1	110263	0.119	5400	100	■	■
945	130	x	35	x	40	x	3,0	15	1	110270	0.136	5100	100	■	■

4

Angle brackets HS were developed to achieve a secure fastening of timber parts on other building materials such as concrete or steel.
The short leg transfers a suction force, together with a M10 screw (+ Ø 30 washer), into the substructure.

The installation of an anchor rail (e.g. HTA 28/15 Halfen iron) enables subsequent adjustment and thus makes installation much easier. To prevent the timber parts from twisting, it is recommended that 2 brackets per connection are used.



TENSION TIES

TYPE HB

ETA-10 0010

NKL 2

250 GD Z275

Art. No.	Dimensions [mm]							nN	nBo	EAN	Weight	Pallet	PU		
	H	x	L	x	W(B)	x	T(S)	Ø 5	Ø 13	4019346	kg				
1543	155	x	50	x	40	x	3,0	18	3	110324	0.169	4200	100		■

Angle brackets HB were developed to achieve a secure fastening of timber parts on other building materials such as concrete or steel.
The short leg transfers a suction force, together with a screw into the substructure.

The installation of an anchor rail (e.g. HTA 28/15 Halfen iron) enables subsequent adjustment and thus makes installation much easier. To prevent the timber parts from twisting, it is recommended that 2 brackets per connection are used.

TYPE HS

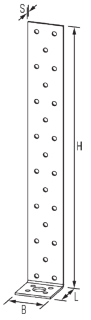
Timber / Concrete

Art. No.	Dimensions [mm]				n_a	NB	VM	$F_{1,T,Rk}$	$F_{1,Bo,ax,rk}$	$F_{2/3,T,RK}$	$F_{2/3,Bo,sx,rk}$
	H	L	W(B)	T(S)							
943	90	35	40	3,0	7	Full	4.0x40	-	-	1,70	1,70
							4.0x60	-	-	2,60	2,60
					3	Partial	4.0x40	0,90	2,20	-	-
							4.0x60	0,90	2,20	-	-
944	110	35	40	3,0	9	Full	4.0x40	-	-	2,20	2,20
							4.0x60	-	-	3,30	3,30
					5	Partial	4.0x40	0,90	2,20	-	-
							4.0x60	0,90	2,20	-	-
945	130	35	40	3,0	11	Full	4.0x40	-	-	2,80	2,80
							4.0x60	-	-	4,10	4,10
					7	Partial	4.0x40	0,90	2,20	-	-
							4.0x60	0,90	2,20	-	-

TYPE HB

Timber / Concrete

Art. No.	Dimensions [mm]				n	nBo	charakt. / KLED	4.0x40 I 5.0x40		4.0x50 I 5.0x50		4.0x60 I 5.0x60			
	H	L	B	S	Ø 5	Ø 13		$F_{z,Rk/Rd}$	n_{erf}	$F_{z,Rk/Rd}$	n_{erf}	$F_{z,Rk/Rd}$	n_{erf}	$F_{Rd,steel}$	k_t
1543	155	50	40	3,0	14	3	charact.	3,50	2	3,50	2	3,50	2	3,50	3,08
							Short	3,50	3	3,50	3	3,50	3		
							Very short	3,50	3	3,50	2	3,50	2		



ETA-10 0010

NKL 2

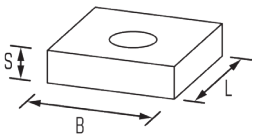
250 GD Z275

TENSION TIES

TYPE HSB

Art. No.	Dimensions [mm]							nN	nBo	EAN	Weight	Pallet	PU		
	H	x	L	x	W(B)	x	T(S)	Ø 5	Ø 14	4019346	kg				
522	200	x	40	x	40	x	2,0	19	1	110706	0.132	4200	100		■
532	300	x	40	x	40	x	2,0	27	1	110713	0.187	2400	50		■
542	400	x	40	x	40	x	2,0	34	1	110720	0.242	1800	50		■
90504	500	x	40	x	40	x	2,0	36	1	135075	0.297	2000	20		■
90505	600	x	40	x	40	x	2,0	48	1	135082	0.351	2000	20		■
524	200	x	40	x	40	x	4,0	19	1	110737	0.264	2100	50		■
534	300	x	40	x	40	x	4,0	27	1	110744	0.373	1600	50		■
544	400	x	40	x	40	x	4,0	34	1	110751	0.483	900	25		■
90512	500	x	40	x	40	x	4,0	36	1	135099	0.593	1000	20		■
90513	600	x	40	x	40	x	4,0	48	1	135006	0.703	1000	20		■

PRESSURE PLATE



TYPE HB / HSB

NKL 2

235 JR verzinkt

Art. No.	Dimensions [mm]					nBo	EAN	Weight	Pallet	PU		
	L	x	W(B)	x	T(S)	Ø 14	4019346	kg				
555	43	x	40	x	10,0	1	109991	0.137	5000	50		■

The HSB concrete flat steel anchors are used to achieve a secure fastening of timber parts on other building materials such as concrete or steel. The short leg transfers a suction force, together with a M10 screw (+ Ø 30 washer), into the substructure.

The installation of an anchor rail (e.g. HTA 28/15 half-iron) enables subsequent adjustment and thus makes installation much easier.

To prevent the timber parts from twisting, it is recommended that 2 brackets per connection are used.

For use as a flat steel anchor, the upturned part is cast in concrete.

TYPE HSB

Timber | Concrete

Art. No.	H	L	W(B)	T(S)	n Ø 5	nBo Ø 13	charakt. / KLED	4.0x40 | 5.0x40		4.0x50 | 5.0x50		4.0x60 | 5.0x60			
								$F_{z,Rk/Rd}$	n_{erf}	$F_{z,Rk/Rd}$	n_{erf}	$F_{z,Rk/Rd}$	n_{erf}	$F_{Rd,Stahl}$	k_t
522	200	40	40	2,0	19	1	charact.	11,60	7	11,60	6	11,60	6	11,60	3,16
							Short	11,38	9	11,60	8	11,60	8		
							Very short	11,60	8	11,60	7	11,60	7		
532	300	40	40	2,0	27	1	charact.	11,60	7	11,60	6	11,60	6	11,60	3,16
							Short	11,60	10	11,60	8	11,60	8		
							Very short	11,60	8	11,60	7	11,60	7		
542	400	40	40	2,0	34	1	charact.	11,60	7	11,60	6	11,60	6	11,60	3,16
							Short	11,60	10	11,60	8	11,60	8		
							Very short	11,60	8	11,60	7	11,60	7		
90504	500	40	40	2,0	37	1	charact.	11,60	7	11,60	6	11,60	6	11,60	3,16
							Short	11,60	10	11,60	8	11,60	8		
							Very short	11,60	8	11,60	7	11,60	7		
90505	600	40	40	2,0	48	1	charact.	11,60	7	11,60	6	11,60	6	11,60	3,16
							Short	11,60	10	11,60	8	11,60	8		
							Very short	11,60	8	11,60	7	11,60	7		
524	200	40	40	4,0	19	1	charact.	16,44	9	19,22	9	20,40	9	23,10	4,00
							Short	11,38	9	13,31	9	14,12	9		
							Very short	13,91	9	16,26	9	17,26	9		
534	300	40	40	4,0	27	1	charact.	23,10	13	23,10	11	23,10	11	23,10	4,00
							Short	21,50	17	23,10	16	23,10	15		
							Very short	23,10	15	23,10	13	23,10	13		
544	400	40	40	4,0	34	1	charact.	23,10	13	23,10	11	23,10	11	23,10	4,00
							Short	23,10	19	23,10	16	23,10	15		
							Very short	23,10	15	23,10	13	23,10	13		
90512	500	40	40	4,0	37	1	charact.	23,10	13	23,10	11	23,10	11	23,10	4,00
							Short	23,10	19	23,10	16	23,10	15		
							Very short	23,10	15	23,10	13	23,10	13		
90513	600	40	40	4,0	48	1	charact.	23,10	13	23,10	11	23,10	11	23,10	4,00
							Short	23,10	19	23,10	16	23,10	15		
							Very short	23,10	15	23,10	13	23,10	13		

5

05 SHEARING ANGLES SHEARING/TENSILE PLATES

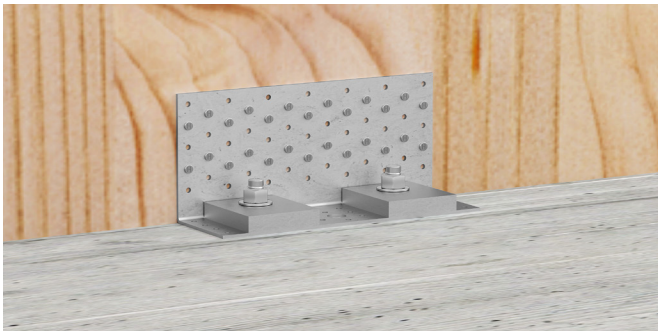
SHEARING ANGLES SHEARING/TENSILE

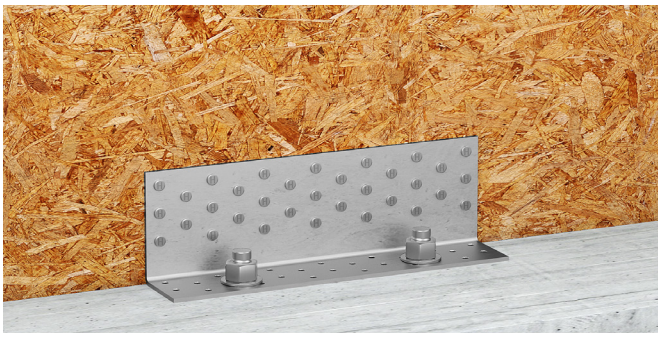
SHEARING ANGLES

The shearing angles "shearing 80" and "shearing 120" were developed to take shearing and tensile loads in timber frames and solid timber construction.

Advantages:

- Connection timber/concrete
- Efficient and quick assembly with GH threaded nails
- Expandable by modular system
- Hole pattern is optimised for board plywood and softwood
- Hole spacing is also optimised for any height compensation
- Various nail patterns are possible, including under consideration of the grain course and edge spacing
- Assembly via intermediate layer, which can and cannot move





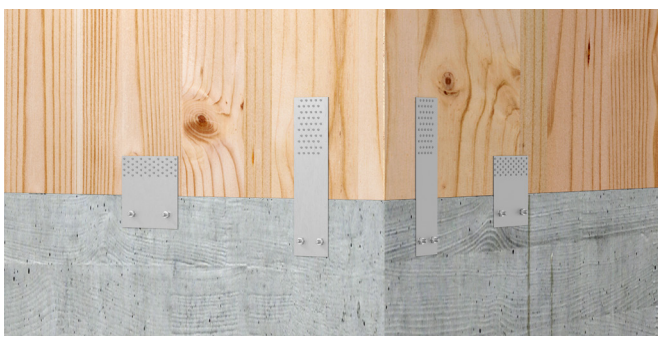
Products **from page 194**

SHEARING AND TENSILE PLATES

Tensile plates were developed to transfer the tensile forces from timber frames and solid timber walls into the baseplate.

Advantages:

- Connection timber/concrete
- Economic and quick assembly
- Hole pattern is optimised for board plywood and softwood
- Various nail patterns are possible, including under consideration of the grain course and edge spacing
- Assembly via intermediate layer, which can and cannot move



Basics of statics **from page 196**
Products & statics **from page 202**

SHEARING/TENSILE PLATES - SHEARING ANGLES

ASSORTMENT

							Basics Statics from page	Products & Statics from page
SHEARING ANGLES			250 GD Z275	NKL 2				194
SHEARING ANGLES & PULL TABS IN THE MODULAR SYSTEM			250 GD Z275	NKL 2				194
SHEARING PLATES		CE	250 GD Z275	NKL 2			196	202
TENSION PLATES		CE	250 GD Z275	NKL 2			196	202

5

CE **CE symbol**

250 GD Z275 **Steel with indication of the steel quality and zinc coating**

Timber/timber connection

Timber/concrete-connection

NKL 1 **Usage class 1**
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 65% for a few weeks per year, e.g. in the case of buildings that are closed on all sides and heated.
Comment: In UC 1, the average moisture content of most softwoods does not exceed 12 %.

NKL 2 **Usage class 2**
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 85% for a few weeks per year, e.g. in the case of open buildings covered by a roof.
Comment: In UC 2, the average moisture content of most softwoods does not exceed 20 %.

NKL 3 **Usage class 3**
Includes climatic conditions that lead to higher moisture contents than in UC 2, e.g. structures that are exposed to the weather without protection. Eurocode 5 / DIN EN 1995-1-1 section 2.3.1.3

KONSTRULINE

THE PRODUCT SERIES FOR CONSTRUCTIVE TIMBER WORK

In the ever-expanding timber construction sector, structural timber, solid timber buildings, multi-storey timber buildings, prefabricated buildings and halls are a particularly fast-growing market, with ever-larger and taller timber buildings requiring their own special products.

For this, we have created the **KONSTRU**LINE series, in which only products are included that meet the requirements of this group. These include tension ties, storey connectors, shearing angles, extra thick joist hangers and beam hangers.

SHEARING-TENSILE PLATES

CE 0769

S. 190

MADE IN GERMANY

TENSION TIE HT2-PIECE

CE ETA-10 0010

S. 176

BEAM HANGERS ALU COMBI MAXI SD 16

CE ETA-16 0044

S. 88

JOIST HANGERS TYPE 05/2.5 COMBI TYPE 08/4.0

CE ETA-08 0264

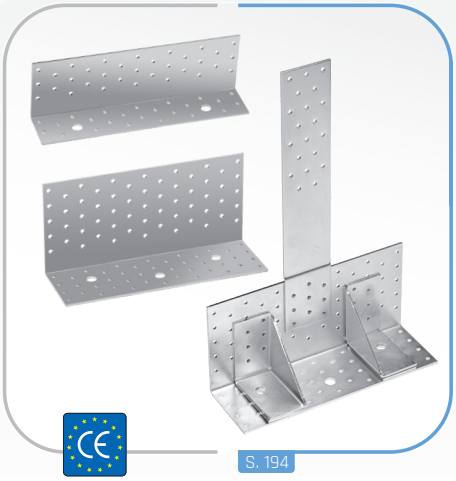
S. 44

TENSION TIE HT

CE ETA-10 0010

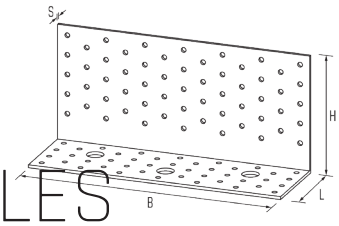
S. 172

SHEARING ANGLE SHEARING 80/120



CE

S. 194



Statics & more Information

TOPLINE KONSTRULINE

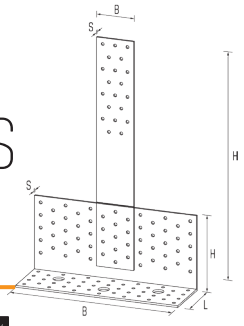
SHEARING ANGLES

TYPE 80/ TYPE 120

NKL 2 | 250 GD Z275

Art. No.	Dimensions [mm]							nN	nN	EAN	Weight	Pallet	PU		
	H	x	L	x	W(B)	x	T(S)	Ø 5	Ø 18	4019346	kg				
11425580	80	x	52,5	x	260	x	3,0	57	2	032824	0.728	480	10	■	■
114255120	120	x	82	x	260	x	3,0	105	3	032831	1.130	480	10	■	■

5



Statics & more Information

TOPLINE KONSTRULINE

SHEARIN ANGLES & PULL TABS

IN THE MODULAR SYSTEM

NKL 2 | 250 GD Z275

Shearing angles

Art. No.	Dimensions [mm]							nN	nN	EAN	Weight	Pallet	PU		
	H	x	L	x	W(B)	x	T(S)	Ø 5	Ø 18	4019346	kg				
11425580	80	x	52,5	x	260	x	3,0	57	2	032824	0.728	480	10	■	■
114255120	120	x	82	x	260	x	3,0	105	3	032831	1.130	480	10	■	■

Combi angle

Art. No.	Dimensions [mm]							nN	nN	EAN	Weight	Pallet	PU		
	H	x	L	x	W(B)	x	T(S)	Ø 5	Ø 18	4019346	kg				
1144373	83	x	83	x	48	x	3,0	6	1	032848	6.360	480	10		■

Pull tab

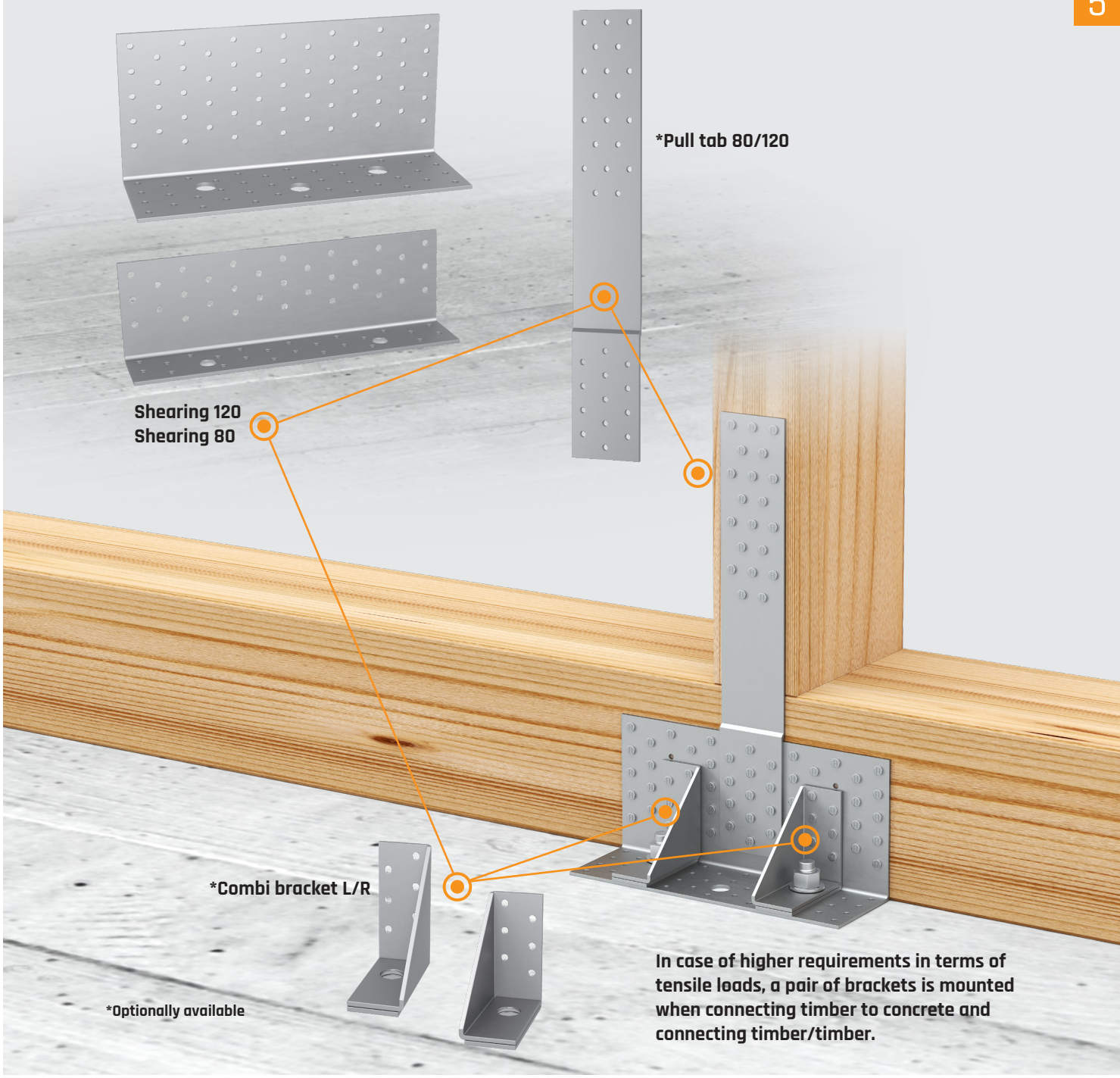
Art. No.	Dimensions [mm]					nN	EAN	Weight	Pallet	PU		
	H	x	W(B)	x	T(S)	Ø 5	4019346	kg				
11460370	370	x	60	x	3,0	20/13	032855	0.475	480	10	■	

Pressure plate

Art. No.	Dimensions [mm]					nN	EAN	Weight	Pallet	PU		
	L	x	W(B)	x	T(S)	Ø 18	4019346	kg				
1147079	70	x	79	x	15,0	1	032862	0.628	960	20		■

GH SHEARING ANGLES
IN THE MODULAR SYSTEM

By fitting additional pressure plates or combi angles L/R, the shearing angles are also suitable for absorbing higher tensile loads F_1. In timber construction, with the additional assembly of the pull tab 370, tensile loads can be absorbed directly from the pole. The modular system can replace the former additional assembly of connectors for tensile and push forces.



SHEARING AND TENSILE PLATES

TECHNICAL FEATURES

Geometry

H	Height (mm)
L	Length (mm)
W(B)	Width (mm)
T(S)	Material thickness (mm)
Ø [mm]	Diameter

Tables

$F_{z,rk}$	Max. load capacity in load direction [kN]
n	Number of holes Ø5.0
n_{Bo}	Number of holes for dowels/bolts with Ø 17.0[mm]
n_{erf}	Necessary number of nails/screws
$F_{Stahl,Rk}$	Characteristic steel load capacity [kN]
NH	Softwood C24
BSP	Board plywood VH 24
	Grain course

Timber connecting element

GH threaded holes ETA-13/0523 Ø4.0xL [mm]

GH wood connector screw ETA-13/0523 Ø5 [mm]

Dowels/bolts

Load directions

$F_{z,rk}$ ↑	Tensile PL 440 + PL 540; lifting load, load direction F1
$F_{z,rk}$ ↔	Shearing PL140; PL220; PL 260 shearing load, load direction $F_{2/3}$

Design

$F_{timber,Rk}$	Characteristic value of load capacity "timber"
$F_{steel,Rk}$	Characteristic value of load capacity "Steel"
k_{mod}	Modification coefficient according to EN 1995-1-1
γM	Partial safety factor for connections in wood construction (DE: γ_M=1.3
γM2	Partial safety factor for stress of structural steel connections on perforated soffit (DE: γ_{M2}=1.25)

Axis/edge spacing

$a_{4,t}$	Minimum spacing from stressed edge, vertical
$a_{3,t}$	to the grain direction
e_{Bo}	Minimum spacing from stressed end grain, parallel
a_{Bo}	to the grain direction
ΔH	Possible height compensation between the lower edge of the timber and Concrete top edge

Steel with indication of the steel quality and zinc coating

Timber/timber connection

Timber/concrete-connection

Usage class 1
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 65% for a few weeks per year, e.g. in the case of buildings that are closed on all sides and heated.
Comment: In UC 1, the average moisture content of most softwoods does not exceed 12 %.

Usage class 2
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 85% for a few weeks per year, e.g. in the case of open buildings covered by a roof.
Comment: In UC 2, the average moisture content of most softwoods does not exceed 20 %.

Usage class 3
Includes climatic conditions that lead to higher moisture contents than in UC 2, e.g. structures that are exposed to the weather without protection. Eurocode 5 / DIN EN 1995-1-1 section 2.3.1.3

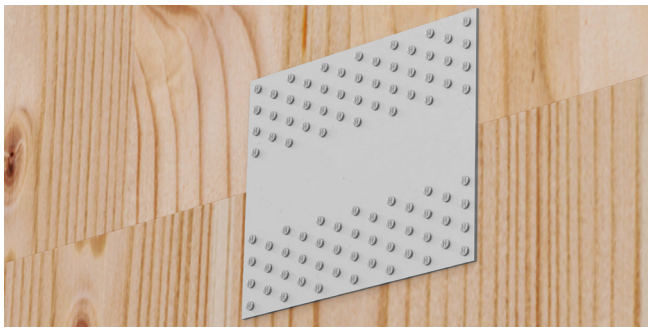
SHEARING AND TENSILE

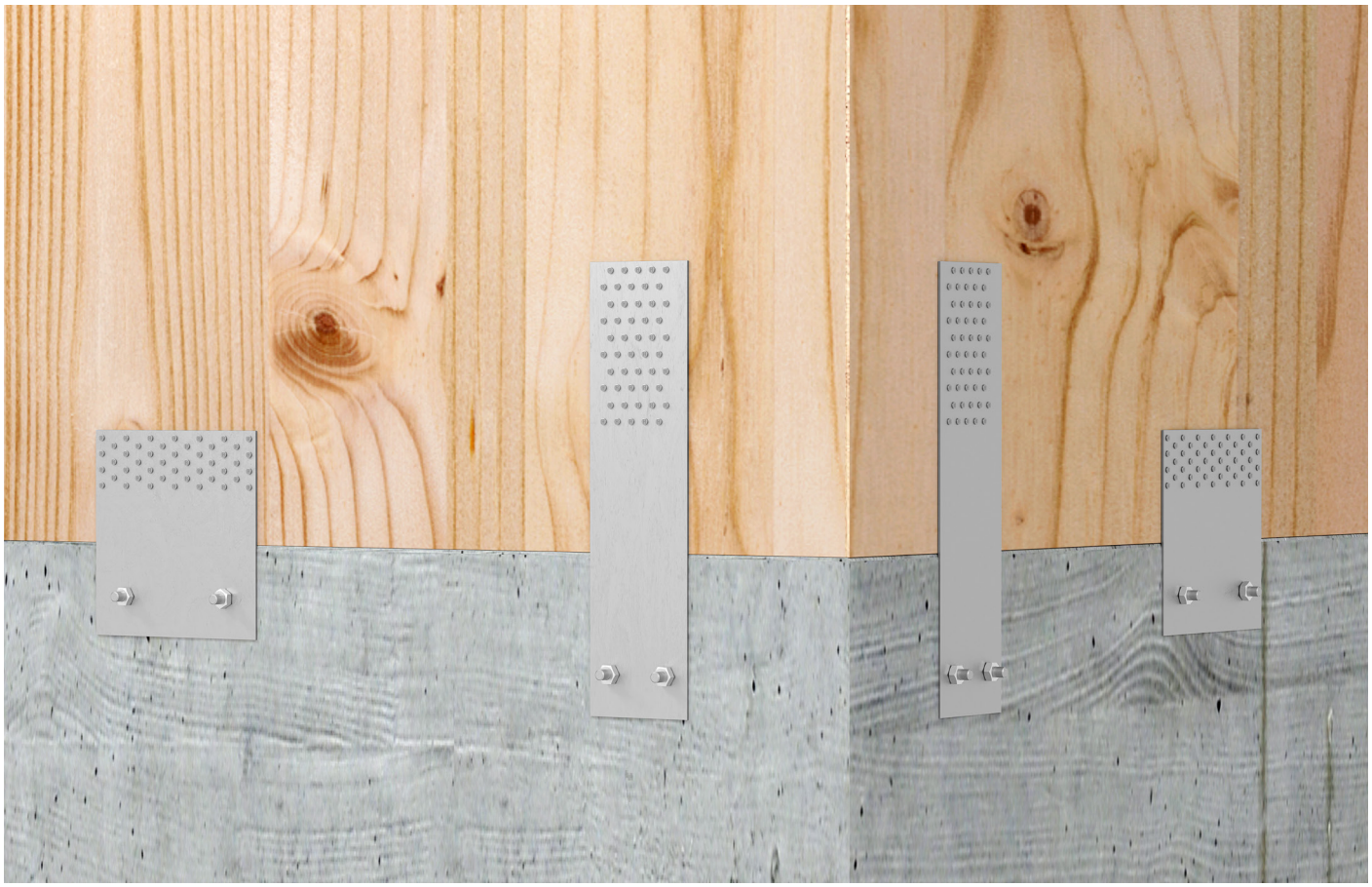
APPLICATIONS

Application:
GH shearing plates for the introduction of shear forces of timber frame and solid wood walls.
GH tension plates for the introduction of tensile forces of timber frame and solid wood walls

Materials:
250 GD Z275

Material thickness:
3.0 mm



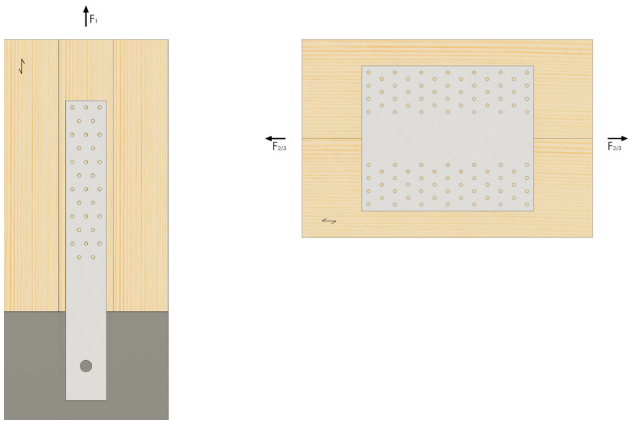


Connecting element
GH threaded nails 4.0 x 35 / 40 / 50 / 60 / 75 / 100 mm
GH screws 5.0 x 25 / 35 / 40 / 50 / 60 / 70 mm
Bolt, dowel or concrete anchor M16

Connecting elements from page 274

SHEARING AND TENSILE PLATES

LOAD DIRECTIONS



Minimum and edge spacing

			GH threaded nails Ø 4.0 x L [mm]	
[mm]		Reduktion*	min. for NH / BSP	Selected NH / BSP
a_1	10d / 12d	0,7	28	40
a_2	5d	0,7	14	20
			min. for HN	selected for HN
$a_{3,t}$	15d	-	60	60
$a_{4,t}$	7d / 10d	-	28	30
			min. for BSP	Selected for BSP
$a_{3,t}$	12d	-	48	50

* Reduction of the connecting element spacing according to EN 1995-1-1:2010, section 8.3.1.4 (1)

Connection to timber

Partial nail fitting or partial screw fitting
Full nail fitting or full screw fitting
Nail patterns for NH = softwood C24 and BSP= board plywoodz VH 24

Load capacities of individual connecting elements

In addition to the listed load-bearing capacity of the individual fastening elements in shearing, a possible block shear failure was taken into account in the load-bearing capacities, see DIN EN 1995-1-1, Annex A.

Connection over intermediate layers

The specified load-bearing capacities also apply to intermediate layers if the following requirements are met:
Intermediate layer:
- OSB boards type OSB/3 and OSB/4 according to EN 13986 (EN 300) or approval
- Synthetic resin-bonded chipboard in accordance with EN 13986 (EN 312) or approval
- Solid wood panels according to EN 13986 (EN 13353) or approval
- Plywood according to EN 13986 (EN 636) or approval
- Plasterboards according to approval
- Fibreboards according to EN 13986 (EN 622-2 and 622-3) minimum raw density 650 kg/m^3

The value of the characteristic bearing strength of the intermediate layer must at least fulfil the value for solid softwood of strength class C24.
The compressive strength of the intermediate layer when loaded at right angles to the connecting surface (for wood-based panels, compressive strength perpendicular to the board plane) must be at least equal to the value of the compressive strength perpendicular to the grain for solid softwood of strength class C24.

Connection of the intermediate layer
The intermediate layer must be force-fit to the timber component (non-moving intermediate layer).
In other cases and generally in the case of movable intermediate layers, the load-bearing capacity of the connecting element should be determined individually for the respective connection.

Connecting element for intermediate layers
The length must be selected so that the profiled length (insert depth) behind the intermediate layer corresponds at least to the length specified in the statics tables.

Connection to concrete

The load-bearing capacity for fixing in concrete must be verified separately in accordance with the requirements of the selected anchor, bolt, screw with Ø16mm.
Edge spacing in the concrete component must be selected and verified in accordance with the selected connecting elements in the concrete and the associated approval/ETA.

Design / proof

Combined stress
For GH screws under combined stress of pulling out and shearing, the following condition must be met:

$$\left(\frac{F_{ax,Ed}}{F_{ax,Rd}}\right)^2 + \left(\frac{F_{v,Ed}}{F_{v,Rd}}\right)^2 \leq 1$$

Load capacities of steel sheet
In the statics tables, the following proof of load capacity has been considered for the steel plate:
Tensile and shearing load capacity of steel, perforated soffit

Design values
To determine the design value of the respective connector, the decisive design value from the connection is determined.

Design value of "timber" failure

$$F_{Holz,Rd} = k_{mod} \cdot \frac{F_{Holz,Rk}}{\gamma_M}$$

Design value of "steel" failure

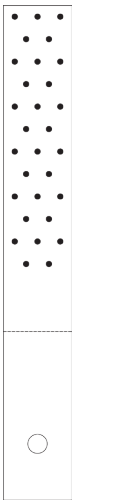
$$F_{Stahl,Rd} = \frac{F_{Stahl,Rk}}{\gamma_{M2}}$$

Design tablen

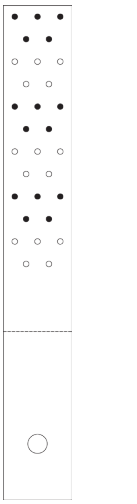
Load capacities in timber in kN
For the connections, the assumption is made that the interconnected components are held against twisting and that eccentric load situations are therefore excluded.
The number of nails must be used under consideration of the specified nail/screw patterns.

Nail/screw patterns for pull tabs

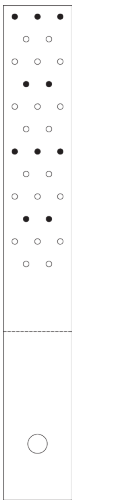
1: Full nail fitting
n = 30
11260440



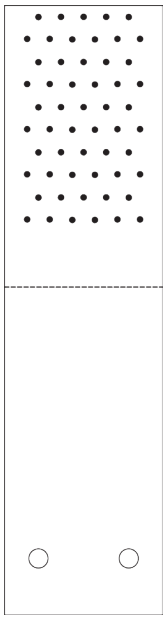
2: Partial nail fitting
n = 15
11260440



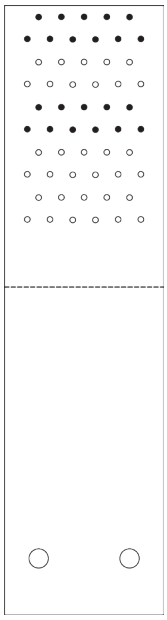
3: Partial nail fitting
n = 10
11260440



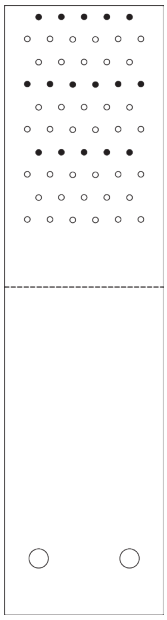
1: Full nail fitting
n = 55
112140540



2: Partial nail fitting
n = 22
112140540

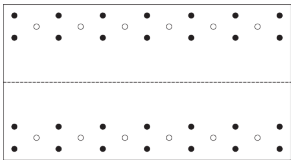


3: Partial nail fitting
n = 16
112140540

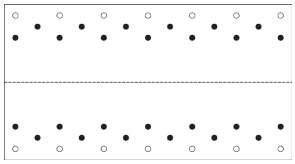


Nail/screw patterns for shearing plates

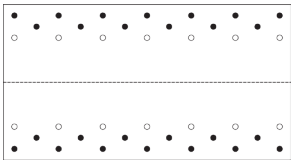
1: Partial nail fitting
Sleeper/plate (NH/BSH) or board plywood (BSP)
Side surface grain direction
112140260



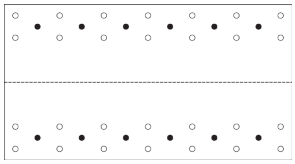
2: Partial nail fitting
Board plywood (BSP)
Side surface grain direction
112140260



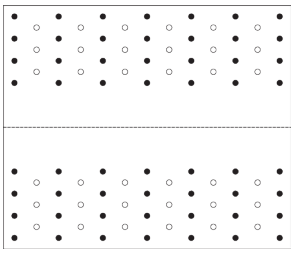
3: Partial nail fitting
Board plywood (BSP)
Side surface grain direction
112140260



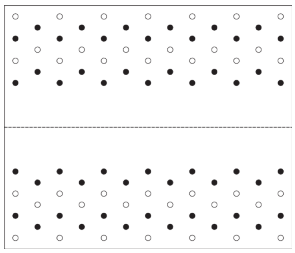
4: Partial nail fitting
Board plywood (BSP)
Narrow surface grain direction
112140260



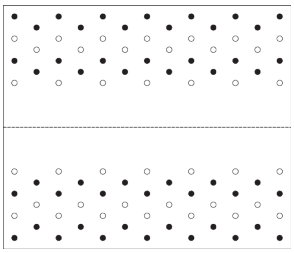
Sleeper (NH/BSH) or board plywood
Side surface
112220260



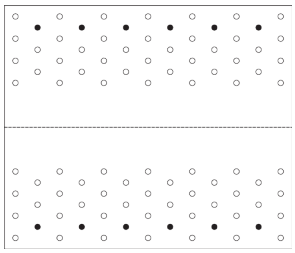
Board plywood (BSP)
Side surface
112220260



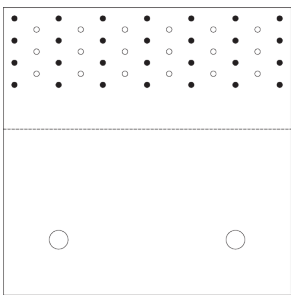
Board plywood (BSP)
Side surface grain direction vertical
112220260



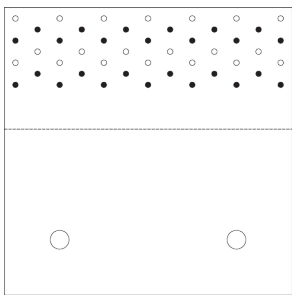
Board plywood (BSP)
Narrow surface grain direction
112220260



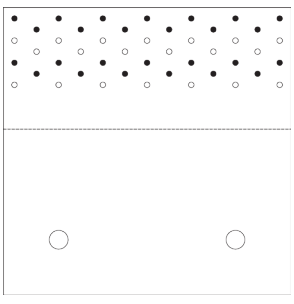
Sleeper (NH/BSH) or board plywood
Side surface grain direction
112260260



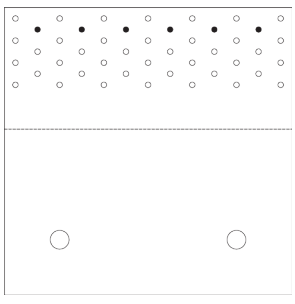
Board plywood (BSP)
Side surface grain direction
112260260



Board plywood (BSP)
Side surface
112260260



Board plywood (BSP)
Narrow surface grain direction
112260260



TECHNICAL ADVICE ON TIMBER CONNECTORS AND WOOD CONSTRUCTION SCREWS!

TIPP

Our technology team will offer you extensive advice on our timber connectors and wood construction screws.

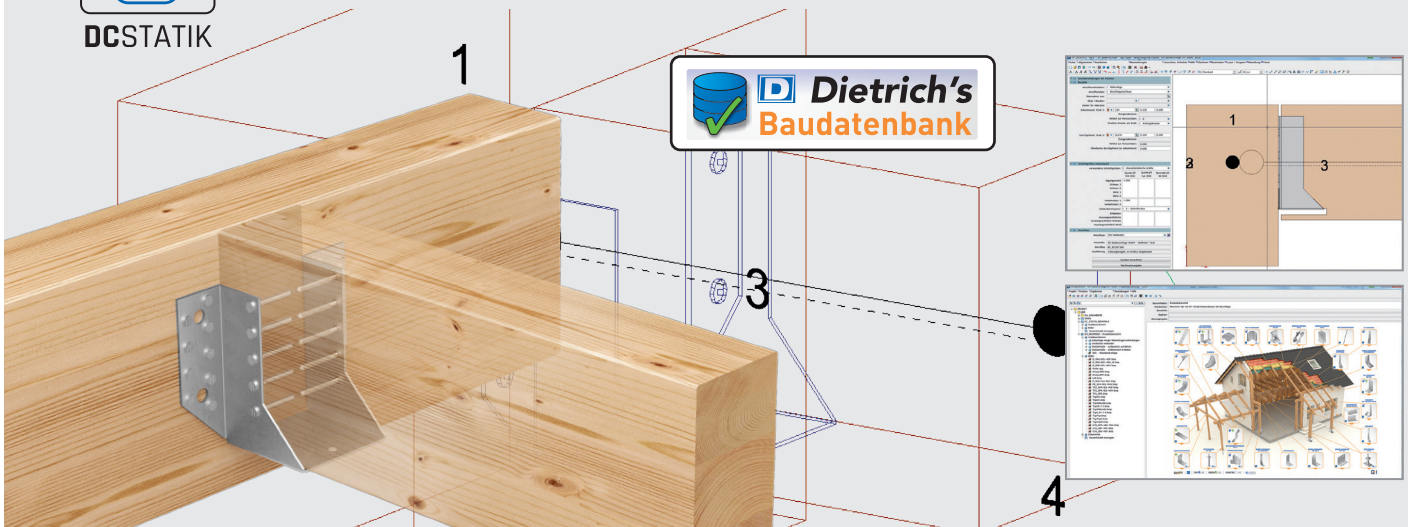
Whether you are a trader, user or construction engineer, if you require technical information about timber connectors and wood construction screws or have technical questions about structural or building physics problems, please contact our

technical hotline: +49 7023 743323-40
or e-mail: statik@holzverbinder.de.

DCSTATIK

DCSTATIK

EXTENSIVE DESIGN OF OUR GH WOOD CONNECTORS* **WITH THE GH D STATICS**



THE PRACTICAL SOFTWARE FOR STATICS CALCULATION.
VERIFIABLE STATIC PROOF IN JUST A FEW CLICKS.

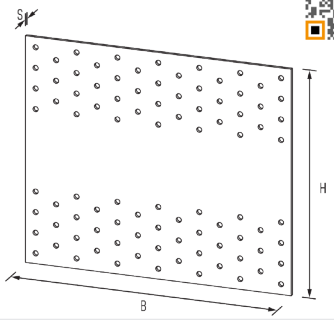
The **GH DC statics software** is available to you for free download at dc-statik.holzverbinder.de

If you have any questions, you can reach our technology department under the number **+49 7023 743323-40** or by e-mail at statik@holzverbinder.de

*Joist hanger timber/timber, integral connector, UV connector timber/timber, OV connector, stanchion

SHEARING PLATES

TYPE PL



TOPLINE KONSTRULINE EN 14545

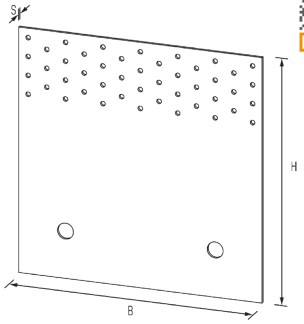
NKL 2 250 GD Z275

Art. No.	Dimensions [mm]					nN	nBo	EAN	Weight	Pallet	PU		
	H	x	W(B)	x	T(S)	Ø 5	Ø 17	4019346	kg				
112140260	140	x	260	x	3,0	40	-	032879	0.804	480	10	■	
112220260	220	x	260	x	3,0	96	-	032886	1.263	480	10	■	

5

SHEARING PLATES

TYPE PL 260



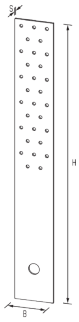
TOPLINE KONSTRULINE EN 14545

NKL 2 250 GD Z275

Art. No.	Dimensions [mm]					nN	nBo	EAN	Weight	Pallet	PU		
	H	x	W(B)	x	T(S)	Ø 5	Ø 17	4019346	kg				
112260260	260	x	260	x	3,0	46	2	032893	1.493	480	10		■

TENSILE PLATES

TYPE PL



TOPLINE KONSTRULINE EN 14545

NKL 2 250 GD Z275

Art. No.	Dimensions [mm]					nN	nBo	EAN	Weight	Pallet	PU		
	H	x	W(B)	x	T(S)	Ø 5	Ø 17	4019346	kg				
11260440	440	x	60	x	3,0	30	1	032787	0.519	540	10		■
112140540	540	x	140	x	3,0	55	2	032794	1.740	160	10		■

SHEARING PLATES TYPE PL

Timber / Timber

Art. No.	Load case $F_{2/3}$					Nail pattern	1		2		3		4*		5**	
	H	W(B)	T(S)	Ø5	Ø17	VM	$F_{z,rk}$	$n_{erf.}$	$F_{z,rk}$	$n_{erf.}$	$F_{z,rk}$	$n_{erf.}$	$F_{z,rk}$	$n_{erf.}$	$F_{z,rk}$	$n_{erf.}$
112140260	140	260	3	40	-	4.0x50	21,90	28	20,50	26	18,90	26	9,10	12(14)	12,50	12
						4.0x60	23,30	28	21,80	26	20,20	26	9,70	12(14)	13,30	12
						4.0x75	24,80	28	32,20	26	21,50	26	10,30	12(14)	14,10	12
112220260	220	260	3	96	-	4.0x50	30,40	56	31,90	48	30,00	52	6,10	24(28)*	13,30	24
						4.0x60	32,40	56	34,10	48	32,10	52	6,50	24(28)*	14,20	24
						4.0x75	34,40	56	36,20	48	34,00	52	6,90	24(28)*	15,10	24

5

SHEARING PLATES TYPE PL 260

Timber / Concrete

Art. No.	Load case $F_{2/3}$					Nail pattern	1		2		3		4*	
	H	W(B)	T(S)	Ø5	Ø17	VM	$F_{z,rk}$	$n_{erf.}$	$F_{z,rk}$	$n_{erf.}$	$F_{z,rk}$	$n_{erf.}$	$F_{z,rk}$	$n_{erf.}$
112260260	260	260	3	46	2	4.0x50	30,40	28	31,90	26	30,00	26	6,10	6-7
						4.0x60	32,40	14	34,10	13	32,10	13	6,50	6-7
						4.0x75	34,40	14	36,20	13	34,00	13	6,90	6-7

* The connecting elements must be arranged in the narrow face of the cross laminated timber in such a way that they are not located in the end grain.

** Connections with differing connection patterns, for combinations of connection pattern 4 with one of the connection patterns 1 to 3 – e.g. narrow surface BSP (nail pattern 4) with side surface PSB (nail pattern 1-3).

TENSILE PLATES TYPE PL

Timber / Concrete

Art. No.	Load case F_1					Nail pattern	1		2		3		
	H	W(B)	T(S)	Ø5	Ø17	VM	$F_{z,rk}$	$n_{erf.}$	$F_{z,rk}$	$n_{erf.}$	$F_{z,rk}$	$n_{erf.}$	$F_{steel,Rk}$
11260440	440	60	3	30	1	4.0x50	31,60	30	31,60	15	22,10	10	35,30
						4.0x60	38,30	30	35,50	15	23,60	10	35,30
						4.0x75	48,40	30	37,70	15	25,10	10	35,30
112140540	540	140	3	55	2	4.0x50	63,20	55	48,70	22	35,40	16	70,60
						4.0x60	76,60	55	52,00	22	37,80	16	70,60
						4.0x75	96,80	55	55,30	22	40,20	16	70,60

6

06 CONNECTORS (OTHER)

CONNECTORS (OTHER)

PROFILE ANCHOR

GH profile anchors are for fixing timber beams, rafters, purlins etc. on profile rails (e.g. Halfen rails).

Basics of statics **from page 208** / Products & statics **from page 210**

T-BAR ANCHORS

GH T-bar anchors are The GH T-bar anchors should always be attached on both sides or diagonally in order to absorb the forces to be connected evenly and ensure a secure connection.

Basics of statics **from page 212** / Products & statics **from page 214**

FLAT CONNECTORS

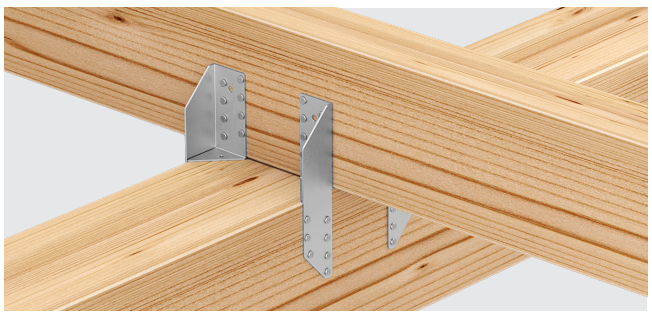
GH flat connectors are simple connecting elements for fixing narrow timber parts. They are alternatives to GH nail plate strips and can also be fixed to concrete with spreader dowels, adhesive dowels, etc. This gives you good stability for various types of construction. Flat connectors are used when wind forces, for example, have to be channelled into roof constructions.

With our lightweight and heavy version, various loads can be transferred. Thanks to the different widths, both narrow and large-area connections can be produced with a high degree of stability. Flat connectors are also used for carpentry connections between posts and studs.

Basics of statics **from page 216** / Products & statics **from page 218**

UNIVERSAL CONNECTORS

GH universal connectors are strong connecting elements that are particularly suitable for securing rafters against lifting loads and for wall transom connections.



Products **from page 218**

CONNECTORS (OTHER)

ASSORTMENT

								Basics Statics from page	Products & Statics from page
PROFILE ANCHOR		CE	250 GD Z275	NKL 2				208	210
T-BAR ANCHORS		CE	250 GD Z275	NKL 2				212	214
LIGHT FLAT CONNECTORS		CE	250 GD Z275	NKL 2				216	218
HEAVY FLAT CONNECTORS		CE	250 GD Z275	NKL 2				216	218
UNIVERSAL CONNECTORS			250 GD Z275	NKL 2					218
PRESS-FIT DOWELS		CE	250 GD Z275	NKL 2					220
GEKA CONNECTOR			GJMB Temperguss verzinkt	NKL 2					221
RING-WEDGE-DOWEL, TWO-SIDED ALU			Al Aluminium	NKL 2					220
ANCHOR DOWELS, ONE-SIDED ALU			Al Aluminium	NKL 2					221

6

CE symbol

Steel with indication of the steel quality and zinc coating

Aluminium

Timber/timber connection

Timber/concrete-connection

Timber/metal-connection

NKL 1

Usage class 1
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 65% for a few weeks per year, e.g. in the case of buildings that are closed on all sides and heated.
Comment: In UC 1, the average moisture content of most softwoods does not exceed 12 %.

NKL 2

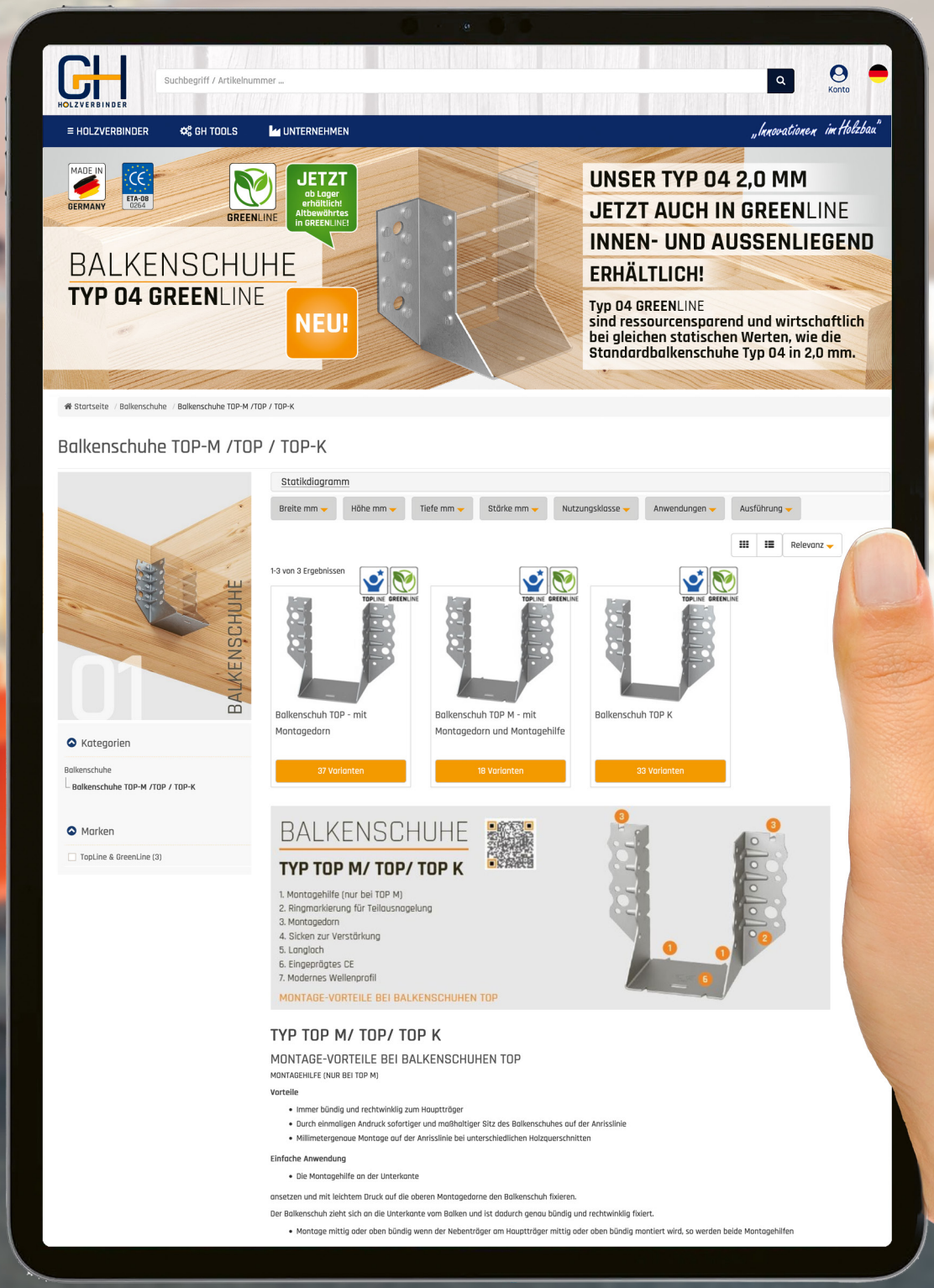
Usage class 2
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 85% for a few weeks per year, e.g. in the case of open buildings covered by a roof.
Comment: In UC 2, the average moisture content of most softwoods does not exceed 20 %.

NKL 3

Usage class 3
Includes climatic conditions that lead to higher moisture contents than in UC 2, e.g. structures that are exposed to the weather without protection. Eurocode 5 / DIN EN 1995-1-1 section 2.3.1.3

At **www.holzverbinder.de** you will find plenty of information on our GH products.

You can also download approvals, static calculations, drawings and CAD files in the article group area.



www.holzverbinder.de

PROFILE ANCHOR

TECHNICAL FEATURES

Geometry

L	Length [mm]
W(B)	Width [mm]
T(S)	Material thickness [mm]

Tables

n_a	Number of connecting elements per connector
NB	Nail pattern
VM	Connecting element Ø x length [mm]
Partial	Minimum number of connecting elements

Load directions

$F_{1,T,Rk}$ ↑	Characteristic load, lifting, for 2 connectors [kN]
$F_{I,Rk,S}$	Characteristic load capacity for steel per 2 connectors [kN]

Steel with indication of the steel quality and zinc coating

Timber/timber connection

Timber/concrete-connection

Usage class 1
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 65% for a few weeks per year, e.g. in the case of buildings that are closed on all sides and heated.
Comment: In UC 1, the average moisture content of most softwoods does not exceed 12 %.

Usage class 2
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 85% for a few weeks per year, e.g. in the case of open buildings covered by a roof.
Comment: In UC 2, the average moisture content of most softwoods does not exceed 20 %.

Usage class 3
Includes climatic conditions that lead to higher moisture contents than in UC 2, e.g. structures that are exposed to the weather without protection. Eurocode 5 / DIN EN 1995-1-1 section 2.3.1.3

PROFILE ANCHOR

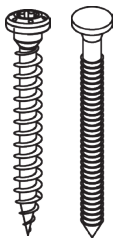
APPLICATIONS

Application:
To secure timber beams, rafters or purlins e.g. against lifting loads on profile rails. Suitable for profile rails Type 28/15 and 38/17 or 40/22.

Materials:

250 GD Z275

Material thickness:
3,0 mm



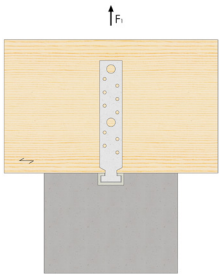
Connecting element:
GH threaded nails 4.0 x 35 / 40 / 50 / 60 / 75 / 100 mm
GH screws 5.0 x 25 / 35 / 40 / 50 / 60 / 70 mm
Connecting elements from page 274

For use in usage classes

NKL 1 NKL 2

Load directions

F_1



Minimum and edge spacing

The minimum spacing of the fastening element and edge spacing must be observed in accordance with EC 5.

		GH threaded nails Ø 4 mm	GH screws Ø 5 mm
$a_{3,t}$	End grain with stress	60 mm	75 mm
$a_{3,c}$	End grain without stress	40 mm	50 mm
$a_{4,t}$	Loaded edge	28 mm	50 mm
$a_{4,c}$	Unloaded edge	20 mm	25 mm

Minimum spacing according to EN 1996-1-1, without pilot drilling, $\rho_k \leq 420$ kg/m³

General information

A connection should always consist of two connectors on both sides, otherwise the eccentricity of the connection must be taken into account.

The effects of the notches in the connector on the load-bearing capacity is not taken into account in the table value of the steel load-bearing capacity.

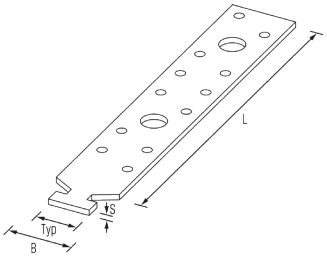
Connection to timber
For the nail or screw arrangement, make sure that the load does not take effect eccentrically.

Design table

The tables contain characteristic load capacities in kN for 2 connectors. The number of fastening elements are for a connector with characteristic raw density of timber: ρk = 350 kg/m³ (C24).

The load capacities have been determined on the basis of ETA-13/0523 for GH connecting elements. The load-bearing capacity of the connection transverse to the grain must be determined in accordance with EN 1995-1-1 8.1.4. The load capacity of the connection to hte anchor rail must be determined separately.

PROFILE ANCHORS



EN 14545

NKL 2

250 GD Z275

Art. No.	Dimensions [mm]					nN	nBo	Typ	EAN	Weight	Pallet	PU		
	L	x	W(B)	x	T(S)	Ø 5	Ø 13		4019346	kg				
281	100	x	34	x	3,0	6	-	1	165010	0.080	8100	100		■
286	140	x	34	x	3,0	10	1	1	165041	0.115	6000	100		■
287	160	x	34	x	3,0	10	2	1	165058	0.135	6000	100		■
285	180	x	34	x	3,0	12	2	1	165072	0.155	6000	100		■
282	140	x	34	x	3,0	10	1	2	165034	0.115	6000	100		■
283	160	x	34	x	3,0	10	2	2	165027	0.135	6000	100		■
284	180	x	34	x	3,0	12	2	2	165065	0.155	6000	100		■

STATICS

Timber | Concrete

Art. No.	L	W(B)	T(S)	n_a Ø 5	NB	$F_{1,T,Rk}$ 4.0 x 40	$F_{1,T,Rk}$ 4.0 x 50	$F_{1,T,Rk}$ 4.0 x 60	$F_{1,S,Rk}$
281	100	34	3,0	2	Partial	7,40	8,90	9,50	19,60
286	140	34	3,0	4	Partial	14,80	17,70	18,90	19,60
287	160	34	3,0	6	Partial	22,20	26,60	28,40	19,60
285	180	34	3,0	8	Partial	29,60	35,40	37,80	19,60
282	140	34	3,0	6	Partial	22,20	26,60	28,40	30,30
283	160	34	3,0	8	Partial	29,60	35,40	37,80	30,30
284	180	34	3,0	10	Partial	37,00	44,30	47,30	30,30

The maximum number of connecting elements and the resulting static values were determined taking into account the required minimum spacing.

T-BAR ANCHORS

TECHNICAL FEATURES

Geometry

L	Length [mm]
W(B)	Width [mm]
T(S)	Material thickness [mm]

Tables

n_a	Number of connecting elements per connector
NB	Nail pattern
VM	Connecting element Ø x length [mm]
Partial	Minimum number of connecting elements

Load directions

$F_{1,T,Rk}$ ↑	Characteristic load, lifting, for 2 connectors [kN]
$F_{I,Rk,S}$	Characteristic load capacity for steel per 2 connectors [kN]

Steel with indication of the steel quality and zinc coating

Timber/metal-connection

Usage class 1
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 65% for a few weeks per year, e.g. in the case of buildings that are closed on all sides and heated.
Comment: In UC 1, the average moisture content of most softwoods does not exceed 12 %.

Usage class 2
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 85% for a few weeks per year, e.g. in the case of open buildings covered by a roof.
Comment: In UC 2, the average moisture content of most softwoods does not exceed 20 %.

Usage class 3
Includes climatic conditions that lead to higher moisture contents than in UC 2, e.g. structures that are exposed to the weather without protection. Eurocode 5 / DIN EN 1995-1-1 section 2.3.1.3

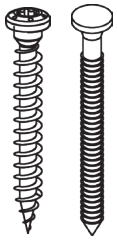
T-BAR ANCHORS

Applications

Application:
Absorption of tensile loads and to secure timber beams, rafters or purlins e.g. Against lifting loads on T-bars or double T-bars.

Materials: 250 GD Z275

Material thickness:
3,0 mm



Connecting element:
GH threaded nails 4.0 x 35 / 40 / 50 / 60 / 75 / 100 mm
GH screws 5.0 x 25 / 35 / 40 / 50 / 60 / 70 mm

Connecting elements from page 274

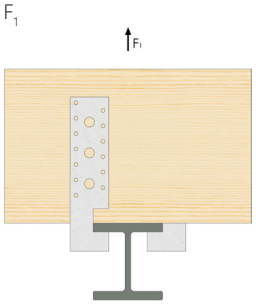
6

For use in usage classes

NKL 1 NKL 2

Load directions

F_1



Minimum and edge spacing
The minimum spacing of the fastening element and edge spacing must be observed in accordance with EC 5.

		GH threaded nails Ø 4 mm	GH screws Ø 5 mm
$a_{3,t}$	End grain with stress	60 mm	75 mm
$a_{3,c}$	End grain without stress	40 mm	50 mm
$a_{4,t}$	Loaded edge	28 mm	50 mm
$a_{4,c}$	Unloaded edge	20 mm	25 mm

Minimum spacing according to EN 1996-1-1, without pilot drilling, $\rho_k \leq 420$ kg/m^3

General information
A connection should always consist of two connectors on both sides, otherwise the eccentricity of the connection must be taken into account.

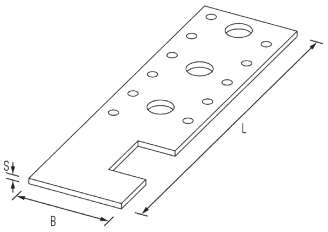
The effects of the notches in the connector on the load-bearing capacity is not taken into account in the table value of the steel load-bearing capacity.

Connection to timber
For the nail or screw arrangement, make sure that the load does not take effect eccentrically.

Design tables
The tables contain characteristic load capacities in kN for 2 connectors. The number of fastening elements are for a connector with characteristic raw density of timber: $\rho k = 350$ kg/m^3 (C24).

The load capacities have been determined on the basis of ETA-13/0523 for GH connecting elements. The load-bearing capacity of the connection transverse to the grain must be determined in accordance with EN 1995-1-1 8.1.4.

T-BAR ANCHORS



EN 14545

NKL 2

250 GD Z275

Art. No.	Dimensions [mm]					nN	nBo	EAN	Weight	Pallet	PU		
	L	x	W(B)	x	T(S)	Ø 5	Ø 13	4019346	kg				
70501	160	x	50	x	3,0	9	2	160015	0.178	6000	100		■
70502	180	x	50	x	3,0	11	3	160022	0.202	4000	100		■
70503	200	x	50	x	3,0	13	3	160039	0.226	4000	100		■

STATICS

Art. No.	L	W(B)	T(S)	n_a Ø 5	NB	$F_{1,T,Rk}$ 4.0 x 40	$F_{1,T,Rk}$ 4.0 x 50	$F_{1,T,Rk}$ 4.0 x 60	$F_{1,S,Rk}$
						Timber	Timber	Timber	Metal
70501	160	50	3,0	6	Partial	9,15	10,90	11,70	6,87
70502	180	50	3,0	8	Partial	12,20	14,60	15,60	6,87
70503	200	50	3,0	10	Partial	15,30	18,20	19,50	6,87

The maximum number of connecting elements and the resulting static values were determined taking into account the required minimum spacing.

FLAT CONNECTORS

TECHNICAL FEATURES

Geometry

L	Length [mm]
W(B)	Width [mm]
T(S)	Material thickness [mm]

Tables

n_a	Number of connecting elements per connector
NB	Nail pattern
VM	Connecting element Ø x length [mm]
Voll	Maximum number of connecting elements
Teil	Minimum number of connecting elements

Load directions

$F_{1,T,Rk}$ ↑ Characteristic load capacity [kN]

Steel with indication of the steel quality and zinc coating

Timber/timber connection

Timber/concrete-connection

Usage class 1
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 65% for a few weeks per year, e.g. in the case of buildings that are closed on all sides and heated.
Comment: In UC 1, the average moisture content of most softwoods does not exceed 12 %.

Usage class 2
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 85% for a few weeks per year, e.g. in the case of open buildings covered by a roof.
Comment: In UC 2, the average moisture content of most softwoods does not exceed 20 %.

Usage class 3
Includes climatic conditions that lead to higher moisture contents than in UC 2, e.g. structures that are exposed to the weather without protection. Eurocode 5 / DIN EN 1995-1-1 section 2.3.1.3

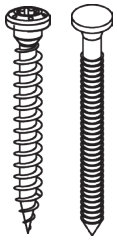
FLAT CONNECTORS

APPLICATIONS

Application:
Absorption of tensile loads e.g. on a rafter or
End grain connection

Materials: 250 GD Z275

Material thickness:
2.0 to 3.0 mm



Connecting element:
GH threaded nails 4.0 x 35 / 40 / 50 / 60 / 75 / 100 mm
GH screws 5.0 x 25 / 35 / 40 / 50 / 60 / 70 mm
Bolt, dowel or concrete anchor M10 or M12

Connecting elements from page 274

For use in usage classes

NKL 1 NKL 2

Load directions
F_1

Minimum and edge spacing
The minimum spacing of the fastening element and edge spacing must be observed in accordance with EC 5.

		GH threaded nails Ø 4 mm	GH screws Ø 5 mm
$a_{3,t}$	End grain with stress	60 mm	75 mm
$a_{3,c}$	End grain without stress	40 mm	50 mm
$a_{4,t}$	Loaded edge	28 mm	50 mm
$a_{4,c}$	Unloaded edge	20 mm	25 mm

Minimum spacing according to EN 1996-1-1, without pilot drilling $\rho_k \leq 420$ kg/m³

Connection to timber
For the nail or screw arrangement, make sure that the load does not take effect eccentrically For a tensile connection ($a_{3,t}$ = 60 mm) there are a range of possibilities for arranging the connecting elements. Connections over intermediate layers are possible.

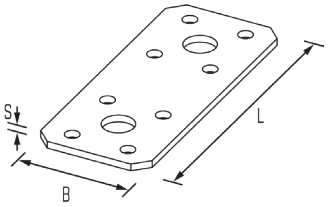
Connection to concrete/ steel
The proof of load-bearing capacity for fixing in concrete must be verified separately in accordance with the requirements of the selected dowel.

Design tables
The tables contain characteristic load capacities in kN. The number of fastening elements are for a connector with characteristic raw density of timber: ρk = 350 kg/m³ (C24). he load capacities have been determined on the basis of ETA-13/0523 for GH connecting elements.

The load-bearing capacity of the connection transverse to the grain must be determined in accordance with EN 1995-1-1 8.1.4. Steel failure is not decisive.

FLAT CONNECTOR

LIGHT



EN 14545

NKL 2

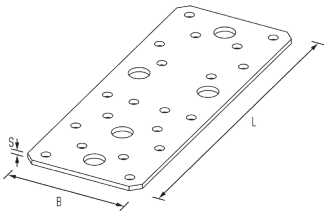
250 GD Z275

Art. No.	Dimensions [mm]					nN	nBo	EAN	Weight	Pallet	PU		
	L	x	W(B)	x	T(S)	Ø 5	Ø 11	4019346	kg				
104	95	x	40	x	2,5	8	2	130025	0.065	12150	150	■	■
145	135	x	55	x	2,0	16	2	130032	0.102	4200	100	■	■
184	175	x	40	x	3,0	16	4	130049	0.144	4000	100	■	■

6

FLAT CONNECTOR

HEAVY



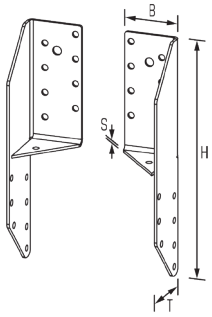
EN 14545

NKL 2

250 GD Z275

Art. No.	Dimensions [mm]					nN	nN	nBo	nBo	EAN	Weight	Pallet	PU		
	L	x	W(B)	x	T(S)	Ø 5	Ø 7	Ø 11	Ø 13	4019346	kg				
1865	170	x	65	x	2,5	20	-	5	-	130100	0.190	3500	50	■	■
2190	190	x	90	x	3,0	28	-	6	2	130117	0.352	2400	50	■	■

UNIVERSAL CONNECTORS



NKL 2

250 GD Z275

Art. No.	Dimensions [mm]					nN	nN	EAN	Weight	Pallet	PU		
	L	x	W(B)	x	T(S)	Ø 5	Ø 7	4019346	kg				
20601	190	x	45	x	2,0	16	1	180006	0.170	1000	50	■	

STATICS

LIGHT

Timber / Concrete

Art. No.	L	W(B)	T(S)	n_a	NB	$F_{1,T,Rk}$ 4.0 x 40	$F_{1,T,Rk}$ 4.0 x 50	$F_{1,T,Rk}$ 4.0 x 60
104	95	40	2,5	-	Full	-	-	-
				2	Partial	3,70	4,43	4,73
184	175	40	3,0	4	Full	7,41	8,86	9,46
				2	Partial	3,70	4,43	4,73
145	135	55	2,0	5	Full	9,39	11,10	11,80
				4	Partial	7,41	8,86	9,46

The maximum number of connecting elements and the resulting static values were determined taking into account the required minimum spacing.

6

HEAVY

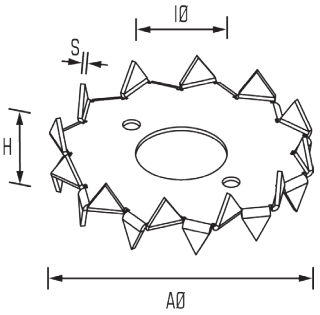
Timber / Concrete

Art. No.	L	W(B)	T(S)	n_a	NB	$F_{1,T,Rk}$ 4.0 x 40	$F_{1,T,Rk}$ 4.0 x 50	$F_{1,T,Rk}$ 4.0 x 60
1865	170	65	2,5	2	Full	3,75	4,43	4,73
				-	Partial	-	-	-
2190	190	90	3,0	4	Full	7,51	8,86	9,46
				2	Partial	3,75	4,43	4,73

The maximum number of connecting elements and the resulting static values were determined taking into account the required minimum spacing.

PRESS-IN DOWEL

TWO-SIDED



NKL 2

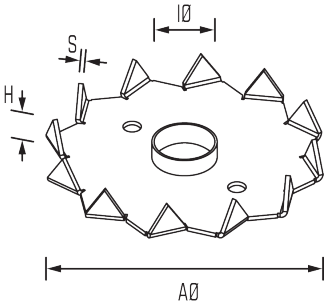
250 GD Z275

Art. No.	Dimensions [mm]					EAN	Weight	Pallet	PU		
	Outer Ø	Inner Ø	Screw Ø	H	T(S)	4019346	kg				
D48	50	17	M12	13,0	1,0	039908	1.410	38400	200	■	
D62	62	21	M12	16,0	1,2	039915	2.900	19200	200	■	
D75	75	26	M16	19,5	1,25	039922	4.020	14400	100	■	
D95	95	33	M16	24,0	1,35	039939	8.730	6720	40	■	
D117	117	48	M20	30,0	1,5	039946	14.680	2100	25	■	

6

PRESS-IN DOWEL

ONE-SIDED

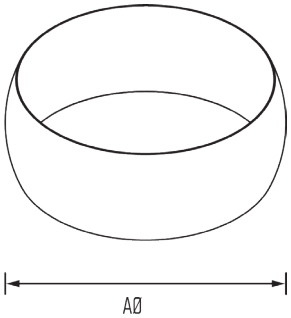


NKL 2

250 GD Z275

Art. No.	Dimensions [mm]					EAN	Weight	Pallet	PU		
	Outer Ø	Inner Ø	Screw Ø	H	T(S)	4019346	kg				
E48	50	12,4	M12	6,6	1,0	039953	1.650	43200	300	■	■
E62	62	12,4	M12	8,7	1,2	039960	3.110	19200	200	■	■
E75	75	16,4	M16	10,4	1,25	039977	4.920	14400	100	■	■
E95	95	16,4	M16	12,7	1,35	039984	7.620	8400	50	■	■
E117	117	20,4	M20	16,0	1,5	039991	13.230	4200	40	■	■

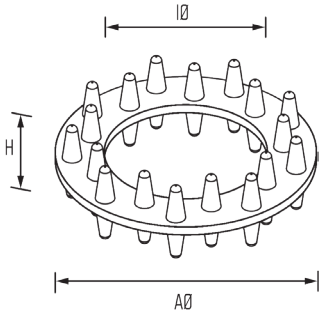
RING-WEDGE-DOWELS



NKL 2

Al Aluminium

Art. No.	Dimensions [mm]			EAN	Weight	Pallet	PU		
	Outer Ø	Screw Ø	GR.	4019346	kg				
A65	65	M12	0	040607	5.560	2400	100	■	
A80	80	M12	I	040614	8.520	2400	100	■	
A95	95	M12	II	040621	10.110	1200	50	■	
A126	126	M12	III	040638	13.310	1200	1	■	
A128	128	M12	IIIa	040645	24.200	800	1	■	
A160	160	M16	IV	040652	38.000	800	1	■	
A190	190	M16	V	040669	46.570	640	1	■	



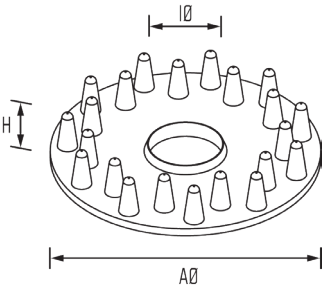
NKL 2

GJMB
Temperguss
verzinkt

GEKA CONNECTOR

TWO-SIDED

Art. No.	Dimensions [mm]				EAN	Weight	Pallet	PU		
	Outer Ø	Inner Ø	Screw Ø	H	4019346	kg				
D50V	50	30,5	M12	27	040003	4.410	3500	50	■	
D65V	65	35,5	M16	27	040010	8.630	1800	50	■	
D80V	80	49,5	M20	27	040027	10.650	1750	25	■	
D95V	95	65,5	M24	27	040034	13.800	1200	25	■	
D115V	115	85,5	M24	27	040041	19.630	1750	25	■	



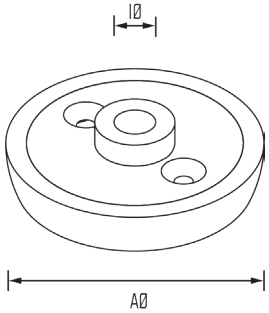
NKL 2

GJMB
Temperguss
verzinkt

GEKA CONNECTOR

ONE-SIDED

Art. No.	Dimensions [mm]				EAN	Weight	Pallet	PU		
	Outer Ø	Inner Ø	Screw Ø	H	4019346	kg				
E50V	50	12,4	M12	15	040058	4.510	3500	50	■	■
E65V	65	16,4	M16	15	040065	8.400	1200	50	■	■
E80V	80	20,4	M20	15	040072	12.680	1350	25	■	■
E95V	95	24,4	M24	15	040089	16.060	800	25	■	■
E115V	115	24,4	M24	15	040096	26.440	1750	25	■	■



NKL 2

Al
Aluminium

ANCHOR DOWELS

Art. No.	Dimensions [mm]				EAN	Weight	Pallet	PU		
	Outer Ø	Screw Ø	GR.	Innen Ø	4019346	kg				
AE65	65	M12	0/2	13	040676	5.600	2400	100	■	■
AE80	80	M12	I/2	13	040683	9.200	2400	100	■	■
AE95	95	M12	II/2	13	040690	13.700	1200	50	■	■
AE128	128	M12	IIIa/2	13	040706	29.900	1200	1	■	■
AE160	160	M16	IV/2	16,5	040713	49.320	640	1	■	■
AE190	190	M16	V/2	16,5	040720	74.520	640	1	■	■

7

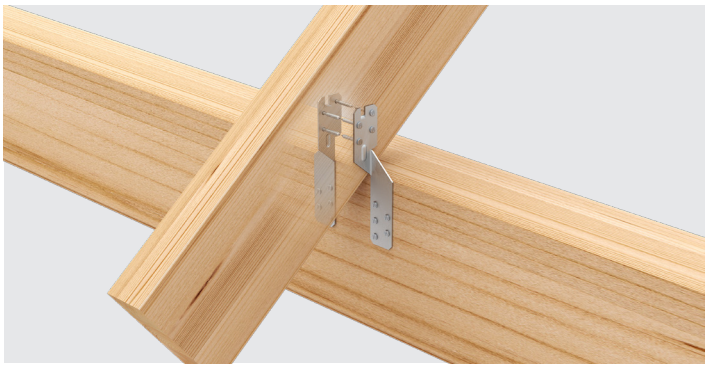
07 RAFTER ANCHORS TRUSS CLIPS

GREENLINE TOPLINE

RAFTER ANCHORS / TRUSS CLIPS

RAFTER ANCHORS TYPE RLD

- Assembly mandrel
- Same product on the right and left side of the rafter
- For use in every rafter angle
- Patent-protected shape
- Optimised nail pattern
- Optional in **GREEN**LINE = resource-saving manufacturing



Basics of statics **from page 226** / Products & statics **from page 228**

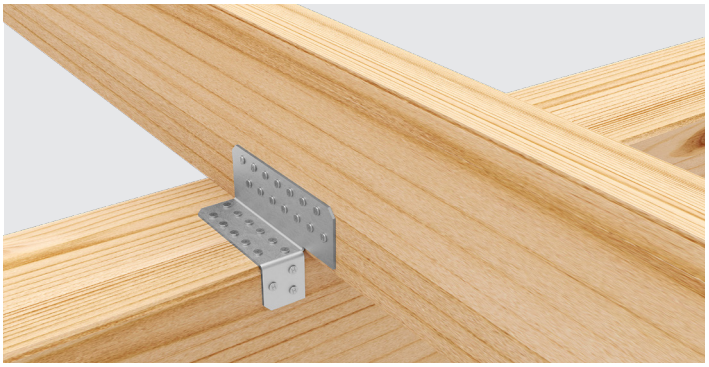
TRUSS CLIPS TYPE CONCRETE / TYPE TIMBER

- Abutment of rafters on concrete or ceiling beams
- The complex offset and the angled pivot, or clamping bolt, are not required (timber type)

Basics of statics **from page 232** / Products & statics **from page 234**

2-PIECE TRUSS CLIPS

- For fixing rafters on ceiling beams
- The complex offset and the angled pivot, or clamping bolt, are not required
- From a timber width of approx. 80 mm.



Products **on page 234**

RAFTER ANCHORS/TRUSS CLIPS

ASSORTMENT

								Length [mm]	Width [mm]	Basics Statics from page	Products & Statics from page	Products Made of V4A from page
RAFTER ANCHOR RLD WITH ASSEMBLY MANDREL		CE	250 GD Z275	NKL 2				170-250	36	226	228	
RAFTER ANCHORS		CE	250 GD Z275	NKL 2	A4 1.4571	NKL 3		290-370	34,50	226	230	295
TRUSS CLIPS, TYPE CONCRETE		CE	S235 JR 55µm	NKL 2				170	60-120	232	234	
TRUSS CLIPS, TYPE TIMBER		CE	S235 JR 55µm	NKL 2				300	60-120	232	234	
2-PIECE TRUSS CLIPS		CE	250 GD Z275	NKL 2				60	160		234	

7

CE symbol

Steel with indication of the steel quality and zinc coating

Stainless steel with material number

Timber/timber connection

Timber/concrete-connection

Usage class 1
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 65% for a few weeks per year, e.g. in the case of buildings that are closed on all sides and heated.
Comment: In UC 1, the average moisture content of most softwoods does not exceed 12 %.

Usage class 2
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 85% for a few weeks per year, e.g. in the case of open buildings covered by a roof.
Comment: In UC 2, the average moisture content of most softwoods does not exceed 20 %.

Usage class 3
Includes climatic conditions that lead to higher moisture contents than in UC 2, e.g. structures that are exposed to the weather without protection. Eurocode 5 / DIN EN 1995-1-1 section 2.3.1.3

GREENLINE

ECOLOGICAL, RESOURCE-SAVING AND ECONOMICAL

The **GH "GREEN**LINE" product series has been committed for the past 14 years, alongside the successful innovative **"TOP**LINE" series, to an increasingly important aspect for the future with the aim manufacturing products with almost unchanged or even better static values in a resource-saving way.

Because huge emissions of approx, 1.7 tonnes CO_2 per tonnes of steel are generated in steel production, we already started years ago to search for ways of achieving a reduction in emissions.

Thanks to new production processes and special materials with more strength, we have been able to save approx. 7300 tonnes of CO_2 in the past 14 years with **GREEN**LINE articles with reduced cross-sections in comparison to former conventional standard products.

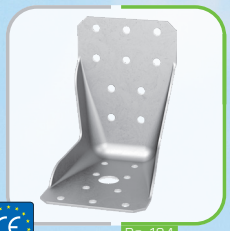
To make things clearer, this corresponds to annual emissions savings of CO_2 for the energy needs of around 1000 German citizens.
(Source: https://de.statista.com/IEA)

In addition to making ecological sense, this is also economically advantageous for everyone involved and saves transport costs that have not yet been included in the calculation.

As the first manufacturer with joist hangers in 1.5 mm and the already established bracing strip in 1.5 mm, more **GREEN**LINE products followed over the years such as standard angle brackets, KR brackets, rafter anchors and nail plates.

In most cases, we have also succeeded in achieving the same or even better static values than conventional standard angle brackets, and at even more lucrative value for money.

ANGLE BRACKETS TYPE KR 90 E



ETA-09 0324 · Pg. 124

JOIST HANGERS TOP/TOP-M

ETA-08 0264 · DC · Pg. 32

JOIST HANGER TOP K 50

ETA-08 0264 · DC · Pg. 36

JOIST HANGER TYPE 04 INTERNAL

ETA-08 0264 · DC · Pg. 50

JOIST HANGER TYPE 04 EXTERNAL

ETA-08 0264 · DC · Pg. 38

ANGLE BRACKETS TYPE 70/90/105

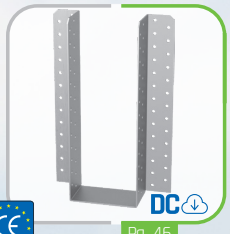
ETA-13 0900 · Pg. 122

JOIST HANGER TYPE 05 INTERNAL

ETA-08 0264 · DC · Pg. 56

MADE IN GERMANY

JOIST HANGER TYPE 05 EXTERNAL



ETA-08 0264 · DC · Pg. 46

CONNECTORS TOP 80/120 VARIO

ETA-09 0322 · Pg. 184

CONNECTORS TOP 80/120

ETA-09 0322 · Pg. 120

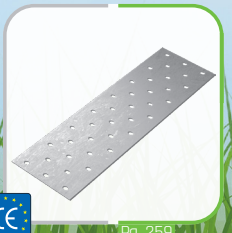
RAFTER ANCHOR RL-D

ETA-10 0007 · Pg. 228

BRACING STRIP TYPE Z

EN 14545 · Pg. 266

NAIL PLATES



EN 14545 · Pg. 259

RAFTER ANCHORS

TECHNICAL FEATURES

Geometry

L	Length of legs (mm)
W(B)	Width (mm)
T(S)	Material thickness (mm)
Ø [mm]	Diameter

Tables

$F_{z,rk}$	Max. load capacity in load direction [kN]
n	Number of holes Ø 5.0

Timber connecting element

GH threaded nails ETA-13/0523 Ø 4.0 x L [mm]

GH wood connector screw ETA-13/0523 Ø 5.0 x L [mm]

Threaded nails EN 14592 stainless steel Ø 4.0 x L [mm]

Load directions

F_1 ↑ Lifting load

Design

Load capacities for two rafter anchors, each arranged diagonally.

The load capacities can be doubled when arranging four rafter anchors.

Characteristic raw density of timber min. 350 kg/m³.

Proof of cross-tension according to DIN EN 1995-1-1 8.1.4 must be kept.

The min. edge spacing according to EC 5 must be met.

Steel with indication of the steel quality and zinc coating

Stainless steel

Timber/timber connection

Timber/concrete-connection

Usage class 1
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 65% for a few weeks per year, e.g. in the case of buildings that are closed on all sides and heated.
Comment: In UC 1, the average moisture content of most softwoods does not exceed 12 %.

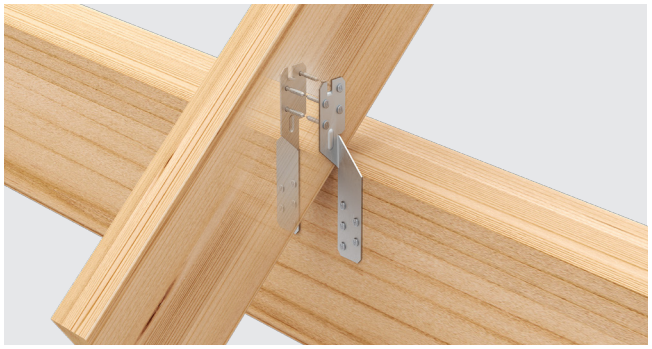
Usage class 2
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 85% for a few weeks per year, e.g. in the case of open buildings covered by a roof.
Comment: In UC 2, the average moisture content of most softwoods does not exceed 20 %.

Usage class 3
Includes climatic conditions that lead to higher moisture contents than in UC 2, e.g. structures that are exposed to the weather without protection. Eurocode 5 / DIN EN 1995-1-1 section 2.3.1.3

RAFTER ANCHORS

APPLICATIONS

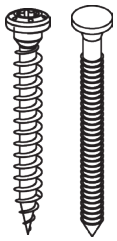
Application:
To secure lifting loads



Materials:

250 GD Z275

Material thickness:
1.5/2.0 mm



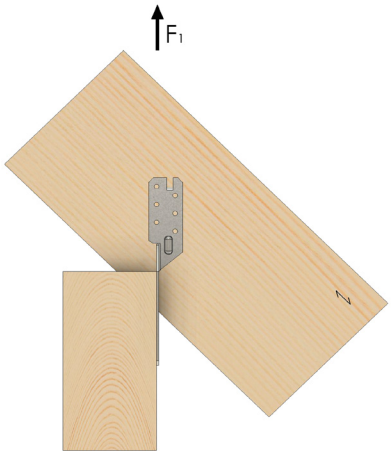
Connecting element:
GH threaded nails 4.0 x 40 / 50 / 60 / 75 / 100 mm
GH screws 5.0 x 25 / 35 / 40 / 50 / 60 / 70 mm

Connecting elements from page 274

For use in usage classes

NKL 1 NKL 2 NKL 3

Load directions



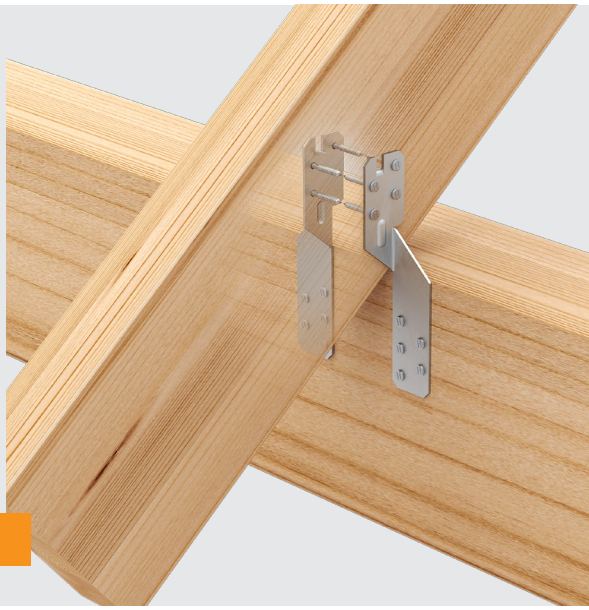
7

RAFTER ANCHORS

TYPE RLD

1. Assembly mandrel (your third hand in assembly)
2. Same product on the right and left side of the rafter
3. For use in every rafter angle
4. Patent-protected shape
5. Optimised nail pattern
6. Optionally in GREENLINE = resource-saving manufacturing

FOR LEFT OR RIGHT-HAND USE - IN EVERY RAFTER ANGLE

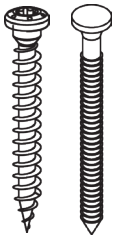


ADVANTAGES

- Fast and precise adjustment due to assembly mandrel
- Simple processing in every rafter angle
- Only one product for the left and right side of the rafter
- Quick processing due to the optimally coordinated nail pattern
- No improvement work on the building site

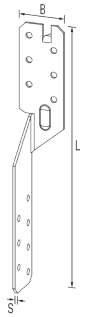
FASTENING ELEMENTS

- GH threaded nail or GH screws



GH threaded nails 4.0 x 40 / 50 / 60 / 75 / 100 mm
GH screws 5.0 x 25 / 35 / 40 / 50 / 60 / 70 mm

Connecting elements from page 274



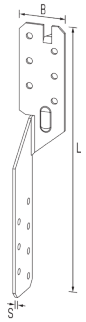
TOPLINE GREENLINE ETA-10 0007

NKL 2 350 GD Z275

RAFTER ANCHORS

TYPE RL-D GREENLINE

Art. No.	Dimensions [mm]					nN	EAN	Weight	Pallet	PU		
	L	x	W(B)	x	T(S)	Ø 5	4019346	kg				
100501RLD15	170	x	36	x	1,5	9	026007	0.060	4200	100	■	
100502RLD15	210	x	36	x	1,5	13	026014	0.070	4200	100	■	
100503RLD15	250	x	36	x	1,5	17	026021	0.093	4200	100	■	



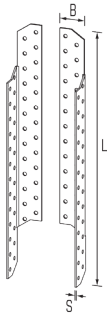
TOPLINE ETA-10 0007

NKL 2 250 GD Z275

RAFTER ANCHORS

TYPE RL-D

Art. No.	Dimensions [mm]					nN	EAN	Weight	Pallet	PU		
	L	x	W(B)	x	T(S)	Ø 5	4019346	kg				
100501RLD	170	x	36	x	2,0	9	115244	0.080	4200	100	■	
100502RLD	210	x	36	x	2,0	13	115251	0.104	4200	100	■	
100503RLD	250	x	36	x	2,0	17	115275	0.124	4200	100	■	



ETA-10 0007

NKL 2 250 GD Z275

RAFTER ANCHORS

Art. No.	Dimensions [mm]					nN	EAN	Weight	Pallet	PU		
	L	x	W(B)	x	T(S)	Ø 5	4019346	kg				
100504	290	x	34,5	x	2,0	2x22	115138	0.202	3900	100	■	
100505	330	x	34,5	x	2,0	2x26	115145	0.235	3000	100	■	
100506	370	x	34,5	x	2,0	2x30	115152	0.274	3000	100	■	

Rafter anchors are used for intersecting timbers, e.g. purlin roofs, or for other sloping roofs.
Horizontal forces can also be absorbed.

TYPE RL-D GREENLINE

Timber / Timber

Art. No.	L	W(B)	T(S)	n_a Ø 5	Connecting element	$F_{Z,Rk}$
100501RLD15	170	36	1,5	4 + 5	4,0x40 / 5,0x40	7,70
100502RLD15	210	36	1,5	6 + 7	4,0x40 / 5,0x40	7,70
100503RLD15	250	36	1,5	8 + 9	4,0x40 / 5,0x40	7,70

TYPE RL-D

7

Timber / Timber

Art. No.	L	W(B)	T(S)	n_a Ø 5	Connecting element	$F_{Z,Rk}$
100501RLD	170	36	2,0	4 + 5	4,0x40 / 5,0x40	7,70
100502RLD	210	36	2,0	6 + 7	4,0x40 / 5,0x40	7,70
100503RLD	250	36	2,0	8 + 9	4,0x40 / 5,0x40	7,70

Timber / Timber

Art. No.	L	W(B)	T(S)	n_a Ø 5	Connecting element	$F_{Z,Rk}$
100504	290	34,5	2,0	10 + 10	4,0x40 / 5,0x40	10,20
100505	330	34,5	2,0	12 + 12	4,0x40 / 5,0x40	10,20
100506	370	34,5	2,0	14 + 14	4,0x40 / 5,0x40	10,20

TRUSS CLIPS

TECHNICAL FEATURES

Geometry

W(B)	Width [mm]
L	Length [mm]
H	Height [mm]
T(S)	Material thickness [mm]

Tables

n_N	Number of nails in baseplate
n_{Bo}	Number of bolts in baseplate
αΔN	Rafter angle [°]
KLED	Class of load impact duration

Timber connecting element

GH threaded nails ETA-13/0523 Ø 4.0 x 40/60 (mm)

GH screws 5.0 x 40 mm

Bolt, dowel or concrete anchor M16

Design

$F_{,Rk}$	Design value [kN] of the load capacity of normal rafter force (1) that can be absorbed
a.	Normal force [kN] neglecting the influence of the contact force
b.	Normal force [kN] taking into account the contact force (c.); press length surface of 20 mm
c.	Normal force [kN] taking into account the contact force (c.); press length surface of 40 mm

Steel with indication of the steel quality and zinc coating

Timber/timber connection

Timber/concrete-connection

Usage class 1
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 65% for a few weeks per year, e.g. in the case of buildings that are closed on all sides and heated.
Comment: In UC 1, the average moisture content of most softwoods does not exceed 12 %.

Usage class 2
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 85% for a few weeks per year, e.g. in the case of open buildings covered by a roof.
Comment: In UC 2, the average moisture content of most softwoods does not exceed 20 %.

Usage class 3
Includes climatic conditions that lead to higher moisture contents than in UC 2, e.g. structures that are exposed to the weather without protection. Eurocode 5 / DIN EN 1995-1-1 section 2.3.1.3

TRUSS CLIPS

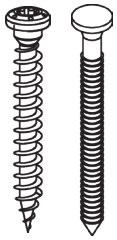
APPLICATIONS

Application:
Truss clips are used to transfer the normal and shear forces from rafters to the timber or concrete substructure.

Materials:

250 GD Z275 | S235 JR 55µm

Material thickness:
2.5 mm



Connecting element:

GH threaded nails 4.0 x 40 mm
GH screws 5.0 x 40 mm
Bolt, dowel or concrete anchor M16

For use in usage classes

NKL 1 NKL 2

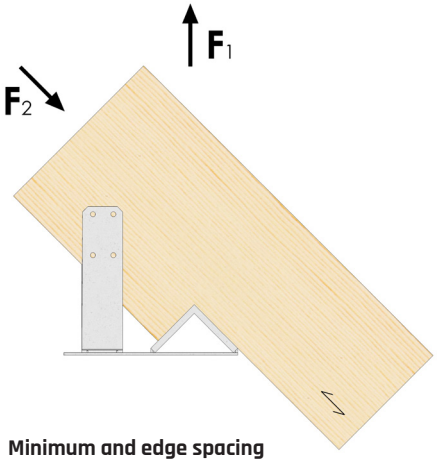
7

Load directions

The load is primarily introduced via two pressing surfaces.

Press surface 1 is formed between the end grain surface and steel bracket. The normal forces from the rafter are transferred to the angle via the end grain surface. The angular deviation between the perpendicular to the bracket surface and the grain direction of the rafter (for roof pitches α DN≠45°) generates a deflection force, which must also be introduced into the connector by pressing via pressing surface 2 or via the nails in the vertical leg of the truss clip. Some of these deflection forces are also overpressurised.

Press surface 2 is formed between the top edge of the beam position/Concrete ceiling or the rafter holder and the bottom edge of the rafter. Additional suction loads can be absorbed by the vertical legs of the truss clip, provided the legs are nailed with comb nails 4 x 40 mm.



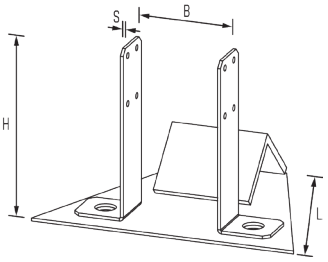
Minimum and edge spacing
Minimum spacing according to Eurocode 5 must be observed.

Connection to timber
The holes of vertical tabs must be fully filled with nails. With a lower number of nails, the load capacity must be reduced linearly. Necessary contact force according to type statics; if the contact force is lower, the normal force increase must be reduced linearly according to the contact force difference. The load capacities only apply in combination with GH threaded nails 4.0 x 400 mm.

Connection to concrete/ steel
The type B connection is made using bolts, dowels or concrete anchors M16. Proof of fastening in concrete or to rail systems must be provided separately, depending on the manufacturer.

Design tables
The load capacities listed in the tables were determined assuming usage classes 1 and 2 and material quality C24 or GL24c.

Calculation of the design value of load capacities according to DIN 1052:2008.12 and approval
All calculations and values are exclusively for GH products and their connecting elements. The load capacities were calculated on the basis of the corresponding approval and the specifications contained therein. Transfer of the values to other makes is not possible.



ETA-08 0264

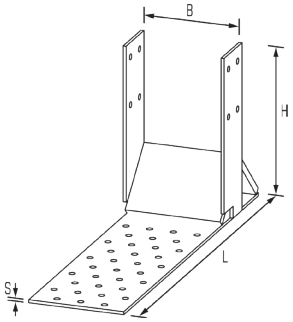
NKL 2

S235 JR 55µm

TRUSS CLIP

TYPE CONCRETE

Art. No.	Dimensions [mm]					nN	n	EAN	Weight	Pallet	PU		
	W(B)	x	L	x	T(S)	Ø 5	Ø 17	4019346	kg				
21100	60	x	170	x	2,5	8	2	155080	1.020	360	15		■
21101	80	x	170	x	2,5	8	2	155035	1.200	360	15		■
21102	100	x	170	x	2,5	8	2	155042	1.350	360	15		■
21103	120	x	170	x	2,5	8	2	155066	1.500	240	10		■



ETA-08 0264

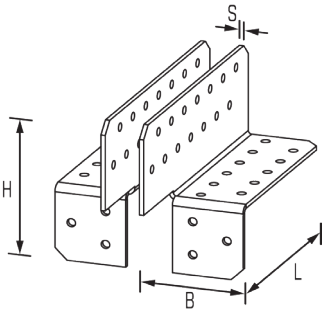
NKL 2

S235 JR 55µm

TRUSS CLIP

TYPE TIMBER

Art. No.	Dimensions [mm]							nN	EAN	Weight	Pallet	PU		
	W(B)	x	L	x	H	x	T(S)	Ø 5	4019346	kg				
22100	60	x	300	x	140	x	2,5	8+25	155059	1.150	480	20	■	
22101	80	x	300	x	140	x	2,5	8+35	155011	1.310	240	10	■	
22102	100	x	300	x	140	x	2,5	8+45	155028	1.470	240	10	■	
22103	120	x	300	x	140	x	2,5	8+55	155073	1.620	240	10	■	



ETA-08 0264

NKL 2

250 GD Z275

TRUSS CLIP

TYPE 2-PIECE

Art. No.	Dimensions [mm]					nN	EAN	Weight	Pallet	PU		
	W(B)	x	L	x	T(S)	Ø 5	4019346	kg				
23101	160	x	60	x	2,5	8	155004	0.600	1200	25	■	

TYPE CONCRETE

Timber / Concrete

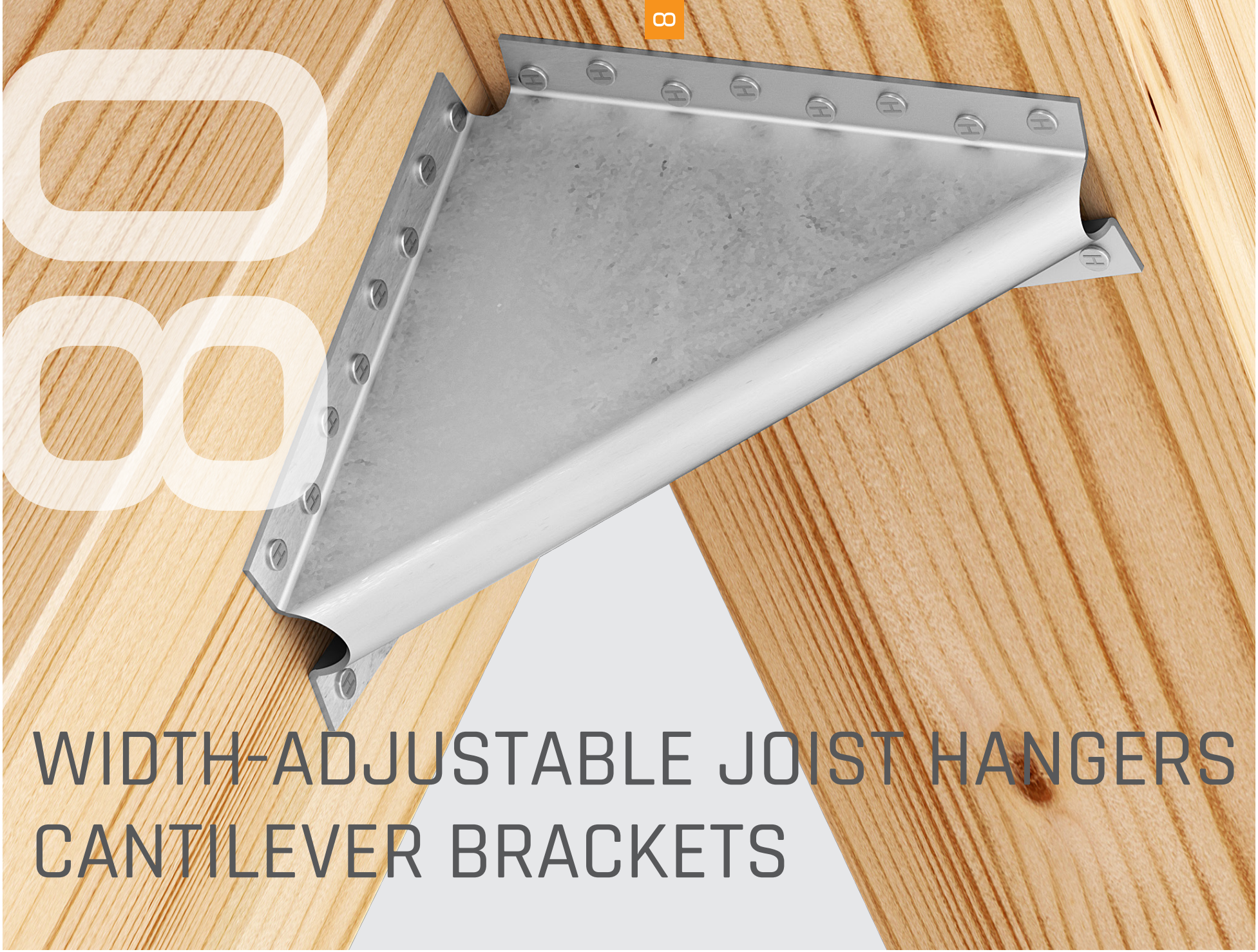
Art. No.	H	L	W(B)	T(S)	αΔN°	n_{Bo} ø17	KLED medium a. $F_{,Rd}$	b. $F_{,Rd}$	c. $F_{,Rd}$
21100	140	170	60	2,5	60	2	11,50	17,70	21,30
21101	140	170	80	2,5	60	2	15,30	23,70	28,40
21102	140	170	100	2,5	60	2	19,10	29,60	35,50
21103	140	170	120	2,5	60	2	22,90	35,50	42,60

7

TYPE TIMBER

Timber / Timber

Art. No.	H	L	W(B)	T(S)	αΔN°	n_N ø5	KLED medium a. $F_{,Rd}$	b. $F_{,Rd}$	c. $F_{,Rd}$
22100	140	300	60	2,5	60	6	11,50	17,70	21,30
22101	140	300	80	2,5	60	8	15,30	23,70	28,40
22102	140	300	100	2,5	60	10	19,10	29,60	35,50
22103	140	300	120	2,5	60	12	22,90	35,50	42,60



8 WIDTH-ADJUSTABLE JOIST HANGERS CANTILEVER BRACKETS

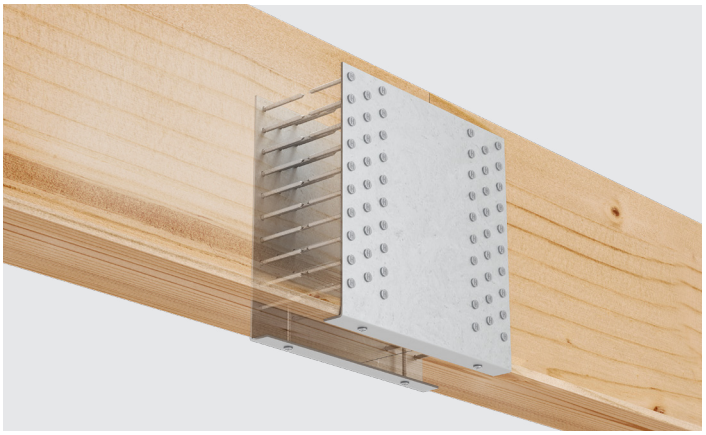
WIDTH-ADJUSTABLE JOIST HANGERS CANTILEVER BRACKETS

WIDTH-ADJUSTABLE JOIST HANGER TYPE 3 (2-PIECE)

GH width-adjustable joist hangers type 3 are used for the simple formation of width-adjustable purlins at the point of zero moment.
Both timbers are given a straight cut.

In addition to material costs, high production costs are also costs, as the production of notches and bolt holes is no longer necessary.

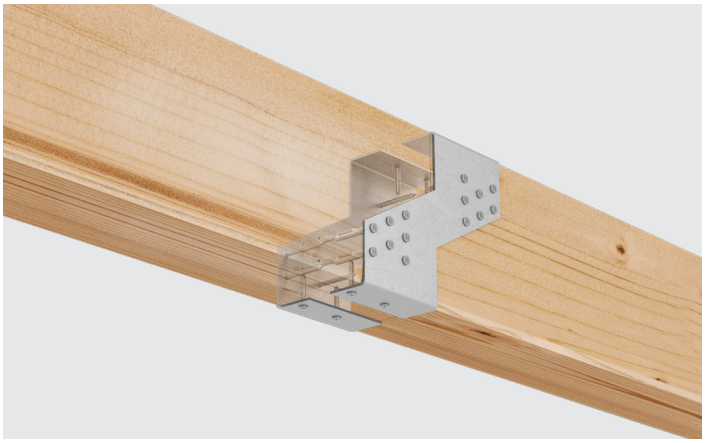
Due to the large spacing of the nail from the joint (120/2 = 60 mm), the nail spacing parallel to the grain (stressed edge) is also complied with.



Basics of statics **from page 240** / Products & statics **from page 242**

WIDTH-ADJUSTABLE JOIST HANGER TYPE 2 (2-PIECE)

GH width-adjustable joist hangers type 2 are used for the simple formationof width-adjustable purlins at the point of zero moment. Both timbers are given a straight cut.



Products **from page 242**

CANTILEVER BRACKETS

GH cantilever brackets are very strong connecting elements and are particularly suitable for fastening rafters on steep beams against lifting and tilting.

Basics of statics **from page 244** / Products & statics **from page 246**

WIDTH-ADJUSTABLE JOIST HANGERS/CANTILEVER BRACKETS

ASSORTMENT

		Height [mm]	Width [mm]	Basics Statics from page	Products & Statics from page
WIDTH-ADJUSTABLE JOIST HANGER TYPE 3 (2-PIECE)	CE 250 GD Z275 NKL 2	90-380	220	**240**	**242**
WIDTH-ADJUSTABLE JOIST HANGER TYPE 2 (2-PIECE)	CE 250 GD Z275 NKL 2	120-200	180		**242**
CANTILEVER BRACKETS	CE 250 GD Z275 NKL 2	90-250	45-150	**244**	**246**

8

CE symbol

Steel with indication of the steel quality and zinc coating

Timber/timber connection

Usage class 1
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 65% for a few weeks per year, e.g. in the case of buildings that are closed on all sides and heated.
Comment: In UC 1, the average moisture content of most softwoods does not exceed 12 %.

Usage class 2
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 85% for a few weeks per year, e.g. in the case of open buildings covered by a roof.
Comment: In UC 2, the average moisture content of most softwoods does not exceed 20 %.

Usage class 3
Includes climatic conditions that lead to higher moisture contents than in UC 2, e.g. structures that are exposed to the weather without protection. Eurocode 5 / DIN EN 1995-1-1 section 2.3.1.3

GH PACKAGING,

TO PROTECT THE ENVIRONMENT

Our GH box sizes are optimised to both the packing units and for storage on pallets.

On our labels, we print all the relevant information such as approvals, article name, dimensions, EAN code and article images.

GH packaging to protect the environment.
Ecological change is changing our society in general and **GH Baubeschläge** also wants to support this with commitment.

At **GH Baubeschläge** we therefore use sustainable brown boxes as our **packaging**, mainly based on recycled paper.

If we are to take our task as a manufacturer seriously as well as our key expertise and the benefits of packaging in the area of protection and transport, then we have to be equally committed to the active and sustainable reduction of the ecological footprint.
The changeover to boxes took place progressively.

WIDTH-ADJUSTABLE JOIST HANGERS

TECHNICAL FEATURES

Geometry

H	Height [mm]
W(B)	Width [mm]
T(S)	Material thickness [mm]

Tables

n_a	Number of connecting elements
NB	Nail pattern
erf_h	Necessary cross-section height
erf_b	Necessary cross-section width
VM	Connecting element Ø x length [mm]
Voll	Maximum number of connecting elements

Timber connecting element

GH threaded nails ETA-13/0523 Ø 4.0 x L [mm]

Load directions

$F_{1,T;Rk}$ ↓ Characteristic load capacity in kN

Steel with indication of the steel quality and zinc coating

Timber/timber connection

Usage class 1
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 65% for a few weeks per year, e.g. in the case of buildings that are closed on all sides and heated.
Comment: In UC 1, the average moisture content of most softwoods does not exceed 12 %.

Usage class 2
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 85% for a few weeks per year, e.g. in the case of open buildings covered by a roof.
Comment: In UC 2, the average moisture content of most softwoods does not exceed 20 %.

Usage class 3
Includes climatic conditions that lead to higher moisture contents than in UC 2, e.g. structures that are exposed to the weather without protection. Eurocode 5 / DIN EN 1995-1-1 section 2.3.1.3

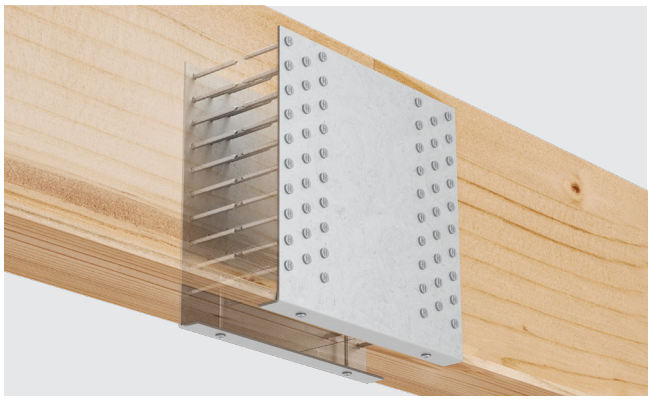
WIDTH-ADJUSTABLE JOIST HANGERS

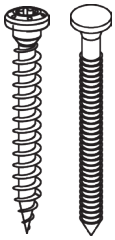
APPLICATIONS

Application:
For simple formation of a joint with width-adjustable purlins
Point of zero moment.

Materials: 250 GD Z275

Material thickness:
2.0 mm





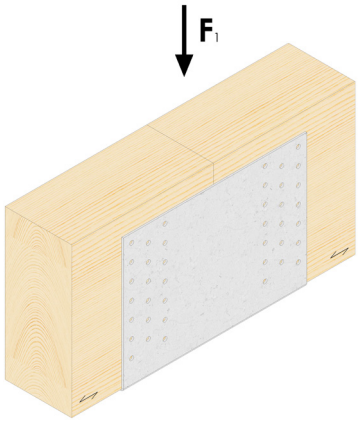
Connecting element:
GH threaded nails 4.0 x 35 / 40 / 50 / 60 / 75 / 100 mm
Connecting elements from page 274

For use in usage classes

NKL 1 NKL 2

8

Load directions

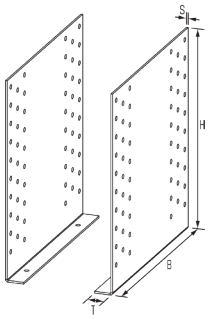


Connection to timber
Full nail fitting according to the statics table, under compliance minimum spacing

Design tables
Maximum characteristic load capacities in kN for one connector pair

Minimum timber cross-diameter [mm]

$erf._h$	$erf._B$		
	4.0 x 40 mm	4.0 x 50 mm	4.0 x 60 mm
Height of connector + 30 mm	54	64	74



ETA-08 0264

NKL 2

250 GD Z275

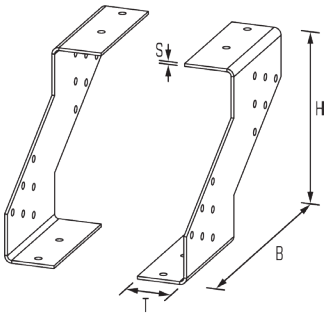
WIDTH-ADJUSTABLE JOIST HANGERS

TYPE 3 (2-PIECE)

Art. No.	Dimensions [mm]							nN	nN	EAN	Weight	Pallet	PU		
	H	x	W(B)	x	T	x	T(S)	Ø 5	Ø 5	4019346	kg				
209	90	x	220	x	20	x	2,0	36	20	177051	0.812	480	20	■	
212	120	x	220	x	20	x	2,0	56	20	177068	1.015	480	20	■	
214	140	x	220	x	20	x	2,0	68	20	177006	1.150	480	20	■	
216	160	x	220	x	20	x	2,0	80	20	177075	1.285	480	20	■	
218	180	x	220	x	20	x	2,0	92	20	177013	1.421	360	15	■	
220	200	x	220	x	20	x	2,0	108	20	177020	1.556	360	15	■	
222	220	x	220	x	20	x	2,0	118	20	177037	1.691	360	15	■	
224	240	x	220	x	20	x	2,0	128	20	177082	1.827	240	10	■	
226	260	x	220	x	20	x	2,0	140	20	177044	1.962	240	10	■	
228	280	x	220	x	20	x	2,0	144	20	177099	1.981	480	10	■	
230	300	x	220	x	20	x	2,0	162	20	177105	2.120	480	10	■	
232	320	x	220	x	20	x	2,0	176	20	177112	2.260	240	10	■	
234	340	x	220	x	20	x	2,0	188	20	177129	2.400	240	10	■	
236	360	x	220	x	20	x	2,0	200	20	177136	2.540	240	10	■	
238	380	x	220	x	20	x	2,0	212	20	177143	2.680	240	10	■	
240	400	x	220	x	20	x	2,0	224	20	177150	2.832	240	10	■	
242	420	x	220	x	20	x	2,0	236	20	177167	2.967	240	10	■	

8

The width-adjustable joist hangers TYPE 3 (2-piece) can be used for various timber cross-sections, taking into account the minimum spacing to the edge in accordance with Eurocode 5 for various timber cross-sections.



ETA-08 0264

NKL 2

250 GD Z275

WIDTH-ADJUSTABLE JOIST HANGERS

TYPE 2 (2-PIECE)

Art. No.	Dimensions [mm]							nN	EAN	Weight	Pallet	PU		
	H	x	W(B)	x	T	x	T(S)	Ø 5	4019346	kg				
812	125	x	180	x	37	x	2,0	37	032626		600	25	■	
814	140	x	180	x	37	x	2,0	37	032633	0.520	600	25	■	
816	160	x	180	x	37	x	2,0	37	032640	0.640	600	25	■	
818	180	x	180	x	37	x	2,0	37	032657	0.650	600	25	■	
820	200	x	180	x	37	x	2,0	37	032664	0.760	600	25	■	

TYPE 3 (2-PIECE)

Timber / Timber

Art. No.	H	W(B)	T(S)	n_a	NB	$F_{1,T,Rk}$ 4.0 x 40	4.0 x 50	4.0 x 60
209	90	220	2,0	36	Full	6,9	8,1	8,7
212	120	220	2,0	56	Full	15,0	12,7	16,1
214	140	220	2,0	68	Full	17,2	20,3	21,7
216	160	220	2,0	80	Full	22,4	26,5	28,3
218	180	220	2,0	92	Full	28,3	33,4	35,7
220	200	220	2,0	104	Full	34,9	41,1	43,9
222	220	220	2,0	116	Full	42,0	49,6	52,9
224	240	220	2,0	124	Full	49,7	58,7	52,6
226	260	220	2,0	140	Full	58,0	68,4	73,0
228	280	220	2,0	152	Full	66,7	78,6	83,9
230	300	220	2,0	164	Full	75,8	89,4	85,5
232	320	220	2,0	176	Full	85,3	100,6	107,4
234	340	220	2,0	188	Full	95,2	112,3	119,9
236	360	220	2,0	200	Full	105,4	124,3	132,7
238	380	220	2,0	212	Full	115,9	136,6	145,9
240	400	220	2,0	224	Full	127,0	149,0	159,0
242	420	220	2,0	236	Full	138,0	162,0	173,0

CANTILEVER BRACKETS

TECHNICAL FEATURES

Geometry

H	Height (mm)
W(B)	Width (mm)
T(S)	Material thickness (mm)

Tables

nN	Number of connecting elements
b	Purlin width (mm)
e	Height of the load attack point, above the beam top edge (mm)

Timber connecting element

GH threaded nails ETA-13/0523 Ø 4.0 x 40/60 (mm)

Design

$F_{\perp,Rk}$ ↑	Characteristic load capacity for lifting loads (mm)
$F_{//,Rk}$ →	Characteristic load capacity for loads in beam longitudinal direction (kN)

Steel with indication of the steel quality and zinc coating

Timber/timber connection

Usage class 1
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 65% for a few weeks per year, e.g. in the case of buildings that are closed on all sides and heated.
Comment: In UC 1, the average moisture content of most softwoods does not exceed 12 %.

Usage class 2
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 85% for a few weeks per year, e.g. in the case of open buildings covered by a roof.
Comment: In UC 2, the average moisture content of most softwoods does not exceed 20 %.

Usage class 3
Includes climatic conditions that lead to higher moisture contents than in UC 2, e.g. structures that are exposed to the weather without protection. Eurocode 5 / DIN EN 1995-1-1 section 2.3.1.3

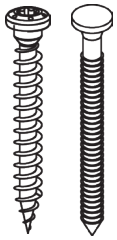
CANTILEVER BRACKETS

APPLICATIONS

Application:
GH cantilever brackets are very strong connectors to fasten beams against lifting and tilting in combination with rafter anchors. Cantilever brackets are also suitable for tilt protection at the base point of the bracing strip fixing.

Materials: 250 GD Z275

Material thickness:
2.0 mm



Connecting element:
GH threaded nails 4.0 x 40/60

Connecting elements from page 274

For use in usage classes

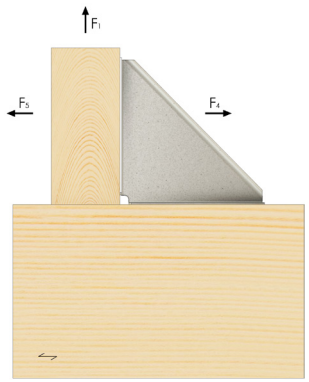
NKL 1 NKL 2

8

Load directions

$F_{\wedge;Rk}$ = Characteristic load capacity for lifting loads [kN]

$F_{//,Rk}$ = Characteristic load capacity for loads in beam longitudinal direction[kN]



Conversion factors design values

Long	Medium	Very short
0,538	0,615	0,846

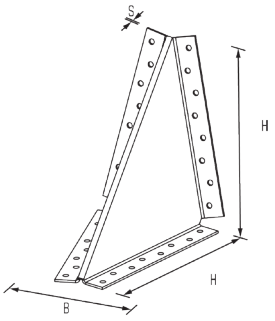
Minimum and edge spacing
Minimum spacing according to EN 1995-1-1, for threaded nails and screws in nail sheets, $\rho k \leq 420$ [kg/m³]
Maximum gap between timber components ≤ 3 mm.

Connection to timber
Full nail fitting
Min. 4.0 x 40 / purlins 4.0 x 60

Design tables
Characteristic value $F_{z,Rk}$ max. in kN
one cantilever bracket and one cantilever bracket in combination with a pair of rafter anchors
Characteristic raw density of timber: ρk = 350 kg/m³ (C24)

Combined stress/proof of interaction:
$(F_{\wedge,Ed} / F_{\wedge,Rd}) + (F_{//,Ed} / F_{//,Rd}) \leq 1$

CANTILEVER



ETA-08 0264

NKL 2

250 GD Z275

Art. No.			Dimensions [mm]				nN	EAN	Weight	Pallet	PU		
	Type	H	x	W(B)	x	T(S)	Ø 5	4019346	kg				
20501	90	88	x	63	x	2	4x4	170007	0.180	2040	40	■	
20502	130	125	x	103	x	2	4x5	170014	0.410	1200	40	■	
20503	170	166	x	115	x	2	4x8	170021	0.550	800	20	■	
20504	210	207	x	133	x	2	4x10	170038	1.000	600	20	■	
20505	250	254	x	180	x	2	4x10	170045	1.500	320	20	■	

STATICS

Timber / Timber

Art. No.	Typ	H	B	S	Ø 5	Load capacities of a cantilever bracket e=100 mm / b=0 $F_{\wedge,Rk}$	Load capacities of a cantilever bracket e=100 mm / b=0 $F_{//,Rk}$	Load capacities of a cantilever bracket in combination with a pair of rafter anchors Length Rafter anchors	Load capacities of a cantilever bracket in combination with a pair of rafter anchors e=100 mm / b=0 $F_{\wedge,Rk}$	Load capacities of a cantilever bracket in combination with a pair of rafter anchors e=100 mm / b=0 $F_{//,Rk}$
20501	90	88	63	2	16	0,50	0,40	170	5,60	4,90
20502	130	125	103	2	20	2,40	1,40	250	10,20	8,80
20503	170	166	115	2	24	4,10	3,20	290	10,20	11,60
20504	210	207	133	2	40	5,30	5,20	290	10,20	14,30
20505	250	254	180	2	40	7,00	8,30	290	10,20	17,00

09

NAIL PLATE STRIPS
NAIL PLATES

GREENLINE

NAIL PLATES / NAIL PLATE STRIPS

NAIL PLATE STRIPS

GH nail plate strips are simple connecting elements for fixing narrow timber parts or for large surface connection.

Basics of statics **from page 252**
Products **from page 256**

NAIL PLATES

GH nail plates have numerous application options. Mainly used as hub connectors in various forms for connecting timber constructions, such as strut connections, rolled tie strap hubs, truss connectors, etc. GH nail plates are also available in the **GREEN**line series.

Basics of statics **from page 252**
Products **from page 258**

NAIL PLATE STRIPS / NAIL PLATES

SORTIMENT

		Length [mm]	Width [mm]	Basics Statics from page	Products & Statics from page
NAIL PLATE STRIPS 2.0	CE, 250 GD Z275, NKL 2, timber/timber	1200	40-400	252	256
NAIL PLATE STRIPS 2.5	CE, 250 GD Z275, NKL 2, timber/timber	1200	40-400	252	257
NAIL PLATE BOARDS	CE, 250 GD Z275, NKL 2, timber/timber	2500	1200		256
NAIL PLATES 2.0	CE, 250 GD Z275, NKL 2, A4 1.4571, NKL 3, timber/timber	120-500	40-200	252	258
NAIL PLATES 1.5 **GREEN**LINE	CE, 250 GD Z275, NKL 2, timber/timber	120-500	40-200	252	259

CE symbol

Steel with indication of the steel quality and galvanisation

Stainless steel with material number

Timber/timber connection

Timber/concrete-connection

Usage class 1
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 65% for a few weeks per year, e.g. in the case of buildings that are closed on all sides and heated.
Comment: In UC 1, the average moisture content of most softwoods does not exceed 12 %.

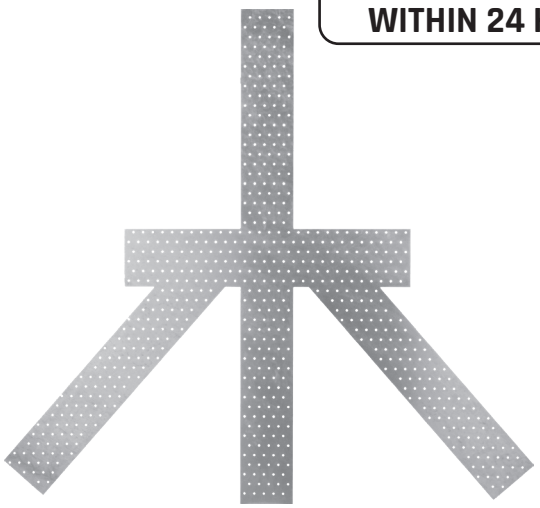
Usage class 2
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 85% for a few weeks per year, e.g. in the case of open buildings covered by a roof.
Comment: In UC 2, the average moisture content of most softwoods does not exceed 20 %.

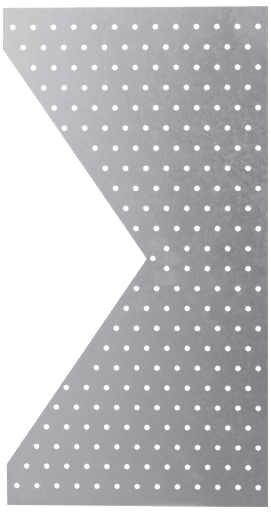
Usage class 3
Includes climatic conditions that lead to higher moisture contents than in UC 2, e.g. structures that are exposed to the weather without protection. Eurocode 5 / DIN EN 1995-1-1 section 2.3.1.3

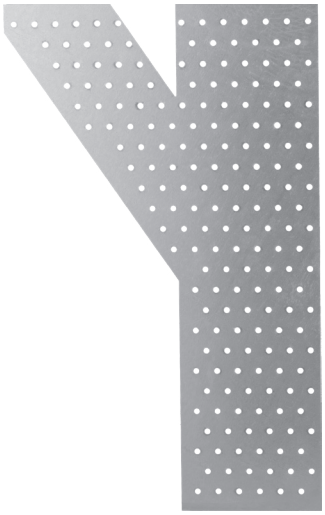
CUSTOMISED NAIL PLATES

WITHIN 24 HOURS WITH MODERN MACHINES

CUSTOMISED PARTS ACCORDING TO DRAWING WITHIN 24 HOURS.







NAIL PLATES / NAIL PLATE STRIPS

TECHNICAL FEATURES

Geometry

L	Length [mm]
W(B)	Width (mm)
T(S)	Material thickness (mm)

Tables

n_a	Number of connecting elements in timber

Design

R_k	Characteristic value of a load capacity [kN]
R_d	Design value of load capacity [kN]
$R_{90,d}$	Design value of load capacity vertical to the grain
n_{ef}	Effective number of connecting elements
Y_M	Partial safety factor
k_{mod}	Modification coefficient for load impact duration

Steel with indication of the steel quality and galvanisation

Stainless steel with material number

Timber/timber connection

Timber/concrete-connection

Usage class 1
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 65% for a few weeks per year, e.g. in the case of buildings that are closed on all sides and heated.
Comment: In UC 1, the average moisture content of most softwoods does not exceed 12 %.

Usage class 2
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 85% for a few weeks per year, e.g. in the case of open buildings covered by a roof.
Comment: In UC 2, the average moisture content of most softwoods does not exceed 20 %.

Usage class 3
Includes climatic conditions that lead to higher moisture contents than in UC 2, e.g. structures that are exposed to the weather without protection. Eurocode 5 / DIN EN 1995-1-1 section 2.3.1.3

NAIL PLATES / NAIL PLATE STRIPS

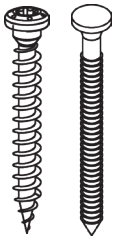
APPLICATIONS

Application:
Nail plates and nail plate strips are intended for transfer of tensile forces in connections.

Materials:

Material thicknesses:
1.5 bis 3.0 mm

For use in usage classes



Connecting element:
GH threaded nails 4.0 x 35 / 40 / 50 / 60 / 75 / 100 mm
GH screws 5.0 x 25 / 35 / 40 / 50 / 60 / 70 mm

Connecting elements from page 274

Connection to timber

A connection should always consist of two opposite nail sheets. The width of the connected timbers must be the same.
Only holes with their centre of gravity at least 6 mm from the nail plate edge may be used.

Design example

Load capacities in kN
Characteristic raw density of timber: ρk = 350 kg/m³ (C24)
Characteristic value $R_{v,k}$
Design value $R_{z,Rd}$ ffor KLED “short”

The following proof must be kept for the design of the connection:

Connecting element load capacity $R_d = n_{ef} \times k_{mod} / 1{,}3 \times R_{v,k}$

Nail plate load capacity in the net cross-section $R_d = 0{,}9 \times A_{net} \times f_u / y_{M2}$ with $A_{net} = 0{,}75 \times b \times t$, $y_{M2} = 1{,}25$

according to EN 1993-1-1 6.2.3

$$R_{90,d} = 14 \times b \sqrt{\frac{h_e}{1 - h_e/h}} \times \frac{k_{mod}}{1{,}3}$$

Cross-tensile proof in the strap according to EN 1995-1-1 8.1.4

Strap	Softwood C24 100 [mm] x 160 [mm]
Tensile rod	Softwood C24 100 [mm] x 160 [mm]
Nail plates	2 x 80 x 240 x 1.5 steel sheet S 250 with tensile strength f_u = 330 [N/mm²]
Threaded nails	4 x 50 according to ETA-13/0523 - 2 x 5 threaded nails in the strap and 2 x 6 threaded nails in the tensile rod

Usage class 2, class of load impact duration “short” → k_{mod} = 0,9

Load capacity of nails in the strap
Shearing load capacity of a threaded nail 4x50 according to ETA-13/0523: $R_{v,k}$ = 2,21 [kN]
Rd = 2 x 5 x 0.9 / 1.3 x 2.21 = 15.3 [kN]

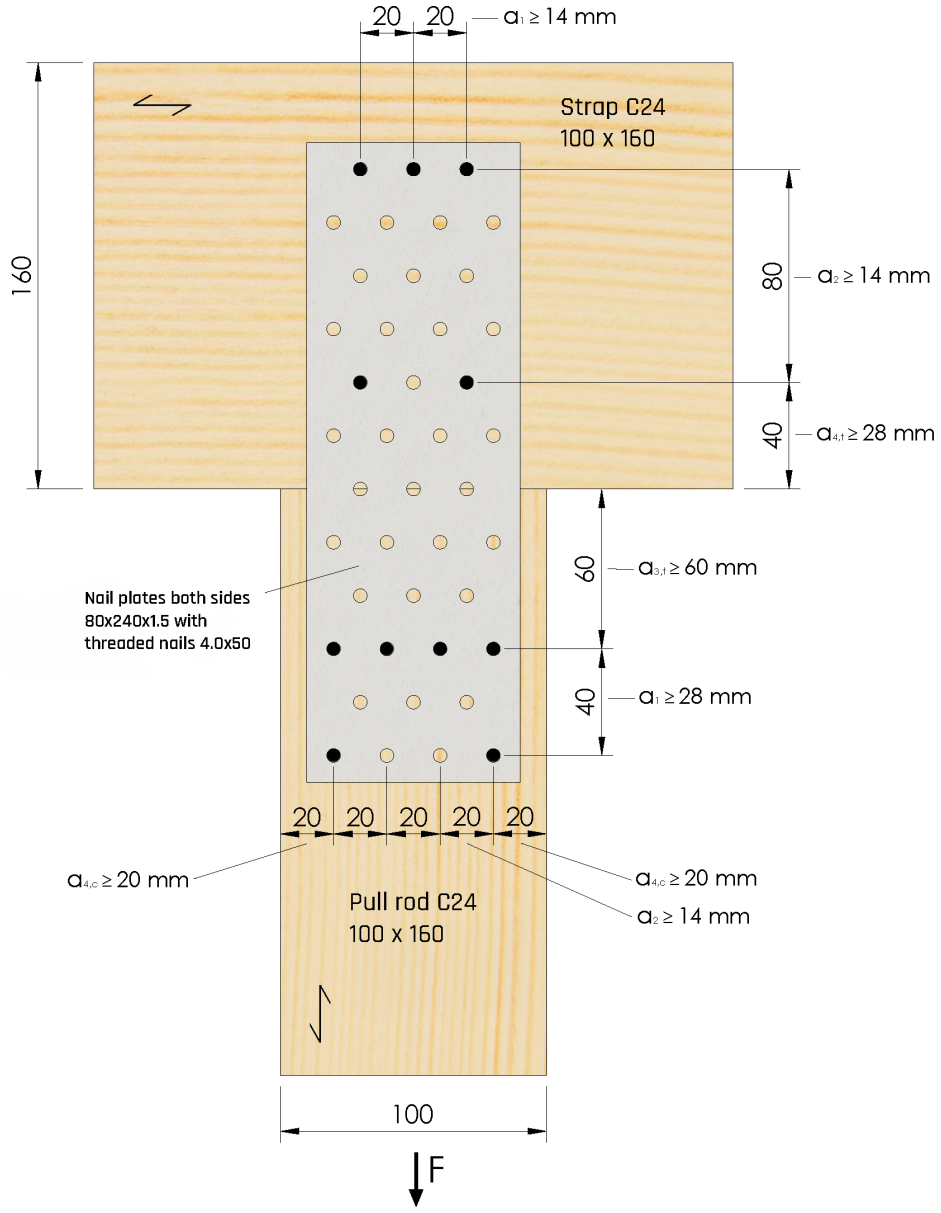
Load capacity of nails in the pull rod
Determination of nef according to EN 1995-1-1 8.3.1.1 (8): $n_{ef} = n^{0{,}85} = 2 \times 3 \times 2^{0{,}85} = 10.8$
Rd = 10.8 x 0.9 / 1.3 x 2.21 = 16.5 [kN]

Load capacity of nail plates
Net cross-section surface: A_{net} = 0,75 x w x d = 0,75 x 80 x 1,5 = 90 [mm²]
Rd = 0.9 x 2 x 90 x 330 / 1.25 = 42.8 [kN]
The off-centre load of the nail plates is not taken into account.

Load capacity of transverse connection
Spacing of the outer connecting element row from the stressed edge: he = 120 [mm]

$$R_{90,d} = 14 \times 100 \times \sqrt{\frac{120}{1 - 120/160}} \times \frac{0{,}9}{1{,}3} = \mathbf{21{,}2\ [kN]}$$

Load capacity of connection: Rd = min (15.3; 16.5; 42.8; 21.2) = 15.3 [kN]



Minimum and edge spacing

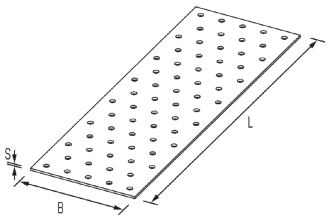
The regulations according to EN1995-1-1 apply for edge spacing parallel and vertical to the grain. In accordance with DIN 1052:2008-12 it is recommended that the clear distance between the outer connecting element groups of two joist hangers corresponds to 2 times the main beam height.
If this is not achieved, the load capacity should be reduced.

		Force parallel to the grain	Force at a right angle to the grain
a_1	in grain direction	28 mm	14 mm
a_2	Right angle to the grain direction	14 mm	14 mm
$a_{3,t}$	End grain with stress	60 mm	40 mm
$a_{3,c}$	End grain without stress	40 mm	40 mm
$a_{4,t}$	Loaded edge	20 mm	28 mm
$a_{4,c}$	Unloaded edge	20 mm	20 mm
See EN 1995-1-1 Tab.8.2 for other brackets than those specified between force and grain			

Minimum spacing according to EN 1995-1-1, for threaded nails Ø 4 mm in nail sheets, $\rho_k \leq 420$ kg/m³

NAIL PLATE STRIPS

2.0 MM



EN 14545

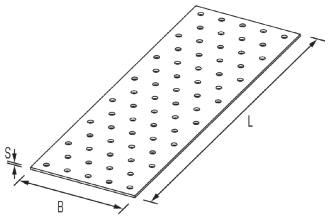
NKL 2

250 GD Z275

Art. No.	Dimensions [mm]					nN	EAN	Weight	Pallet	PU		
	W(B)	x	L	x	T(S)	Ø 5	4019346	kg				
101563	40	x	1200	x	2,0	90	125007	0.659	1200	20	■	
101526	60	x	1200	x	2,0	150	125014	0.988	780	20	■	
101527	80	x	1200	x	2,0	210	125021	1.318	600	20	■	
101528	100	x	1200	x	2,0	270	125038	1.647	420	10	■	
101529	120	x	1200	x	2,0	330	125045	1.977	360	10	■	
101530	140	x	1200	x	2,0	390	125052	2.306	300	10	■	
101531	160	x	1200	x	2,0	450	125069	2.636	200	10	■	
101532	180	x	1200	x	2,0	510	125076	2.965	200	10	■	
101533	200	x	1200	x	2,0	570	125083	3.295	200	5	■	
101534	220	x	1200	x	2,0	630	125090	3.624	150	5	■	
101535	240	x	1200	x	2,0	690	125106	3.954	150	5	■	
101536	260	x	1200	x	2,0	750	125113	4.283	150	5	■	
101537	280	x	1200	x	2,0	810	125120	4.613	100	5	■	
101538	300	x	1200	x	2,0	870	125137	4.942	100	5	■	
101543	400	x	1200	x	2,0	1170	125182	6.589	100	5	■	

9

NAIL PLATE BOARDS



EN 14545

NKL 2

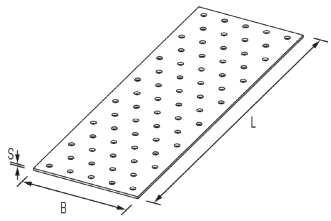
250 GD Z275

Art. No.	Dimensions [mm]					EAN	Weight	PU		
	W(B)	x	L	x	T(S)	4019346	kg			
101600	1200	x	2500	x	2,0	127308	40.860	1	■	
101700	1200	x	2500	x	2,5	127315	51.070	1	■	
101800	1200	x	2500	x	3,0	127322	61.280	1	■	

EN 14545

250 GD Z275

NKL 2



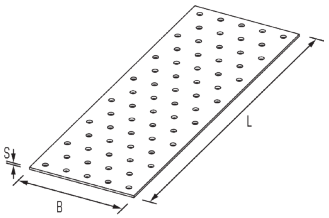
NAIL PLATE STRIPS

2.5 MM

Art. No.	Dimensions [mm]					nN	EAN	Weight	Pallet	PU		
	W(B)	x	L	x	T(S)	Ø 5	4019346	kg				
101564	40	x	1200	x	2,5	90	125199	0.824	1200	10	■	
101544	60	x	1200	x	2,5	150	125205	1.236	800	10	■	
101545	80	x	1200	x	2,5	210	125212	1.647	600	10	■	
101546	100	x	1200	x	2,5	270	125229	2.059	420	10	■	
101547	120	x	1200	x	2,5	330	125236	2.471	400	10	■	
101548	140	x	1200	x	2,5	390	125243	2.883	400	5	■	
101549	160	x	1200	x	2,5	450	125250	3.295	200	5	■	
101550	180	x	1200	x	2,5	510	125267	3.707	200	5	■	
101551	200	x	1200	x	2,5	570	125274	4.118	200	5	■	
101552	220	x	1200	x	2,5	630	125281	4.530	150	5	■	
101553	240	x	1200	x	2,5	690	125298	4.942	150	5	■	
101554	260	x	1200	x	2,5	750	125304	5.354	150	5	■	
101555	280	x	1200	x	2,5	810	125311	5.766	100	5	■	
101556	300	x	1200	x	2,5	870	125328	6.178	100	5	■	
101561	400	x	1200	x	2,5	1170	125373	8.237	100	5	■	

NAIL PLATES

2.0 MM



EN 14545

NKL 2

250 GD Z275

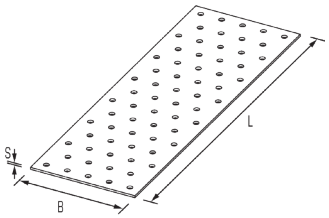
Art. No.	Dimensions [mm]					nN	EAN	Weight	Pallet	PU		
	W(B)	x	L	x	T(S)	Ø 5	4019346	kg				
101501	40	x	120	x	2,0	9	127018	0.066	12600	200	■	
101502	40	x	160	x	2,0	12	127100	0.088	7000	100	■	
101562	50	x	200	x	2,0	15	127117	0.137	7200	150	■	
101503	60	x	140	x	2,0	18	127025	0.115	6300	150	■	
15102110	60	x	160	x	2,0	20	127407	0.144	4800	100	■	
101504	60	x	200	x	2,0	25	127032	0.165	4800	100	■	
101505	60	x	240	x	2,0	30	127049	0.198	4800	100	■	
15102302	60	x	300	x	2,0	38	127414	0.257	1600	50	■	
15102136	60	x	340	x	2,0	43	127421	0.291	1600	50	■	
15102137	60	x	420	x	2,0	55	127483	0.360	1600	50	■	
15102304	60	x	500	x	2,0	63	127438	0.428	900	25	■	
101506	80	x	200	x	2,0	35	127056	0.220	3500	50	■	
101507	80	x	240	x	2,0	42	127063	0.264	2400	50	■	
101508	80	x	300	x	2,0	53	127070	0.340	2550	50	■	
101509	100	x	140	x	2,0	32	127124	0.192	3500	50	■	
101510	100	x	200	x	2,0	45	127087	0.275	2400	50	■	
101511	100	x	240	x	2,0	54	127131	0.329	2400	50	■	
101565	100	x	260	x	2,0	59	127148	0.357	2550	50	■	
101512	100	x	300	x	2,0	68	127094	0.412	2550	50	■	
101513	100	x	400	x	2,0	90	127155	0.549	900	20	■	
101514	100	x	500	x	2,0	113	127162	0.686	900	20	■	
101515	120	x	200	x	2,0	55	127179	0.329	2400	50	■	
101516	120	x	240	x	2,0	66	127186	0.395	2400	50	■	
101566	120	x	260	x	2,0	72	127193	0.428	1700	50	■	
101517	120	x	300	x	2,0	83	127209	0.494	1700	50	■	
101518	120	x	400	x	2,0	110	127216	0.659	675	15	■	
101519	120	x	500	x	2,0	138	127223	0.824	675	15	■	
15102311	140	x	300	x	2,0	98	127452	0.630	1200	25	■	
101520	140	x	400	x	2,0	130	127230	0.769	675	15	■	
101521	140	x	500	x	2,0	163	127247	0.961	675	15	■	
15102312	160	x	300	x	2,0	113	127346	0.720	1000	25	■	
101522	160	x	400	x	2,0	150	127254	0.879	675	15	■	
101523	160	x	500	x	2,0	188	127261	1.098	675	15	■	
101524	180	x	400	x	2,0	170	127278	0.988	675	15	■	
101525	180	x	500	x	2,0	209	127285	1.236	600	15	■	
101567	200	x	300	x	2,0	143	127292	0.824	480	15	■	

EN 14545

GREENLINE

250 GD Z275

NKL 2



NAIL PLATES

GREENLINE 1.5 MM

Art. No.	Dimensions [mm]					nN	EAN	Weight	Pallet	PU		
	W(B)	x	L	x	T(S)	Ø 5	4019346	kg				
10150115	40	x	120	x	1,5	9	032206	0.050	12600	200	■	
10150215	40	x	160	x	1,5	12	032220	0.066	7000	100	■	
10156215	50	x	200	x	1,5	15	032244	0.103	7200	150	■	
10150315	60	x	140	x	1,5	18	032251	0.086	6300	150	■	
1510211015	60	x	160	x	1,5	20	032268	0.108	4800	100	■	
10150415	60	x	200	x	1,5	25	032275	0.124	4800	100	■	
10150515	60	x	240	x	1,5	30	032282	0.149	4800	100	■	
1510230215	60	x	300	x	1,5	38	032299	0.193	1600	50	■	
1510213615	60	x	340	x	1,5	43	032305	0.219	1600	50	■	
1510213715	60	x	420	x	1,5	55	032312	0.277	900	25	■	
1510265015	60	x	500	x	1,5	63	032329	0.321	1350	50	■	
10150615	80	x	200	x	1,5	35	032336	0.165	3500	50	■	
10150715	80	x	240	x	1,5	42	032343	0.198	2400	50	■	
10150815	80	x	300	x	1,5	53	032350	0.255	2550	50	■	
10150915	100	x	140	x	1,5	32	032367	0.144	3500	50	■	
10151015	100	x	200	x	1,5	45	032374	0.206	2400	50	■	
10151115	100	x	240	x	1,5	54	032381	0.247	2400	50	■	
10156515	100	x	260	x	1,5	59	032398	0.268	2550	50	■	
10151215	100	x	300	x	1,5	68	032404	0.309	2550	50	■	
10151315	100	x	400	x	1,5	90	032411	0.412	900	20	■	
10151415	100	x	500	x	1,5	113	032428	0.515	900	20	■	
10151515	120	x	200	x	1,5	55	032435	0.247	2400	50	■	
10151615	120	x	240	x	1,5	66	032442	0.296	2400	50	■	
10156615	120	x	260	x	1,5	72	032459	0.321	1700	50	■	
10151715	120	x	300	x	1,5	83	032466	0.371	1700	50	■	
10151815	120	x	400	x	1,5	110	032473	0.371	675	15	■	
10151915	120	x	500	x	1,5	38	032480	0.618	675	15	■	
1510231115	140	x	300	x	1,5	98	032497	0.473	1200	25	■	
10152015	140	x	400	x	1,5	130	032503	0.577	675	15	■	
10152115	140	x	500	x	1,5	163	032510	0.721	675	15	■	
10152215	160	x	400	x	1,5	150	032534	0.659	675	15	■	
10152315	160	x	500	x	1,5	188	032558	0.824	675	15	■	
10152415	180	x	400	x	1,5	170	032589	0.741	675	15	■	
10152515	180	x	500	x	1,5	209	032596	0.927	600	15	■	
10156715	200	x	300	x	1,5	143	032602	0.618	480	15	■	

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BRACING STRIPS / ROLLED TIE STRAP CONNECTIONS

10

TOPLINE GREENLINE

BRACING STRIPS / ROLLED TIE STRAP CONNECTIONS

BRACING STRIP TYPE Z

- Metre marking [1]
- Galvanised edges [2]
- 25% less weight [3]
- Higher tensile strength
- CE [4]

[1] Metre marking
GH TOP bracing strips in 40 and 60 sizes in 50 m length have a metre marking from 1 to 50 metres. This eliminates the tedious measuring of the bracing strips and it is always possible to see how many metres are left on the roll, which minimises unnecessary storage costs for opened rolls.

[2] Galvanised edges
We also have the possibility to supply bracing strips in size 40 or 60 in a length of 50 metres with galvanised edges.

[3] 25% less weight
In comparison to the standard bracing strip in 2 mm thickness, we have 25% reduction in weight.
This makes work on the building site easier as well as in stocking and commissioning.

[4] CE
GH bracing strips are EN 14595 CE-certified.

Basics of statics **from page 264**
Products & statics **from page 266**

ROLLED STRAP TIES

- For optimum introduction of the load into the roof or timber construction

Products **from page 270**

BRACING STRIPS / ROLLED STRAP TIES

ASSORTMENT

								Basics Statics from page	Products & Statics from page
BRACING STRIP TYPE Z	GREENLINE		CE	350 GD Z275	NKL 2			264	266
BRACING STRIP 3.0 MM			CE	250 GD Z275	NKL 2			264	268
MOUNTING STRIP IN PLASTIC BOX				250 GD Z275	NKL 2				268
ROLLED STRAP TIES	TOPLINE			250 GD Z275	NKL 2				270

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CE symbol

Steel with indication of the steel quality and galvanisation

Timber/timber connection

Timber/concrete-connection

Usage class 1
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 65% for a few weeks per year, e.g. in the case of buildings that are closed on all sides and heated.
Comment: In UC 1, the average moisture content of most softwoods does not exceed 12 %.

Usage class 2
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 85% for a few weeks per year, e.g. in the case of open buildings covered by a roof.
Comment: In UC 2, the average moisture content of most softwoods does not exceed 20 %.

Usage class 3
Includes climatic conditions that lead to higher moisture contents than in UC 2, e.g. structures that are exposed to the weather without protection. Eurocode 5 / DIN EN 1995-1-1 section 2.3.1.3

GH TRAINING - KNOWLEDGE IS THE KEY TO SUCCESS

In our training room for up to 50 persons, we show participants application examples from practice. All GH products are actively explained and clarified.

So that we are not only able to help our customers by telephone in all regions, GH regularly offers efficient training for its employees. This is the only way we can be a contact partner for you who goes beyond technology in the future.

INSERT WIND BRACING STRIP

TECHNICAL FEATURES

Geometry

W(B)	Width [mm]
L	Length [mm]
T(S)	Material thickness [mm]

Tables

VM	Connecting element Ø x length [mm]
$R_{1,k}$	Characteristic load capacity VM [kN]
$R_{1,d}$	Design value of load capacity VM [kN]
$R_{t,k}$ [kN]	Characteristic tension load capacity [kN]
$R_{t,d}$ [kN]	Design value of tension load capacity

Load directions

F_1 →	Tensile load

Timber connecting element

GH threaded nails ETA-13/0523 Ø 4.0xL [mm]
GH wood connector screws ETA-13/0523 Ø 5.0xL [mm]

10

350 GD Z275 **Steel with indication of the steel quality and galvanisation**

Timber/timber connection

Timber/concrete-connection

NKL 1 **Usage class 1**
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 65% for a few weeks per year, e.g. in the case of buildings that are closed on all sides and heated.
Comment: In UC 1, the average moisture content of most softwoods does not exceed 12 %.

NKL 2 **Usage class 2**
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 85% for a few weeks per year, e.g. in the case of open buildings covered by a roof.
Comment: In UC 2, the average moisture content of most softwoods does not exceed 20 %.

NKL 3 **Usage class 3**
Includes climatic conditions that lead to higher moisture contents than in UC 2, e.g. structures that are exposed to the weather without protection. Eurocode 5 / DIN EN 1995-1-1 section 2.3.1.3

INSERT WIND BRACING STRIP

APPLICATIONS

Application:
Bracing strips are used to diagonally brace roof and wall constructions.

Materials:

350 GD Z275

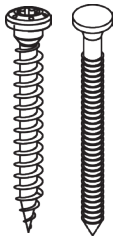
250* GD Z275

Material thicknesses:
1.5 and *3.0 mm

For use in usage classes

NKL 1

NKL 2



Connecting element:
GH threaded nails 4.0 x 35 / 40 / 50 / 60 / 75 / 100 mm
GH screws 5.0 x 25 / 35 / 40 / 50 / 60 / 70 mm

Connecting elements from page 274

Minimum and edge spacing

		Force parallel to the grain	Force at a right angle to the grain	Angle	
a_1	in grain direction	10d	5d	0°≤α≤360°	(5+5cosα)d
a_2	Right angle to the grain direction	5d	5d	0°≤α≤360°	5d
$a_{3,t}$	End grain with stress	15d	10d	-90°≤α≤90°	(10+5cosα)d
$a_{3,c}$	End grain without stress	10d	10d	90°≤α≤270°	10d
$a_{4,t}$	Loaded edge	5d	7d	0°≤α≤180°	(5+2sinα)d
$a_{4,c}$	Unloaded edge	5d	5d	180°≤α≤360°	5d
See EN 1995-1-1 Tab.8.2 for more brackets between force and grain					

Minimum spacing according to EN 1995-1-1 for threaded nails and wood connector screws

General information
In the standardised application of roof reinforcement, the number of nails under compliance with the edge and axis spacing at the end points is decisive in accordance with Eurocode 5. By using GH connection plates page 271 and the corresponding connectors, more nails can be used and therefore higher load capacities achieved.

For a one-sided load on connection points, these must be protected against twisting, such as with GH cantilever brackets from **page 246** In case of higher loads, several bracing strips can be arranged next to each other.

For tensioning the bracing strip, the bracing strip tensioner art. no. 33000117, **page 371**, or the bracing strip tensioner with thread, art. no 33000121, **page 371**, for the GH joist tensioner must be used.

Design tables
The tables contain characteristic load capacities in kN. The load capacities of the connecting elements have been determined on the basis of ETA-13/0523 for GH connecting elements.

METRE MARKING
01
CE

TOP BRACING STRIP

"METRE MARK 1 - 50 METRES"

ADVANTAGES

- With CE symbol
- With optional galvanised edges
- Metre marking of 1 - 50 metres (size 40 and 60 in 50 m length)
- Installation without metre dimension
- Easier work due to low weight
- 25% less weight (freight cost savings)
- Easy unwinding and bracing
- Suitable for existing unrolling and tensioning systems

GREENLINE TOPLINE

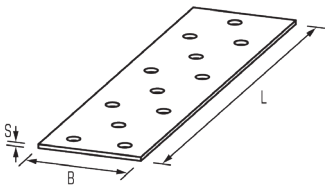
APPLICATION

Bracing strips are for diagonal bracing of roof constructions.

The bracing strip can be attached directly to the top or bottom of the rafter. The narrow thickness prevents any obstruction to the fastening of the roof battens, plasterboard, formwork or the like. At least 2 GH threaded nails 4.0 x 40 are necessary at each crosspoint with the timber construction.

If one bracing strip is not enough due to static reasons, 2 or more bracing strips can be arranged next to each other.

BRACING STRIP



TOPLINE GREENLINE EN 14545

NKL 2 350 GD Z275

Art. No.	Dimensions [mm]					EAN	Weight	Pallet	PU		
	W(B)	x	L	x	T(S)	4019346	kg				
4215	40	x	25000	x	1,5	017852	10.296	30	1	■	
4515* **	40	x	50000	x	1,5	140055	20.100	30	1	■	
6515* **	60	x	50000	x	1,5	140062	30.150	20	1	■	
8215	80	x	25000	x	1,5	140079	20.100	10	1	■	
453	40	x	50000	x	3,0	140017	40.500	10	1	■	

* With metre marking

** With optional galvanised edges

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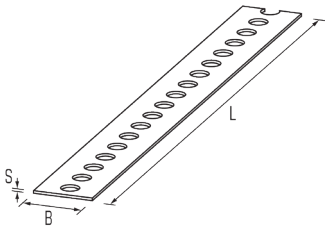
ASSEMBLY STRIP

IN PLASTIC BOX



NKL 2 250 GD Z275

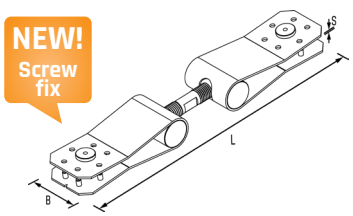
Art. No.	Dimensions [mm]						EAN	Weight	Pallet	PU		
	W(B)	x	L	x	T(S)	Ø	4019346	kg				
1101275	12	x	10000	x	0,75	5,2	046500	0.674	360	5	■	■
1101775	17	x	10000	x	0,75	6,5	046517	0.942	360	5	■	■
1102575	25	x	10000	x	0,75	8,5	046524	1.371	360	5	■	■

The assembly strip is suitable for fixing to timber and concrete/masonry

Art. No.	W(B)	L	T(S)		F1,Rt,k	F1,Rt,d
				Timber / Timber		
4215	40	25000	1,5		17,00	13,60
4515	40	50000	1,5		17,00	13,60
6515	60	50000	1,5		25,50	20,40
8215	80	25000	1,5		34,00	27,20
453	40	50000	3,0		26,70	21,40

Load capacity per GH threaded nail

	T(S)=1.5				T(S)=3.0			
	character.	Constant	Medium	Short	character.	Constant	Medium	Short
VM [mm]	$R_{1,k}$ [kN]	$R_{1,d}$ [kN]			$R_{1,k}$ [kN]	$R_{1,d}$ [kN]		
4.0 x 40	1,890	0,872	1,163	1,308	1,852	0,855	1,140	1,282
4.0 x 50	2,214	1,022	1,362	1,533	2,214	1,022	1,362	1,533
4.0 x 60	2,364	1,091	1,455	1,637	2,364	1,091	1,455	1,637
4.0 x 75	2,514	1,160	1,547	1,740	2,514	1,160	1,547	1,740



TOPLINE

NKL 2

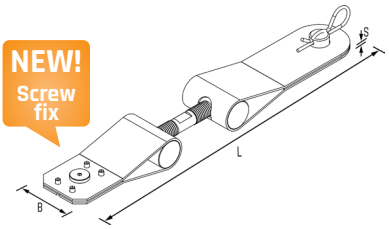
250 GD Z275

ROLLED STRAP TIE SYSTEM

SCREW FIX TENSIONER FOR BRACING STRIP

Art. No.	Type	Dimensions [mm]					nN	Thread	EAN	Weight	Pallet	PU
		W(B)	x	L	x	T(S)	Ø 5		4019346	kg		
110814	S40	40	x	300 bis 350	x	2,0	5+5	M12/SW10	025505	0.700	240	4
110816	S60	60	x	300 bis 375	x	2,0	7+7	M16/SW12	025512	1.325	240	4
110818	S80	80	x	300 bis 375	x	2,0	11+11	M16/SW12	025529	1.779	240	4

Incl. knurled nuts



TOPLINE

NKL 2

250 GD Z275

ROLLED STRAP TIE SYSTEM

SCREW FIX TENSIONER FOR CONNECTION PLATES

Art. No.	Type	Dimensions [mm]					nN	Thread	EAN	Weight	Pallet	PU
		W(B)	x	L	x	T(S)	Ø 5		4019346	kg		
1108211	SK40/60	60	x	300-350	x	2,0	5	M16/SW12	025567	1.597	192	4

For bracing strip 40 x 1.5/2.0 mm and 60 x 1.5/2.0 mm I incl. knurled nuts/bolts/spring plugs

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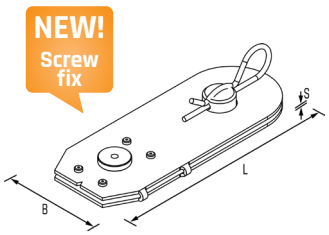


TOPLINE

NKL 2

250 GD Z275

ROLLED STRAP TIE SYSTEM

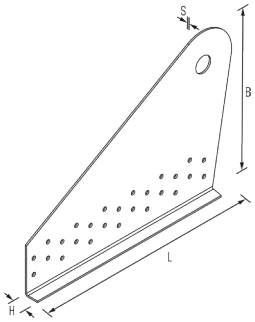
SCREW FIX COMBI CONNECTORS FOR CONNECTION PLATES

Art. No.	Type	Dimensions [mm]					nN	Thread	EAN	Weight	Pallet	PU
		W(B)	x	L	x	T(S)	Ø 5		4019346	kg		
1108201	KK40/60	60	x	157	x	2	5	-	025550	0.364	192	4

For bracing strip 40 x 1.5/2.0 mm and 60 x 1.5/2.0 mm I incl. knurled nuts/bolts/spring plugs

250 GD Z275

NKL 2



ROLLED STRAP TIE SYSTEM

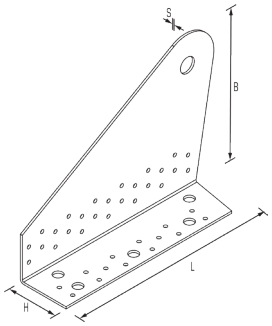
CONNECTION PLATE

Art. No.	Type	Dimensions [mm]							n	EAN	Weight	Pallet	*PU		
		W(B)	x	L	x	H	x	T(S)	Ø 21	4019346	kg		PAAR		
110931	A40	198	x	289	x	15	x	2,0	1,00	025451	1.368	48	1	■	

*1 x left / 1 x right

250 GD Z275

NKL 2



ROLLED STRAP TIE SYSTEM

CONNECTION PLATE

Art. No.	Type	Dimensions [mm]							n	EAN	Weight	Pallet	*PU		
		W(B)	x	L	x	H	x	T(S)	Ø 21	4019346	kg		PAAR		
110932	A60	198	x	289	x	63	x	3,0	1,00	025468	2.557	48	1	■	■

*1 x left / 1 x right

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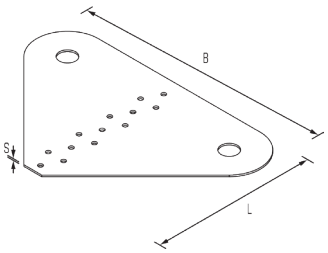
250 GD Z275

NKL 2



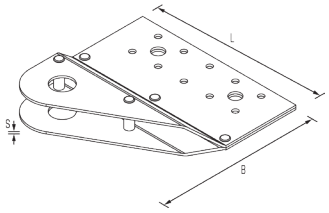
ROLLED STRAP TIE SYSTEM

CONNECTION PLATE

Art. No.	Type	Dimensions [mm]							n	EAN	Weight	Pallet	PU		
		W(B)	x	L	x	H	x	T(S)	Ø 21	4019346	kg				
110933	A40/60	190	x	290	x	2	x	2,0	2	025475	0.575	240	10	■	

ROLLED STRAP TIE SYSTEM

CONNECTION



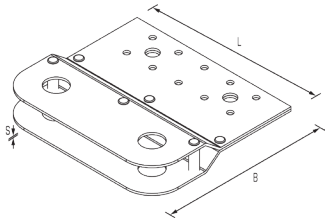
NKL 2

250 GD Z275

Art. No.	Type	Dimensions [mm]					n	EAN	Weight	Pallet	PU		
		W(B)	x	L	x	T(S)	Ø 17	4019346	kg				
110934	B1	216	x	238	x	3	2	025482	2.125	96	4	■	

ROLLED STRAP TIE SYSTEM

CONNECTION



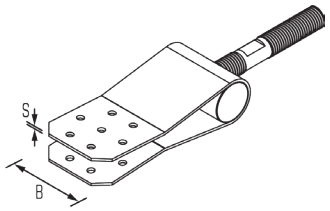
NKL 2

250 GD Z275

Art. No.	Type	Dimensions [mm]					n	EAN	Weight	Pallet	PU		
		W(B)	x	L	x	T(S)	Ø 17	4019346	kg				
110935	B2	216	x	238	x	3	2	025499	2.700	96	4	■	

10

The rolled strap tie is used in the system as a static construction element for roofs and halls, to absorb or dissipate wind and suction loads. The GH tensioning units and GH connection plates are suitable for rolled strap ties with material thicknesses 1.5/2.0 and 3.0 mm.



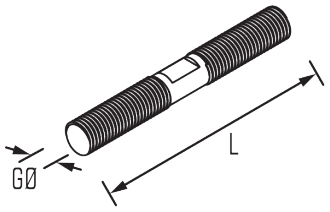
250 GD Z275

NKL 2

ROLLED STRAP TIE SYSTEM

CONNECTION

Art. No.	Type	Dimensions [mm]		nN	GØ	EAN	Weight	Pallet	PU		
		W(B)	T(S)	Ø 5		4019346	kg				
110940	B1/B2	40	2	7	16	026106	0.813	384	8	■	



250 GD Z275

NKL 2

ROLLED STRAP TIE SYSTEM

CONNECTION

Art. No.	Type	Dimensions [mm]	GØ	EAN	Weight	Pallet	PU		
		L		4019346	kg				
110941	Thread left+right	150	16	026113	0.550	560	8	■	

For connections to type B1 and B2 with threaded rods M16

CONNECTING ELEMENT

WOOD CONNECTOR SCREWS/THREADED NAILS/ROD DOWELS

GH CONNECTING ELEMENT

WOOD CONNECTOR SCREWS/NAILS/ROD DOWELS

GH WOOD CONNECTOR SCREWS

Due to their special geometry, GH screws can be used as an approved connection as an alternative to anchors or threaded nails. In solid timber and board plywood, the GH screw achieves higher load-bearing capacity values than anchor or threaded nails. In addition, the GH screw is approved for many joist hangers for installation on beech, OSB, laminated veneer lumber, hard fibreboard and resin-bonded chipboard.

Basics of statics **from page 278**
Products & statics **from page 280**

THREADED NAILS

Threaded nails are used where nails are stressed due to pull-out and shearing. They are driven into the timber just like nails, but hold like a screw. There is a tapered shoulder under the flat head, which means that the hole in the GH connector is always completely filled when the nail is driven in, resulting in force-fit, centred fastening.
GH threaded nails are used for fixing GH timber connectors in timber construction, engineering timber construction, carpentry work, building trades, etc.
GH threaded nails with embossed length information on the nail head for static verification.

Basics of statics **from page 278**
Products & statics **from page 282**

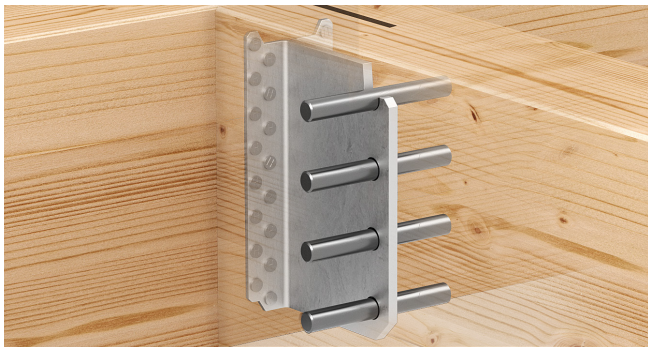
RAFTER NAILS

Rafter nails are used for load-bearing timber structures in roof construction, e.g. for purlin or rafter assemblies. The nail shaft has a barbed profile. This profiling allows a high permissible stress in the shaft direction (pull-out).

Products **from page 282**

ROD DOWELS

Rod dowels serve as a connecting element between timber connectors such as beam hangers or integral connectors. Furthermore, they are used in the assembly of columns on stanchions, for example. The drill hole in the timber may not be larger than the rod dowel diameter.



Products **from page 284**

GH CONNECTING ELEMENT

WOOD CONNECTOR SCREWS/NAILS/ROD DOWELS

								Basics Statics from page	Products & Statics from page	Products Made of V4A from page
GH WOOD CONNECTOR SCREWS		CE	Stahl VZ	NKL 2				278	280	
GH THREADED NAILS		CE	Stahl VZ	NKL 2	A4 1.4404	NKL 3		278	282	295
GH RAFTER NAILS		CE	Stahl VZ	NKL 2					282	
ROD DOWELS*		CE	235 JR galv. verzinkt	NKL 2					284	

* More steel qualities and galvanisations available on request.

S235 hot-dip galvanised
S355 galvanically and hot-dip galvanised
Stainless steel 1.4571 with usage class 3

11

CE symbol

Galvanised steel

Stainless steel with material number

Usage class 1
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 65% for a few weeks per year, e.g. in the case of buildings that are closed on all sides and heated.
Comment: In UC 1, the average moisture content of most softwoods does not exceed 12 %.

Usage class 2
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 85% for a few weeks per year, e.g. in the case of open buildings covered by a roof.
Comment: In UC 2, the average moisture content of most softwoods does not exceed 20 %.

Usage class 3
Includes climatic conditions that lead to higher moisture contents than in UC 2, e.g. structures that are exposed to the weather without protection. Eurocode 5 / DIN EN 1995-1-1 section 2.3.1.3

HUGE WAREHOUSE CAPACITY

WITH MORE THAN 4500 SQUARE METRES OF STORAGE SPACE AND 4800 PALLET SPACES

11

15,000,000 articles are produced and stocked per year!

Our team of experienced logistics specialists puts our products in our high-bay warehouse with the greatest of care. Thanks to state-of the-art technology, we always have the stock levels under control.

Due to this huge amount of stock items, we are capable of sending almost any size from our program to our customers on the day of ordering.

Thanks to intelligent warehouse logistics and an efficient material flow, throughput times can be reduced, costs can be reduced and processes sustainably optimised.
We also make sure that our shipping is climate-neutral, which takes account of increased environmental awareness.

GH SCREWS AND THREADED NAILS

TECHNICAL FEATURES

Geometry

$Ø_{[mm]}$	Diameter of connecting element
$L_{[mm]}$	Length of connecting element

Load directions

F_v ↓	Value of load capacity for shearing per shear joint of the connecting element [kN]
F_{ax} →	Value of load capacity when pulling out the connecting element [kN]

Design

R_d	Design value of load capacity [kN]
R_k	Characteristic value of load capacity [kN]
KLED	Classes of load impact duration according to EN 1995-1-1, chapter 2.3.1.2

Galvanised steel

Stainless steel with material number

Usage class 1
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 65% for a few weeks per year, e.g. in the case of buildings that are closed on all sides and heated.
Comment: In UC 1, the average moisture content of most softwoods does not exceed 12 %.

Usage class 2
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 85% for a few weeks per year, e.g. in the case of open buildings covered by a roof.
Comment: In UC 2, the average moisture content of most softwoods does not exceed 20 %.

Usage class 3
Includes climatic conditions that lead to higher moisture contents than in UC 2, e.g. structures that are exposed to the weather without protection. Eurocode 5 / DIN EN 1995-1-1 section 2.3.1.3

GH SCREWS AND THREADED NAILS

APPLICATIONS

Application:
Connections in timber with steel sheet formed parts up to 6.0 [mm] Material thickness. GH threaded nails and GH wood connection screws are used for connections of two- or three-dimensional timber connectors up to 6.0 [mm] material thickness, in load-bearing timber constructions without pre-drilling in compliance with the edge and centre spacing according to Eurocode 5, or the corresponding ETA of the connector.

Design

Threaded nail Ø 4.0 [mm]
BDesign as a thick sheet: Ab $t_{thick} \geq 1.5$ [mm]
Design as a thin sheet: Ab $t_{thin} \geq 0.9$ to 1.5 [mm]

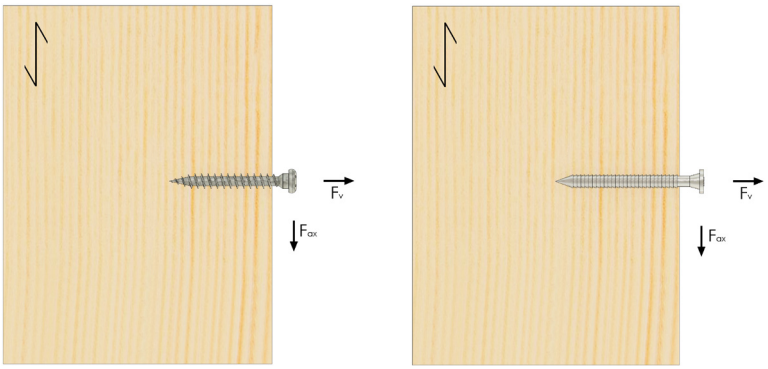
Threaded nail Ø 6.0 [mm]
Design as a thick sheet: Ab $t_{thick} \geq 3.0$ [mm]
Design as a thin sheet: Ab $t_{thin} \geq 2.0$ to 3.0 [mm]

GH wood connection screws Ø 5.0 [mm]
Design as a thick sheet: Ab $t_{thick} \geq 2,0$ [mm]
Design as a thin sheet: Ab $t_{thin} \geq 1,5$ to 2,0 [mm]
Linear interpolation can take place between t_{thin} and t_{thick}

For use in usage classes

Timber qualities
Construction beech
GH threaded nails 4.0 x 35 mm is approved for fixing in construction beech, without pilot drilling.

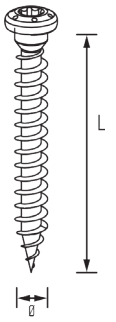
Load directions



Minimum spacing

Spacing		Minimum spacing			
		Without pilot drilling		With pilot drilling	
		Parallel to the grain	Right-angle to the grain	Parallel to the grain	Right-angle to the grain
a_1	in grain direction	10d	5d	5d	4d
a_2	Right angle to the grain direction	5d	5d	3d	4d
$a_{3,t}$	End grain with stress	15d	10d	12d	7d
$a_{3,c}$	End grain without stress	10d	10d	7d	7d
$a_{4,t}$	Loaded edge	5d	7d	3d	5d
$a_{4,c}$	Unloaded edge	5d	7d	3d	3d

For other brackets than those specified between force and grain see EN 1995-1-1 Tab. 8.2



ETA-13
0523

NKL 2

Stahl
VZ

GH SCREWS

FOR TIMBER CONNECTORS

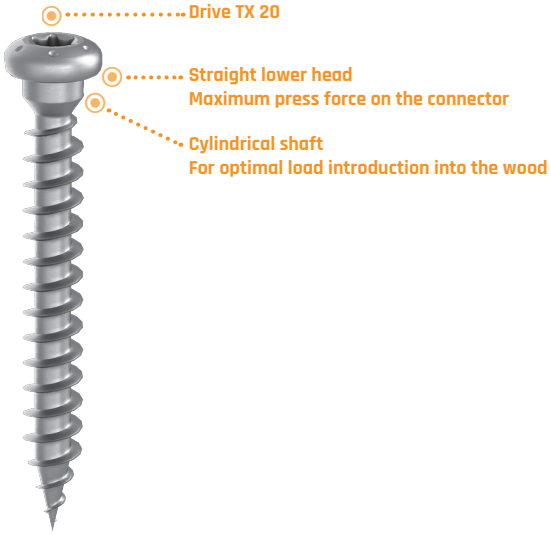
Art. No.	Dimensions [mm]			TX	EAN	Weight	Pallet	PU
	Ø	x	L		4019346	kg		
505025	5,0	x	25	TX20	400050	0.231	145000	500
505035	5,0	x	35	TX20	400005	0.323	145000	500
505040	5,0	x	40	TX20	400012	0.356	145000	500
505050	5,0	x	50	TX20	400029	0.427	72000	200
505060	5,0	x	60	TX20	400036	0.480	58000	200
505070	5,0	x	70	TX20	400043	0.554	58000	200

The **GH timber connector screw** can be used as an alternative to anchor/threaded nails due to its special geometry with approval for fastening to timber connectors. In solid timber and board plywood, the GH wood connector screw achieves higher load-bearing capacity values than anchor or threaded nails.

Special features of the GH wood connector screw

- Approved for fixing GH wood connectors as an alternative to the threaded nail
- Special head geometry with cylindrical lower head for optimum load distribution
- Only screw with approval in OSB (from 12 mm plate thickness)
- Connection can be released again
- This is the only screw to be used for a wide range of connections
  to timber components:
- Plywood according to EN 636 or ETA
- Solid wood boards according to EN 13353 and EN 13986
- Board plywood according to ETA
- Veneered wood according to EN 14374 or ETA
- Timber material according to ETA[1]
- Tensioning plates of technical classes P4 to P7 according to EN 312 or ETA
- OSB/3 and OSB/4 according to EN 300 or ETA

[1] if the ETA of the product contains specifications for the use of self-cutting screws,
the specifications of the ETA for the timber material shall apply.

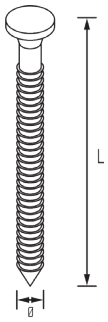


STATICS

Art. No.	Dimensions [mm]				Rk [kN]	Design value Rd according to KLED [kN]				
	Ø	X	L			Constant	Long	Medium	Short	Very short
505025	5	X	25	F_v	1,41	0,65	0,76	0,87	0,98	1,19
				F_{ax}	1,10	0,51	0,59	0,68	0,76	0,93
505035	5	X	35	F_v	1,83	0,84	0,98	1,12	1,26	1,55
				F_{ax}	1,63	0,75	0,88	1,00	1,13	1,38
505040	5	X	40	F_v	2,00	0,93	1,08	1,23	1,39	1,70
				F_{ax}	1,89	0,87	1,02	1,16	1,31	1,60
505050	5	X	50	F_v	2,14	0,99	1,15	1,31	1,48	1,81
				F_{ax}	2,42	1,11	1,30	1,49	1,67	2,04
505060	5	X	60	F_v	2,27	1,05	1,22	1,39	1,57	1,92
				F_{ax}	2,94	1,36	1,58	1,81	2,04	2,49
505070	5	X	70	F_v	2,40	1,11	1,29	1,48	1,66	2,03
				F_{ax}	3,47	1,60	1,87	2,13	2,40	2,93

Screws d=5 mm according to EN 1995-1-1 + ETA

THREADED NAILS



ETA-13
0523

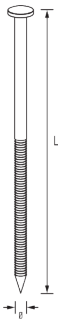
NKL 2

Stahl VZ

Art. No.	Dimensions [mm]			EAN	Weight	Pallet	Outer box	PU
	Ø	x	L	4019346	kg			
403	4,0	x	35*	210093	3.400	120000	3000	250
404	4,0	x	40	210017	4.200	120000	3000	250
405	4,0	x	50	210024	5.200	120000	3000	250
406	4,0	x	60	210031	6.100	120000	3000	250
407	4,0	x	75	210048	7.600	120000	2000	250
408	4,0	x	100	210055	10.200	90000	2000	250
606	6,0	x	60	210062	14.500	50000	1000	250
608	6,0	x	80	210079	19.000	50000	1000	250
601	6,0	x	100	210086	23.000	40000	1000	250

GH threaded nails with embossed length information on the nail head for static verification.
* Approval for fixing in construction beech, without pilot drilling

RAFTER NAILS



EN
14592

NKL 2

Stahl VZ

Art. No.	Dimensions [mm]			EAN	Weight	Pallet	PU
	Ø	x	L	4019346	kg		
39600080	6,0	x	80	230008	0.019	20000	250
39600110	6,0	x	110	230015	0.026	20000	250
39600150	6,0	x	150	230022	0.035	10000	250
39600180	6,0	x	180	230039	0.042	10000	100
39600210	6,0	x	210	230046	0.049	10000	100
39600230	6,0	x	230	230053	0.053	10000	100
39600260	6,0	x	260	230060	0.060	10000	100
39600280	6,0	x	280	230077	0.065	10000	100
39600300	6,0	x	300	230084	0.069	10000	100
39600330	6,0	x	330	230091	0.076	10000	100
39600360	6,0	x	360	230107	0.082	10000	100

STATICS

Art. No.					Rk [kN]	Design value Rd according to KLED [kN]				
	Ø	X	L			Constant	Long	Medium	Short	Very short
403	4	X	35	F_v	1,68	0,77	0,90	1,03	1,16	1,42
				F_{ax}	0,75	0,35	0,40	0,46	0,52	0,63
404	4	X	40	F_v	1,88	0,87	1,01	1,16	1,30	1,59
				F_{ax}	0,90	0,42	0,48	0,55	0,62	0,76
405	4	X	50	F_v	2,21	1,02	1,19	1,36	1,53	1,87
				F_{ax}	1,20	0,55	0,65	0,74	0,83	1,02
406	4	X	60	F_v	2,36	1,09	1,27	1,45	1,64	2,00
				F_{ax}	1,50	0,69	0,81	0,92	1,04	1,27
407	4	X	75	F_v	2,51	1,16	1,35	1,55	1,74	2,13
				F_{ax}	1,80	0,83	0,97	1,11	1,25	1,52
408	4	X	100	F_v	2,81	1,30	1,52	1,73	1,95	2,38
				F_{ax}	2,40	1,11	1,29	1,48	1,66	2,03
606	6	X	60	F_v	3,96	1,83	2,13	2,44	2,74	3,35
				F_{ax}	2,25	1,04	1,21	,38	1,56	1,90
608	6	X	80	F_v	4,75	2,19	2,56	2,93	3,29	4,02
				F_{ax}	3,15	1,45	1,70	1,94	2,18	2,67
601	6	X	100	F_v	4,98	2,30	2,68	3,06	3,45	4,21
				F_{ax}	3,60	1,66	1,94	2,22	2,49	3,05

Threaded nails according to EN 1995-1-1 + ETA

EN 14592

NKL 2

235 JR galv. verzinkt

ROD DOWELS

8 MM

Art. No.	Dimensions [mm]			EAN	Weight	PU
	Ø	x	L	4019346	kg	
08040	8	x	40	038505	1.560	250
08050	8	x	50	216385	2.000	100
08060	8	x	60	216392	2.340	100
08070	8	x	70	038529	2.730	100
08080	8	x	80	216248	3.120	100
08090	8	x	90	216255	3.510	100
08100	8	x	100	216262	3.900	100
08110	8	x	110	216422	4.250	100
08120	8	x	120	216279	4.680	100
08130	8	x	130	216446	5.100	100
08140	8	x	140	216286	5.460	100
08150	8	x	150	216453	5.900	100
08160	8	x	160	216460	6.200	100
08170	8	x	170	216477	6.600	100
08180	8	x	180	216484	7.000	100
08190	8	x	190	038635	7.410	100
08200	8	x	200	216491	7.800	100
081000	8	x	1000	217719	39.000	1

10 MM

Art. No.	Dimensions [mm]			EAN	Weight	PU
	Ø	x	L	4019346	kg	
01040	10	x	40	038659	6.200	100
01050	10	x	50	038666	6.200	100
01060	10	x	60	216361	3.720	100
01070	10	x	70	038697	5.000	100
01080	10	x	80	216101	5.000	100
01090	10	x	90	038727	5.000	100
10100	10	x	100	216118	6.200	100
10110	10	x	110	216538	6.800	100
10120	10	x	120	216293	7.440	100
10130	10	x	130	216552	8.100	100
10140	10	x	140	213094	8.680	100
10150	10	x	150	216125	9.300	100
10160	10	x	160	216576	9.920	100
10170	10	x	170	038802	11.160	100
10180	10	x	180	216583	11.160	100
10190	10	x	190	038833	12.400	100
10200	10	x	200	216132	12.400	100
10210	10	x	210	216590	13.000	100
10220	10	x	220	216606	13.600	100
10230	10	x	230	216613	14.300	100
10240	10	x	240	216620	14.900	100
10250	10	x	250	216637	15.500	50
10260	10	x	260	216644	16.100	50
10270	10	x	270	038857	17.300	50
10280	10	x	280	216651	17.300	50
10290	10	x	290	038864	18.600	50
10300	10	x	300	216668	18.600	50
10400	10	x	400	038871	24.800	100
101000	10	x	1000	217726	62.000	20

Further dimensions available on request.

All rod dowels also come in a hot-dip galvanised version, S355 galvanised and hot-dip galvanised and in stainless steel 1.4571 for use in usage class 3, available at short notice.

EN 14592

235 JR galv. verzinkt

NKL 2

ROD DOWELS

12 MM

Art. No.	Dimensions [mm]			EAN	Weight	PU
	Ø	x	L	4019346	kg	
01240	12	x	40	038888	4.500	100
01250	12	x	50	216149	4.500	100
01260	12	x	60	216002	5.340	100
01270	12	x	70	216019	6.230	100
01280	12	x	80	216026	7.120	100
01290	12	x	90	216033	8.010	100
12100	12	x	100	216040	8.900	100
12110	12	x	110	216705	9.790	100
12120	12	x	120	216057	10.680	100
12130	12	x	130	216729	11.570	100
12140	12	x	140	216064	12.460	100
12150	12	x	150	216071	13.350	100
12160	12	x	160	216088	14.240	100
12170	12	x	170	216743	15.100	100
12180	12	x	180	216750	16.020	100
12190	12	x	190	216767	16.900	100
12200	12	x	200	216095	17.800	100
12210	12	x	210	216774	18.700	100
12220	12	x	220	216781	19.600	100
12230	12	x	230	216798	20.500	100
12240	12	x	240	216804	21.200	100
12250	12	x	250	216811	22.300	50
12260	12	x	260	039021	23.100	50
12270	12	x	270	216828	24.000	50
12280	12	x	280	216835	25.000	50
12290	12	x	290	039038	24.800	50
12300	12	x	300	039045	24.800	50
12400	12	x	400	039052	33.000	50
121000	12	x	1000	216699	89.000	1

16 MM

Art. No.	Dimensions [mm]			EAN	Weight	PU
	Ø	x	L	4019346	kg	
16080	16	x	80	216903	12.600	50
16090	16	x	90	216910	14.200	50
16100	16	x	100	216156	15.800	50
16110	16	x	110	216927	17.400	50
16120	16	x	120	216316	19.000	50
16130	16	x	130	216941	20.500	50
16140	16	x	140	216323	22.100	50
16150	16	x	150	216163	23.700	50
16160	16	x	160	216330	25.300	50
16170	16	x	170	216965	26.900	50
16180	16	x	180	216972	28.400	50
16190	16	x	190	216989	30.000	50
16200	16	x	200	216170	31.600	50
16210	16	x	210	216996	33.200	50
16220	16	x	220	217009	34.800	50
16230	16	x	230	217016	36.300	50
16240	16	x	240	039069	37.900	50
16250	16	x	250	217023	39.500	25
16260	16	x	260	217030	41.000	25
16270	16	x	270	039076	37.900	25
16280	16	x	280	217047	37.900	25
16290	16	x	290	039083	47.500	25
16300	16	x	300	216187	47.500	25
16400	16	x	400	216194	63.200	25
161000	16	x	1000	217702	158.000	1

Further dimensions available on request.

All rod dowels also come in a hot-dip galvanised version, S355 galvanised and hot-dip galvanised and in stainless steel 1.4571 for use in usage class 3, available at short notice.

EN 14592

NKL 2

235 JR galv. verzinkt

ROD DOWELS

20 MM

Art. No.	Dimensions [mm]			EAN	Weight	PU
	Ø	x	L	4019346	kg	
20100	20	x	100	039090	29.600	50
20110	20	x	110	039106	29.640	50
20120	20	x	120	217078	29.600	50
20130	20	x	130	039113	32.110	50
20140	20	x	140	039120	34.580	50
20150	20	x	150	039137	37.500	50
20160	20	x	160	216347	39.500	50
20170	20	x	170	039144	44.500	50
20180	20	x	180	216354	44.500	25
20190	20	x	190	217085	46.900	25
20200	20	x	200	216200	49.500	25
20210	20	x	210	039151	51.870	25
20220	20	x	220	217092	55.000	25
20230	20	x	230	039168	59.280	25
20240	20	x	240	039175	59.280	25
20250	20	x	250	216217	61.800	25
20260	20	x	260	039182	62.300	25
20270	20	x	270	039199	69.200	25
20280	20	x	280	039205	69.200	25
20290	20	x	290	039212	74.100	25
20300	20	x	300	216224	74.100	25
20400	20	x	400	216231	99.000	25
201000	20	x	1000	217733	247.000	1

Further dimensions available on request.

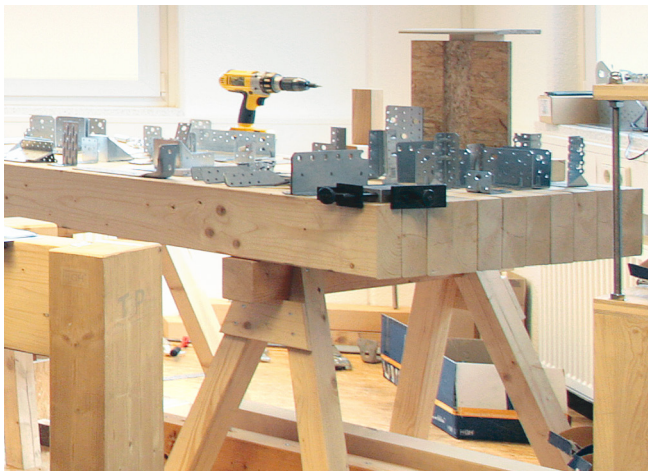
All rod dowels also come in a hot-dip galvanised version, S355 galvanised and hot-dip galvanised and in stainless steel 1.4571 for use in usage class 3, available at short notice.

GH TRAINING –

KNOWLEDGE IS THE KEY TO SUCCESS

11

Further training – an investment in the future.



We teach our training participants to the latest state of technology, also with regard to economics, efficient and environmental protection. Experienced lecturers work on solutions specific to the target group together with the participants.

In our training rooms for up to 50 people, theory and practice is taught in small training groups.
This allows us to accommodate every single participant and their specific questions.

So that we are not only able to help our customers by telephone in all regions, GH regularly offers efficient training for its employees. This is the only way we can be a contact partner for you who goes beyond technology in the future.

VASTAHL

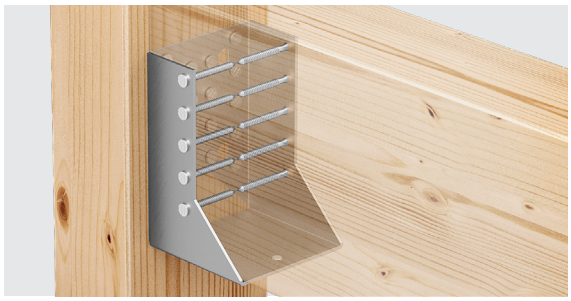
12

STAINLESS STEEL PRODUCTS

STAINLESS STEEL PRODUCTS

JOIST HANGER V4A, EXTERIOR AND INTERIOR

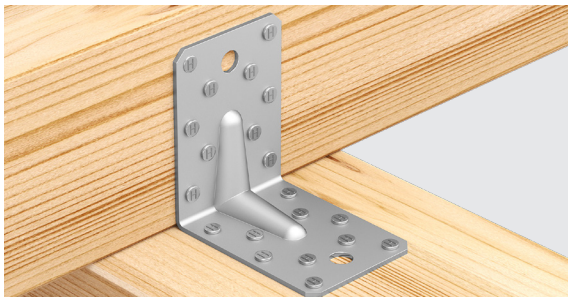
Standard joist hangers for connections between
- Timber/timber
- Timber/OSB via intermediate layer
- Timber/OSB only on timber board materials
- Timber/concrete
- Timber/steel



Products **from page 292**

ANGLE BRACKETS V4A

Angle brackets can be used for simple and quick connections between timber/timber, timber/concrete, timber/masonry, etc.



Products **from page 293**

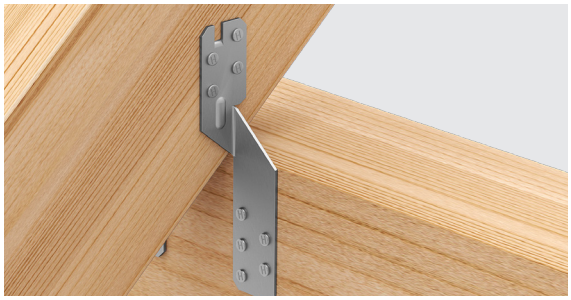
NAIL PLATE BRACKETS V4A

Nail plate brackets are used in a range of connections. Whether roofing or interior development, landscaping or for simple cross or joist connection.

Products **from page 294**

RAFTER ANCHORS V4A

Rafter anchors are used for connecting crossing timbers and serve to secure lifting loads.



Products **from page 295**

THREADED NAILS V4A

Threaded nails are used where nails are stressed due to pull-out and shearing. They are driven into the timber just like nails, but hold like a screw. There is a tapered shoulder under the flat head, which means that the hole in the GH connector is always completely filled when the nail is driven in, resulting in force-fit, centred fastening.
GH threaded nails are used for fixing GH timber connectors in timber construction, engineering timber construction, carpentry work, building trades, etc.

Products on page 295

STAINLESS STEEL PRODUCTS

ASSORTMENT

		Width [mm]	Height [mm]	Products from page
JOIST HANGER TYPE 04 COMBI	CE A4 1.4571 NKL 3	60-140	100-180	**292**
JOIST HANGER TYPE I 04 COMBI	CE A4 1.4571 NKL 3	60-140	100-180	**292**

		Height [mm]	Length [mm]	Width [mm]	Products from page
ANGLE BRACKET TYPE 55 / 70	CE A4 1.4571 NKL 3	70	70	55	**293**
ANGLE BRACKET TYPE 65 / 90 S	CE A4 1.4571 NKL 3	90	90	65	**293**
ANGLE BRACKET TYPE 90 / 100 S	CE A4 1.4571 NKL 3	100	100	90	**293**
ANGLE BRACKET TYPE 40 / 90	CE A4 1.4571 NKL 3	90	90	40	**294**
NAIL PLATE BRACKET	CE A4 1.4571 NKL 3	40-60	40-60	40-60	**294**
RAFTER ANCHORS	CE A4 1.4571 NKL 3		170-250	36	**295**

		Ø [mm]	Length [mm]	Products from page
THREADED NAILS	A4 1.4404 NKL 3	4-6	40-60	**295**

CE symbol

Stainless steel with material number

Timber/timber connection

Timber/concrete-connection

Timber/metal-connection

GH wood connectors are made exclusively of material 1.4571 (V4A). The material 1.4571 complies with the specifications in Eurocode 5 and fulfils the requirements of usage class 3. Fastening elements such as threaded nails, screws or dowels must also fulfil the requirements of usage class 3. The load capacities may need to be checked depending on the application.

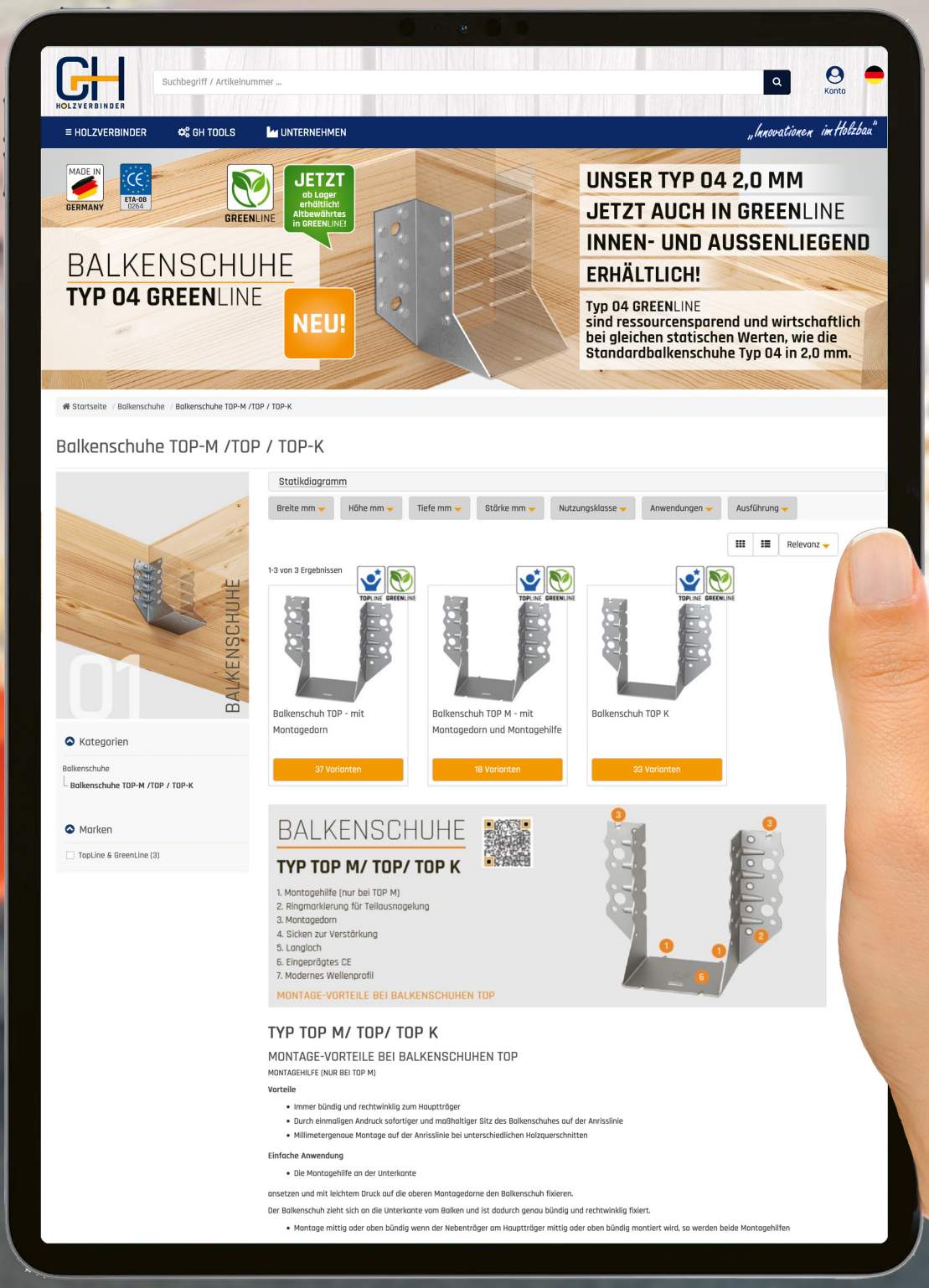
Usage class 1
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 65% for a few weeks per year, e.g. in the case of buildings that are closed on all sides and heated.
Comment: In UC 1, the average moisture content of most softwoods does not exceed 12 %.

Usage class 2
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 85% for a few weeks per year, e.g. in the case of open buildings covered by a roof.
Comment: In UC 2, the average moisture content of most softwoods does not exceed 20 %.

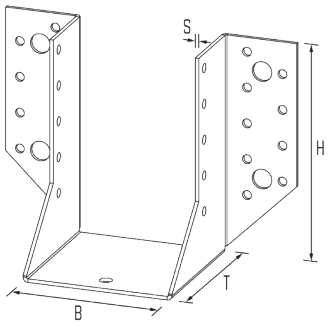
Usage class 3
Includes climatic conditions that lead to higher moisture contents than in UC 2, e.g. structures that are exposed to the weather without protection.
Eurocode 5 / DIN EN 1995-1-1 section 2.3.1.3

At **www.holzverbinder.de** you will find plenty of information on our GH products.

You can also download approvals, static calculations, drawings and CAD files in the article group area.



www.holzverbinder.de



JOIST HANGERS

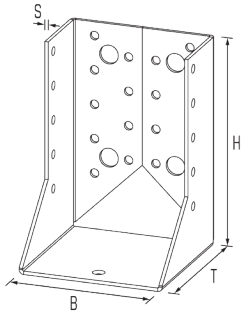
TYPE 04 OUTSIDE V4A STAINLESS STEEL

ETA-08 0264

NKL 3

A4 1.4571

Art. No.	Dimensions [mm]							nH	nN	nH	EAN	Weight	Pallet	PU			
	W(B)	x	H	x	D(T)	x	T(S)	Ø 5	Ø5	Ø 11	4019346	kg					
30502KA4	60	x	100	x	80	x	2,0	14	8	4x9	220009	0.282	1200	50	■		■
30505KA4	80	x	120	x	80	x	2,0	18	10	4	220016	0.370	1200	50	■		■
30508KA4	100	x	140	x	80	x	2,0	22	12	4	220023	0.440	1200	50	■		■
30511KA4	120	x	160	x	80	x	2,0	26	14	6	220030	0.507	600	25	■		■
30514KA4	140	x	180	x	80	x	2,0	30	16	6	220047	0.577	600	25	■		■



JOIST HANGERS

TYPE 04 INSIDE V4A STAINLESS STEEL

ETA-08 0264

NKL 3

A4 1.4571

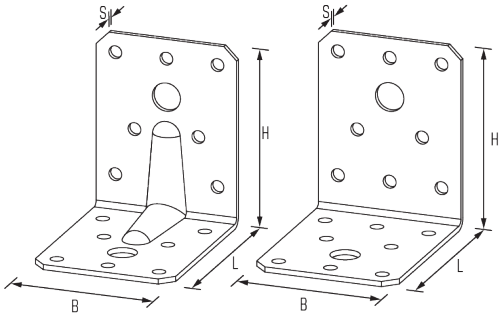
Art. No.	Dimensions [mm]							nH	nN	nH	EAN	Weight	Pallet	PU			
	W(B)	x	H	x	D(T)	x	T(S)	Ø 5	Ø5	Ø 11	4019346	kg					
30502IKA4	60	x	100	x	80	x	2,0	8	8	4x9	220504	0.270	1200	50	■		■
30505IKA4	80	x	120	x	80	x	2,0	18	10	4	220511	0.370	1200	50	■		■
30508IKA4	100	x	140	x	80	x	2,0	22	12	4	220528	0.440	1200	50	■		■
30511IKA4	120	x	160	x	80	x	2,0	26	14	6	220535	0.507	600	25	■		■
30514IKA4	140	x	180	x	80	x	2,0	30	16	6	220542	0.577	600	25	■		■

Other items and dimensions in stainless steel A4 (rust-free) available on request

ETA-09 0323

A4 1.4571

NKL 3



ANGLE BRACKETS

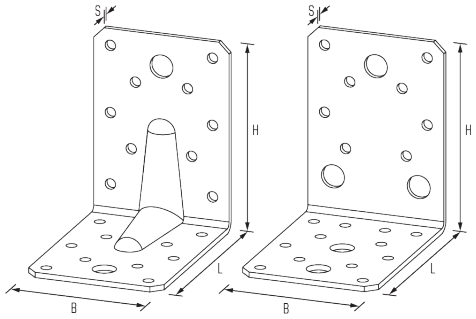
TYPE 55/70 V4A STAINLESS STEEL

Art. No.	Rib	Dimensions [mm]							nN	nBo	EAN	Weight	Pallet	PU		
		H	x	L	x	W(B)	x	T(S)	Ø 5	Ø 11	4019346	kg				
5501SA4	with	70	x	70	x	55	x	2,0	14	2	220145	0.104	4800	100	■	■
5502SA4	without	70	x	70	x	55	x	2,0	16	2	220108	0.103	4800	100	■	■

ETA-09 0323

A4 1.4571

NKL 3



ANGLE BRACKETS

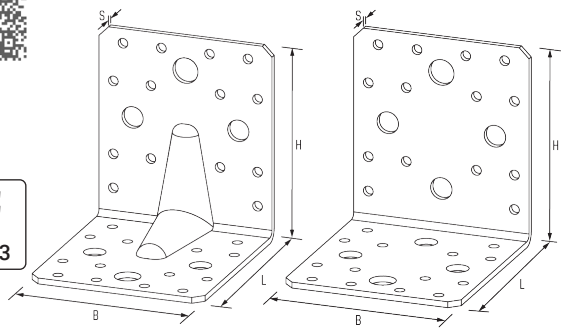
TYPE 65/90 V4A STAINLESS STEEL

Art. No.	Rib	Dimensions [mm]							nN	nBo	EAN	Weight	Pallet	PU		
		H	x	L	x	W(B)	x	T(S)	Ø 5	Ø 11	4019346	kg				
6503SA4	with	90	x	90	x	65	x	2,5	20	2	221600	0.185	4800	100	■	■
6504SA4	without	90	x	90	x	65	x	2,5	20	5	221617	0.185	4800	100	■	■

ETA-09 0323

A4 1.4571

NKL 3



ANGLE BRACKETS

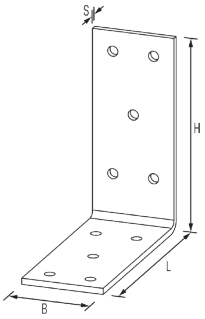
TYPE 90/100 V4A STAINLESS STEEL

Art. No.	Rib	Dimensions [mm]							nN	nBo	nBo	EAN	Weight	Pallet	PU		
		H	x	L	x	W(B)	x	T(S)	Ø 5	Ø 11	Ø 13	4019346	kg				
9003SA4	with	100	x	100	x	90	x	2,5	28	4	4	220078	0.294	3000	50	■	■
9004SA4	without	100	x	100	x	90	x	2,5	28	6	6	220085	0.294	3000	50	■	■

Other items and dimensions in stainless steel A4 (rust-free) available on request

ANGLE BRACKETS

TYPE 40/90 V4A STAINLESS STEEL



ETA-09 0322

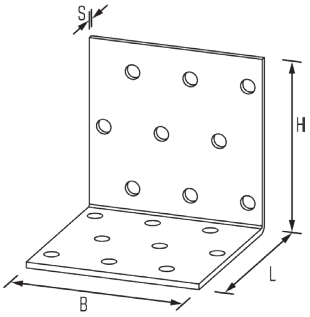
NKL 3

A4 1.4571

Art. No.	Dimensions [mm]							nN	EAN	Weight	Pallet	PU		
	H	x	L	x	W(B)	x	T(S)	Ø 5	4019346	kg				
994A4	90	x	90	x	40	x	2,0	10	220115	0.114	5100	100	■	

NAIL PLATE BRACKES

V4A STAINLESS STEEL



ETA-13 0900

NKL 3

A4 1.4571

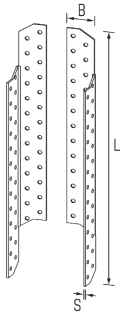
Art. No.	Dimensions [mm]							nN	EAN	Weight	Pallet	PU		
	H	x	L	x	W(B)	x	T(S)	Ø 5	4019346	kg				
10500A4	40	x	40	x	40	x	2,0	8	221402	0.046	14000	200	■	
10521A4	50	x	50	x	40	x	2,0	8	221419	0.073	14000	200	■	
10502A4	60	x	60	x	40	x	2,0	14	220139	0.069	6600	150	■	
10504A4	60	x	60	x	60	x	2,0	18	221426	0.103	7000	100	■	
10526A4	60	x	60	x	60	x	2,5	18	220122	0.130	7000	100	■	

Other items and dimensions in stainless steel A4 (rust-free) available on request

ETA-10 0007

A4 1.4571

NKL 3



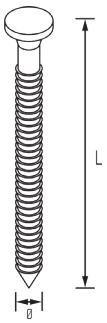
RAFTER ANCHORS

V4A STAINLESS STEEL

Art. No.	Dimensions [mm]					nN	EAN	Weight	Pallet	PU		
	L	x	W(B)	x	T(S)	Ø 5	4019346	kg				
100501A4	170	x	36	x	2,0	2x10	115206	0.092	8000	100	■	
100502A4	210	x	36	x	2,0	2x14	115213	0.128	8000	100	■	
100503A4	250	x	36	x	2,0	2x18	115282	0.165	4500	100	■	

A4 1.4404

NKL 3



THREADED NAILS

V4A STAINLESS STEEL

Art. No.	Dimensions [mm]			EAN	Weight	Pallet	Outer box	PU
	Ø	x	L	4019346	kg			
4044A4	4,0	x	40	221006	0.453	120000	3000	250
4055A4	4,0	x	50	221013	0.560	120000	3000	250
4066A4	4,0	x	60	221020	0.683	120000	3000	250
6066A4	6,0	x	60	221037	1.525	50000	-	200

Other items and dimensions in stainless steel A4 (rust-free) available on request

GH SCREWS

OVERVIEW

The new **GH wood connection screws S Drive** and **SK Drive** is available in the sustainable brown box.

GH WOOD CONSTRUCTION SCREW S DRIVE*

GH WOOD CONSTRUCTION SCREW SK DRIVE*

GH CONICAL HEAD SCREW KF
STAINLESS STEEL 1.4006

ETA-20 0403

ETA-12 0501

Screw packaging to protect the environment.
Ecological change is changing our society in general and **GH Baubeschläge** also wants to support this with commitment.

At **GH Baubeschläge** we therefore use sustainable brown boxes mainly based on recycled paper for our **GH wood construction screws S Drive** and **SK Drive**.

If we take our role as a manufacturer and our core expertise and the benefits of packaging in terms of protection and transportation seriously, we are equally committed to actively and sustainably reducing our environmental footprint.

GH SCREW PACKAGING

ADVANTAGES

1. Extra deep TX-drive with attachment chamfer
2. Shaft milling ribs for tension-free turning
3. Milling ribs on the head
4. Conical milling head
5. Notch drilling tip ,no pilot drilling
6. Fast thread
7. Thread to the tip
8. Special Gleitmot coating
9. Deep thread for optimum pull-out values
10. CE symbol
11. Approval ETA-12/0501
12. Approval ETA-20/0403

GH WOOD CONSTRUCTION SCREWS

ASSORTMENT

				Basics Statics from page	Products & Statics from page
GH WOOD CONSTRUCTION SCREW S DRIVE	CE	Stahl VZ	NKL 2	300	302
GH WOOD CONSTRUCTION SCREW SK DRIVE	CE	Stahl VZ	NKL 2	300	310
GH CONICAL HEAD SCREW KF	CE	A4 Edelstahl	NKL 3		314
TOP-FIX DUO WITH HEX HEAD AND TX DRIVE		Stahl VZ	NKL 2		316

CE symbol

Galvanised steel

Stainless steel

Usage class 1
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 65% for a few weeks per year, e.g. in the case of buildings that are closed on all sides and heated.
Comment: In UC 1, the average moisture content of most softwoods does not exceed 12 %.

Usage class 2
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 85% for a few weeks per year, e.g. in the case of open buildings covered by a roof.
Comment: In UC 2, the average moisture content of most softwoods does not exceed 20 %.

Usage class 3
Includes climatic conditions that lead to higher moisture contents than in UC 2, e.g. structures that are exposed to the weather without protection. Eurocode 5 / DIN EN 1995-1-1 section 2.3.1.3

MODERN WAREHOUSE AND LOGISTICS CAPACITY

AT THE WEILHEIM/TECK SITE

Performance with plenty of space.

Our GH wood connectors and GH wood construction screws are stored in a warehouse space of more than 4500 square metres with 4800 pallet spaces.
The ordered goods are ready to ship within a few hours.

From our location in Weilheim/Teck, our company supplies customers throughout Germany as far as France, Switzerland, Austria, Italy, the Benelux countries and beyond.

With 1176 modules, we have one of the most modern solar facilities in our area. Due to its power of 320 kWp, our system products around 300,000 kWh per year. This covers the annual needs of around 75 households with an average of 4 persons.

GH WOOD CONSTRUCTION SCREWS

TECHNICAL FEATURES

Geometry

d [mm]	Thread outer diameter
l [mm]	Length of screw
b [mm]	Effective thread length
d_k [mm]	Head diameter
d_1 [mm]	Core diameter
d_s [mm]	Shaft diameter
TX	Drive

Tables

$f_{tens,k,Stahl}$ [kN]	Tensile load capacity
$M_{y,k,Stahl}$ [Nm]	Yield moment
zul. Nz [kN]	Permissible value, axial (DIN)
zul. Nv [kN]	Permissible value, shearing (DIN)
α_{AD} [kN]	Attachment part
α_{ET} [kN]	Main component
α=90° / 0°	Force chamfer angle

Design

R_d	Design value of load capacity [kN]
R_k	Characteristic value of load capacity [kN]
KLED	Classes of load impact duration according to EN 1995-1-1, chapter 2.3.1.2

Galvanised steel

Usage class 1
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 65% for a few weeks per year, e.g. in the case of buildings that are closed on all sides and heated.
Comment: In UC 1, the average moisture content of most softwoods does not exceed 12 %.

Usage class 2
Moisture content in the building materials that corresponds to a temperature of 20° C and a relative humidity of the ambient air that only exceeds a value of 85% for a few weeks per year, e.g. in the case of open buildings covered by a roof.
Comment: In UC 2, the average moisture content of most softwoods does not exceed 20 %.

Usage class 3
Includes climatic conditions that lead to higher moisture contents than in UC 2, e.g. structures that are exposed to the weather without protection. Eurocode 5 / DIN EN 1995-1-1 section 2.3.1.3

GH WOOD CONSTRUCTION SCREWS

APPLICATIONS

Application:
Wood construction screws for constructive and statically loaded Connections

For use in usage classes

Minimum and edge spacing:
Spacing must be complied with according to ETA-20/0403

Design tables:

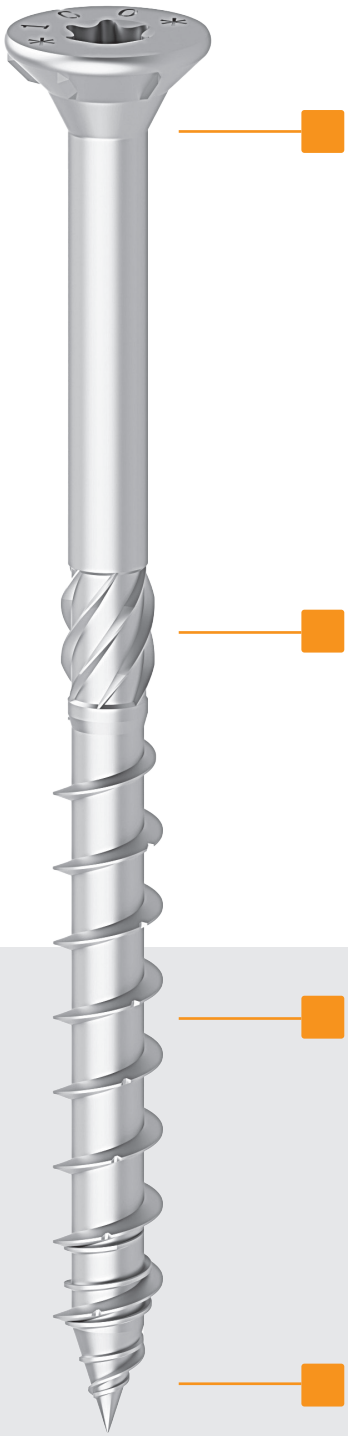
Timber attachment part
For connections, the minimum thickness of the attachment part must be observed

Attachment part	
d	$Ad_{min\ [mm]}$
8.0	30
10.0	40
12.0	80

Steel attachment part
For steel/timber connections, a minimum thickness of the attachment part must not be observed

GH WOOD CONSTRUCTION SCREW

S DRIVE



ETA-20
0403

The new **GH wood connection screw S Drive** is available in the sustainable brown box.

HEAD
The countersunk head demonstrates clear advantages due to the lower head ribs:

- Optimal countersinking
- Smooth movement
- Gentle on materials

SHAFT MILL
The shaft mill reduces the turn-in resistance

THREAD
Tough thread with patented guide thread, rolled to the tip:

- Faster screw connection
- Minimised explosive effect
- Lower torque during screw-in
- No pilot drilling necessary

TIP
Patented guide thread tip with rolled flanks to the tip

For advantages see page 297

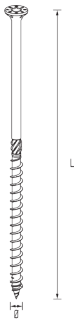
1 2 3 5 6 7 9 10 12

The **GH S Drive** wood construction screw is characterised by its fast screw fastening and lower torque when screwing in.

Tough thread incl. guide thread
patented guide thread.

Alternative head shape
Disc head **GH SK Drive.**

GH S DRIVE IN WHITE - BLUE GALVANISED



ETA-20 0403

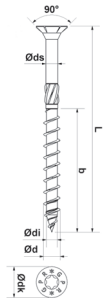
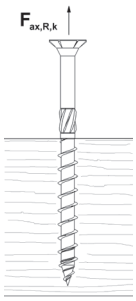
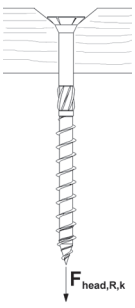
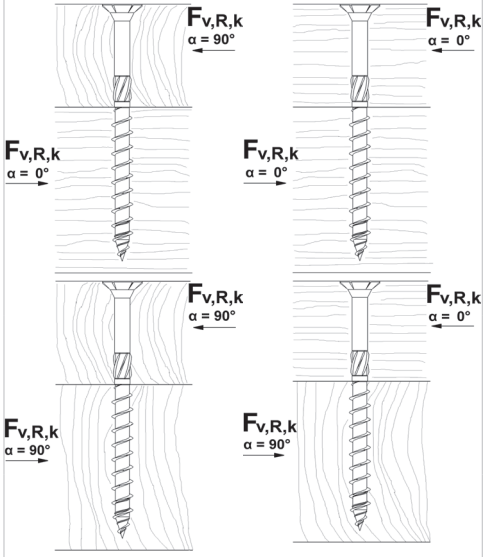
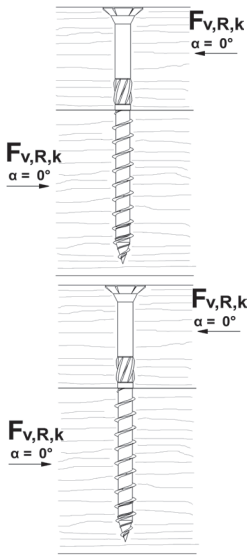
NKL 2

Stahl VZ

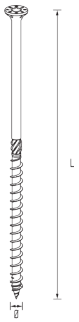
WOOD CONSTRUCTION SCREWS

GH S DRIVE

Art. No.	Dimensions [mm]				EAN	Weight	Pallet	PU
	Ø	x	L	TX	4019346	kg		
90140030	4,0	x	30/24	TX20	521502	0.162	290000	1000
90140040	4,0	x	40/30	TX20	521526	0.208	220000	1000
90140050	4,0	x	50/30	TX20	521533	0.255	145000	500
90140060	4,0	x	60/35	TX20	521540	0.302	110000	500
90140070	4,0	x	70/35	TX20	521557	0.349	72000	200
90145050	4,5	x	50/29	TX20	521564	0.327	110000	500
90145060	4,5	x	60/29	TX20	521571	0.385	72500	250
90145070	4,5	x	70/39	TX20	521588	0.443	58000	200
90145080	4,5	x	80/39	TX20	521595	0.501	44000	200
90150050	5,0	x	50/30	TX25	521601	0.408	90000	250
90150060	5,0	x	60/30	TX25	521618	0.481	72500	250
90150070	5,0	x	70/37	TX25	521625	0.554	58000	200
90150080	5,0	x	80/37	TX25	521632	0.627	44000	200
90150090	5,0	x	90//55	TX25	521649	0.700	29000	100
90150100	5,0	x	100/55	TX25	521656	0.773	29000	100
90150120	5,0	x	120/55	TX25	521663	0.919	29000	100
90160060	6,0	x	60/36	TX30	521670	0.717	44000	200
90160070	6,0	x	70/36	TX30	521687	0.833	44000	200
90160080	6,0	x	80/48	TX30	521694	0.949	29000	100
90160090	6,0	x	90/48	TX30	521700	1.065	29000	100
90160100	6,0	x	100/48	TX30	521717	1.181	29000	100
90160120	6,0	x	120/64	TX30	521731	1.413	29000	100
90160140	6,0	x	140/64	TX30	521755	1.645	22000	100
90160150	6,0	x	150/64	TX30	521762	1.739	22000	100
90160160	6,0	x	160/64	TX30	521779	1.877	22000	100
90160180	6,0	x	180/64	TX30	521786	1.994	22000	100
90160200	6,0	x	200/64	TX30	521793	2.341	22000	100
90160220	6,0	x	220/64	TX30	521809	2.573	16000	100
90160240	6,0	x	240/64	TX30	521816	2.805	16000	100
90160260	6,0	x	260/64	TX30	521823	3.037	16000	100
90160280	6,0	x	280/64	TX30	521830	3.114	14000	100
90160300	6,0	x	300/64	TX30	521847	3.501	14000	100

	Dimensions [mm]			Pull-out resistance		Head pull-through resistance		Shearing Timber - timber					Shearing Steel - timber		
															
Art. No.	Ø	L	b	zul. N_z	$F_{ax,R,k}$	zul. N_z	$F_{head,R,k}$	α=0°...90° zul. N	α_{AD}=90° α_{ET}=0° 1. $F_{v,R,k}$	1. $F_{v,R,k}$ 2. $F_{v,R,k}$	α=90° 3. $F_{v,R,k}$	α_{AD}=0° α_{ED}=90° 4. $F_{v,R,k}$	α=0°...90° zul. N	α=0° 1. $F_{v,R,k}$	α=90° 2. $F_{v,R,k}$
90140030	4,0	30	24												
90140040	4,0	40	30	0,60	1,78	0,32	1,09	a)	a)	a)	a)	a)	0,34	1,57	1,57
90140050	4,0	50	30	0,60	1,78	0,32	1,09	a)	a)	a)	a)	a)	0,34	1,57	1,57
90140060	4,0	60	35	0,70	2,07	0,32	1,09	0,27	1,06	1,06	1,06	1,06	0,34	1,64	1,64
90140070	4,0	70	35	0,70	2,07	0,32	1,09	0,27	1,07	1,07	1,07	1,07	0,34	1,64	1,64
90145050	4,5	50	29	0,65	1,80	0,41	1,43	a)	a)	a)	a)	a)	0,43	1,91	1,91
90145060	4,5	60	29	0,65	1,80	0,41	1,43	0,34	1,35	1,35	1,35	1,35	0,43	1,91	1,91
90145070	4,5	70	39	0,88	2,42	0,41	1,43	0,34	1,38	1,38	1,38	1,38	0,43	2,06	2,06
90145080	4,5	80	39	0,88	2,42	0,41	1,43	0,34	1,38	1,38	1,38	1,38	0,43	2,06	2,06
90150050	5,0	50	30	0,75	2,04	0,50	1,46	a)	a)	a)	a)	a)	0,53	2,25	2,25
90150060	5,0	60	30	0,75	2,04	0,50	1,46	0,43	1,46	1,46	1,46	1,46	0,53	2,25	2,25
90150070	5,0	70	37	0,93	2,52	0,50	1,46	0,43	1,58	1,58	1,58	1,58	0,53	2,37	2,37
90150080	5,0	80	37	0,93	2,52	0,50	1,46	0,43	1,59	1,59	1,59	1,59	0,53	2,37	2,37
90150090	5,0	90	55	1,38	3,74	0,50	1,46	0,43	1,59	1,59	1,59	1,59	0,53	2,67	2,67
90150100	5,0	100	55	1,38	3,74	0,50	1,46	0,43	1,59	1,59	1,59	1,59	0,53	2,67	2,67
90150120	5,0	120	55	1,38	3,74	0,50	1,46	0,43	1,59	1,59	1,59	1,59	0,53	2,67	2,67
90160060	6,0	60	36	1,08	2,81	0,72	2,10	0,58	1,76	1,76	1,76	1,76	0,77	3,01	3,01
90160070	6,0	70	36	1,08	2,81	0,72	2,10	0,61	1,98	1,98	1,98	1,98	0,77	3,01	3,01
90160080	6,0	80	48	1,44	3,74	0,72	2,10	0,61	1,96	1,96	1,96	1,96	0,77	3,25	3,25
90160090	6,0	90	48	1,44	3,74	0,72	2,10	0,61	1,96	1,96	1,96	1,96	0,77	3,25	3,25
90160100	6,0	100	48	1,44	3,74	0,72	2,10	0,61	2,16	2,16	2,16	2,16	0,77	3,25	3,25
90160120	6,0	120	64	1,92	4,99	0,72	2,10	0,61	2,16	2,16	2,16	2,16	0,77	3,56	3,56
90160140	6,0	140	64	1,92	4,99	0,72	2,10	0,61	2,16	2,16	2,16	2,16	0,77	3,56	3,56
90160150	6,0	150	64	1,92	4,99	0,72	2,10	0,61	2,16	2,16	2,16	2,16	0,77	3,56	3,56
90160160	6,0	160	64	1,92	4,99	0,72	2,10	0,61	2,16	2,16	2,16	2,16	0,77	3,56	3,56
90160180	6,0	180	64	1,92	4,99	0,72	2,10	0,61	2,16	2,16	2,16	2,16	0,77	3,56	3,56
90160200	6,0	200	64	1,92	4,99	0,72	2,10	0,61	2,16	2,16	2,16	2,16	0,77	3,56	3,56
90160220	6,0	220	64	1,92	4,99	0,72	2,10	0,61	2,16	2,16	2,16	2,16	0,77	3,56	3,56
90160240	6,0	240	64	1,92	4,99	0,72	2,10	0,61	2,16	2,16	2,16	2,16	0,77	3,56	3,56
90160260	6,0	260	64	1,92	4,99	0,72	2,10	0,61	2,16	2,16	2,16	2,16	0,77	3,56	3,56
90160280	6,0	280	64	1,92	4,99	0,72	2,10	0,61	2,16	2,16	2,16	2,16	0,77	3,56	3,56
90160300	6,0	300	64	1,92	4,99	0,72	2,10	0,61	2,16	2,16	2,16	2,16	0,77	3,56	3,56

a) Min. component thickness for timber/timer connections not achieved



ETA-20 0403

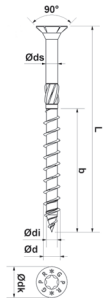
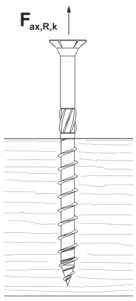
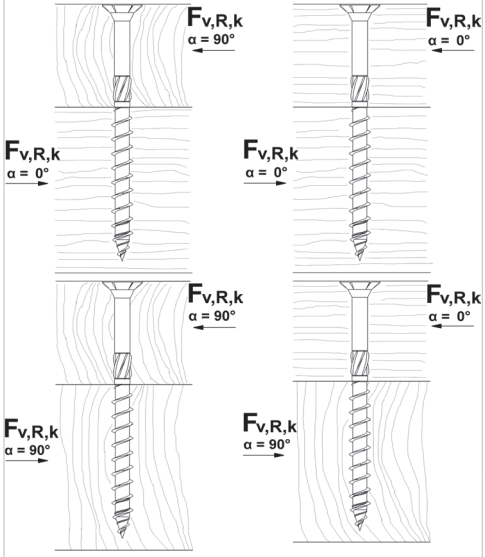
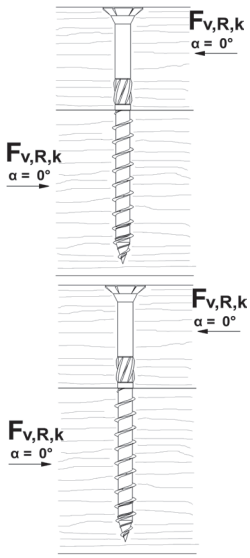
NKL 2

Stahl VZ

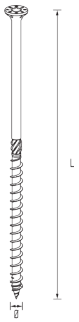
WOOD CONSTRUCTION SCREWS

GH S DRIVE

Art. No.	Dimensions [mm]				EAN	Weight	Pallet	PU
	Ø	x	L	TX	4019346	kg		
90180080	8,0	x	80/54	TX40	521854	1.814	21750	75
90180100	8,0	x	100/54	TX40	521861	2.224	16500	75
90180120	8,0	x	120/54	TX40	521878	2.634	16500	75
90180140	8,0	x	140/84	TX40	521885	3.044	16500	75
90180160	8,0	x	160/84	TX40	521892	3.454	16500	75
90180180	8,0	x	180/100	TX40	521908	3.864	12000	75
90180200	8,0	x	200/100	TX40	521915	4.274	12000	75
90180220	8,0	x	220/100	TX40	521922	4.684	12000	75
90180240	8,0	x	240/100	TX40	521939	5.094	10500	75
90180260	8,0	x	260/100	TX40	521946	5.504	10500	75
90180280	8,0	x	280/100	TX40	521953	5.914	10500	75
90180300	8,0	x	300/100	TX40	521960	6.324	10500	75
90180320	8,0	x	320/100	TX40	521977	6.734	8250	75
90180340	8,0	x	340/100	TX40	521984	7.144	8250	75
90180360	8,0	x	360/100	TX40	521991	7.554	8250	75
90180380	8,0	x	380/100	TX40	522004	7.964	8250	75
90180400	8,0	x	400/100	TX40	522011	8.374	8250	75

	Dimensions [mm]			Pull-out resistance		Head pull-through resistance		Shearing Timber - timber					Shearing Steel - timber		
															
Art. No.	Ø	L	b	zul. N_z	$F_{ax,R,k}$	zul. N_z	$F_{head,R,k}$	α=0°...90° zul. N	α_{AD}=90° α_{ET}=0° 1. $F_{v,R,k}$	1. $F_{v,R,k}$ 2. $F_{v,R,k}$	α=90° 3. $F_{v,R,k}$	α_{AD}=0° α_{ED}=90° 4. $F_{v,R,k}$	α=0°...90° zul. N	α=0° 1. $F_{v,R,k}$	α=90° 2. $F_{v,R,k}$
90180080	8,0	80	54	2,16	4,62	1,13	2,79	a)	a)	a)	a)	a)	1,36	6,18	5,29
90180100	8,0	100	54	2,16	4,62	1,13	2,79	1,10	3,68	4,25	3,50	3,89	1,36	6,18	5,29
90180120	8,0	120	54	2,16	4,62	1,13	2,79	1,10	3,68	4,25	3,50	3,89	1,36	6,18	5,29
90180140	8,0	140	84	3,36	7,19	1,13	2,79	1,10	3,89	4,25	3,62	3,89	1,36	6,82	5,94
90180160	8,0	160	84	3,36	7,19	1,13	2,79	1,10	3,89	4,25	3,62	3,89	1,36	6,82	5,94
90180180	8,0	180	100	4,00	8,56	1,13	2,79	1,10	3,89	4,25	3,62	3,89	1,36	7,16	6,28
90180200	8,0	200	100	4,00	8,56	1,13	2,79	1,10	3,89	4,25	3,62	3,89	1,36	7,16	6,28
90180220	8,0	220	100	4,00	8,56	1,13	2,79	1,10	3,89	4,25	3,62	3,89	1,36	7,16	6,28
90180240	8,0	240	100	4,00	8,56	1,13	2,79	1,10	3,89	4,25	3,62	3,89	1,36	7,16	6,28
90180260	8,0	260	100	4,00	8,56	1,13	2,79	1,10	3,89	4,25	3,62	3,89	1,36	7,16	6,28
90180280	8,0	280	100	4,00	8,56	1,13	2,79	1,10	3,89	4,25	3,62	3,89	1,36	7,16	6,28
90180300	8,0	300	100	4,00	8,56	1,13	2,79	1,10	3,89	4,25	3,62	3,89	1,36	7,16	6,28
90180320	8,0	320	100	4,00	8,56	1,13	2,79	1,10	3,89	4,25	3,62	3,89	1,36	7,16	6,28
90180340	8,0	340	100	4,00	8,56	1,13	2,79	1,10	3,89	4,25	3,62	3,89	1,36	7,16	6,28
90180360	8,0	360	100	4,00	8,56	1,13	2,79	1,10	3,89	4,25	3,62	3,89	1,36	7,16	6,28
90180380	8,0	380	100	4,00	8,56	1,13	2,79	1,10	3,89	4,25	3,62	3,89	1,36	7,16	6,28
90180400	8,0	400	100	4,00	8,56	1,13	2,79	1,10	3,89	4,25	3,62	3,89	1,36	7,16	6,28

a) Min. component thickness for timber/timer connections not achieved



ETA-20 0403

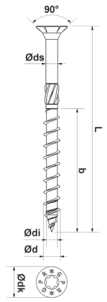
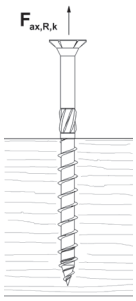
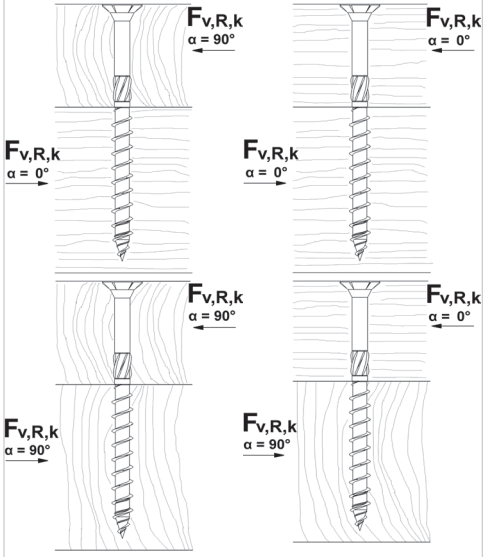
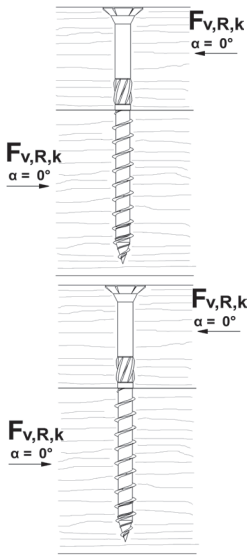
NKL 2

Stahl VZ

WOOD CONSTRUCTION SCREWS

GH S DRIVE

Art. No.	Dimensions [mm]				EAN	Weight	Pallet	PU
	Ø	x	L	TX	4019346	kg		
90110080	10,0	x	80/60	TX40	522028	2.793	14500	50
90110100	10,0	x	100/60	TX40	522035	3.234	11000	50
90110120	10,0	x	120/60	TX40	522042	3.828	11000	50
90110140	10,0	x	140/60	TX40	522059	4.422	11000	50
90110160	10,0	x	160/100	TX40	522066	5.016	11000	50
90110180	10,0	x	180/100	TX40	522073	5.610	11000	50
90110200	10,0	x	200/100	TX40	522080	6.204	8000	50
90110220	10,0	x	220/100	TX40	522097	6.798	8000	50
90110240	10,0	x	240/100	TX40	522103	7.392	8000	50
90110260	10,0	x	260/100	TX40	522110	7.986	8000	50
90110280	10,0	x	280/100	TX40	522127	8.580	7000	50
90110300	10,0	x	300/100	TX40	522134	9.174	7000	50
90110320	10,0	x	320/100	TX40	522141	9.768	5500	50
90110340	10,0	x	340/100	TX40	522158	10.362	5500	50
90110360	10,0	x	360/100	TX40	522165	10.956	5500	50
90110380	10,0	x	380/100	TX40	522172	11.550	5500	50
90110400	10,0	x	400/100	TX40	522189	12.144	5500	50

	Dimensions [mm]			Pull-out resistance		Head pull-through resistance		Shearing Timber - timber					Shearing Steel - timber		
															
Art. No.	Ø	L	b	zul. N_z	$F_{ax,R,k}$	zul. N_z	$F_{head,R,k}$	α=0°...90° zul. N	α_{AD}=90° α_{ET}=0° 1. $F_{v,R,k}$	1. $F_{v,R,k}$ 2. $F_{v,R,k}$	α=90° 3. $F_{v,R,k}$	α_{AD}=0° α_{ED}=90° 4. $F_{v,R,k}$	α=0°...90° zul. N	α=0° 1. $F_{v,R,k}$	α=90° 2. $F_{v,R,k}$
90110080	10,0	80	60	3,00	5,70	1,71	4,18	a)	a)	a)	a)	a)	2,13	8,14	6,90
90110100	10,0	100	60	3,00	5,70	1,71	4,18	1,60	4,48	5,47	4,25	5,12	2,13	8,14	6,90
90110120	10,0	120	60	3,00	5,70	1,71	4,18	1,70	5,28	5,79	4,91	5,28	2,13	8,14	6,90
90110140	10,0	140	60	3,00	5,70	1,71	4,18	1,70	5,28	5,79	4,91	5,28	2,13	8,14	6,90
90110160	10,0	160	100	5,00	9,50	1,71	4,18	1,70	5,28	5,79	4,91	5,28	2,13	9,09	7,85
90110180	10,0	180	100	5,00	9,50	1,71	4,18	1,70	5,28	5,79	4,91	5,28	2,13	9,09	7,85
90110200	10,0	200	100	5,00	9,50	1,71	4,18	1,70	5,28	5,79	4,91	5,28	2,13	9,09	7,85
90110220	10,0	220	100	5,00	9,50	1,71	4,18	1,70	5,28	5,79	4,91	5,28	2,13	9,09	7,85
90110240	10,0	240	100	5,00	9,50	1,71	4,18	1,70	5,28	5,79	4,91	5,28	2,13	9,09	7,85
90110260	10,0	260	100	5,00	9,50	1,71	4,18	1,70	5,28	5,79	4,91	5,28	2,13	9,09	7,85
90110280	10,0	280	100	5,00	9,50	1,71	4,18	1,70	5,28	5,79	4,91	5,28	2,13	9,09	7,85
90110300	10,0	300	100	5,00	9,50	1,71	4,18	1,70	5,28	5,79	4,91	5,28	2,13	9,09	7,85
90110320	10,0	320	100	5,00	9,50	1,71	4,18	1,70	5,28	5,79	4,91	5,28	2,13	9,09	7,85
90110340	10,0	340	100	5,00	9,50	1,71	4,18	1,70	5,28	5,79	4,91	5,28	2,13	9,09	7,85
90110360	10,0	360	100	5,00	9,50	1,71	4,18	1,70	5,28	5,79	4,91	5,28	2,13	9,09	7,85
90110380	10,0	380	100	5,00	9,50	1,71	4,18	1,70	5,28	5,79	4,91	5,28	2,13	9,09	7,85
90110400	10,0	400	100	5,00	9,50	1,71	4,18	1,70	5,28	5,79	4,91	5,28	2,13	9,09	7,85

a) Min. component thickness for timber/timer connections not achieved

Features of GH S Drive

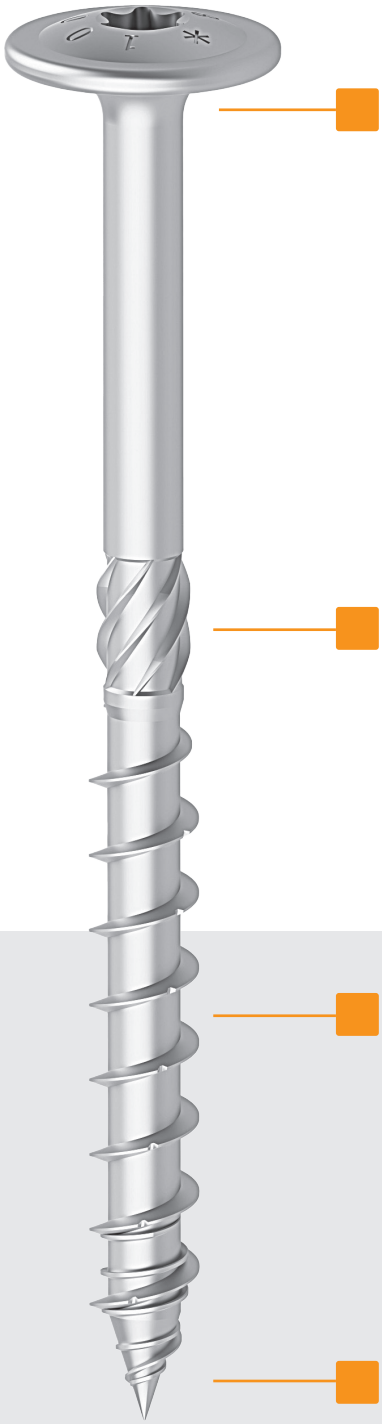
	Ø 4.0	Ø 4.5	Ø 5.0	Ø 6.0	Ø 8.0	Ø 10.0
d_k	8.0	9.0	10.0	12.0	15.0	18.5
d_l	2.6	2.8	3.3	4.0	5.3	6.2
d_s	2.8	3.2	3.5	4.3	5.9	7.1
TX	20	20	25	30	40	40
$f_{tens,k,Stahl}$	5.0	5.8	8.8	12.8	22.7	33.2
$My_{,k,Stahl}$	3.2	4.9	6.5	10.1	22.6	33.0

Washer

			Ø 6.0	Ø 8.0	Ø 10.0
Diameter		[mm]	22.0	28.0	35.0
Height		[mm]	4.5	6.0	7.0
Head pull-through parameters	Washer	[N/mm²]	20.4	13.7	9.2
	Countersunk head	[N/mm²]	14.6	12.4	12.2
	Plate head	[N/mm²]	16.7	17.6	15.2
Head pull-through resistance	Washer	[kN]	9.87	10.74	11.27
	Countersunk head	[kN]	2.10	2.79	4.18
	Plate head	[kN]	3.27	7.04	9.5

GH WOOD CONSTRUCTION SCREW

SK DRIVE



CE ETA-20 0403

The new **GH wood connection screw SK Drive** is available in the sustainable brown box.

HEAD
The disc head has clear advantages:

- High pull-through values without washer
- Smooth movement
- Gentle on materials

SHAFT MILL
The shaft mill reduces the turn-in resistance

THREAD
Tough thread with patented guide thread, rolled to the tip:

- Faster screw connection
- Minimised explosive effect
- Lower torque during screw-in
- No pilot drilling necessary

TIP
Patented guide thread tip with rolled flanks to the tip

For advantages see screw overview on page 297

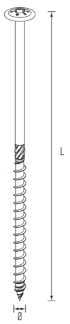
1 2 5 6 7 9 10 12

The GH **SK Drive** wood construction screw is characterised by its fast screw fastening and lower torque when screwing in.

Tough thread incl. guide thread
patented guide thread.

Alternative head shape
Countersunk head **GH S Drive.**

GH SK DRIVE IN WHITE - BLUE GALVANISED



WOOD CONSTRUCTION SCREWS

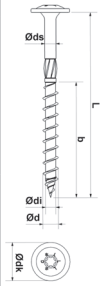
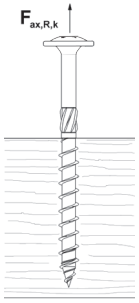
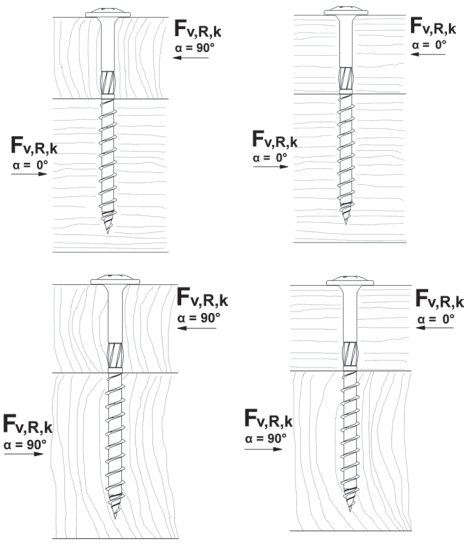
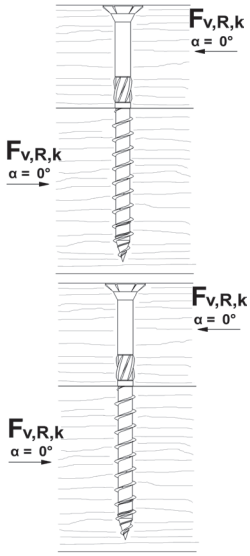
GH SK DRIVE

ETA-20 0403

NKL 2

Stahl VZ

Art. No.	Dimensions [mm]				EAN	Weight	Pallet	PU
	Ø	x	L	TX	4019346	kg		
90360060	6,0	x	60/36	TX30	522196	0.880	36000	100
90360080	6,0	x	80/48	TX30	522202	1.060	29000	100
90360100	6,0	x	100/48	TX30	522219	1.360	22000	100
90360120	6,0	x	120/64	TX30	522226	1.560	22000	100
90360140	6,0	x	140/64	TX30	522233	1.960	22000	100
90360160	6,0	x	160/64	TX30	522240	2.200	11000	50
90360180	6,0	x	180/64	TX30	522257	2.440	11000	50
90360200	6,0	x	200/64	TX30	522264	2.680	8000	50
90380080	8,0	x	80/54	TX40	522271	2.043	14500	50
90380100	8,0	x	100/54	TX40	522288	2.455	11000	50
90380120	8,0	x	120/54	TX40	522295	2.867	11000	50
90380140	8,0	x	140/84	TX40	522301	3.279	11000	50
90380160	8,0	x	160/84	TX40	522318	3.691	8000	50
90380180	8,0	x	180/100	TX40	522325	4.103	8000	50
90380200	8,0	x	200/100	TX40	522332	4.515	8000	50
90380220	8,0	x	220/100	TX40	522349	4.889	7000	50
90380240	8,0	x	240/100	TX40	522356	5.339	7000	50
90380260	8,0	x	260/100	TX40	522363	5.751	7000	50
90380280	8,0	x	280/100	TX40	522370	6.163	5500	50
90380300	8,0	x	300/100	TX40	522387	6.575	5500	50
90380320	8,0	x	320/100	TX40	522394	6.987	5500	50
90380340	8,0	x	340/100	TX40	522400	7.399	5500	50
90380360	8,0	x	360/100	TX40	522417	7.811	5500	50
90380380	8,0	x	380/100	TX40	522424	8.223	5500	50
90380400	8,0	x	400/100	TX40	522431	8.635	5500	50

	Dimensions [mm]			Pull-out resistance		Head pull-through resistance		Shearing Timber - timber					Shearing Steel - timber		
															
Art. No.	Ø	L	b	zul. N_z	$F_{ax,R,k}$	zul. N_z	$F_{head,R,k}$	α=0°...90° zul. N	α_{AD}=90° α_{ET}=0° 1. $F_{v,R,k}$	2. $F_{v,R,k}$	α=90° 3. $F_{v,R,k}$	α_{AD}=0° α_{ED}=90° 4. $F_{v,R,k}$	α=0°...90° zul. N	α=0° 1. $F_{v,R,k}$	α=90° 2. $F_{v,R,k}$
90360060	6,0	60	36	1,08	2,81	0,98	3,27	0,61	1,94	1,94	1,94	1,94	0,77	3,01	3,01
90360080	6,0	80	48	1,44	3,74	0,98	3,27	0,61	2,25	2,25	2,25	2,25	0,77	3,25	3,25
90360100	6,0	100	48	1,44	3,74	0,98	3,27	0,61	2,45	2,45	2,45	2,45	0,77	3,25	3,25
90360120	6,0	120	64	1,92	4,99	0,98	3,27	0,61	2,45	2,45	2,45	2,45	0,77	3,56	3,56
90360140	6,0	140	64	1,92	4,99	0,98	3,27	0,61	2,45	2,45	2,45	2,45	0,77	3,56	3,56
90360160	6,0	160	64	1,92	4,99	0,98	3,27	0,61	2,45	2,45	2,45	2,45	0,77	3,56	3,56
90360180	6,0	180	64	1,92	4,99	0,98	3,27	0,61	2,45	2,45	2,45	2,45	0,77	3,56	3,56
90360200	6,0	200	64	1,92	4,99	0,98	3,27	0,61	2,45	2,45	2,45	2,45	0,77	3,56	3,56
90380080	8,0	80	54	2,16	4,62	2,00	7,04	a)	a)	a)	a)	a)	1,36	6,18	5,29
90380100	8,0	100	54	2,16	4,62	2,00	7,04	1,10	4,14	4,70	3,95	4,35	1,36	6,18	5,29
90380120	8,0	120	54	2,16	4,62	2,00	7,04	1,10	4,35	4,70	4,08	4,35	1,36	6,18	5,29
90380140	8,0	140	84	3,36	7,19	2,00	7,04	1,10	4,95	5,31	4,69	4,95	1,36	6,82	5,94
90380160	8,0	160	84	3,36	7,19	2,00	7,04	1,10	4,95	5,31	4,69	4,95	1,36	6,82	5,94
90380180	8,0	180	100	4,00	8,56	2,00	7,04	1,10	4,95	5,31	4,69	4,95	1,36	7,16	6,28
90380200	8,0	200	100	4,00	8,56	2,00	7,04	1,10	4,95	5,31	4,69	4,95	1,36	7,16	6,28
90380220	8,0	220	100	4,00	8,56	2,00	7,04	1,10	4,95	5,31	4,69	4,95	1,36	7,16	6,28
90380240	8,0	240	100	4,00	8,56	2,00	7,04	1,10	4,95	5,31	4,69	4,95	1,36	7,16	6,28
90380260	8,0	260	100	4,00	8,56	2,00	7,04	1,10	4,95	5,31	4,69	4,95	1,36	7,16	6,28
90380280	8,0	280	100	4,00	8,56	2,00	7,04	1,10	4,95	5,31	4,69	4,95	1,36	7,16	6,28
90380300	8,0	300	100	4,00	8,56	2,00	7,04	1,10	4,95	5,31	4,69	4,95	1,36	7,16	6,28
90380320	8,0	320	100	4,00	8,56	2,00	7,04	1,10	4,95	5,31	4,69	4,95	1,36	7,16	6,28
90380340	8,0	340	100	4,00	8,56	2,00	7,04	1,10	4,95	5,31	4,69	4,95	1,36	7,16	6,28
90380360	8,0	360	100	4,00	8,56	2,00	7,04	1,10	4,95	5,31	4,69	4,95	1,36	7,16	6,28
90380380	8,0	380	100	4,00	8,56	2,00	7,04	1,10	4,95	5,31	4,69	4,95	1,36	7,16	6,28
90380400	8,0	400	100	4,00	8,56	2,00	7,04	1,10	4,95	5,31	4,69	4,95	1,36	7,16	6,28

a) Min. component thickness for timber/timer connections not achieved

Features of GH SK Drive

	Ø 6.0	Ø 8.0
d_k	14.0	20.0
d_1	4.0	5.3
d_s	4.3	5.9
TX	30	40
$f_{tens,k,Stahl}$	12.8	22.7
$My_{,k,Stahl}$	10.1	22.6

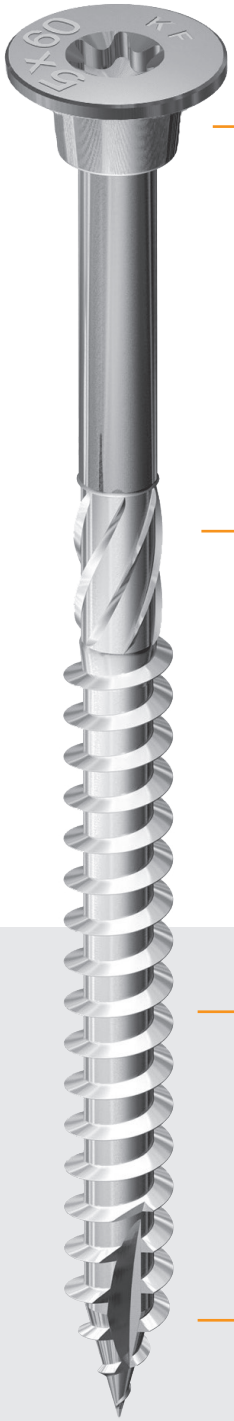
ETA-12
0501

CONICAL HEAD SCREW

NKL 3

A4
Edelstahl

GH KF



SHAFT MILL
Guiding, extended
shaft milling ribs for easy processing

Martensitic stainless steels, non-rusting
for patios and façades, especially for fixing solid wood

Optimum thread/shaft ratio
for high thread pull-out values

THREAD
Deep thread for a strong hold
in the edge area and in soft substructures

Fine thread
for precise adjustment of the screw-in depth

TIP
Thread through to the tip
for good "bite"

Pulled back notch drilling tip
for precise placement

For advantages see screw overview on page 297

1 2 3 4 5 6 7 9 10 11

GH KF ball head screw

Made of martensitic stainless steel 1.4006 for indoor and outdoor use. The special alloy, which significantly reduces the resistance to turning, is also suitable for fastening hardwoods.

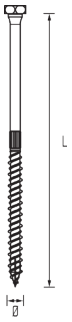
The countersunk head warrants a clean head finish on the wood surface.

The deep thread flanks guarantee a firm hold even in soft substructures.

STAINLESS STEEL RUST-FREE 1.4006

Wood construction screw GH KF

Art. No.	Dimensions [mm]				EAN	PU
	ø	x	L	TX	4019346	
92793565	5.0	x	50	TX25	516683	250
92793570	5.0	x	60	TX25	516690	200
92793575	5.0	x	70	TX25	516706	250



DUOFIX

HEXAGONAL HEAD

NKL 2

Stahl VZ

Art. No.	Dimensions [mm]				EAN	Weight	Pallet	PU
	Ø	x	L	TX	4019346	kg		
92881304	8,0	x	40	TX30	518007	1.270	22250	100
92881305	8,0	x	50	TX30	518014	1.480	22250	100
92881306	8,0	x	60	TX30	518021	1.680	22250	50
92881307	8,0	x	70	TX30	518038	1.800	14500	50
92881308	8,0	x	80	TX30	518045	2.110	14500	50
92881310	8,0	x	100	TX30	518052	2.350	14500	50
92881312	8,0	x	120	TX30	518069	2.950	14500	50
92881314	8,0	x	140	TX30	518076	3.380	11000	50
92881316	8,0	x	160	TX30	518083	3.800	11000	50
92881318	8,0	x	180	TX30	518090	4.220	11000	50
92881320	8,0	x	200	TX30	518106	4.640	8000	50
92881322	8,0	x	220	TX30	518113	5.060	8000	50
92881324	8,0	x	240	TX30	518120	5.490	8000	50
92881326	8,0	x	260	TX30	518137	5.910	7250	50
92881328	8,0	x	280	TX30	518144	6.330	7250	50
92881330	8,0	x	300	TX30	518151	6.750	7250	50
92881332	8,0	x	320	TX30	518168	7.170	5500	50
92881334	8,0	x	340	TX30	518175	7.600	5500	50
92881336	8,0	x	360	TX30	518182	8.020	5500	50
92881338	8,0	x	380	TX30	518199	8.440	5500	50
92881340	8,0	x	400	TX30	518205	8.860	5500	50
92881406	10,0	x	60	TX40	518212	2.510	18000	50
92881407	10,0	x	70	TX40	518229	2.810	14500	50
92881408	10,0	x	80	TX40	518236	3.110	14500	50
92881410	10,0	x	100	TX40	518243	3.710	11000	50
92881412	10,0	x	120	TX40	518250	4.310	11000	50
92881414	10,0	x	140	TX40	518267	4.910	11000	50
92881416	10,0	x	160	TX40	518274	5.510	11000	50
92881418	10,0	x	180	TX40	518281	6.110	11000	50
92881420	10,0	x	200	TX40	518298	6.710	8000	50

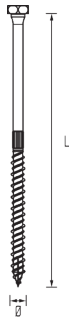
13

TIPP

TOP-Fix duo screws can be used as an alternative to the DIN 571 (key screw).

Advantages:

- No pilot drilling necessary
- The special glide coating allows quick turn-in, 10 x faster than DIN 571
- Extraction values up to 25% better than DIN 571
- 2 drives, SW or TX as required
- Length embossing in the head



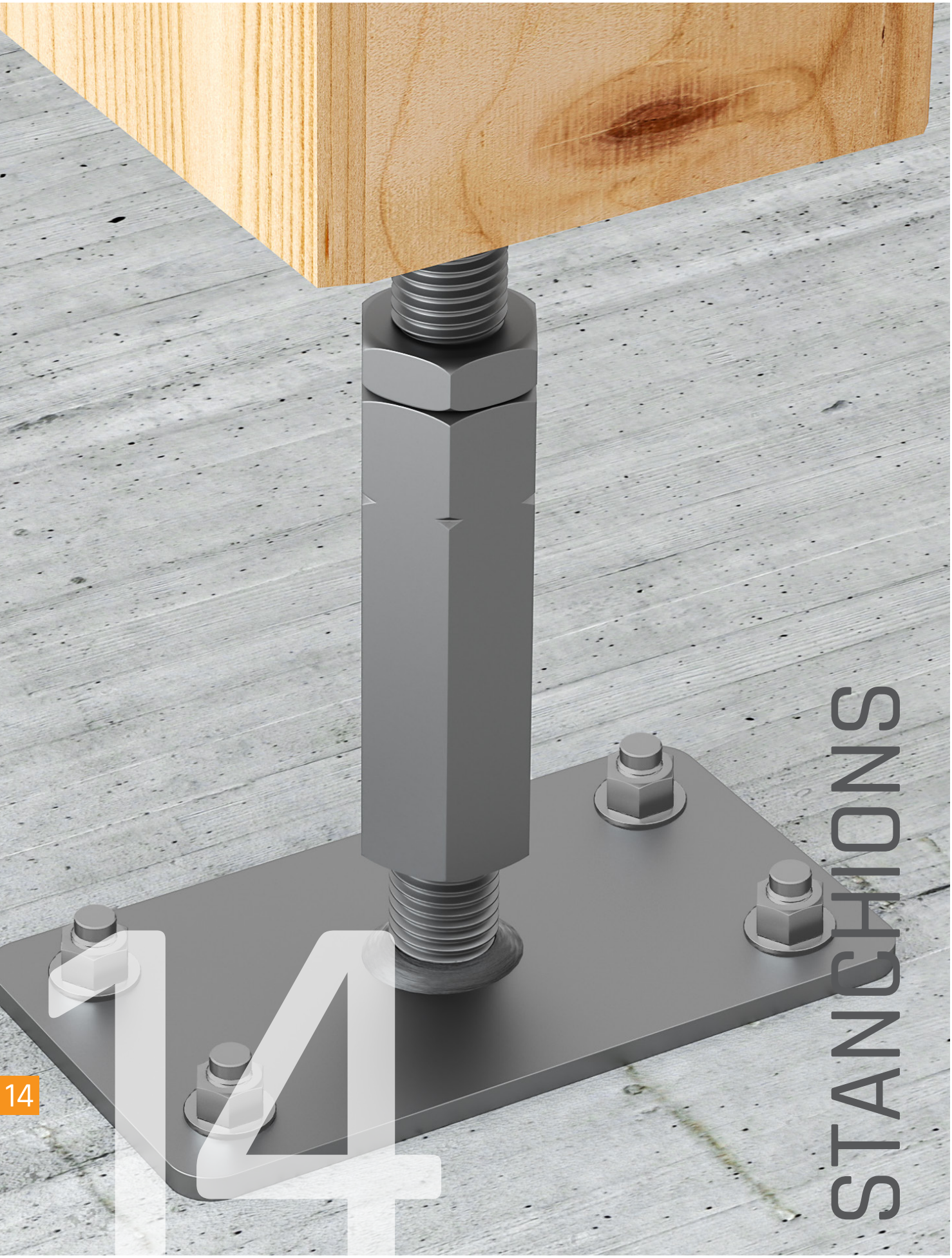
Stahl VZ

NKL 2

DUOFIX

HEXAGONAL HEAD

Art. No.	Dimensions [mm]				EAN	Weight	Pallet	PU
	Ø	x	L	TX	4019346	kg		
92881422	10,0	x	220	TX40	518304	7.310	8000	50
92881424	10,0	x	240	TX40	518311	7.910	8000	50
92881426	10,0	x	260	TX40	518328	8.510	7250	50
92881428	10,0	x	280	TX40	518335	9.110	7250	50
92881430	10,0	x	300	TX40	518342	9.710	7250	50
92881432	10,0	x	320	TX40	518359	10.310	5500	50
92881434	10,0	x	340	TX40	518366	10.910	5500	50
92881436	10,0	x	360	TX40	518373	11.510	5500	50
92881438	10,0	x	380	TX40	518380	12.110	5500	50
92881440	10,0	x	400	TX40	518397	12.710	5500	50
92881506	12,0	x	60	TX40	518403	3.380	7250	25
92881508	12,0	x	80	TX40	518410	4.170	7250	25
92881510	12,0	x	100	TX40	518427	4.690	7250	25
92881512	12,0	x	120	TX40	518434	5.750	7250	25
92881514	12,0	x	140	TX40	518441	6.540	5500	25
92881516	12,0	x	160	TX40	518458	7.330	5500	25
92881518	12,0	x	180	TX40	518465	8.120	5500	25
92881520	12,0	x	200	TX40	518472	8.910	4000	25
92881522	12,0	x	220	TX40	518489	9.700	4000	25
92881524	12,0	x	240	TX40	518496	10.490	4000	25
92881526	12,0	x	260	TX40	518502	11.280	3625	25
92881528	12,0	x	280	TX40	518519	12.070	3625	25
92881530	12,0	x	31	TX40	518526	12.860	3625	25
92881532	12,0	x	320	TX40	518533	13.650	2750	25
92881534	12,0	x	340	TX40	518540	14.440	2750	25
92881536	12,0	x	360	TX40	518557	15.230	2750	25
92881538	12,0	x	380	TX40	518564	16.020	2750	25
92881540	12,0	x	400	TX40	518571	16.810	2750	25



14 STANCHIONS

ZINTOP DCSTATIK ETA-16 0550

STANCHIONS

ZINTOP SERIES

Stanchions that have to meet the requirements of usage class 3 are subsequently hot-dip galvanised or have our **ZIN**TOP coating.
ZINTOP not only has optimum corrosion protection, but is also visually more appealing.
We supply a larger selection of stanchions, including ones with the **ZIN**TOP surface.
The **ZIN**TOP coating is approved for usage class 3.

Advantages of the ZINTOP **coating:**

- Even surface
- High corrosion resistance
- No contact corrosion in connection with stainless steel
- Approved for usage class 3 in timber construction
- Good surface hardness
- Even layer thickness, including on thread parts

ZINTOP

CATALOGUE PAGES

Basics of statics **from page 322**
Products & statics **from page 342**

STANCHIONS

- Mainly produced in Germany using our modern welding robots
- Consistent quality
- High load absorption of pressure, traction and horizontal load impacts
- Sometimes side and height-adjustable when installed yet with high static values

CATALOGUE PAGES

Basics of statics **from page 322**
Products & statics **from page 330**

STANCHIONS

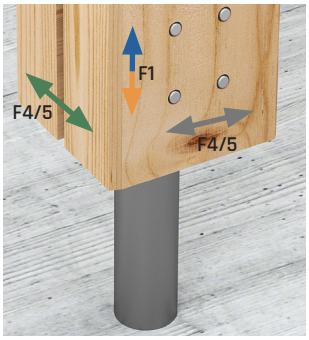
ASSORTMENT

			in concrete	on concrete	Height-adjustable	Side-adjustable	Basics Statics & Diagrams from page	Products & Statics from page
STANCHION TYPE U-60		235 JR feuerverzinkt, NKL 3	■				322	330
STANCHION TYPE L-60		235 JR feuerverzinkt, NKL 3	■				322	330
STANCHION TYPE U-70		CE, 235 JR feuerverzinkt, NKL 3	■				322	332
STANCHION TYPE U-90		CE, 235 JR feuerverzinkt, NKL 3	■				322	332
STANCHION TYPE T01		CE, 235 JR feuerverzinkt, NKL 3	■				322	334
STANCHION TYPE T02		CE, 235 JR feuerverzinkt, NKL 3	■				322	334
STANCHION TYPE T03		CE, 235 JR feuerverzinkt, NKL 3	■				322	336
STANCHION TYPE T04 EXTRA THICK		CE, 235 JR feuerverzinkt, NKL 3	■				322	336
STANCHION TYPE D		CE, 235 JR feuerverzinkt, NKL 3	■				322	338
STANCHION TYPE DS		CE, 235 JR feuerverzinkt, NKL 3	■				326	338
STANCHION GROUP S - TYPE H		235 JR feuerverzinkt, NKL 3	■				326	340
STANCHION GROUP S - TYPE R		235 JR feuerverzinkt, NKL 3	■					340
STANCHION TYPE U-70		CE, 235 JR feuerverzinkt, NKL 3	■			■	322	342
STANCHION TYPE D ZINTOP		CE, ZINTOP, NKL 3	■		■		322	342
STANCHION TYPE D		CE, 235 JR galv. verzinkt, NKL 2	■		■		322	342
STANCHION TYPE P		CE, 235 JR feuerverzinkt, NKL 3		■			322	344
STANCHION TYPE D EXTRA THICK		CE, 235 JR feuerverzinkt, NKL 3		■			322	344
STANCHION TYPE T05 EXTRA THICK		CE, 235 JR feuerverzinkt, NKL 3		■			322	344
STANCHION TYPE T01		CE, 235 JR feuerverzinkt, NKL 3		■			322	346
STANCHION TYPE D		CE, 235 JR feuerverzinkt, NKL 3		■			322	346
STANCHION GROUP S - GROUND SLEEVE		235 JR feuerverzinkt, NKL 3		■				349
STANCHION GROUP S - TYPE B		235 JR feuerverzinkt, NKL 3		■				348

STANCHIONS

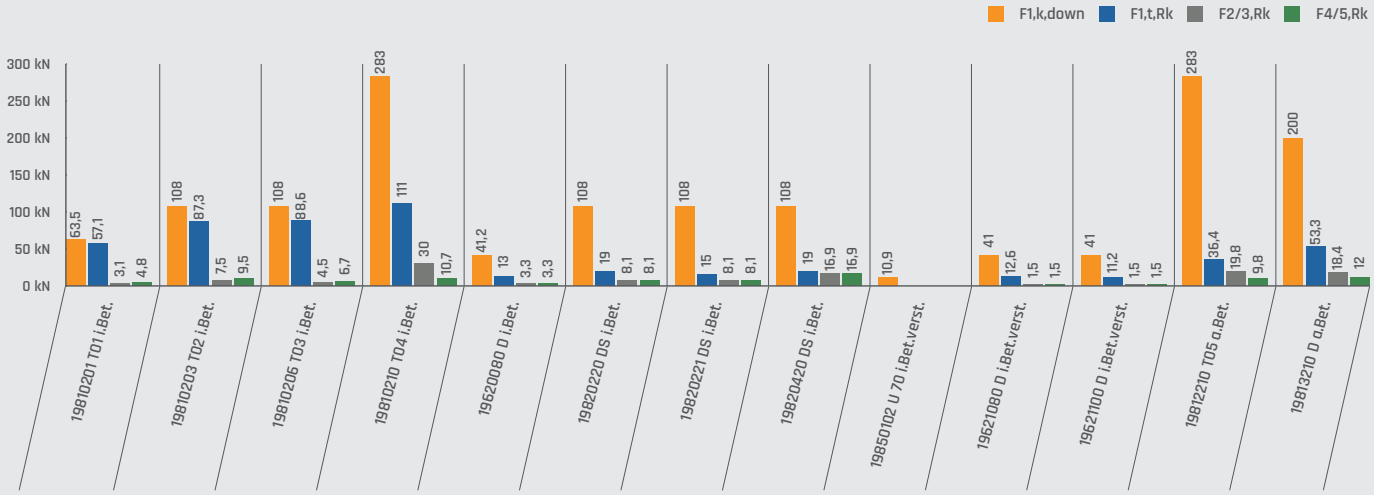
ASSORTMENT

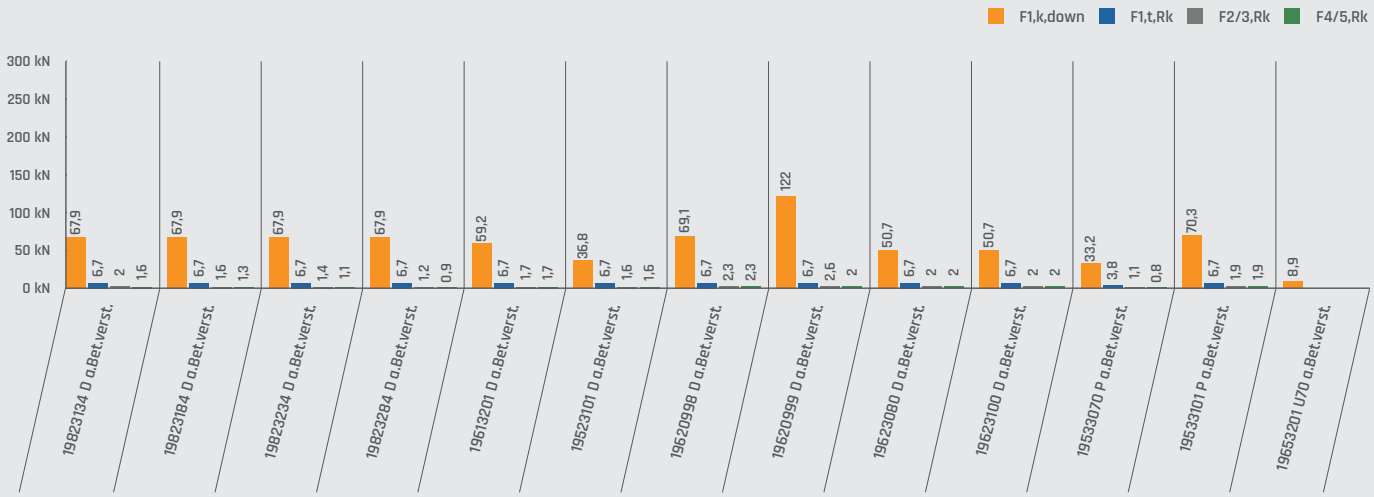
				in concrete	on concrete	Height-adjustable	Side-adjustable	Basics Statics & Diagrams from page	Products & Statics from page
STANCHION GROUP S - TYPE B WITH BEAD			235 JR feuerverzinkt / NKL 3		■				348
STANCHION TYPE D24 ZINTOP		CE	ZINTOP / NKL 3		■	■		322	350
STANCHION TYPE D24		CE	235 JR feuerverzinkt / NKL 3		■	■		322	350
STANCHION TYPE D40 ZINTOP		CE	ZINTOP / NKL 3		■	■		322	352
STANCHION TYPE D40		CE	235 JR feuerverzinkt / NKL 3		■	■		322	352
STANCHION TYPE T01 H ZINTOP		CE	ZINTOP / NKL 3		■	■		322	354
STANCHION TYPE T01 H		CE	235 JR galv. verzinkt / NKL 2		■	■		322	354
STANCHION TYPE D03 ZINTOP		CE	ZINTOP / NKL 3		■	■		322	356
STANCHION TYPE D03		CE	235 JR galv. verzinkt / NKL 2		■	■		322	356
STANCHION TYPE D ZINTOP		CE	ZINTOP / NKL 3		■	■		322	358
STANCHION TYPE D		CE	235 JR galv. verzinkt / NKL 2		■	■		322	358
STANCHION TYPE D05 ZINTOP		CE	ZINTOP / NKL 3		■	■		322	360
STANCHION TYPE D05		CE	235 JR galv. verzinkt / NKL 2		■	■		322	360
STANCHION TYPE P		CE	235 JR galv. verzinkt / NKL 2		■	■		322	362
STANCHION TYPE P24 ZINTOP		CE	ZINTOP / NKL 3		■	■		322	362
STANCHION TYPE P24		CE	235 JR galv. verzinkt / NKL 2		■	■		322	362
STANCHION TYPE PR ZINTOP		CE	ZINTOP / NKL 3		■	■		322	364
STANCHION TYPE PR		CE	235 JR galv. verzinkt / NKL 2		■	■		322	364
STANCHION TYPE U70 ZINTOP		CE	ZINTOP / NKL 3		■	■	■	322	366
STANCHION TYPE U70		CE	235 JR galv. verzinkt / NKL 2		■	■	■	322	366
STANCHION TYPE PB		CE	235 JR feuerverzinkt / NKL 3		■	■		322	368
STANCHION TYPE FIX			235 JR galv. verzinkt / NKL 2		■	■			368

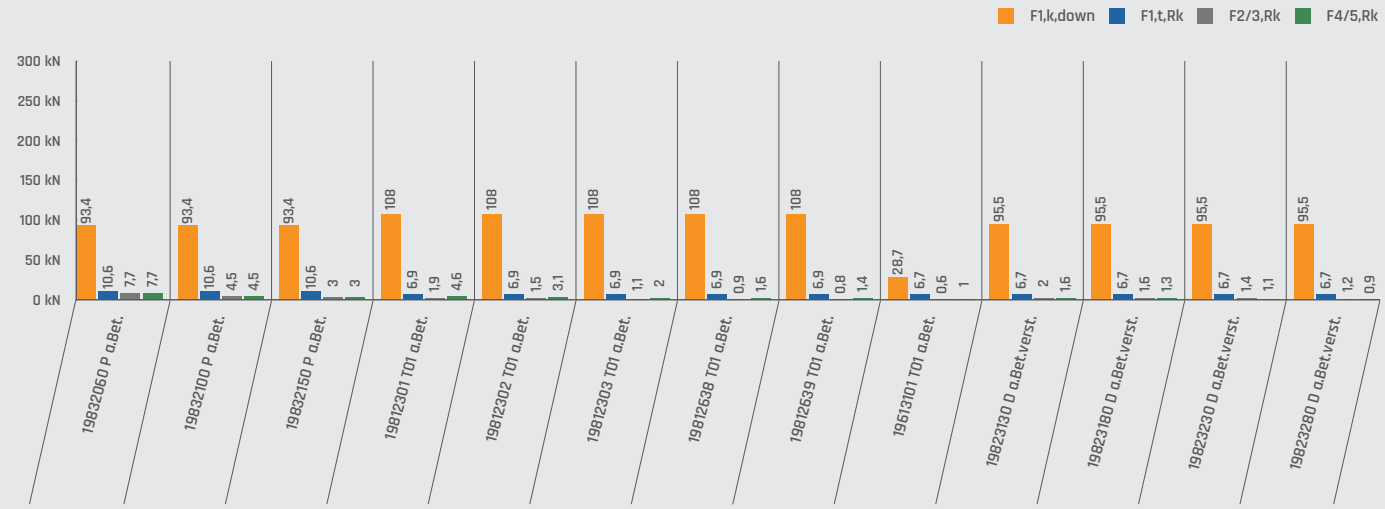


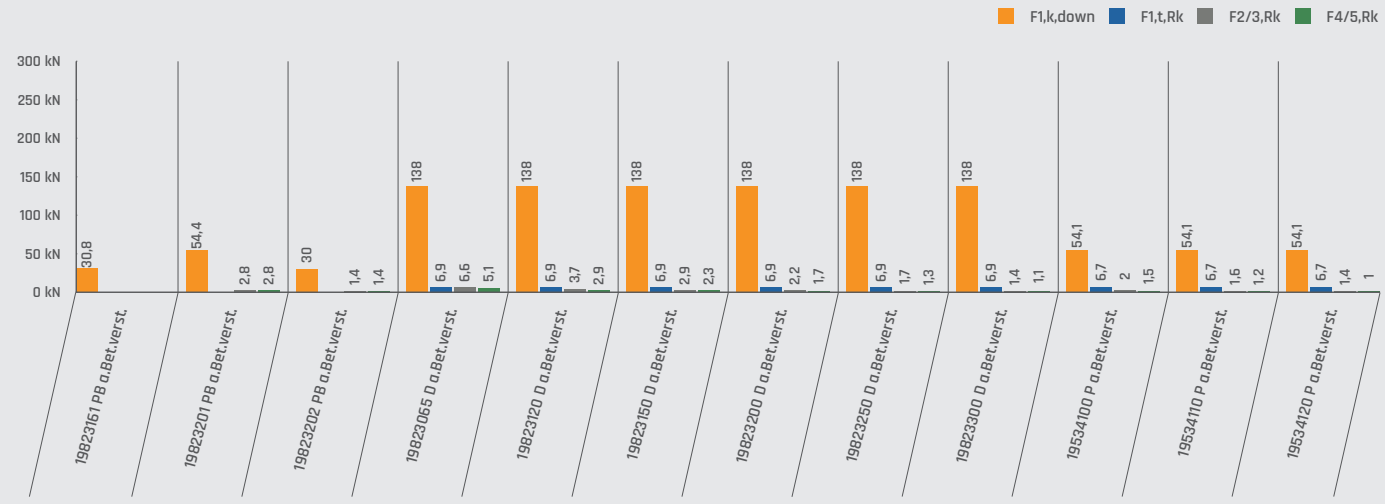
STANCHIONS

STATICS DIAGRAM






F1,k,down
F1,t,Rk
F2/3,Rk
F4/5,Rk
300 kN
250 kN
200 kN
150 kN
100 kN
50 kN
0 kN
93,4 10,6 7,7 7,7
19832060 P a.Bet.
93,4 10,6 4,5 4,5
19832100 P a.Bet.
93,4 10,6 3 3
19832150 P a.Bet.
108 6,9 1,9 4,6
19812301 T01 a.Bet.
108 6,9 1,5 3,1
19812302 T01 a.Bet.
108 6,9 1,1 2
19812303 T01 a.Bet.
108 6,9 0,9 1,6
19812638 T01 a.Bet.
108 6,9 0,8 1,4
19812639 T01 a.Bet.
28,7 6,7 0,6 1
19613101 T01 a.Bet.
95,5 6,7 2 1,6
19823130 D a.Bet.verst.
95,5 6,7 1,6 1,3
19823180 D a.Bet.verst.
95,5 6,7 1,4 1,1
19823230 D a.Bet.verst.
95,5 6,7 1,2 0,9
19823280 D a.Bet.verst.


F1,k,down
F1,t,Rk
F2/3,Rk
F4/5,Rk
300 kN
250 kN
200 kN
150 kN
100 kN
50 kN
0 kN
30,8
19823161 PB a.Bet.verst.
54,4 2,8 2,8
19823201 PB a.Bet.verst.
30 1,4 1,4
19823202 PB a.Bet.verst.
138 6,9 6,6 5,1
19823065 D a.Bet.verst.
138 6,9 3,7 2,9
19823120 D a.Bet.verst.
138 6,9 2,9 2,3
19823150 D a.Bet.verst.
138 6,9 2,2 1,7
19823200 D a.Bet.verst.
138 6,9 1,7 1,3
19823250 D a.Bet.verst.
138 6,9 1,4 1,1
19823300 D a.Bet.verst.
54,1 6,7 2 1,5
19534100 P a.Bet.verst.
54,1 6,7 1,6 1,2
19534110 P a.Bet.verst.
54,1 6,7 1,4 1
19534120 P a.Bet.verst.

ZINTOP

ON THE SAFE SIDE, WITH AN ATTRACTIVE LOOK

Stanchions that have to meet the requirements of usage class 3 are subsequently hot-dip galvanised or have our **ZIN**TOP coating.
ZINTOP not only has optimum corrosion protection, but is also visually more appealing.
We supply a larger selection of stanchions, including ones with the **ZIN**TOP surface.
The **ZIN**TOP coating is approved for usage class 3.

Advantages of the ZINTOP **coating::**

- Even surface
- High corrosion resistance
- No contact corrosion in connection with stainless steel
- Approved for usage class 3 in timber construction
- Good surface hardness
- Even layer thickness, including on thread parts

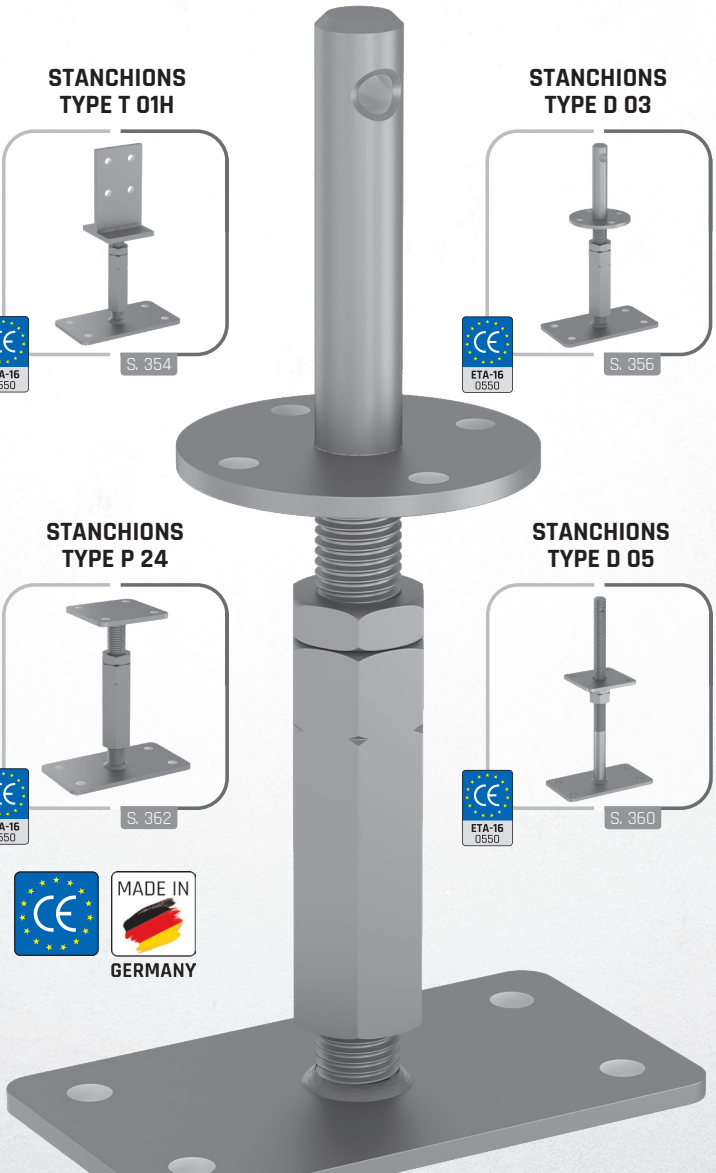
The usage class must be determined for the corresponding application according to EN 1995-1-1 2.3 1.3 Usage classes.
The following definition is only a reference point:

Usage class 1
The timber component is located in a heated building

Usage class 2
The wood component is located under a roof and is not directly exposed to the weather

usage class 3
The wood component can be exposed to weather and splashes.

The static values indicated in the catalogue are for orientation purposes only. Detailed load capacity tables for determination of combined stress with design examples can be found at:
www.holzverbinder.de



STANCHIONS TYPE PR

S. 364

STANCHIONS TYPE T 01H

S. 354

STANCHIONS TYPE D 03

S. 356

STANCHIONS TYPE D

S. 358

STANCHIONS TYPE D 24

S. 350

STANCHIONS TYPE P 24

S. 362

STANCHIONS TYPE D 05

S. 360

STANCHIONS TYPE D 40

S. 352

STANCHIONS TYPE D I. B.

S. 342

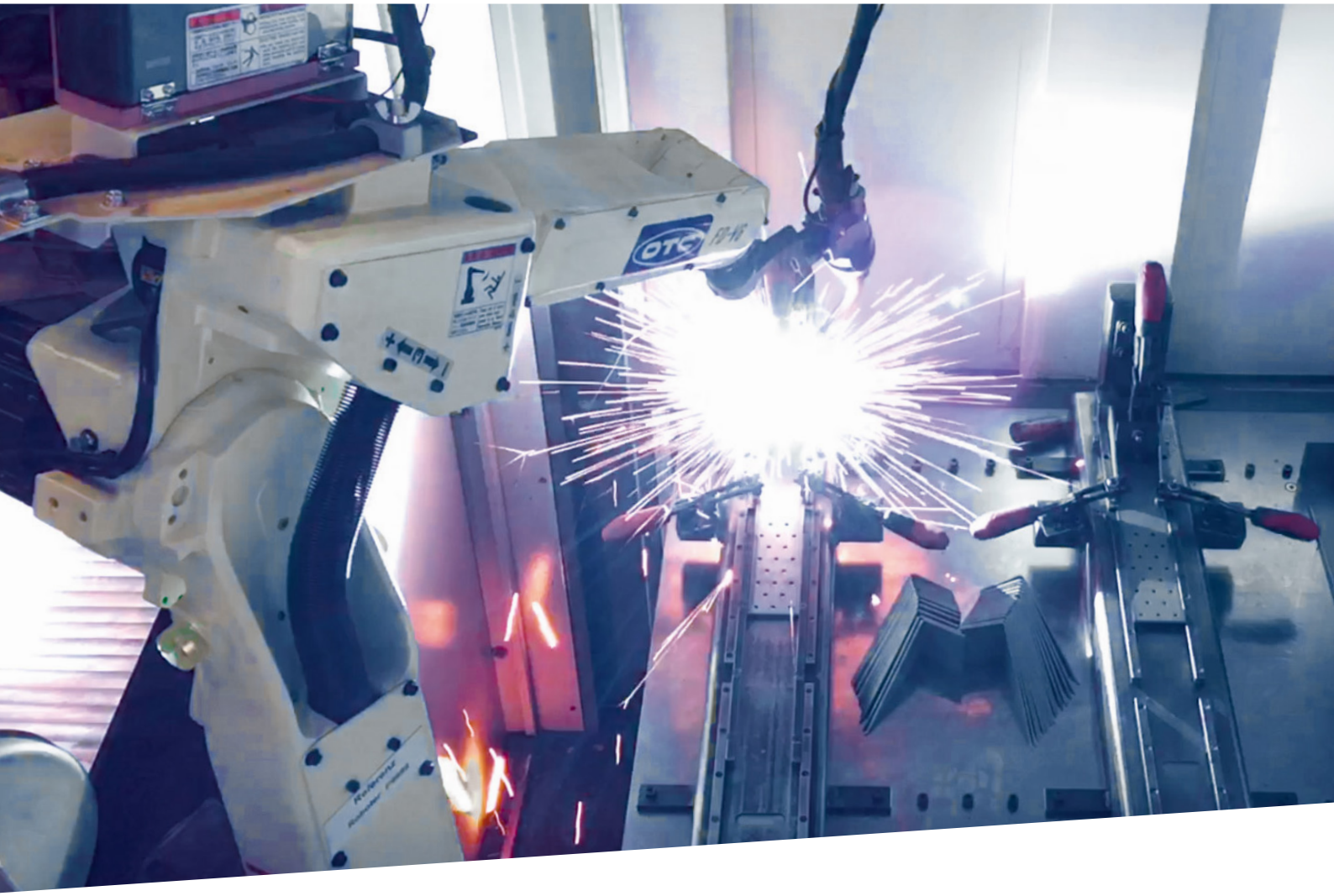
MADE IN GERMANY

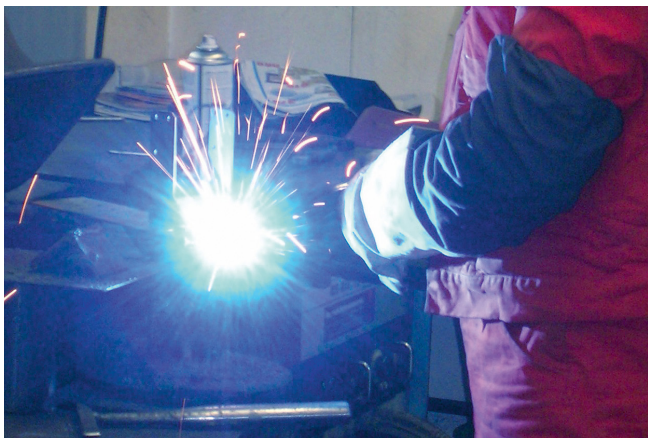
STANCHIONS TYPE U 70

S. 366

OUR INNOVATIVE WELDING TECHNOLOGY

ACHIEVES CONNECTIONS WHETHER MANUALLY OR ROBOT-ASSISTED





We weld connections of the highest level to last.

All GH stanchions with the CE symbol comply with our ETA-16/0550 and are manufactured exclusively at our production facilities in Germany, mostly using our highly automated welding robot.

The combination of state-of-the-art welding technology and highly trained specialists is a guarantee for connections and a decisive preliminary step for the further processing of our products.

Not possible doesn't exist!
True to this motto, we can manufacture stanchions for you according to drawings, sketches or even samples.

STANCHIONS

TECHNICAL FEATURES

Geometry

W(B)	Width (mm)
H	Height (mm)
D(T)	Depth (mm)
T(S)	Material thickness (mm)
SB	Blade width (mm)
SH	Blade height (mm)
SS	Blade thickness (mm)
DOH	Mandrel height (mm)
DOØ	Mandrel diameter (mm)
TB	Carrier plate width (mm)
TL	Carrier plate length (mm)
TS	Carrier plate thickness (mm)
DH	Pin height (mm)
DØ	Pin diameter (mm)
RH	Pipe height (mm)
RØ	Pipe diameter (mm)
GH	Thread height (mm)
GØ	Thread diameter (mm)
BL	Baseplate length (mm)
BB	Baseplate width (mm)
BS	Baseplate thickness (mm)

Tables

VM	Connecting element
$Ø_{(mm)}$	Diameter of connecting element
$L_{ef,\,(mm)}$	Minimum thread length of wood construction screws
$L_{(mm)}$	Length of connecting element
	Grain direction in the wood component

Load directions / measurement

$F_{1,c}$ ↓	Pressure load, downwards, right-angled to the baseplate
$F_{1,t}$ ↑	Tensile load, upwards, right-angled to the baseplate
$F_{2/3}$ ← →	Load vertical to the connecting elements in the blade, pin, tab
$F_{4/5}$ ← →	Load parallel to the connecting elements in the blade, pin, tab
$\gamma_{M,Stahl}$	Safety coefficient for steel

Indices

[a)] Load capacity values apply to baseplates with 8 mm and 6 mm thickness.

[b)] Load capacity values apply to a baseplate with 8 mm thickness. For a baseplate with 6 mm thickness with the values marked with the indices [1)] to [6)] are to be multiplied with the factor from the following table.

1)	2)	3)	4)	5)	6)
0.67	0.72	0.75	0.81	0.84	0.86

[c)] For a tensile load with load $F_{1,t}$ rod dowels are required in addition to the specified screws.

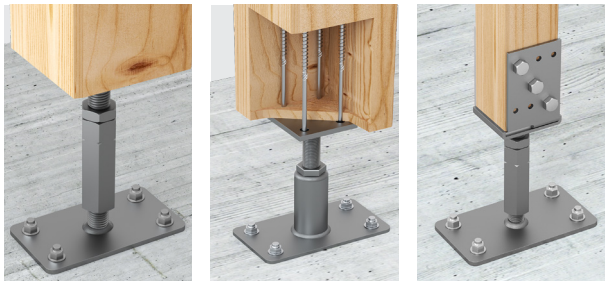
[d)] If screws with a thread length longer l_{ef} longer than 100 mm are used, the value of load capacity $F_{1,t,Rk,Holz}$ must be increased by the factor $f_{1,t,Holz} = (l_{ef} / 100\ mm)^{0,9}$

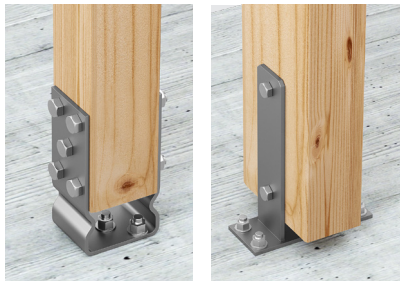
STANCHIONS

APPLICATIONS

Application:
Connection of posts on concrete or in concrete

Materials:





Corrosion protection:
ZINTOP coating,
hot-dip galvanised
galvanised

For use in usage classes

Connecting element:

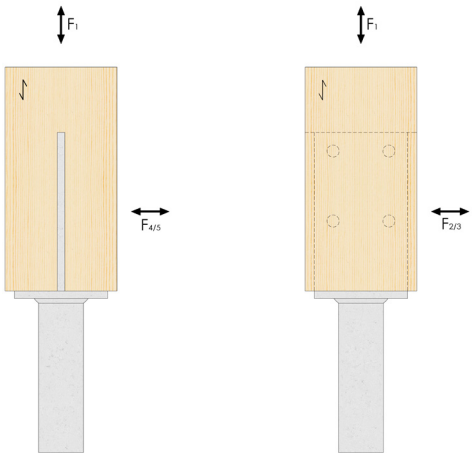
timber
Screws according to EN 14592 (DIN 571 and thread according to DIN 7998)
Screw diameter with minimum screw length and minimum thread length l_{ef}:

Ø 10x120 - $l_{ef.} \geq 100$ mm
Ø 10x60, Ø 4x60 - $l_{ef.} \geq 40$ mm
Ø 8x70 - $l_{ef.} \geq 50$ mm
Ø 12X80 - $l_{ef.} \geq 60$ mm

Concrete
Bolt anchor, concrete screw, adhesive dowel

Connecting elements from page 274

Load directions



General information

For use in usage class 3, the fastening elements must be provided with a zinc coating (Fe/Zn 25c).
The posts must always be installed perpendicular to the baseplate of the stanchion.
The end grain surface of the post must be placed fully on the baseplate.
In load case F1,t sometimes additional rod dowels are required.
Minimum spacing of the rod dowel to the end grain: $a_{3,t} \geq 80$ mm.

For stanchions with support plate (with holes), the minimum spacing and minimum length of the thread can be observed.
GH disc head screws screwed into the end wood vertically.

The minimum requirement of the steel quality is fulfilled when using GH rod dowels.
The following load capacities can be applied:

Ø	8	10	12
$F_{v,Rk}$/0°	9.2	13.2	18.2

Connection to concrete
Proof of the load-bearing capacity for fastening to concrete must be provided separately in accordance with the manufacturer's specifications.
For stanchions in concrete, the minimum concreting depth is 150 mm.

Design
The table contains characteristic values of the load-bearing capacity for determining design values of the load-bearing capacity in the ultimate limit state.
The load-bearing capacities apply to the specified maximum spacing between the load application points and the upper edge of the substrate.
Characteristic raw density of timber: ρ_k = 350 kg/m³ (C24) or higher.

Design value of load capacity

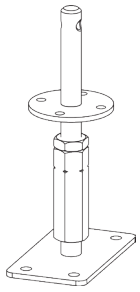
$$F_{i,Rd} = \min \{ k_{mod} \times F_{i,Rk,Holz} / \gamma_{M,Holz} ; F_{i,Rk,Stahl} / \gamma_{M,Stahl} \}$$

with k_{mod} nach DIN EN 1995-1-1 und $\gamma_{M,Holz}$ = 1,3
All partial safety factors $\gamma_{M,Stahl}$ must be considered when determining the design value.

Proof of load capacity:

$$\sum [F_{(i,Ed)}/F_{(i,Rd)} \leq 1]$$

Design example



Stanchion 19613201 type D03 on concrete, height-adjustable

Column connection
Post NH C24 14/14; Planned spacing of the end grain from the floor: a≈200 mm
Usage class 2 (posts under a roof and protected from weathering and splashes)

Impact combinations
1 Impact combination of own weight and snow, k_{mod} = 0.9
Pressure force $F_{1;C;Ed}$ = 31.2 kN

2 Impact combination of own weight and wind, k_{mod} = 1.0
Tensile force $F_{1,t,Ed}$ = 2.47 kN horizontal force $F_{2/3}$ or $F_{4/5}$ = 0.78 kN
If the correct arrangement of the stanchion is not checked at the installation site, the horizontal load should be applied in the most unfavourable constellation.

Properties and requirements of the stanchion from the table

Art. No.	[mm]					Connecting element
	Post		Maximum distances			
	$W(B)_{min}$	H_{min}	a_{max}	$e_{2/3}$	$e_{4/5}$	
19613201	120	120	236	236	236	4 screws Ø10x120

Connecting element

4 screws Ø 10 x 120 according to EN 14592 with thread length $l_{ef} \geq 100$ mm
→ e.g. wood construction screw GH S Drive Ø 10 x 200 with l_{ef} = 100 mm (+ countersunk washer)
or key screws according to DIN 571 Ø 10 x 180 with l_{ef} = 0.6 x 180 = 108 mm
The screws must be screwed into the pre-drilled holes.

Specified minimum cross-section of column
b/h =14/14 > min b/h = 12/12 ✓

Maximum distances
a = 200 mm < max a = 236 mm ✓

Load capacities of the stanchion from table

Art. No.	$F_{1,c}$ - pressure			$F_{1,t}$ - tension			$F_{2/3}$			$F_{4/5}$		
	timber	Steel		timber	Steel		timber	Steel		timber	Steel	
	$F_{1,c,Rk}$	$F_{1,c,Rk}$	γ_M	$F_{1,t,Rk}$	$F_{1,t,Rk}$	γ_M	$F_{2/3,Rk}$	$F_{2/3,Rk}$	γ_M	$F_{4/5,Rk}$	$F_{4/5,Rk}$	γ_M
19613201 [b]	129,00	59,20	1,00	16,30 [d]	6,66	1,00	8,36 [5]	1,66	1,25	8,36 [5]	1,66	1,25
		44,30	1,10									

Design value of load capacities for impact combination 1
[b] The thickness of the baseplate is 6 mm → the reduction factors [1] and [5] must be considered!
$F_{1,c,Rd}$= min {k_{mod} x $F_{1,c,Rk,Holz}$ / $\gamma_{M,Holz}$; $F_{1,c,Rk,Stahl}$ / $\gamma_{M,Stahl}$} = min {0,9 x 129 / 1,3 ; 0,67 x 59,2 / 1,0 ; 44,3 / 1,1}= 39,7 kN

Design value of load capacity for impact combination 1
$F_{1,c,Ed}$ / $F_{1,c,Rd}$ = 31,2 / 39,7 = <u>0,79</u> ✓

Design value of load capacities for impact combination 2
[d] An increase in the load-bearing capacity of the timber connection has no effect on the overall load-bearing capacity here, as the overall load capacity is limited by the steel load capacity.
$F_{1,t,Rd}$ = min {k_{mod} x $F_{1,t,Rk,Holz}$ / $\gamma_{M,Holz}$; $F_{1,t,Rk,Stahl}$ / $\gamma_{M,Stahl}$} = min {1,0 x 16,3 / 1,3 ; 6,66 / 1,0} = <u>6,66 kN</u>
$F_{2/3,Rd}$= $F_{4/5,Rd}$= min {k_{mod} x $F_{2/3,Rk,Holz}$ / $\gamma_{M,Holz}$; $F_{2/3,Rk,Stahl}$ / $\gamma_{M,Stahl}$} = min {1,0 x 0,84 x 8,36 / 1,3 ; 1,66 / 1,25} = <u>1,33 kN</u>

Design value of load capacity for impact combination 2
$F_{1,t,Ed}$ / $F_{1,t,Rd}$ + $F_{2/3,Ed}$ / $F_{2/3,Rd}$ = 2,47 / 6,66 + 0,78 / 1,33 = <u>0,96</u> ✓

Load on anchor bolts
4 anchor bolts Ø12 mm

Impact combination 1
No stress on the anchor bolts, as the compressive force is transferred to the substrate via contact through the baseplate.

Impact combination 2
If the correct arrangement of the stanchion is not checked at the installation site, the load on the anchor bolts should be determined in the most unfavourable constellation. It is also recommended to determine the load on the anchor bolts with the maximum spacing $e_{2/3}$ or $e_{4/5}$.

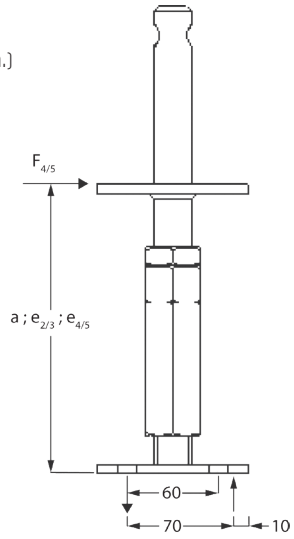
Tensile load on the anchor bolts by load $F_{1,t,Ed}$ and eccentric load $F_{4/5,Ed}$

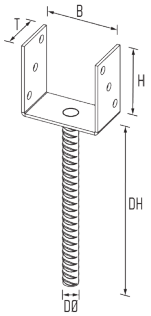
$F_{ax,Bo,Ed}$ = $F_{1,t,Ed}$ / 4 + $F_{4/5,Ed}$ / 2 x $e_{4/5}$ / 70 mm = 2,47 / 4 + 0,78 / 2 x 236 / 70 = <u>1,93 kN</u>

(The distance between the centre of rotation and the edge of the component was set at 10 mm.)

Shearing load of the anchor bolts by load F

$F_{lat,Bo,Ed}$ = $F_{4/5,Ed}$ / 4 = 0,78 / 4 = <u>0,20 kN</u>





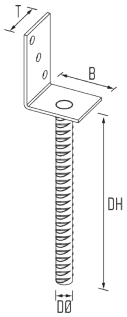
STANCHIONS

TYPE U-60 IN CONCRETE

NKL 3

235 JR feuerverzinkt

Art. No.	Top part [mm]					Pin [mm]			EAN	Weight	Pallet	PU
	W(B)	x	D(T)	x	H	D Ø	x	DH	4019346	kg		
19800201	71	x	60	x	115	20	x	250	500439	0.850	360	15
19800203	81	x	60	x	115	20	x	250	500453	0.880	360	15
19800204	91	x	60	x	115	20	x	250	500460	0.890	360	15
19800205	101	x	60	x	115	20	x	250	500477	1.300	240	10
19800206	121	x	60	x	115	20	x	250	500484	0.920	240	10
19800207	141	x	60	x	115	20	x	250	500491	0.960	240	10



STANCHIONS

TYPE L-60 IN CONCRETE

NKL 3

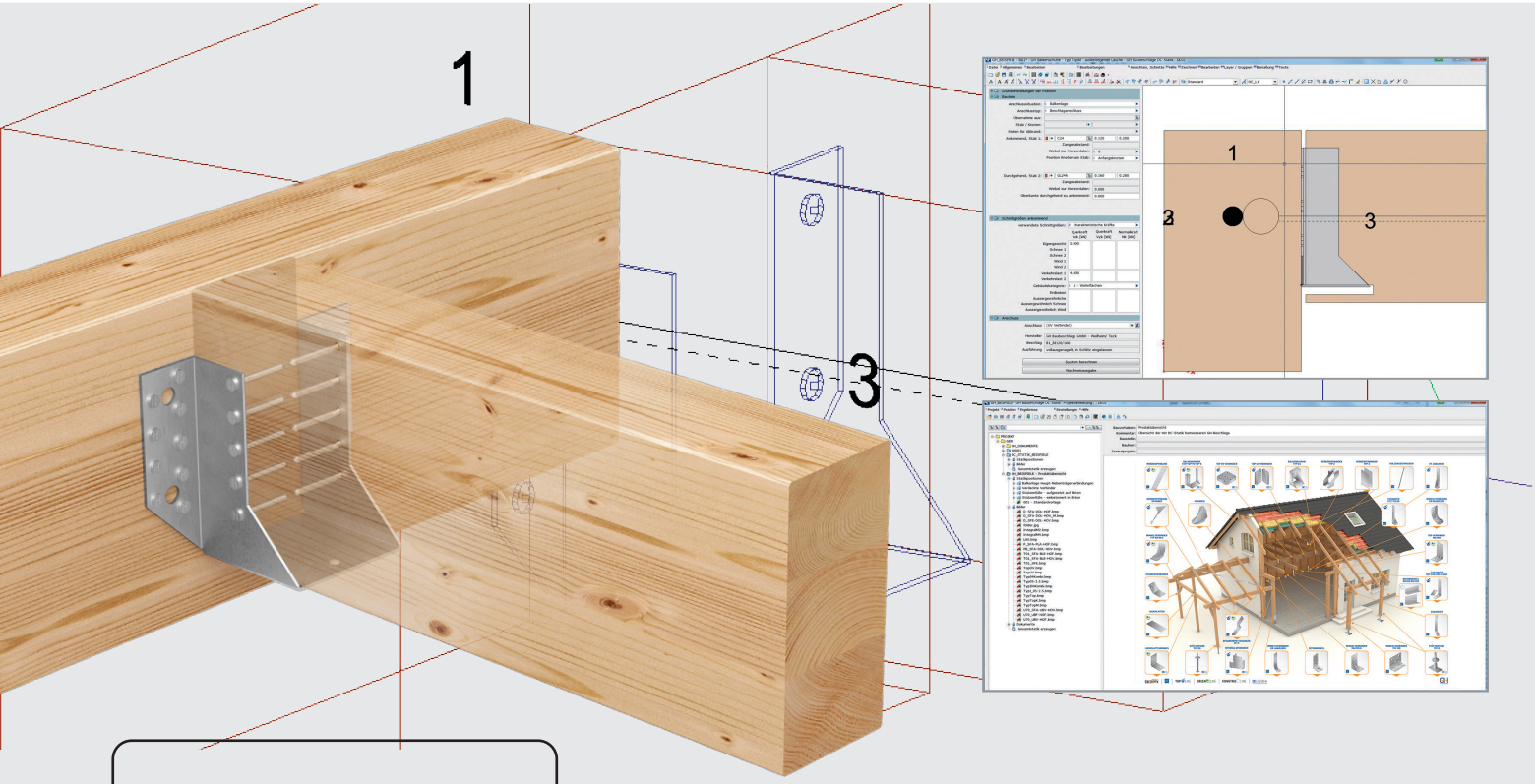
235 JR feuerverzinkt

Art. No.	Top part [mm]			Pin [mm]			EAN	Weight	Pallet	PU
	W(B)	x	D(T)	D Ø	x	DH	4019346	kg		
19860102	70	x	60	20	x	250	500002	0.690	640	20

DCSTATIK

EXTENSIVE DESIGN OF OUR GH TIMBER CONNECTORS*

WITH THE GH DC STATICS



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DCSTATIK

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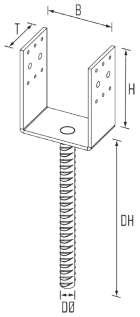


STANCHIONS

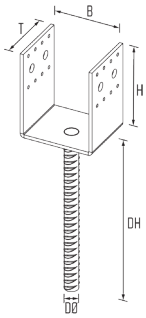
TYPE U-70 IN CONCRETE

ETA-16 0550

NKL 3

235 JR feuerverzinkt

Art. No.	Top part [mm]					Pin [mm]			EAN	Weight	Pallet	PU
	W(B)	x	D(T)	x	H	D Ø	x	DH	4019346	kg		
19800301	81	x	70	x	125	20	x	250	500200	1.120	360	15
19800302	91	x	70	x	125	20	x	250	500217	1.150	360	15
19800303	101	x	70	x	125	20	x	250	500224	1.180	240	10
19800304	121	x	70	x	125	20	x	250	500231	1.220	240	10



STANCHIONS

TYPE U-90 IN CONCRETE

ETA-16 0550

NKL 3

235 JR feuerverzinkt

Art. No.	Top part [mm]					Pin [mm]			EAN	Weight	Pallet	PU
	W(B)	x	D(T)	x	H	D Ø	x	DH	4019346	kg		
19800305	91	x	90	x	125	20	x	250	500248	1.510	240	10
19800306	101	x	90	x	125	20	x	250	500255	1.550	240	10
19800307	121	x	90	x	125	20	x	250	500262	1.620	240	10
19800308	141	x	90	x	125	20	x	250	500279	1.680	240	10

TYPE U-70 IN CONCRETE

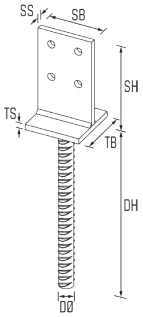
Timber / Concrete

Art. No.	[mm]					Connecting element	$F_{1,c}$ - pressure			$F_{1,t}$ - tension			$F_{2/3}$			$F_{4/5}$		
	Post		Maximum distances				timber	Steel		timber	Steel		timber	Steel		timber	Steel	
	B_{min}	H_{min}	a_{max}	$e_{2/3}$	$e_{3/4}$		$F_{1,c,Rk}$	$F_{1,c,Rk}$	γ_M	$F_{1,t,Rk}$	$F_{1,t,Rk}$	γ_M	$F_{2/3,Rk}$	$F_{2/3,Rk}$	γ_M	$F_{4/5,Rk}$	$F_{4/5,Rk}$	γ_M
19800301	81	94	100	190	102	2 screws Ø8x70	75,70	39,40	1,00	6,17	3,91	1,00	5,01	1,31	1,00	4,93	2,75	1,00
19800302	91	94	100	190	102	2 screws Ø8x70	83,10	39,40	1,00	6,17	3,33	1,00	5,01	1,10	1,00	4,93	2,75	1,00
19800303	101	94	100	190	102	2 screws Ø8x70	90,40	39,40	1,00	6,17	2,90	1,00	5,01	1,10	1,00	4,93	2,75	1,00
19800304	121	94	100	190	102	2 screws Ø8x70	105,00	39,40	1,00	6,17	2,31	1,00	5,01	1,10	1,00	4,93	2,75	1,00

TYPE U-90 IN CONCRETE

Timber / Concrete

Art. No.	[mm]					Connecting element	$F_{1,c}$ - pressure			$F_{1,t}$ - tension			$F_{2/3}$			$F_{4/5}$		
	Post		Maximum distances				timber	Steel		timber	Steel		timber	Steel		timber	Steel	
	B_{min}	H_{min}	a_{max}	$e_{2/3}$	$e_{3/4}$		$F_{1,c,Rk}$	$F_{1,c,Rk}$	γ_M	$F_{1,t,Rk}$	$F_{1,t,Rk}$	γ_M	$F_{2/3,Rk}$	$F_{2/3,Rk}$	γ_M	$F_{4/5,Rk}$	$F_{4/5,Rk}$	γ_M
19800305	91	126	100	190	97	2 screws Ø12x80	107,00	39,40	1,00	10,90	3,33	1,00	7,95	1,81	1,00	6,36	2,16	1,00
19800306	101	126	100	190	97	2 screws Ø12x80	116,00	39,40	1,00	10,90	2,90	1,00	7,95	1,55	1,00	6,36	2,16	1,00
19800307	121	126	100	190	97	2 screws Ø12x80	135,00	39,40	1,00	10,90	2,31	1,00	7,95	1,41	1,00	6,36	2,16	1,00
19800308	141	126	100	190	97	2 screws Ø12x80	154,00	39,40	1,00	10,90	1,91	1,00	7,95	1,41	1,00	6,36	2,16	1,00

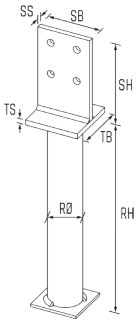


STANCHIONS

TYPE T-01 IN CONCRETE

Art. No.	Blade [mm]						Pin [mm]			Carrier plate [mm]			EAN	Weight	Pallet	PU
	SB	x	SH	x	SS	Ø 11	D Ø	x	DH	TB	x	TS	4019346	kg		
19810201	80	x	130	x	8	4	20	x	250	80	x	8	505007	1.800	240	10
19810240	80	x	130	x	8	4	20	x	400	80	x	8	003503	2.150	200	10

Fastening element: GH rod dowels Ø 10 mm **(see page 284)**



STANCHIONS

TYPE T-02 IN CONCRETE

Art. No.	Blade [mm]						Tube [mm]			Carrier plate [mm]			EAN	Weight	Pallet	PU
	SB	x	SH	x	SS	Ø 11	R Ø	x	RH	TB	x	TS	4019346	kg		
19810203	80	x	130	x	8	4	48,3	x	300	80	x	8	505021	2.350	180	10
19810204	80	x	130	x	8	4	48,3	x	500	80	x	8	505038	3.100	120	10

Fastening element: GH rod dowels Ø 10 mm **(see page 284)**

TYPE T-01 IN CONCRETE

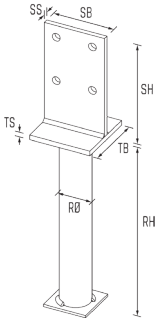
Timber / Concrete

Art. No.	[mm]					Connecting element	$F_{1,c}$ - pressure			$F_{1,t}$ - tension			$F_{2/3}$			$F_{4/5}$		
	Post		Maximum distances				timber	Steel		timber	Steel		timber	Steel		timber	Steel	
	B_{min}	H_{min}	a_{max}	$e_{2/3}$	$e_{3/4}$		$F_{1,c,Rk}$	$F_{1,c,Rk}$	γ_M	$F_{1,t,Rk}$	$F_{1,t,Rk}$	γ_M	$F_{2/3,Rk}$	$F_{2/3,Rk}$	γ_M	$F_{4/5,Rk}$	$F_{4/5,Rk}$	γ_M
19810201	100	100	100	210	120	4 rod dowels Ø10	75,60	63,50	1,00	24,80	57,10	1,25	9,20	3,11	1,25	1,66	4,77	1,00
19810240	100	100	150	260	164	4 rod dowels Ø10	75,60	63,50	1,00	24,80	57,10	1,25	9,20	2,38	1,00	1,60	3,63	1,00

TYPE T-02 IN CONCRETE

Timber / Concrete

Art. No.	[mm]					Connecting element	$F_{1,c}$ - pressure			$F_{1,t}$ - tension			$F_{2/3}$			$F_{4/5}$		
	Post		Maximum distances				timber	Steel		timber	Steel		timber	Steel		timber	Steel	
	B_{min}	H_{min}	a_{max}	$e_{2/3}$	$e_{3/4}$		$F_{1,c,Rk}$	$F_{1,c,Rk}$	γ_M	$F_{1,t,Rk}$	$F_{1,t,Rk}$	γ_M	$F_{2/3,Rk}$	$F_{2/3,Rk}$	γ_M	$F_{4/5,Rk}$	$F_{4/5,Rk}$	γ_M
19810203	100	120	100	210	132	4 rod dowels Ø10	75,60	108,00	1,10	24,80	87,30	1,25	12,00	7,53	1,00	2,26	9,50	1,00
19810204	100	120	200	310	232	4 rod dowels Ø10	75,60	108,00	1,10	24,80	87,30	1,25	12,00	5,07	1,00	2,26	6,70	1,00

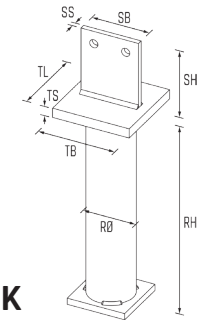


STANCHIONS

TYPE T-03 IN CONCRETE

Art. No.	Blade [mm]						Tube [mm]			Carrier plate [mm]			EAN	Weight	Pallet	PU
	SB	x	SH	x	SS	Ø 13	R Ø	x	RH	TB	x	TS	4019346	kg		
19810206	100	x	170	x	8	4	48,3	x	500	100	x	8	505052	3.870	60	5

Fastening element: GH rod dowels Ø 12 mm **(see page 285)**



STANCHIONS

TYPE T-04 IN CONCRETE EXTRA THICK

Art. No.	Blade [mm]						Tube [mm]			Carrier plate [mm]			EAN	Weight	Pallet	PU
	SB	x	SH	x	SS	Ø 13	R Ø	x	RH	TB	x	TS	4019346	kg		
19810210	90	x	105	x	8	2	70	x	323	120	x	15	505700	5.330	50	1

The carrier plate has a thickness of 15 mm. For timber constructions with maximum static pressure stress.

Fastening element: GH rod dowels Ø 12 mm **(see page 285)**

TYPE T-03 IN CONCRETE

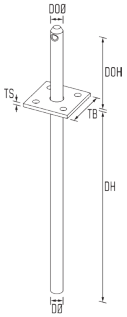
Timber / Concrete

Art. No.	[mm]					Connecting element	$F_{1,c}$ - pressure			$F_{1,t}$ - tension			$F_{2/3}$			$F_{4/5}$		
	Post		Maximum distances				timber	Steel		timber	Steel		timber	Steel		timber	Steel	
	B_{min}	H_{min}	a_{max}	$e_{2/3}$	$e_{3/4}$		$F_{1,c,Rk}$	$F_{1,c,Rk}$	γ_M	$F_{1,t,Rk}$	$F_{1,t,Rk}$	γ_M	$F_{2/3,Rk}$	$F_{2/3,Rk}$	γ_M	$F_{4/5,Rk}$	$F_{4/5,Rk}$	γ_M
19810206	120	156	200	350	232	4 rod dowels Ø10	128,00	108,00	1,10	34,90	88,60	1,25	18,90	4,48	1,00	2,95	6,70	1,00

TYPE T-04 IN CONCRETE EXTRA THICK

Timber / Concrete

Art. No.	[mm]					Connecting element	$F_{1,c}$ - pressure			$F_{1,t}$ - tension			$F_{2/3}$			$F_{4/5}$		
	Post		Maximum distances				timber	Steel		timber	Steel		timber	Steel		timber	Steel	
	B_{min}	H_{min}	a_{max}	$e_{2/3}$	$e_{3/4}$		$F_{1,c,Rk}$	$F_{1,c,Rk}$	γ_M	$F_{1,t,Rk}$	$F_{1,t,Rk}$	γ_M	$F_{2/3,Rk}$	$F_{2/3,Rk}$	γ_M	$F_{4/5,Rk}$	$F_{4/5,Rk}$	γ_M
19810210	140	136	150	230	182	2 rod dowels Ø12	213,00	283,00	1,10	36,00	111,00	1,25	18,90	30,00	1,25	4,90	10,70	1,00



STANCHIONS

TYPE D IN CONCRETE

ETA-16 0550

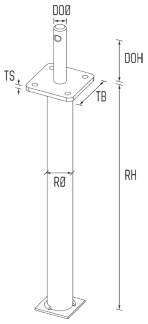
NKL 3

235 JR feuerverzinkt

DCSTATIK

Art. No.	Mandrel [mm]				Pin [mm]			Carrier plate [mm]				EAN	Weight	Pallet	PU
	DO Ø	x	DOH	Ø 9	D Ø	x	DH	TB	x	TS	Ø 11	4019346	kg		
19620080	20	x	120	1,00	20	x	374	80	x	6	4	510001	1.930	180	10
19620100	20	x	120	1,00	20	x	374	100	x	6	4	510018	1.690	180	10
19820400	24	x	120	1,00	24	x	374	100	x	6	4	003510	2.490	180	5

Fastening element: GH rod dowels Ø 8 mm **(see page 284)**
TOP-Fix Duo screw Ø 10 x 120 mm **(see page 316)**



STANCHIONS

TYPE DS IN CONCRETE

ETA-16 0550

NKL 3

235 JR feuerverzinkt

DCSTATIK

Art. No.	Mandrel [mm]				Tube [mm]			Carrier plate [mm]				EAN	Weight	Pallet	PU
	DO Ø	x	DOH	Ø 11	R Ø	x	RH	TB	x	TS	Ø 11	4019346	kg		
19820220	24	x	120	1	48,3	x	500	100	x	6	4	510148	2.900	120	10
19820221	24	x	120	1	48,3	x	400	100	x	6	4	010556	2.900	120	10
19820420	40	x	120	1	48,3	x	500	100	x	6	4	510131	3.100	120	10

Sturdy hot-dip galvanised stanchion to install in concrete to transfer loads directly into the foundations.
The 24 or 40 mm mandrels enable a quick, cost-effective and invisible connection.

Fastening element: GH rod dowels Ø 10 mm **(see page 284)**
TOP-Fix Duo screw Ø 10 x 120 mm **(see page 316)**

TYPE D IN CONCRETE

Timber / Concrete

Art. No.	[mm]					Connecting element	$F_{1,c}$ - pressure			$F_{1,t}$ - tension			$F_{2/3}$			$F_{4/5}$		
	Post		Maximum distances				timber	Steel		timber	Steel		timber	Steel		timber	Steel	
	B_{min}	H_{min}	a_{max}	$e_{2/3}$	$e_{3/4}$		$F_{1,c,Rk}$	$F_{1,c,Rk}$	γ_M	$F_{1,t,Rk}$	$F_{1,t,Rk}$	γ_M	$F_{2/3,Rk}$	$F_{2/3,Rk}$	γ_M	$F_{4/5,Rk}$	$F_{4/5,Rk}$	γ_M
19620080	100	100	100	100	100	4 screws Ø10x120	105,00	41,20	1,00	16,30 d)	13,00	1,00	6,38	3,33	1,00	6,38	3,33	1,00
19620100	120	120	100	100	100	4 screws Ø10x120	176,00	41,90	1,00	16,30 d)	11,50	1,00	6,94	3,33	1,00	6,94	3,33	1,00
19820400	120	120	100	100	100	4 screws Ø10x120	174,00	38,80	1,00	16,30 d)	10,90	1,00	6,94	5,76	1,00	6,94	5,76	1,00

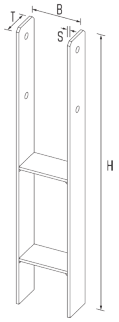
For indices see **page 326**

TYPE DS IN CONCRETE

Timber / Concrete

Art. No.	[mm]					Connecting element	$F_{1,c}$ - pressure			$F_{1,t}$ - tension			$F_{2/3}$			$F_{4/5}$		
	Post		Maximum distances				timber	Steel		timber	Steel		timber	Steel		timber	Steel	
	B_{min}	H_{min}	a_{max}	$e_{2/3}$	$e_{3/4}$		$F_{1,c,Rk}$	$F_{1,c,Rk}$	γ_M	$F_{1,t,Rk}$	$F_{1,t,Rk}$	γ_M	$F_{2/3,Rk}$	$F_{2/3,Rk}$	γ_M	$F_{4/5,Rk}$	$F_{4/5,Rk}$	γ_M
19820220	120	120	200	200	200	4 screws Ø10x120	174,00	108,00	1,10	16,30 d)	19,00	1,00	8,22	8,08	1,00	8,22	8,08	1,00
19820221	120	120	100	100	100	4 screws Ø10x120	174,00	108,00	1,10	16,30 d)	19,00	1,00	8,22	16,90	1,00	8,22	16,90	1,00
19820420	120	120	200	200	200	4 screws Ø10x120	160,00	108,00	1,10	16,30 d)	15,00	1,00	8,22	8,08	1,00	8,22	8,08	1,00

For indices see **page 326**



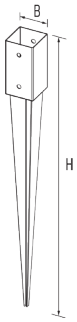
STANCHIONS

TYPE H IN CONCRETE GROUP S

NKL 3

235 JR feuerverzinkt

Art. No.	Dimensions [mm]							EAN	Weight	PU
	W(B)	x	H	x	D(T)	x	T(S)	4019346	kg	
19840080	71	x	600	x	60	x	6,0	515129	3.850	1
19840090	81	x	600	x	60	x	6,0	515136	3.900	1
19840100	91	x	600	x	60	x	6,0	515105	3.950	1
19840105	95	x	600	x	60	x	6,0	515143	4.075	1
19840110	101	x	600	x	60	x	6,0	515112	4.100	1
19840111	111	x	600	x	60	x	6,0	515150	4.015	1
19840120	121	x	600	x	60	x	6,0	515167	4.175	1
19840140	141	x	600	x	60	x	6,0	515181	4.248	1



STANCHIONS

TYPE S-R

NKL 3

235 JR feuerverzinkt

Art. No.	Dimensions [mm]			EAN	Weight	PU
	W(B)	x	H	4019346	kg	
19880271	71	x	750	515235	2.000	1
19880291	91	x	750	515242	2.600	1
19880071	71	x	900	515204	2.200	1
19880091	91	x	900	515211	2.800	1
19880101	101	x	900	515228	3.200	1

ZINTOP

ON THE SAFE SIDE, WITH AN ATTRACTIVE LOOK

Stanchions that have to meet the requirements of usage class 3 are subsequently hot-dip galvanised or have our **ZIN**TOP coating.
ZINTOP not only has optimum corrosion protection, but is also visually more appealing.
We supply a larger selection of stanchions, including ones with the **ZIN**TOP surface.
The **ZIN**TOP coating is approved for usage class 3.

Advantages of the ZINTOP **coating:**

- Even surface
- High corrosion resistance
- No contact corrosion in connection with stainless steel
- Approved for usage class 3 in timber construction
- Good surface hardness
- Even layer thickness, including on thread parts

The usage class must be determined for the corresponding application according to EN 1995-1-1 2.3 1.3 Usage classes. The following definition is only a reference point:

Usage class 1
The timber component is located in a heated building

Usage class 2
The wood component is located under a roof and is not directly exposed to the weather

usage class 3
The wood component can be exposed to weather and splashes.

The static values indicated in the catalogue are for orientation purposes only. Detailed load capacity tables for determination of combined stress with design examples can be found at:
www.holzverbinder.de

STANCHIONS TYPE PR

S. 364

STANCHIONS TYPE T 01H

S. 354

STANCHIONS TYPE D 03

S. 356

STANCHIONS TYPE D

S. 358

STANCHIONS TYPE D 24

S. 350

STANCHIONS TYPE P 24

S. 362

STANCHIONS TYPE D 05

S. 360

STANCHIONS TYPE D 40

S. 352

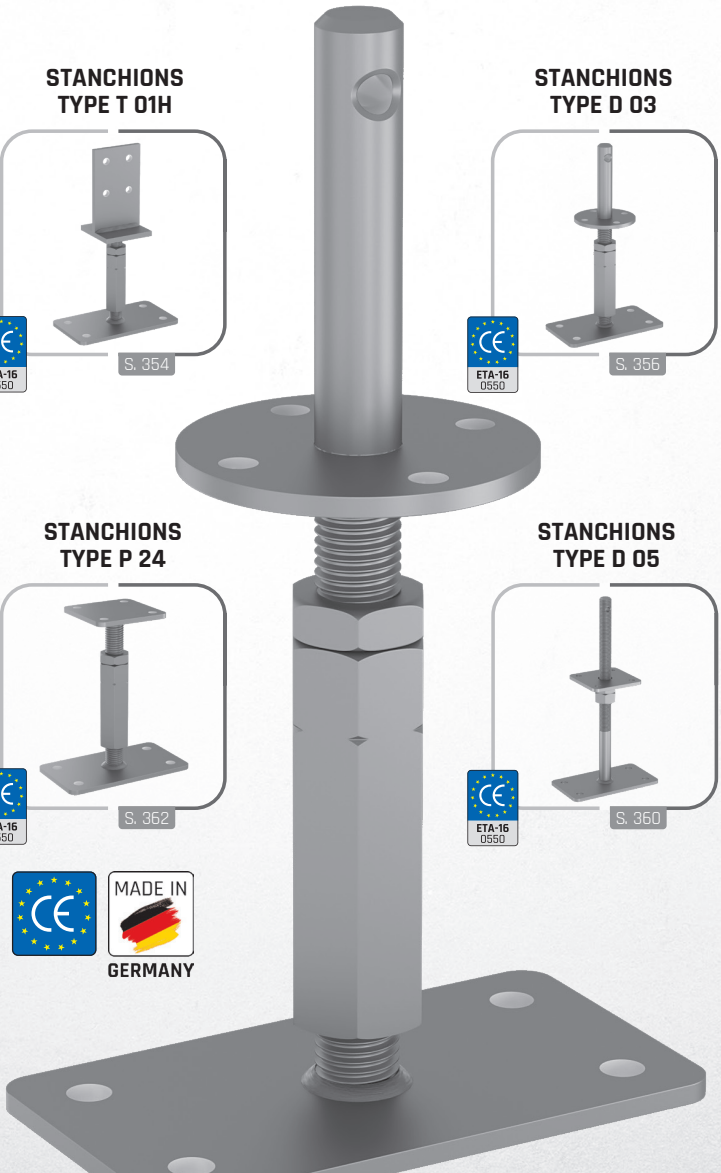
STANCHIONS TYPE D I. B.

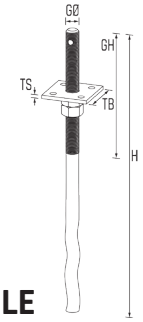
S. 342

MADE IN GERMANY

STANCHIONS TYPE U 70

S. 366





ZINTOP STANCHIONS

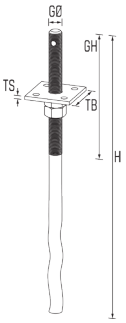
TYPE D IN CONCRETE HEIGHT-ADJUSTABLETABLE

ZINTOP ETA-16 0550

NKL 3 | 235 JR ZINTOP | DC DCSTATIK

Art. No.	Mandrel [mm]					Carrier plate [mm]				EAN	Weight	Pallet	PU
	G Ø	x	GH	H	Ø 9	TB	x	TS	Ø 11	4019346	kg		
19621080TOP	22	x	240	500	1,00	80	x	6	4	010693	1.630	360	10
19621100TOP	22	x	240	500	1,00	100	x	6	4	010709	1.960	360	10

Fastening element: GH rod dowels Ø 8 mm **(see page 284)**
TOP-Fix Duo screw Ø 10 x 120 mm **(see page 316)**



STANCHIONS

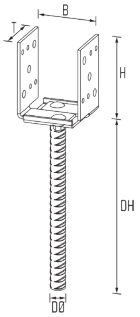
TYPE D IN CONCRETE HEIGHT-ADJUSTABLE

ETA-16 0550

NKL 2 | 235 JR galv. verzinkt | DC DCSTATIK

Art. No.	Mandrel [mm]					Carrier plate [mm]				EAN	Weight	Pallet	PU
	G Ø	x	GH	H	Ø 9	TB	x	TS	Ø 11	4019346	kg		
19621080	22	x	240	500	1,00	80	x	6	4	510025	1.630	360	10
19621100	22	x	240	500	1,00	100	x	6	4	510032	1.960	360	10

Fastening element: GH rod dowels Ø 8 mm **(see page 284)**
TOP-Fix Duo screw Ø 10 x 120 mm **(see page 316)**



STANCHIONS

TYPE U-70 IN CONCRETE SIDE-ADJUSTABLE

ETA-16 0550

NKL 3 | 235 JR feuerverzinkt | DC DCSTATIK

Art. No.	Top part [mm]					Pin [mm]			EAN	Weight	Pallet	PU
	W(B)	x	H	x	D(T)	D Ø	x	DH	4019346	kg		
19850102	70-150	x	115	x	70	20	x	250	501016	1.150	240	10
19850202	70-150	x	115	x	70	20	x	400	003527	2.120	240	10

Side adjustment 70-150 mm via slotted hole using a fixing screw.

Fastening element: TOP-Fix Duo screw Ø 10 x 60 mm **(see page 316)**

TYPE D IN CONCRETE HEIGHT-ADJUSTABLE

Timber | Concrete

Art. No.	[mm]					Connecting element	$F_{1,c}$ - pressure			$F_{1,t}$ - tension			$F_{2/3}$			$F_{4/5}$		
	Post		Maximum distances				timber	Steel		timber	Steel		timber	Steel		timber	Steel	
	B_{min}	H_{min}	a_{max}	$e_{2/3}$	$e_{3/4}$		$F_{1,c,Rk}$	$F_{1,c,Rk}$	γ_M	$F_{1,t,Rk}$	$F_{1,t,Rk}$	γ_M	$F_{2/3,Rk}$	$F_{2/3,Rk}$	γ_M	$F_{4/5,Rk}$	$F_{4/5,Rk}$	γ_M
19621080TOP	100	100	180	180	180	2 screws Ø12x120	106,00	41,00	1,10	16,30 d)	12,60	1,00	6,38	1,53	1,00	6,38	1,53	1,00
19621100TOP	120	120	180	180	180	2 screws Ø12x120	178,00	41,00	1,10	16,30 d)	11,20	1,00	6,94	1,53	1,00	6,94	1,53	1,00
19621080TOP	100	100	**300**	**300**	**300**	2 screws Ø12x120	106,00	22,90	1,10	16,30 d)	12,60	1,00	6,38	0,90	1,00	6,38	0,90	1,00
19621100TOP	120	120	**300**	**300**	**300**	2 screws Ø12x120	178,00	22,90	1,10	16,30 d)	11,20	1,00	6,94	0,90	1,00	6,94	0,90	1,00

For indices see **page 326**

TYPE D IN CONCRETE HEIGHT-ADJUSTABLE

Timber | Concrete

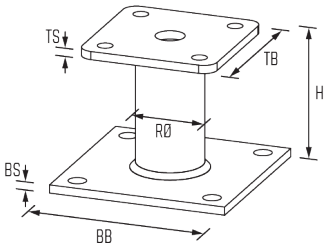
Art. No.	[mm]					Connecting element	$F_{1,c}$ - pressure			$F_{1,t}$ - pressure			$F_{2/3}$			$F_{4/5}$		
	Post		Maximum distances				timber	Steel		timber	Steel		timber	Steel		timber	Steel	
	B_{min}	H_{min}	a_{max}	$e_{2/3}$	$e_{3/4}$		$F_{1,c,Rk}$	$F_{1,c,Rk}$	γ_M	$F_{1,t,Rk}$	$F_{1,t,Rk}$	γ_M	$F_{2/3,Rk}$	$F_{2/3,Rk}$	γ_M	$F_{4/5,Rk}$	$F_{4/5,Rk}$	γ_M
19621080	100	100	180	180	180	2 screws Ø12x120	106,00	41,00	1,10	16,30 d)	12,60	1,00	6,38	1,53	1,00	6,38	1,53	1,00
19621100	120	120	180	180	180	2 screws Ø12x120	178,00	41,00	1,10	16,30 d)	11,20	1,00	6,94	1,53	1,00	6,94	1,53	1,00
19621080	100	100	**300**	**300**	**300**	2 screws Ø12x120	106,00	22,90	1,10	16,30 d)	12,60	1,00	6,38	0,90	1,00	6,38	0,90	1,00
19621100	120	120	**300**	**300**	**300**	2 screws Ø12x120	178,00	22,90	1,10	16,30 d)	11,20	1,00	6,94	0,90	1,00	6,94	0,90	1,00

For indices see **page 326**

TYPE U-70 IN CONCRETE SIDE-ADJUSTABLE

Timber | Concrete

Art. No.	[mm]					Connecting element	$F_{1,c}$ - pressure			$F_{1,t}$ - pressure			$F_{2/3}$			$F_{4/5}$		
	Post		Maximum distances				timber	Steel		timber	Steel		timber	Steel		timber	Steel	
	B_{min}	H_{min}	a_{max}	$e_{2/3}$	$e_{3/4}$		$F_{1,c,Rk}$	$F_{1,c,Rk}$	γ_M	$F_{1,t,Rk}$	$F_{1,t,Rk}$	γ_M	$F_{2/3,Rk}$	$F_{2/3,Rk}$	γ_M	$F_{4/5,Rk}$	$F_{4/5,Rk}$	γ_M
19850102	70-150	100	100	210	132	2 screws Ø10x60	15,90	10,90 -	1,00	-	-	-	-	-	-	-	-	-
19850202	70-150	70	150	210	132	2 screws Ø10x60	15,90	10,90 -	1,00	-	-	-	-	-	-	-	-	-

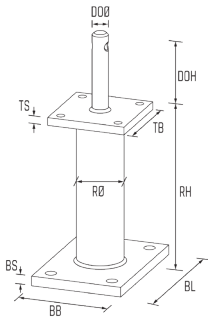


STANCHIONS

TYPE P

Art. No.	Dimensions [mm]		Carrier plate [mm]				Baseplate [mm]				EAN	Weight	Pallet	PU
	R Ø	H	TB	x	TS	Ø 11	BB	x	BS	Ø 13	4019346	kg		
19832060	48,3	60	100	x	6	4	130	x	6	4	510209	1.270	400	10
19832100	48,3	100	100	x	6	4	130	x	6	4	510216	1.420	300	10
19832150	48,3	150	100	x	6	4	130	x	6	4	510223	1.620	240	10

Fastening element: TOP-Fix Duo screw Ø 10 x 120 mm **(see page 316)**

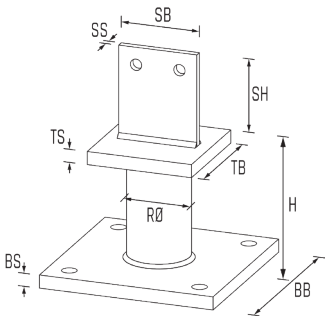


STANCHIONS

TYPE D EXTRA THICK ON CONCRETE

Art. No.	Mandrel [mm]						Carrier plate [mm]				Baseplate [mm]						EAN	Weight	Pallet	PU
	DO Ø	x	DOH	Ø 11	R Ø	H	TB	x	TS	Ø 12	BB	x	BL	x	BS	Ø 17	4019346	kg		
19813210	24	x	120	1	70	250	120	x	12	4	140	x	200	x	15	4	003565	7.190	50	1

Fastening element: GH rod dowels Ø 10 mm **(see page 284)**
TOP-Fix Duo screw Ø 10 x 100 mm **(see page 316)**



STANCHIONS

TYPE T-05 EXTRA THICK

Art. No.	Blade [mm]								Carrier plate [mm]			Baseplate [mm]				EAN	Weight	Pallet	PU
	SB	x	SH	x	SS	Ø 13	R Ø	H	TB	x	TS	BB	x	BS	Ø 17	4019346	kg		
19812210	90	x	150	x	8	2	70	148	120	x	15	200	x	15	4	505717	8.050	50	1

Fastening element: GH rod dowels Ø 12 mm **(see page 285)**

TYPE P

Timber | Concrete

Art. No.	[mm]					Connecting element	$F_{1,c}$ - pressure			$F_{1,t}$ - tension			$F_{2/3}$			$F_{4/5}$		
	Post		Maximum distances				timber	Steel		timber	Steel		timber	Steel		timber	Steel	
	B_{min}	H_{min}	a_{max}	$e_{2/3}$	$e_{3/4}$		$F_{1,c,Rk}$	$F_{1,c,Rk}$	γ_M	$F_{1,t,Rk}$	$F_{1,t,Rk}$	γ_M	$F_{2/3,Rk}$	$F_{2/3,Rk}$	γ_M	$F_{4/5,Rk}$	$F_{4/5,Rk}$	γ_M
19832060	120	120	60	60	60	4 screws Ø10x120	101,00	93,40	1,00	16,30 d)	10,60	1,00	6,94	7,71	1,00	6,94	7,71	1,00
19832100	120	120	100	100	100	4 screws Ø10x120	101,00	93,40	1,00	16,30 d)	10,60	1,00	6,94	4,53	1,00	6,94	4,53	1,00
19832150	120	120	150	150	150	4 screws Ø10x120	101,00	93,40	1,00	16,30 d)	10,60	1,00	6,94	2,99	1,00	6,94	2,99	1,00

For indices see **page 326**

TYPE D EXTRA THICK ON CONCRETE

Timber | Concrete

Art. No.	[mm]					Connecting element	$F_{1,c}$ - pressure			$F_{1,t}$ - tension			$F_{2/3}$			$F_{4/5}$		
	Post		Maximum distances				timber	Steel		timber	Steel		timber	Steel		timber	Steel	
	B_{min}	H_{min}	a_{max}	$e_{2/3}$	$e_{3/4}$		$F_{1,c,Rk}$	$F_{1,c,Rk}$	γ_M	$F_{1,t,Rk}$	$F_{1,t,Rk}$	γ_M	$F_{2/3,Rk}$	$F_{2/3,Rk}$	γ_M	$F_{4/5,Rk}$	$F_{4/5,Rk}$	γ_M
19813210	140	140	250	250	250	2 Schrauben Ø10x100	262,00	200,00	1,25	16,30 d)	53,30	1,00	10,20	18,40	1,25	10,20	12,00	1,00

For indices see **page 326**

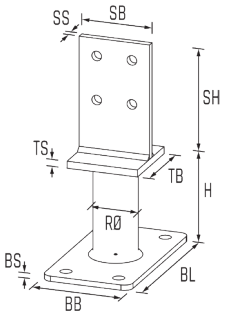
TYPE T-05 EXTRA THICK

Timber | Concrete

Art. No.	[mm]					Connecting element	$F_{1,c}$ - pressure			$F_{1,t}$ - tension			$F_{2/3}$			$F_{4/5}$		
	Post		Maximum distances				timber	Steel		timber	Steel		timber	Steel		timber	Steel	
	B_{min}	H_{min}	a_{max}	$e_{2/3}$	$e_{3/4}$		$F_{1,c,Rk}$	$F_{1,c,Rk}$	γ_M	$F_{1,t,Rk}$	$F_{1,t,Rk}$	γ_M	$F_{2/3,Rk}$	$F_{2/3,Rk}$	γ_M	$F_{4/5,Rk}$	$F_{4/5,Rk}$	γ_M
19812210	140	140	148	228	167	2 Stabdübel Ø12	202,00	283,00	1,00	36,00	36,40	1,25	19,60	19,80	1,25	4,78	9,77	1,00

STANCHIONS

TYPE T-01 ON CONCRETE



ETA-16 0550

NKL 3

235 JR feuerverzinkt

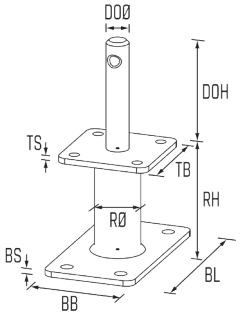
DCSTATIK

Art. No.	Blade [mm]								Carrier plate [mm]			Baseplate [mm]						EAN	Weight	Pallet	PU
	SB	x	SH	x	SS	Ø 11	R Ø	H	TB	x	TS	BB	x	BL	x	BS	Ø 13	4019346	kg		
19812301	80	x	130	x	8	4	48,3	70	80	x	8	100	x	180	x	6	4	505083	2.000	240	10
19812302	80	x	130	x	8	4	48,3	120	80	x	8	100	x	180	x	6	4	505090	2.100	240	10
19812303	80	x	130	x	8	4	48,3	200	80	x	8	100	x	180	x	6	4	505113	2.300	240	10
19812638	80	x	130	x	8	4	48,3	250	80	x	8	100	x	180	x	6	4	003541	2.500	180	10
19812639	80	x	130	x	8	4	48,3	300	80	x	8	100	x	180	x	6	4	003558	2.600	180	10

Fastening element: GH rod dowels Ø 10 mm **(see page 284)**

STANCHIONS

TYPE D ON CONCRETE



ETA-16 0550

NKL 3

235 JR feuerverzinkt

DCSTATIK

Art. No.	Mandrel [mm]						Carrier plate [mm]				Baseplate [mm]						EAN	Weight	Pallet	PU
	DO Ø	x	DOH	Ø 11	R Ø	H	TB	x	TS	Ø 11	BB	x	BL	x	BS	Ø 13	4019346	kg		
19823065	24	x	120	1	48,3	70	100	x	6	4	100	x	180	x	6	4	011935	1.950	240	10
19823120	24	x	120	1	48,3	120	100	x	6	4	100	x	180	x	6	4	011928	2.200	240	10
19823150	24	x	120	1	48,3	150	100	x	6	4	100	x	180	x	6	4	011201	2.300	240	10
19823200	24	x	120	1	48,3	200	100	x	6	4	100	x	180	x	6	4	011218	2.500	180	10
19823250	24	x	120	1	48,3	250	100	x	6	4	100	x	180	x	6	4	011225	2.700	180	10
19823300	24	x	120	1	48,3	300	100	x	6	4	100	x	180	x	6	4	011232	2.900	180	10

Fastening element: GH rod dowels Ø 10 mm **(see page 284)**
TOP-Fix Duo screw Ø 10 x 120 mm **(see page 316)**

TYPE T-01 ON CONCRETE

Timber | Concrete

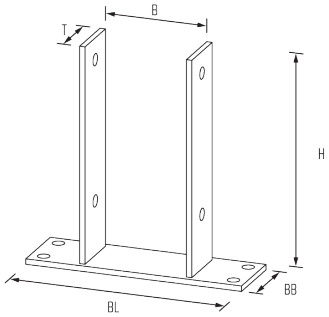
Art. No.	[mm]					Connecting element	$F_{1,c}$ - pressure			$F_{1,t}$ - tension			$F_{2/3}$			$F_{4/5}$		
	Post		Maximum distances				timber	Steel		timber	Steel		timber	Steel		timber	Steel	
	B_{min}	H_{min}	a_{max}	$e_{2/3}$	$e_{3/4}$		$F_{1,c,Rk}$	$F_{1,c,Rk}$	γ_M	$F_{1,t,Rk}$	$F_{1,t,Rk}$	γ_M	$F_{2/3,Rk}$	$F_{2/3,Rk}$	γ_M	$F_{4/5,Rk}$	$F_{4/5,Rk}$	γ_M
19812301	100	100	70	180	92	4 rod dowels Ø10	75,60	108,00	1,10	24,80	6,88	1,00	9,22	1,87	1,00	2,24	4,61	1,00
19812302	100	100	120	230	139	4 rod dowels Ø10	75,60	108,00	1,10	24,80	6,88	1,00	9,22	1,45	1,00	2,19	3,05	1,00
19812303	100	100	200	310	214	4 rod dowels Ø10	75,60	108,00	1,10	24,80	6,88	1,00	9,22	1,07	1,00	2,10	1,98	1,00
19812638	100	100	250	360	263	4 rod dowels Ø10	75,60	108,00	1,10	24,80	6,88	1,00	9,22	0,92	1,00	2,08	1,61	1,00
19812639	100	100	300	410	312	4 rod dowels Ø10	75,60	108,00	1,10	24,80	6,88	1,00	9,22	0,81	1,00	1,99	1,36	1,00

TYPE D ON CONCRETE

Timber | Concrete

Art. No.	[mm]					Connecting element	$F_{1,c}$ - pressure			$F_{1,t}$ - tension			$F_{2/3}$			$F_{4/5}$		
	Post		Maximum distances				timber	Steel		timber	Steel		timber	Steel		timber	Steel	
	B_{min}	H_{min}	a_{max}	$e_{2/3}$	$e_{3/4}$		$F_{1,c,Rk}$	$F_{1,c,Rk}$	γ_M	$F_{1,t,Rk}$	$F_{1,t,Rk}$	γ_M	$F_{2/3,Rk}$	$F_{2/3,Rk}$	γ_M	$F_{4/5,Rk}$	$F_{4/5,Rk}$	γ_M
19823065	120	120	70	70	70	4 screws Ø10x120	169,00	138,00	1,10	16,30 d)	6,88	1,00	6,68	6,61	1,00	6,68	5,09	1,00
19823120	120	120	120	120	120	4 screws Ø10x120	169,00	138,00	1,10	16,30 d)	6,88	1,00	6,68	3,71	1,00	6,68	2,86	1,00
19823150	120	120	150	150	150	4 screws Ø10x120	169,00	138,00	1,10	16,30 d)	6,88	1,00	6,68	2,94	1,00	6,68	2,26	1,00
19823200	120	120	200	200	200	4 screws Ø10x120	169,00	138,00	1,10	16,30 d)	6,88	1,00	6,68	2,18	1,00	6,68	1,68	1,00
19823250	120	120	250	250	250	4 screws Ø10x120	169,00	138,00	1,10	16,30 d)	6,88	1,00	6,68	1,73	1,00	6,68	1,33	1,00
19823300	120	120	300	300	300	4 screws Ø10x120	169,00	138,00	1,10	16,30 d)	6,88	1,00	6,68	1,44	1,00	6,68	1,11	1,00

For indices see **page 326**



STANCHIONS

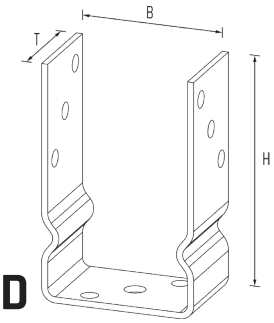
TYPE S-B ON CONCRETE

NKL 3

235 JR feuerverzinkt

Art. No.	Top part [mm]					Baseplate [mm]			EAN	Weight	Pallet	PU
	W(B)	x	H	x	D(T)	BB	x	BL	4019346	kg		
19874201	71	x	200	x	50	60	x	150	515013	1.200	320	10
19874202	81	x	200	x	50	60	x	150	515006	1.250	320	10
19874203	91	x	200	x	50	60	x	150	515020	1.300	320	10
19874204	101	x	200	x	50	60	x	150	515037	1.320	320	10
19874205	121	x	200	x	50	60	x	150	515044	1.370	320	10
19874206	141	x	200	x	50	60	x	150	515051	1.430	320	10

Fastening element: TOP-Fix Duo screw **(see page 316)**



STANCHIONS

TYPE S-B ON CONRETE WITH BEAD

NKL 3

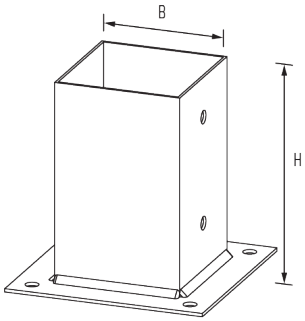
235 JR feuerverzinkt

Art. No.	Dimensions [mm]					EAN	Weight	Pallet	PU
	W(B)	x	H	x	D(T)	4019346	kg		
19874071	71	x	150	x	60	516003	1.100	600	20
19874081	81	x	150	x	60	516010	1.140	600	20
19874091	91	x	150	x	60	516027	1.170	480	20
19874101	101	x	150	x	60	516034	1.250	480	20
19874121	121	x	150	x	60	516041	1.290	480	20

Fastening element: TOP-Fix Duo screw **(see page 316)**

NKL 3

235 JR
feuerverzinkt

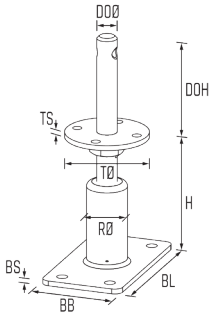


STANCHIONS

SCREW-ON GROUND SLEEVES

Art. No.	Dimensions [mm]			EAN	Weight	Pallet	PU
	W(B)	x	H	4019346	kg		
19894071	71	x	150	515068	1.160	594	1
19894091	91	x	150	515075	1.300	504	10
19894101	101	x	150	515198	1.380	462	10

Fastening element: TOP-Fix Duo screw **(see page 316)**



ZINTOP

ETA-16 0550

NKL 3

235 JR ZINTOP

DC DCSTATIK

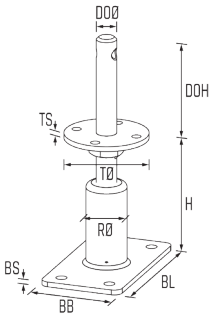
ZINTOP STANCHIONS

TYPE D-24 HEIGHT-ADJUSTABLE

Art. No.	Mandrel [mm]						Carrier plate [mm]				Baseplate [mm]					EAN	Weight	Pallet	PU
	DO Ø	x	DOH	Ø 11	R Ø	H	T Ø	x	TS	Ø 11	BB	x	BL	x	BS	Ø 13	4019346	kg		
19823130TOP	24	x	120	1	48,3	140-210	100	x	6	4	100	x	180	x	6	4	010723	2.700	240	10
19823180TOP	24	x	120	1	48,3	190-260	100	x	6	4	100	x	180	x	6	4	010730	2.825	240	10
19823230TOP	24	x	120	1	48,3	240-310	100	x	6	4	100	x	180	x	6	4	010747	3.000	240	10
19823280TOP	24	x	120	1	48,3	290-360	100	x	6	4	100	x	180	x	6	4	010754	3.125	240	10

An M24 thread allows height adjustment of up to 70 mm when installed and pre-assembly of the support plate with mandrel.

Fastening element: GH rod dowels Ø 10 mm **(see page 284)**
TOP-Fix Duo screw Ø 10 x 120 mm **(see page 316)**



ETA-16 0550

NKL 3

235 JR feuerverzinkt

DC DCSTATIK

STANCHIONS

TYPE D-24 HEIGHT-ADJUSTABLE

Art. No.	Mandrel [mm]						Carrier plate [mm]				Baseplate [mm]					EAN	Weight	Pallet	PU
	DO Ø	x	DOH	Ø 11	BL	H	T Ø	x	TS	Ø 11	G Ø	x	BB	x	R Ø	Ø 13	4019346	kg		
19823130	24	x	120	1	48,3	140-210	100	x	6	4	100	x	180	x	6	4	510087	2.700	240	10
19823180	24	x	120	1	48,3	190-260	100	x	6	4	100	x	180	x	6	4	510094	2.825	240	10
19823230	24	x	120	1	48,3	240-310	100	x	6	4	100	x	180	x	6	4	510100	3.000	240	10
19823280	24	x	120	1	48,3	290-360	100	x	6	4	100	x	180	x	6	4	510117	3.125	240	10

An M24 thread allows height adjustment of up to 70 mm when installed and pre-assembly of the support plate with mandrel.

Fastening element: GH rod dowels Ø 10 mm **(see page 284)**
TOP-Fix Duo screw Ø 10 x 120 mm **(see page 316)**

TYPE D-24 HEIGHT-ADJUSTABLE

Timber | Concrete

Art. No.	[mm]					Connecting element	$F_{1,c}$ - pressure			$F_{1,t}$ - tension			$F_{2/3}$			$F_{4/5}$		
	Post		Maximum distances				timber	Steel		timber	Steel		timber	Steel		timber	Steel	
	B_{min}	H_{min}	a_{max}	$e_{2/3}$	$e_{3/4}$		$F_{1,c,Rk}$	$F_{1,c,Rk}$	γ_M	$F_{1,t,Rk}$	$F_{1,t,Rk}$	γ_M	$F_{2/3,Rk}$	$F_{2/3,Rk}$	γ_M	$F_{4/5,Rk}$	$F_{4/5,Rk}$	γ_M
19823130TOP	120	120	210	210	210	4 screws Ø10x120 (Load case $F_{1,c}$+1 rod dowel Ø10)	129,00	95,50	1,25	6,36 c)	6,66 c)	1,00	7,67 5)	2,01	1,00	7,67 5)	1,55	1,00
19823180TOP	120	120	260	260	260		129,00	95,50	1,25	6,36 c)	6,66 c)	1,00	7,67 5)	1,63	1,00	7,67 5)	1,25	1,00
19823230TOP	120	120	310	310	310		129,00	95,50	1,25	6,36 c)	6,66 c)	1,00	7,67 5)	1,36	1,00	7,67 5)	1,05	1,00
19823280TOP	120	120	360	360	360		129,00	95,50	1,25	6,36 c)	6,66 c)	1,00	7,67 5)	1,18	1,00	7,67 5)	0,90	1,00

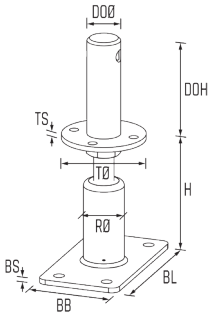
For indices see **page 326**

TYPE D-24 HEIGHT-ADJUSTABLE

Timber | Concrete

Art. No.	[mm]					Connecting element	$F_{1,c}$ - pressure			$F_{1,t}$ - tension			$F_{2/3}$			$F_{4/5}$		
	Post		Maximum distances				timber	Steel		timber	Steel		timber	Steel		timber	Steel	
	B_{min}	H_{min}	a_{max}	$e_{2/3}$	$e_{3/4}$		$F_{1,c,Rk}$	$F_{1,c,Rk}$	γ_M	$F_{1,t,Rk}$	$F_{1,t,Rk}$	γ_M	$F_{2/3,Rk}$	$F_{2/3,Rk}$	γ_M	$F_{4/5,Rk}$	$F_{4/5,Rk}$	γ_M
19823130	120	120	210	210	210	4 screws Ø10x120 (Load case $F_{1,c}$+1 rod dowel Ø10)	129,00	95,50	1,25	6,36 c)	6,66 c)	1,00	7,67 5)	2,01	1,00	7,67 5)	1,55	1,00
19823180	120	120	260	260	260		129,00	95,50	1,25	6,36 c)	6,66 c)	1,00	7,67 5)	1,63	1,00	7,67 5)	1,25	1,00
19823230	120	120	310	310	310		129,00	95,50	1,25	6,36 c)	6,66 c)	1,00	7,67 5)	1,36	1,00	7,67 5)	1,05	1,00
19823280	120	120	360	360	360		129,00	95,50	1,25	6,36 c)	6,66 c)	1,00	7,67 5)	1,18	1,00	7,67 5)	0,90	1,00

For indices see **page 326**



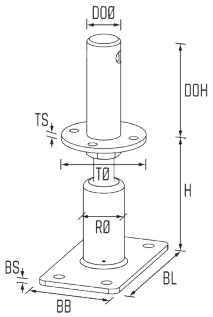
ZINTOP STANCHIONS

TYPE D-40 HEIGHT-ADJUSTABLE

Art. No.	Mandrel [mm]						Carrier plate [mm]				Baseplate [mm]					EAN	Weight	Pallet	PU
	DO Ø	x	DOH	Ø 11	R Ø	H	T Ø	x	TS	Ø 11	BB	x	BL	x	BS	Ø 13	4019346	kg		
19823134TOP	40	x	120	1	48,3	140-210	100	x	6	4	100	x	180	x	6	4	010761	3.450	120	5
19823184TOP	40	x	120	1	48,3	190-260	100	x	6	4	100	x	180	x	6	4	010778	3.580	120	5
19823234TOP	40	x	120	1	48,3	240-310	100	x	6	4	100	x	180	x	6	4	010785	3.700	120	5

Especially for joinery systems
An M24 thread allows height adjustment of up to 70 mm when installed and pre-assembly of the support plate with mandrel.

Fastening element: GH rod dowels Ø 10 mm **(see page 284)**
TOP-Fix Duo screw Ø 10 x 120 mm **(see page 316)**



STANCHIONS

TYPE D-40 HEIGHT-ADJUSTABLE

Art. No.	Mandrel [mm]						Carrier plate [mm]				Baseplate [mm]					EAN	Weight	Pallet	PU
	DO Ø	x	DOH	Ø 11	R Ø	H	T Ø	x	TS	Ø 11	BB	x	BL	1	BS	Ø 13	4019346	kg		
19823134	40	x	120	1	48,3	140-210	100	x	6	4	100	x	180	x	6	4	501214	3.450	120	5
19823184	40	x	120	1	48,3	190-260	100	x	6	4	100	x	180	x	6	4	501252	3.580	120	5
19823234	40	x	120	1	48,3	240-310	100	x	6	4	100	x	180	x	6	4	501269	3.700	120	5
19823284	40	x	120	1	48,3	290-360	100	x	6	4	100	x	180	x	6	4	011911	3.900	240	5

Especially for joinery systems
An M24 thread allows height adjustment of up to 70 mm when installed and pre-assembly of the support plate with mandrel.

Fastening element: GH rod dowels Ø 10 mm **(see page 284)**
TOP-Fix Duo screw Ø 10 x 120 mm **(see page 316)**

TYPE D-40 HEIGHT-ADJUSTABLE

Timber / Concrete

Art. No.	[mm]					Connecting element	$F_{1,c}$ - pressure			$F_{1,t}$ -tension			$F_{2/3}$			$F_{4/5}$		
	Post		Maximum distances				timber	Steel		timber	Steel		timber	Steel		timber	Steel	
	B_{min}	H_{min}	a_{max}	$e_{2/3}$	$e_{3/4}$		$F_{1,c,Rk}$	$F_{1,c,Rk}$	γ_M	$F_{1,t,Rk}$	$F_{1,t,Rk}$	γ_M	$F_{2/3,Rk}$	$F_{2/3,Rk}$	γ_M	$F_{4/5,Rk}$	$F_{4/5,Rk}$	γ_M
19823134TOP	120	120	210	210	210	4 screws Ø10x120	114,00	67,90 6)	1,00	16,30 d)	6,66	1,00	7,67 5)	2,01	1,00	7,67 5)	1,55	1,00
19823184TOP	120	120	260	260	260	4 screws Ø10x120	114,00	67,90 6)	1,00	16,30 d)	6,66	1,00	7,67 5)	1,63	1,00	7,67 5)	1,25	1,00
19823234TOP	120	120	310	310	310	4 screws Ø10x120	114,00	67,90 6)	1,00	16,30 d)	6,66	1,00	7,67 5)	1,36	1,00	7,67 5)	1,05	1,00

For indices see **page 326**

TYPE D-40 HEIGHT-ADJUSTABLE

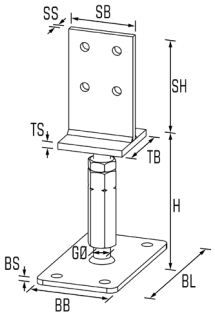
Timber / Concrete

Art. No.	[mm]					Connecting element	$F_{1,c}$ - pressure			$F_{1,t}$ -tension			$F_{2/3}$			$F_{4/5}$		
	Post		Maximum distances				timber	Steel		timber	Steel		timber	Steel		timber	Steel	
	B_{min}	H_{min}	a_{max}	$e_{2/3}$	$e_{3/4}$		$F_{1,c,Rk}$	$F_{1,c,Rk}$	γ_M	$F_{1,t,Rk}$	$F_{1,t,Rk}$	γ_M	$F_{2/3,Rk}$	$F_{2/3,Rk}$	γ_M	$F_{4/5,Rk}$	$F_{4/5,Rk}$	γ_M
19823134	120	120	210	210	210	4 screws Ø10x120	114,00	67,90 6)	1,00	16,30 d)	6,66	1,00	7,67 5)	2,01	1,00	7,67 5)	1,55	1,00
19823184	120	120	260	260	260	4 screws Ø10x120	114,00	67,90 6)	1,00	16,30 d)	6,66	1,00	7,67 5)	1,63	1,00	7,67 5)	1,25	1,00
19823234	120	120	310	310	310	4 screws Ø10x120	114,00	67,90 6)	1,00	16,30 d)	6,66	1,00	7,67 5)	1,36	1,00	7,67 5)	1,05	1,00
19823284	120	120	360	360	360	4 screws Ø10x120	114,00	67,90 6)	1,00	16,30 d)	6,66	1,00	7,67 5)	1,18	1,00	7,67 5)	0,90	1,00

For indices see **page 326**

ZINTOP STANCHIONS

TYPE T-01H ON CONCRETE, ADJUSTABLE



ZINTOP

ETA-16 0550

NKL 3

235 JR ZINTOP

DCSTATIK

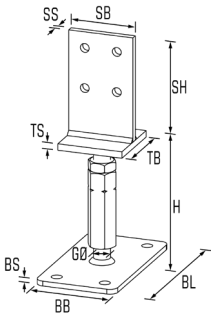
Art. No.	Blade [mm]								Carrier plate [mm]			Baseplate [mm]					EAN	Weight	Pallet	PU
	SB	x	SH	x	SS	Ø 11	G Ø	H	TB	x	TS	BB	x	BL	x	BS	Ø 13	4019346	kg		
19613101TOP	80	x	130	x	8	4	20	150-200	80	x	8	100	x	180	x	6	4	010792	2.800	180	5

Hight-adjustable from 150 to 200 mm when installed.

Fastening element: GH rod dowels Ø 10 mm **(see page 284)**

STANCHIONS

TYPE T-01H ON CONCRETE, ADJUSTABLE



ETA-16 0550

NKL 2

235 JR galv. verzinkt

DCSTATIK

Art. No.	Blade [mm]								Carrier plate [mm]			Baseplate [mm]					EAN	Weight	Pallet	PU
	SB	x	SH	x	SS	Ø 11	G Ø	H	TB	x	TS	BB	x	BL	x	BS	Ø 13	4019346	kg		
19613101	80	x	130	x	8	4	20	150-200	80	x	8	100	x	180	x	6	4	505106	2.800	180	5

Hight-adjustable from 150 to 200 mm when installed.

Fastening element: GH rod dowels Ø 10 mm **(siehe Seite 284)**

TYPE T-01H ON CONCRETE, ADJUSTABLE

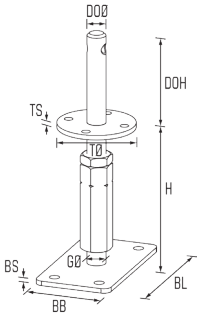
Timber / Concrete

Art. No.	[mm]					Connecting element	$F_{1,c}$ - pressure			$F_{1,t}$ - tension			$F_{2/3}$			$F_{4/5}$		
	Post		Maximum distances				timber	Steel		timber	Steel		timber	Steel		timber	Steel	
	B_{min}	H_{min}	a_{max}	$e_{2/3}$	$e_{3/4}$		$F_{1,c,Rk}$	$F_{1,c,Rk}$	γ_M	$F_{1,t,Rk}$	$F_{1,t,Rk}$	γ_M	$F_{2/3,Rk}$	$F_{2/3,Rk}$	γ_M	$F_{4/5,Rk}$	$F_{4/5,Rk}$	γ_M
19613101TOP	100	100	200	310	203	4 rod dowels Ø10	75,60	28,70	1,10	24,80	6,66	1,00	9,22	0,63	1,00	0,93	0,96	1,00

TYPE T-01H ON CONCRETE, ADJUSTABLE

Timber / Concrete

Art. No.	[mm]					Connecting element	$F_{1,c}$ - pressure			$F_{1,t}$ - tension			$F_{2/3}$			$F_{4/5}$		
	Post		Maximum distances				timber	Steel		timber	Steel		timber	Steel		timber	Steel	
	B_{min}	H_{min}	a_{max}	$e_{2/3}$	$e_{3/4}$		$F_{1,c,Rk}$	$F_{1,c,Rk}$	γ_M	$F_{1,t,Rk}$	$F_{1,t,Rk}$	γ_M	$F_{2/3,Rk}$	$F_{2/3,Rk}$	γ_M	$F_{4/5,Rk}$	$F_{4/5,Rk}$	γ_M
19613101	100	100	200	310	203	4 rod dowels Ø10	75,60	28,70	1,10	24,80	6,66	1,00	9,22	0,63	1,00	0,93	0,96	1,00



ZINTOP

ETA-16 0550

NKL 3

235 JR ZINTOP

DC DCSTATIK

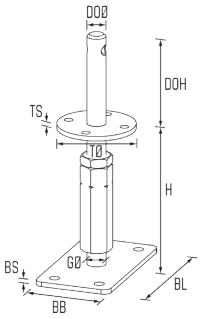
ZINTOP STANCHIONS

TYPE D 03 ON CONCRETE, HEIGHT-ADJUSTABLE

Art. No.	Mandrel [mm]						Carrier plate [mm]				Baseplate [mm]					EAN	Weight	Pallet	PU
	DO Ø	x	DOH	Ø 11	G Ø	H	T Ø	x	TS	Ø 11	BB	x	BL	x	BS	Ø 13	4019346	kg		
19613201TOP	24	x	120	1	24	165-236	100	x	6	4	100	x	180	x	6	4	010716	2.850	240	10

Hight-adjustable from 165 to 236 mm when installed.

Fastening element: GH rod dowels Ø 10 mm **(see page 284)**
TOP-Fix Duo screw Ø 10 x 120 mm **(see page 316)**



ETA-16 0550

NKL 2

235 JR galv. verzinkt

DC DCSTATIK

STANCHIONS

TYPE D 03 ON CONCRETE, HEIGHT-ADJUSTABLE

Art. No.	Mandrel [mm]						Carrier plate [mm]				Baseplate [mm]					EAN	Weight	Pallet	PU
	DO Ø	x	DOH	Ø 11	G Ø	H	T Ø	x	TS	Ø 11	BB	x	BL	x	BS	Ø 13	4019346	kg		
19613201	24	x	120	1	24	165-236	100	x	6	4	100	x	180	x	6	4	003534	2.850	240	10

Hight-adjustable from 165 to 236 mm when installed.

Fastening element: GH rod dowels Ø 10 mm **(see page 284)**
TOP-Fix Duo screw Ø 10 x 120 mm **(see page 316)**

TYPE D 03 ON CONCRETE, HEIGHT-ADJUSTABLE

Timber / Concrete

Art. No.	[mm]					Connecting element	$F_{1,c}$ - pressure			$F_{1,t}$ - tension			$F_{2/3}$			$F_{4/5}$		
	Post		Maximum distances				timber	Steel		timber	Steel		timber	Steel		timber	Steel	
	B_{min}	H_{min}	a_{max}	$e_{2/3}$	$e_{3/4}$		$F_{1,c,Rk}$	$F_{1,c,Rk}$	γ_M	$F_{1,t,Rk}$	$F_{1,t,Rk}$	γ_M	$F_{2/3,Rk}$	$F_{2/3,Rk}$	γ_M	$F_{4/5,Rk}$	$F_{4/5,Rk}$	γ_M
19613201TOP	120	120	236	236	236	4 screws Ø10x120	129,00	59,20 1) 44,30	1,00 1,10	16,30 d)	6,66	1,00	8,36 5)	1,66	1,25	8,36 5)	1,66	1,25

For indices see **page 326**

TYPE D 03 ON CONCRETE, HEIGHT-ADJUSTABLE

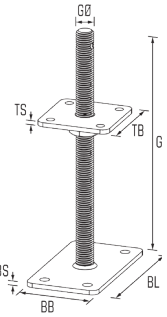
Timber / Concrete

Art. No.	[mm]					Connecting element	$F_{1,c}$ - pressure			$F_{1,t}$ - tension			$F_{2/3}$			$F_{4/5}$		
	Post		Maximum distances				timber	Steel		timber	Steel		timber	Steel		timber	Steel	
	B_{min}	H_{min}	a_{max}	$e_{2/3}$	$e_{3/4}$		$F_{1,c,Rk}$	$F_{1,c,Rk}$	γ_M	$F_{1,t,Rk}$	$F_{1,t,Rk}$	γ_M	$F_{2/3,Rk}$	$F_{2/3,Rk}$	γ_M	$F_{4/5,Rk}$	$F_{4/5,Rk}$	γ_M
19613201	120	120	236	236	236	4 screws Ø10x120	129,00	59,20 1) 44,30	1,00 1,10	16,30 d)	6,66	1,00	8,36 5)	1,66	1,25	8,36 5)	1,66	1,25

For indices see **page 326**

ZINTOP STANCHIONS

TYPE D ON CONCRETE, HEIGHT-ADJUSTABLE



ZINTOP

ETA-16 0550

NKL 3

235 JR ZINTOP

DC

DCSTATIK

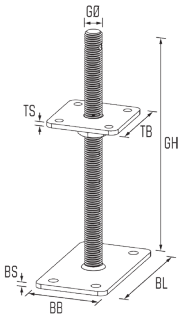
Art. No.	Thread [mm]				Carrier plate [mm]				Baseplate [mm]						EAN	Weight	Pallet	PU
	G Ø	x	GH	Ø 9	TB	x	TS	Ø 11	BB	x	BL	x	BS	Ø 13	4019346	kg		
19523101TOP	20	x	330	1	80	x	6	4	100	x	180	x	6	4	010662	1.550	240	10
19620998TOP	24	x	330	-	100	x	6	4	100	x	180	x	6	4	010679	2.230	240	10
19620999TOP	30	x	330	-	120	x	8	4	100	x	180	x	6	4	010686	3.400	120	5

Carrier plate welded.

Fastening element: GH rod dowels Ø 8 mm **(see page 284)**
TOP-Fix Duo screw Ø 10 x 120 mm **(see page 316)**

STANCHIONS

TYPE D ON CONCRETE, HEIGHT-ADJUSTABLE



ETA-16 0550

NKL 2

235 JR galv. verzinkt

DC

DCSTATIK

Art. No.	Thread [mm]				Carrier plate [mm]				Baseplate [mm]						EAN	Weight	Pallet	PU
	G Ø	x	GH	Ø 9	TB	x	TS	Ø 11	BB	x	BL	x	BS	Ø 13	4019346	kg		
19523101	20	x	330	1	80	x	6	4	100	x	180	x	6	4	510070	1.550	240	10
19620998	24	x	330	-	100	x	6	4	100	x	180	x	6	4	217757	2.230	240	10
19620999	30	x	330	-	120	x	8	4	100	x	180	x	6	4	501245	3.400	120	5

Carrier plate welded.

Fastening element: GH rod dowels Ø 8 mm **(see page 284)**
TOP-Fix Duo screw Ø 10 x 120 mm **(see page 316)**

TYPE D ON CONCRETE, HEIGHT-ADJUSTABLE

Timber / Concrete

Art. No.	[mm]					Connecting element	$F_{1,c}$ - pressure			$F_{1,t}$ - tension			$F_{2/3}$			$F_{4/5}$		
	Post		Maximum distances				timber	Steel		timber	Steel		timber	Steel		timber	Steel	
	B_{min}	H_{min}	a_{max}	$e_{2/3}$	$e_{3/4}$		$F_{1,c,Rk}$	$F_{1,c,Rk}$	γ_M	$F_{1,t,Rk}$	$F_{1,t,Rk}$	γ_M	$F_{2/3,Rk}$	$F_{2/3,Rk}$	γ_M	$F_{4/5,Rk}$	$F_{4/5,Rk}$	γ_M
19523101TOP	100	100	170	170	170	4 screws Ø10x120	107,00	36,80	1,10	16,30 d)	6,66	1,00	7,55 5)	1,64	1,25	7,55 5)	1,64	1,25
19620998TOP	120	120	170	170	170	4 screws Ø10x120	191,00	69,10 3)	1,00	16,30 d)	6,66	1,00	8,22 5)	2,34	1,25	8,22 5)	2,34	1,25
								62,70	1,10									
19620999TOP	140	140	170	170	170	4 screws Ø10x120	278,00	122,00 4)	1,00	16,30 d)	6,66	1,00	8,75 5)	2,61	1,00	8,75 5)	2,01	1,00
								118,00	1,10									
19523101TOP	100	100	**336**	**336**	**336**	4 screws Ø10x120	107,00	13,80	1,10	16,30 d)	6,66	1,00	7,55 5)	0,81	1,25	7,55 5)	0,81	1,25
19620998TOP	120	120	**336**	**336**	**336**	4 screws Ø10x120	191,00	26,60	1,10	16,30 d)	6,66	1,00	8,22 5)	1,15	1,25	8,22 5)	1,15	1,25
19620999TOP	140	140	**336**	**336**	**336**	4 screws Ø10x120	278,00	60,00	1,10	16,30 d)	6,66	1,00	8,75 5)	1,29	1,00	8,75 5)	0,99	1,00

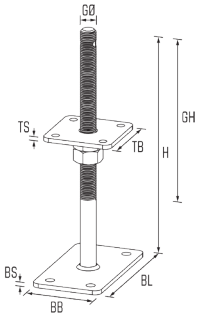
For indices see **page 326**

TYPE D ON CONCRETE, HEIGHT-ADJUSTABLE

Timber / Concrete

Art. No.	[mm]					Connecting element	$F_{1,c}$ - pressure			$F_{1,t}$ - tension			$F_{2/3}$			$F_{4/5}$		
	Post		Maximum distances				timber	Steel		timber	Steel		timber	Steel		timber	Steel	
	B_{min}	H_{min}	a_{max}	$e_{2/3}$	$e_{3/4}$		$F_{1,c,Rk}$	$F_{1,c,Rk}$	γ_M	$F_{1,t,Rk}$	$F_{1,t,Rk}$	γ_M	$F_{2/3,Rk}$	$F_{2/3,Rk}$	γ_M	$F_{4/5,Rk}$	$F_{4/5,Rk}$	γ_M
19523101	100	100	170	170	170	4 screws Ø10x120	107,00	36,80	1,10	16,30 d)	6,66	1,00	7,55 5)	1,64	1,25	7,55 5)	1,64	1,25
19620998	120	120	170	170	170	4 screws Ø10x120	191,00	69,10 3)	1,00	16,30 d)	6,66	1,00	8,22 5)	2,34	1,25	8,22 5)	2,34	1,25
								62,70	1,00									
19620999	140	140	170	170	170	4 screws Ø10x120	278,00	122,00 4)	1,00	16,30 d)	6,66	1,00	8,75 5)	2,61	1,00	8,75 5)	2,01	1,00
								118,00	1,10									
19523101	100	100	**336**	**336**	**336**	4 screws Ø10x120	107,00	13,80	1,10	16,30 d)	6,66	1,00	7,55 5)	0,81	1,25	7,55 5)	0,81	1,25
19620998	120	120	**336**	**336**	**336**	4 screws Ø10x120	191,00	26,60	1,10	16,30 d)	6,66	1,00	8,22 5)	1,15	1,25	8,22 5)	1,15	1,25
19620999	140	140	**336**	**336**	**336**	4 screws Ø10x120	278,00	60,00	1,10	16,30 d)	6,66	1,00	8,75 5)	1,29	1,00	8,75 5)	0,99	1,00

For indices see **page 326**



ZINTOP STANCHIONS

TYPE D 05 ON CONCRETE, HEIGHT-ADJUSTABLE

ZINTOP

ETA-16 0550

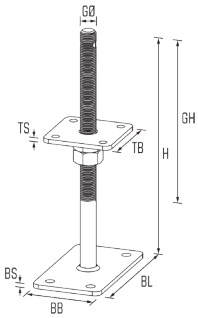
NKL 3

235 JR ZINTOP

DCSTATIK

Art. No.	Thread [mm]					Carrier plate [mm]				Baseplate [mm]					EAN	Weight	Pallet	PU
	G Ø	x	GH	Ø 9	H	TB	x	TS	Ø 11	BB	x	BL	x	BS	Ø 13	4019346	kg		
19623080TOP	22	x	250	1	350	80	x	6	4	100	x	180	x	6	4	010648	2.110	240	10
19623100TOP	22	x	250	1	350	100	x	6	4	100	x	180	x	6	4	010655	2.390	240	10

Fastening element: GH rod dowels Ø 8 mm **(see page 284)**
TOP-Fix Duo screw Ø 10 x 120 mm **(see page 316)**



ETA-16 0550

STANCHIONS

TYPE D 05 ON CONCRETE, HEIGHT-ADJUSTABLE

NKL 2

235 JR galv. verzinkt

DCSTATIK

Art. No.	Thread [mm]					Carrier plate [mm]				Baseplate [mm]					EAN	Weight	Pallet	PU
	G Ø	x	GH	Ø 9	H	TB	x	TS	Ø 11	BB	x	BL	x	BS	Ø 13	4019346	kg		
19623080	22	x	250	1	350	80	x	6	4	100	x	180	x	6	4	510056	2.110	240	10
19623100	22	x	250	1	350	100	x	6	4	100	x	180	x	6	4	510063	2.390	240	10

Fastening element: GH rod dowels Ø 8 mm **(see page 284)**
TOP-Fix Duo screw Ø 10 x 120 mm **(see page 316)**

TYPE D 05 ON CONCRETE, HEIGHT-ADJUSTABLE

Timber / Concrete

Art. No.	[mm]					Connecting element	$F_{1,c}$ - pressure			$F_{1,t}$ - tension			$F_{2/3}$			$F_{4/5}$		
	Post		Maximum distances				timber	Steel		timber	Steel		timber	Steel		timber	Steel	
	B_{min}	H_{min}	a_{max}	$e_{2/3}$	$e_{3/4}$		$F_{1,c,Rk}$	$F_{1,c,Rk}$	γ_M	$F_{1,t,Rk}$	$F_{1,t,Rk}$	γ_M	$F_{2/3,Rk}$	$F_{2/3,Rk}$	γ_M	$F_{4/5,Rk}$	$F_{4/5,Rk}$	γ_M
19623080TOP	100	100	170	170	170	4 screws Ø10x120 (Load case $F_{1,t}$+1 rod dowel Ø8)	117,00	50,70	1,10	4,25 c)	6,66 c)	1,00	6,38	2,01	1,25	6,38	2,01	1,25
19623100TOP	120	120	170	170	170		193,00	50,70	1,10	4,25 c)	6,66 c)	1,00	6,94	2,01	1,25	6,94	2,01	1,25
19623080TOP	100	100	**356**	**356**	**356**	4 screws Ø10x120	117,00	18,70	1,10	-	-	-	6,38	0,94	1,25	6,38	0,94	1,25
19623100TOP	120	120	**356**	**356**	**356**	4 screws Ø10x120	193,00	18,70	1,10	-	-	-	6,94	0,94	1,25	6,94	0,94	1,25

For indices see **page 326**

TYPE D 05 ON CONCRETE, HEIGHT-ADJUSTABLE

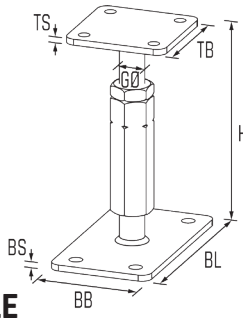
Timber / Concrete

Art. No.	[mm]					Connecting element	$F_{1,c}$ - pressure			$F_{1,t}$ - tension			$F_{2/3}$			$F_{4/5}$		
	Post		Maximum distances				timber	Steel		timber	Steel		timber	Steel		timber	Steel	
	B_{min}	H_{min}	a_{max}	$e_{2/3}$	$e_{3/4}$		$F_{1,c,Rk}$	$F_{1,c,Rk}$	γ_M	$F_{1,t,Rk}$	$F_{1,t,Rk}$	γ_M	$F_{2/3,Rk}$	$F_{2/3,Rk}$	γ_M	$F_{4/5,Rk}$	$F_{4/5,Rk}$	γ_M
19623080	100	100	170	170	170	4 screws Ø10x120 (Load case $F_{1,t}$+1 rod dowel Ø8)	117,00	50,70	1,10	4,25 c)	6,66 c)	1,00	6,38	2,01	1,25	6,38	2,01	1,25
19623100	120	120	170	170	170		193,00	50,70	1,10	4,25 c)	6,66 c)	1,00	6,94	2,01	1,25	6,94	2,01	1,25
19623080	100	100	**356**	**356**	**356**	4 screws Ø10x120	117,00	18,70	1,10	-	-	-	6,38	0,94	1,25	6,38	0,94	1,25
19623100	120	120	**356**	**356**	**356**	4 screws Ø10x120	193,00	18,70	1,10	-	-	-	6,94	0,94	1,25	6,94	0,94	1,25

For indices see **page 326**

ZINTOP STANCHIONS

TYPE P 24 ON CONCRETE, HEIGHT-ADJUSTABLE



ZINTOP

ETA-16 0550

NKL 3

235 JR ZINTOP

DCSTATIK

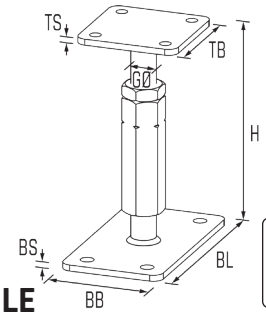
Art. No.	Carrier plate [mm]						Baseplate [mm]						EAN	Weight	Pallet	PU
	TB	x	TS	Ø 11	G Ø	H	BB	x	BL	x	BS	Ø 13	4019346	kg		
19533101TOP	100	x	6	4	24	150-200	100	x	180	x	6	4	010815	2.940	240	10

Hight-adjustable from 150 to 200 mm when installed.

Fastening element: TOP-Fix Duo screw Ø 10 x 120 mm **(see page 316)**

STANCHIONS

TYPE P 24 ON CONCRETE, HEIGHT-ADJUSTABLE



ETA-16 0550

NKL 2

235 JR galv. verzinkt

DCSTATIK

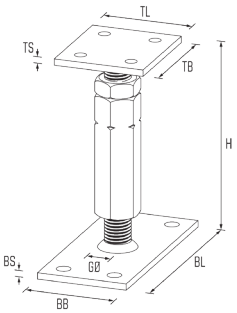
Art. No.	Carrier plate [mm]						Baseplate [mm]						EAN	Weight	Pallet	PU
	TB	x	TS	Ø 11	G Ø	H	BB	x	BL	x	BS	Ø 13	4019346	kg		
19533101	100	x	6	4	24	150-200	100	x	180	x	6	4	011249	2.260	240	10

Hight-adjustable from 150 to 200 mm when installed.

Fastening element: TOP-Fix Duo screw Ø 10 x 120 mm **(see page 316)**

STANCHIONS

TYPE P ON CONCRETE, HEIGHT-ADJUSTABLE



ETA-16 0550

NKL 2

235 JR galv. verzinkt

DCSTATIK

Art. No.	Carrier plate [mm]							Baseplate [mm]						EAN	Weight	Pallet	PU
	TB	x	TL	x	TS	Ø 9	G Ø	H	BB	x	BL	x	BS	Ø 11	4019346	kg		
19533070	70	x	80	x	5	4	20	150-200	70	x	150	x	5	4	501221	0.900	240	10

Hight-adjustable from 150 to 200 mm when installed.

Fastening element: TOP-Fix Duo screw Ø 8 x 70 mm **(see page 316)**

TYPE P 24 ON CONCRETE, HEIGHT-ADJUSTABLE

Timber / Concrete

Art. No.	[mm]					Connecting element	$F_{1,c}$ - pressure			$F_{1,t}$ - tension			$F_{2/3}$			$F_{4/5}$		
	Post		Maximum distances				timber	Steel		timber	Steel		timber	Steel		timber	Steel	
	B_{min}	H_{min}	a_{max}	$e_{2/3}$	$e_{3/4}$		$F_{1,c,Rk}$	$F_{1,c,Rk}$	γ_M	$F_{1,t,Rk}$	$F_{1,t,Rk}$	γ_M	$F_{2/3,Rk}$	$F_{2/3,Rk}$	γ_M	$F_{4/5,Rk}$	$F_{4/5,Rk}$	γ_M
19533101TOP	120	120	210	210	210	4 screws Ø10x120	202,00	70,30 2)	1,00	16,30 d)	6,66	1,00	8,22 5)	1,87	1,25	8,22 5)	1,87	1,25
								56,70	1,10									

For indices see **page 326**

TYPE P 24 ON CONCRETE, HEIGHT-ADJUSTABLE

Timber / Concrete

Art. No.	[mm]					Connecting element	$F_{1,c}$ - pressure			$F_{1,t}$ - tension			$F_{2/3}$			$F_{4/5}$		
	Post		Maximum distances				timber	Steel		timber	Steel		timber	Steel		timber	Steel	
	B_{min}	H_{min}	a_{max}	$e_{2/3}$	$e_{3/4}$		$F_{1,c,Rk}$	$F_{1,c,Rk}$	γ_M	$F_{1,t,Rk}$	$F_{1,t,Rk}$	γ_M	$F_{2/3,Rk}$	$F_{2/3,Rk}$	γ_M	$F_{4/5,Rk}$	$F_{4/5,Rk}$	γ_M
19533101	120	120	210	210	210	4 screws Ø10x120	202,00	70,30 2)	1,00	16,30 d)	6,66	1,00	8,22 5)	1,87	1,25	8,22 5)	1,87	1,25
								56,70	1,10									

For indices see **page 326**

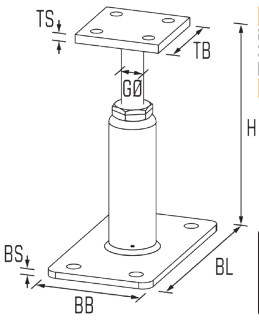
TYPE P 24 ON CONCRETE, HEIGHT-ADJUSTABLE

Timber / Concrete

Art. No.	[mm]					Connecting element	$F_{1,c}$ - pressure			$F_{1,t}$ - tension			$F_{2/3}$			$F_{4/5}$		
	Post		Maximum distances				timber	Steel		timber	Steel		timber	Steel		timber	Steel	
	B_{min}	H_{min}	a_{max}	$e_{2/3}$	$e_{3/4}$		$F_{1,c,Rk}$	$F_{1,c,Rk}$	γ_M	$F_{1,t,Rk}$	$F_{1,t,Rk}$	γ_M	$F_{2/3,Rk}$	$F_{2/3,Rk}$	γ_M	$F_{4/5,Rk}$	$F_{4/5,Rk}$	γ_M
19533070	100	90	200	200	200	4 screws Ø8x70	93,40	33,20	1,10	7,80	3,84	1,00	3,38	1,05	1,00	3,38	0,81	1,00

ZINTOP STANCHIONS

TYPE PR ON CONCRETE, HEIGHT-ADJUSTABLE



ZINTOP

ETA-16 0550

NKL 3

235 JR ZINTOP

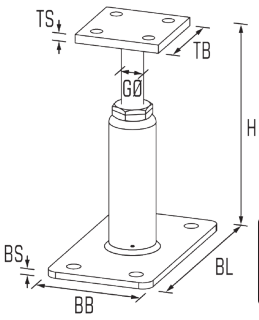
DCSTATIK

Art. No.	Carrier plate [mm]						Baseplate [mm]						EAN	Weight	Pallet	PU
	TB	x	TS	Ø 11	G Ø	H	BB	x	BL	x	BS	Ø 13	4019346	kg		
19534100TOP	80	x	6	4	22	135-215	100	x	180	x	6	4	010617	1.700	240	10
19534110TOP	80	x	6	4	22	185-265	100	x	180	x	6	4	010600	1.900	240	10
19534120TOP	80	x	6	4	22	235-315	100	x	180	x	6	4	010624	2.100	240	10

Fastening element: TOP-Fix Duo screw Ø 10 x 120 mm **(see page 316)**

STANCHIONS

TYPE PR ON CONCRETE, HEIGHT-ADJUSTABLE



ETA-16 0550

NKL 2

235 JR galv. verzinkt

DCSTATIK

Art. No.	Carrier plate [mm]						Baseplate [mm]						EAN	Weight	Pallet	PU
	TB	x	TS	Ø 11	G Ø	H	BB	x	BL	x	BS	Ø 13	4019346	kg		
19534100	80	x	8	4	22	135-215	100	x	180	x	6	4	011256	1.700	240	10
19534110	80	x	8	4	22	185-265	100	x	180	x	6	4	011263	1.900	240	10
19534120	80	x	8	4	22	235-315	100	x	180	x	6	4	011270	2.100	240	10

Fastening element: TOP-Fix Duo screw Ø 10 x 120 mm **(see page 316)**

TYPE PR ON CONCRETE, HEIGHT-ADJUSTABLE

Timber / Concrete

Art. No.	[mm]					Connecting element	$F_{1,c}$ - pressure			$F_{1,t}$ - tension			$F_{2/3}$			$F_{4/5}$		
	Post		Maximum distances				timber	Steel		timber	Steel		timber	Steel		timber	Steel	
	B_{min}	H_{min}	a_{max}	$e_{2/3}$	$e_{3/4}$		$F_{1,c,Rk}$	$F_{1,c,Rk}$	γ_M	$F_{1,t,Rk}$	$F_{1,t,Rk}$	γ_M	$F_{2/3,Rk}$	$F_{2/3,Rk}$	γ_M	$F_{4/5,Rk}$	$F_{4/5,Rk}$	γ_M
19534100TOP	100	100	215	215	215	4 screws Ø10x120	126,00	54,10	1,25	16,30 d)	6,66	1,00	7,55 5)	1,99	1,00	7,55 5)	1,53	1,00
19534110TOP	100	100	265	265	265	4 screws Ø10x120	126,00	54,10	1,25	16,30 d)	6,66	1,00	7,55 5)	1,61	1,00	7,55 5)	1,24	1,00
19534120TOP	100	100	315	315	315	4 screws Ø10x120	126,00	54,10	1,25	16,30 d)	6,66	1,00	7,55 5)	1,35	1,00	7,55 5)	1,04	1,00

For indices see **page 326**

TYPE PR ON CONCRETE, HEIGHT-ADJUSTABLE

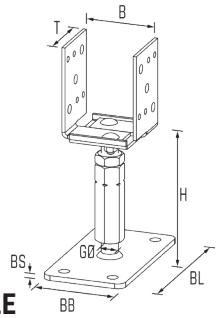
Timber / Concrete

Art.-Nr.	[mm]					Connecting element	$F_{1,c}$ - pressure			$F_{1,t}$ - tension			$F_{2/3}$			$F_{4/5}$		
	Post		Maximum distances				timber	Steel		timber	Steel		timber	Steel		timber	Steel	
	B_{min}	H_{min}	a_{max}	$e_{2/3}$	$e_{3/4}$		$F_{1,c,Rk}$	$F_{1,c,Rk}$	γ_M	$F_{1,t,Rk}$	$F_{1,t,Rk}$	γ_M	$F_{2/3,Rk}$	$F_{2/3,Rk}$	γ_M	$F_{4/5,Rk}$	$F_{4/5,Rk}$	γ_M
19534100	100	100	215	215	215	4 screws Ø10x120	126,00	54,10	1,25	16,30 d)	6,66	1,00	7,55 5)	1,99	1,00	7,55 5)	1,53	1,00
19534110	100	100	265	265	265	4 screws Ø10x120	126,00	54,10	1,25	16,30 d)	6,66	1,00	7,55 5)	1,61	1,00	7,55 5)	1,24	1,00
19534120	100	100	315	315	315	4 screws Ø10x120	126,00	54,10	1,25	16,30 d)	6,66	1,00	7,55 5)	1,35	1,00	7,55 5)	1,04	1,00

For indices see **page 326**

ZINTOP STANCHIONS

TYPE U 70 ON CONCRETE HEIGHT/SIDE-ADJUSTABLE



ZINTOP

ETA-16 0550

NKL 3

235 JR ZINTOP

DCSTATIK

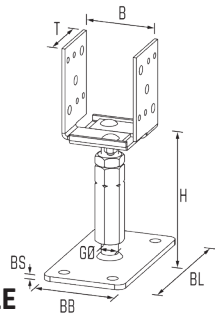
Art. No.	Top part [mm]					Baseplate [mm]						EAN	Weight	Pallet	PU
	W(B)	x	D(T)	G Ø	H	BB	x	BL	x	BS	Ø 13	4019346	kg		
19653201TOP	70-150	x	70	20	150-200	100	x	180	x	6	4	010808	1.850	240	10

Hight-adjustable from 150 to 200 mm when installed.

Fastening element: TOP-Fix Duo screw Ø 10 x 60 mm **(see page 316)**

STANCHIONS

TYPE U 70 ON CONCRETE HEIGHT/SIDE-ADJUSTABLE



ETA-16 0550

NKL 2

235 JR galv. verzinkt

DCSTATIK

Art. No.	Top part [mm]					Baseplate [mm]						EAN	Weight	Pallet	PU
	W(B)	x	D(T)	G Ø	H	BB	x	BL	x	BS	Ø 13	4019346	kg		
19653201	70-150	x	70	20	150-200	100	x	180	x	6	4	501054	1.850	240	10

Hight-adjustable from 150 to 200 mm when installed.

Fastening element: TOP-Fix Duo screw Ø 10 x 60 mm **(see page 316)**

TYPE U 70 ON CONCRETE, HEIGHT-/SIDE-ADJUSTABLE

Timber / Concrete

Art. No.	[mm]					Connecting element	$F_{1,c}$ - pressure			$F_{1,t}$ - tension			$F_{2/3}$			$F_{4/5}$		
	Post		Maximum distances				timber	Steel		timber	Steel		timber	Steel		timber	Steel	
	B_{min}	H_{min}	a_{max}	$e_{2/3}$	$e_{3/4}$		$F_{1,c,Rk}$	$F_{1,c,Rk}$	γ_M	$F_{1,t,Rk}$	$F_{1,t,Rk}$	γ_M	$F_{2/3,Rk}$	$F_{2/3,Rk}$	γ_M	$F_{4/5,Rk}$	$F_{4/5,Rk}$	γ_M
19653201TOP	70-150	100	200	-	-	4 screws Ø10x60	15,90	8,89	1,00	-	-	-	-	-	-	-	-	-

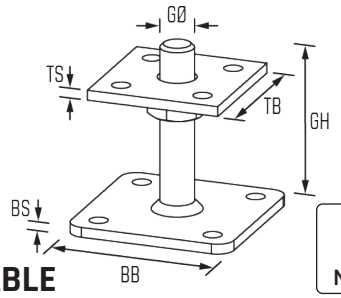
TYPE U 70 ON CONCRETE, SIDE-/HEIGHT-ADJUSTABLE

Timber / Concrete

Art. No.	[mm]					Connecting element	$F_{1,c}$ - pressure			$F_{1,t}$ - tension			$F_{2/3}$			$F_{4/5}$		
	Post		Maximum distances				timber	Steel		timber	Steel		timber	Steel		timber	Steel	
	B_{min}	H_{min}	a_{max}	$e_{2/3}$	$e_{3/4}$		$F_{1,c,Rk}$	$F_{1,c,Rk}$	γ_M	$F_{1,t,Rk}$	$F_{1,t,Rk}$	γ_M	$F_{2/3,Rk}$	$F_{2/3,Rk}$	γ_M	$F_{4/5,Rk}$	$F_{4/5,Rk}$	γ_M
19653201	70-150	100	200	-	-	4 screws Ø10x60	15,90	8,89 -	1,00	-	-	-	-	-	-	-	-	-

STANCHIONS

TYPE PB ON CONCRETE, HEIGHT-ADJUSTABLE



ETA-16 0550

NKL 3

235 JR galv. verzinkt

DCSTATIK

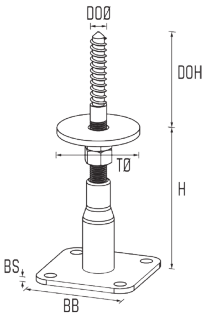
Art. No.	Thread [mm]			Carrier plate [mm]				Baseplate [mm]				EAN	Weight	Pallet	PU
	G Ø	x	GH	TB	x	TS	Ø	BB	x	BS	Ø 11	4019346	kg		
19823161	16	x	100	70	x	6	2x 5,0	100	x	6	4	510902	0.650	600	20
19823201	20	x	100	80	x	6	4x 11,0	100	x	6	4	510919	0.910	600	20
19823202	20	x	200	80	x	6	4x 11,0	100	x	6	4	510926	1.850	300	10

Height-adjustable in fitted state. The carrier plate can be pre-fitted.

Fastening element: TOP-Fix Duo screw **(see page 316)**

STANCHIONS

FIX ON CONCRETE, HEIGHT-ADJUSTABLE



NKL 2

235 JR galv. verzinkt

Art. No.	Mandrel [mm]					Baseplate [mm]				EAN	Weight	Pallet	PU
	DO Ø	x	DOH	H	T Ø	BB	x	BS	Ø 11	4019346	kg		
19523110	16	x	90	130-170	80	100	x	5	4	165508	1.100	300	10

TYPE PB ON CONCRETE, HEIGHT-ADJUSTABLE

Timber / Concrete

Art. No.	[mm]					Connecting element	$F_{1,c}$ - pressure			$F_{1,t}$ - tension			$F_{2/3}$			$F_{4/5}$		
	Post		Maximum distances				timber	Steel		timber	Steel		timber	Steel		timber	Steel	
	B_{min}	H_{min}	a_{max}	$e_{2/3}$	$e_{3/4}$		$F_{1,c,Rk}$	$F_{1,c,Rk}$	γ_M	$F_{1,t,Rk}$	$F_{1,t,Rk}$	γ_M	$F_{2/3,Rk}$	$F_{2/3,Rk}$	γ_M	$F_{4/5,Rk}$	$F_{4/5,Rk}$	γ_M
19823161	90	90	100	-	-	2 screws Ø4x60	89,60	30,80	1,10	-	-	-	-	-	-	-	-	-
19823201	100	100	100	100	100	4 screws Ø10x120	118,00	54,40	1,10	-	-	-	6,38	2,83	1,25	6,38	2,83	1,25
19823202	100	100	200	200	200	4 screws Ø10x120	118,00	30,00	1,10	-	-	-	6,38	1,37	1,25	6,38	1,37	1,25

15

TOOLS

TOOLS

BRACING STRIP TENSIONER

Art. No.	EAN	Weight	PU
	4019346	kg	
33000117	000748	1.380	1

With safety bar, no wood damage, slip-resistant handle, simple use.

BRACING STRIP UNROLLING DEVICE

Art. No.	EAN	Weight	PU
	4019346	kg	
33000122	000755	14.000	1
33000124	000779	16.700	1

For transporting and processing the bracing strip in the workshop and on the building site.

The advantages:
- Easy removal
- No risk of injury due to protruding strip parts
- Simple operation
- 160 mm large, rubber wheels with roller bearings ensure a very smooth run
- The unit is fully hot-dip galvanised, therefore no rusting
- Holder for shears available on the device

JOIST TENSIONER

Art. No.	EAN	Weight	PU
	4019346	kg	
33000200	167106	2.370	1

For tensioning, pulling and fitting the timbers together during the hammering process. The joist tensioner has drop-forged hooks whose impact points are not hardened due to the risk of splintering. Instead of welding seams, which could tear due to impact, the joist tensioner has rivets. There are no screws on the ratchet that could become loose. The new generation with ergonomic rubber handle for a secure hold. 5-year warranty on threaded parts.
Make use of the benefits!

BRACING STRIP TENSIONER WITH THREAD

Art. No.	EAN	Weight	PU
	4019346	kg	
33000121	000786	1.155	1

In conjunction with the joist tensioner, it is the ideal tensioner for all bracing strip dimensions. Screwed onto one side of the joist tensioner.

BRACING STRIP SHEARS

Art. No.	EAN	Weight	PU
	4019346	kg	
33000123	000762	2.700	1

The advantages:
- Long blades prevent deformation when cutting the strips and nail plates
- Cut through 40 mm strip with one cut
- Suitable for all bracing strip dimensions and nail plates in any width
- Easy cutting via lever construction

Product name		Page
A		
Anchor dowel		220
Anchor nail		282
Angle brackets	from page	106
Angle bracket 110/170 S		132
Angle bracket chair		159
Angle bracket concrete		156
Angle bracket entrance door		158
Angle bracket extra thick		150
Angle bracket KR slotted hole / round hole		134
Angle bracket stainless steel		293
Angle bracket thick		159
Angle brackets TOP 80 / TOP 120		120
Angle bracket TOP-KR90E(XTRA)		124
Angle bracket type 110		138
Angle bracket type 40 / type 45		144
Angle bracket type 40 / 90		146
Angle bracket type 40 / 120		146
Angle bracket type 50 / Type 80		138
Angle bracket type 55 / 70 S		122
Angle bracket type 55 / 80		140
Angle bracket type 65 / 90 S		126
Angle bracket type 90 / 100 S		130
Angle bracket type 692		146
Angle bracket type HB		186
Angle bracket type HS		186
Angle bracket type HSB		188
Angle bracket type RL / LL / LLG		152
Angle bracket – Z		158
B		
Beam hangers	from page	88
Beam hanger 2-row type M angled connection		102
Beam hanger 2-row type M with assembly fix tab		98
Beam hanger 4-row type M with assembly fix tab		100
Beam hanger TYPE ALU		94
Bracing strips		266
Bracing strip type Z with approval		266
Bracing strip unrolling device		371
Bracing strip shears		371
Bracing strip tensioner		371
Bracing strip tensioner with thread for joist tensioner		371
Bracing strip connections / screw fix		270
C		
Cantilever brackets		246
Chair angle bracket		159
Comb nails		282
Concealed connectors	from page	62
Concealed connectors integral connector type M angled connection		102
Concealed connector joist hanger type alu		94
Concealed connectorIntegral connector 2-row type M		98
Concealed connectorIntegral connector 4-row type M		100
Concealed connectors TOP OV		82
Concrete angle bracket		156
Concrete flat steel anchor		188
Conical head screws KF stainless steel Ø 4.0 – Ø 6.0 mm		314

Product name		Page
Corner angle bracket		158
Console angle		142
TOP UV concealed connectors		66
D		
Disc head GH SK Drive Ø 6.0 – Ø 8.0 mm		312
Drilling template for joist hanger / integral connector		100
Drive-in ground sleeve		340
E		
Entrance door angle bracket		158
F		
Flat steel anchor		188
Fully threaded screws for OV		82
Fully threaded screws for TOP UV		66
G		
GEKA connector		221
GH screw with approval		280
GREENLINE SERIES OVERVIEW		104
Ground sleeve		349
Screw-on ground sleeve		349
H		
H-stanchions		340
Heavy flat connectors		218
HE anchor		214
HT tension tie		172
HT tension tie - 2-piece		176
I		
Invisible connectors	from page	62
Integral connector type alu		94
Integral connector 2-row type M with assembly fix tab		98
Integral connector 4-row type M with assembly fix tab		100
Integral connector type M angled connection		102
J		
Joist hangers	from page	18
Joist hanger type TOP-M		30
Joist hanger type TOP		30
Joist hanger type TOP-K 50		30
Joist hanger type GH 04 / combi **GREEN**Line		38
Joist hanger type GH 04 / combi		40
Joist hanger type 05 / 2.5 combi extra thick		44
Joist hanger type 05 / 2.0		46
Joist hanger type 07		48
Joist hanger type I GH 04 / combi **GREEN**Line		50
Joist hanger type I GH 04 / combi		52
Joist hanger type I GH 05 / 2.5 combi extra thick		54
Joist hanger type I GH 05 / 2		56
2-piece joist hanger		58
Stainless steel joist hangers		292
Joist tensioner		371
Width-adjustable joist hanger type 2 (2-piece)		242
Width-adjustable joist hanger type 3 (2-piece)		242
K		
KONSTRULINE SERIES OVERVIEW		193
KR angle bracket slotted hole / round hole		134
L		
Light flat connector		218

Product name	Page
M	
Mounting strip in plastic box	268
N	
Nail plates 1.5 mm	259
Nail plates 2.0 mm	258
Nail plate strips 2.0 mm and 2.5 mm	256
Nail plate boards 2.0 mm – 3.0 mm	256
Stainless steel nail plates	294
Nail plate bracket equal-legged 2.0 mm and 2.5 mm	148
Nail plate bracket unequal-legged	149
O	
OV concealed connector	82
P	
Plate head screw GH SK Drive Ø 6.0 – Ø 8.0 mm	312
Pressure plate for connector TOP 80 / TOP 120 vario	184
Pressure plate for angle brackets HB and HSB	188
Pressure plate for tension tie HT	174
Pressure plate for tension tie TOP 240 / 280 vario	170
Post holders from page	330
Press-fit dowels	220
Profile anchor	210
R	
Rafter anchors from page	228
Rafter anchor RL-D with assembly mandrel	230
Rafter anchors	230
Rafter anchor stainless steel	295
Rafter holder	234
Rafter nails	282
Ring-wedge dowels	220
Rod dowels from page	284
Rod dowel Ø 8.0 mm according to CE EN 14592	284
Rod dowel Ø 10.0 mm according to CE EN 14593	284
Rod dowel Ø 12.0 mm according to CE EN 14594	285
Rod dowel Ø 16.0 mm according to CE EN 14594	285
Rod dowel Ø 20.0 mm according to CE EN 14594	286
S	
Screw fix rolled tie strap connections	270
Screw GH with approval	280
TOP-FIX Duo screw Ø 8.0 – Ø 12.0 mm	316
Shearing angles	194
Shearing angles and tensile plates in the modular system	194
Shearing plates	202
Stainless steel timber connector V4A	292
Stanchions from page	330
Stanchion in concrete from page	330
Stanchion type L-60 in concrete	330
Stanchion type U-60 in concrete	330
Stanchion type U-70 in concrete	332
Stanchion type U-90 in concrete	332
Stanchion type T01 in concrete	334
Stanchion type T02 in concrete	334
Stanchion type T03 in concrete	336
Stanchion type T04 extra thick in concrete	336
Stanchion type D in concrete	338
Stanchion type DS in concrete	338

Product name	Page
Stanchion type H in concrete	340
Stanchion type R in concrete	340
Stanchion in concrete, adjustable from page	342
Stanchion type D in concrete, height-adjustable / **ZIN**TOP	342
Stanchion type U-70 in concrete, side-adjustable	342
Stanchion on concrete from page	344
Stanchion type T04 extra thick on concrete	344
Stanchion type D on concrete	346
Stanchion type P on concrete	344
Stanchion type T01 on concrete	346
Stanchion type T05 extra thick on concrete	344
Stanchion group S– type B on concrete	348
Stanchion group S – type B on concrete with bead	348
Stanchion on concrete, adjustable from page	350
Stanchion type D mandrel 24 on concrete, height-adjustable / **ZIN**TOP	350
Stanchion type D mandrel 40 on concrete, height-adjustable / **ZIN**TOP	352
Stanchion type T01H on concrete, height-adjustable / **ZIN**TOP	354
Stanchion type D 03 on concrete, height-adjustable / **ZIN**TOP	356
Stanchion type D on concrete, height-adjustable / **ZIN**TOP	358
Stanchion type D 05 on concrete, height-adjustable / **ZIN**TOP	360
Stanchion type P on concrete, height-adjustable	362
Stanchion type P24 on concrete, height-adjustable / **ZIN**TOP	362
Stanchion type PR on concrete, height-adjustable / **ZIN**TOP	364
Stanchion type U-70 on concrete, height-/side-adjustable / **ZIN**TOP	366
Stanchion fix, height-adjustable on concrete	368
Stanchion type PB on concrete, height-adjustable	368
Strut connector with 135° angle	132
T	
Tensioning devices	371
Tension ties from page	160
Tension tie HT	172
Tension tie HT - 2-piece	176
Tension tie including washer	182
Tension tie TOP 240 / TOP 280 Vario	168
Tension tie connector TOP 80 / TOP 120 vario	184
Tension plates	202
Threaded nails	282
Stainless steel threaded nails	295
Truss clips from page	234
2-piece truss clips	234
Truss clips type B (concrete)	234
Truss clips type H (timber)	234
T-bar anchor	214
Tools	370
TOPLINE SERIES OVERVIEW	16
U	
Universal connectors	218
UV concealed connector	66
W	
Wood construction screws from page	296
Wood construction screw GH S Drive Ø 3.5 – Ø 10,0 mm	304
Z	
Z-angle bracket	158
ZINTOP SERIES OVERVIEW	324

BECOME PART OF OUR SUCCESSFUL TEAM

INNOVATIONS
IN TIMBER CONSTRUCTION

FOR OUR DEVELOPMENT AND STATICS DEPARTMENT, WE ARE LOOKING TO FILL THE FOLLOWING VACANCY AS SOON AS POSSIBLE:

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M/F/D

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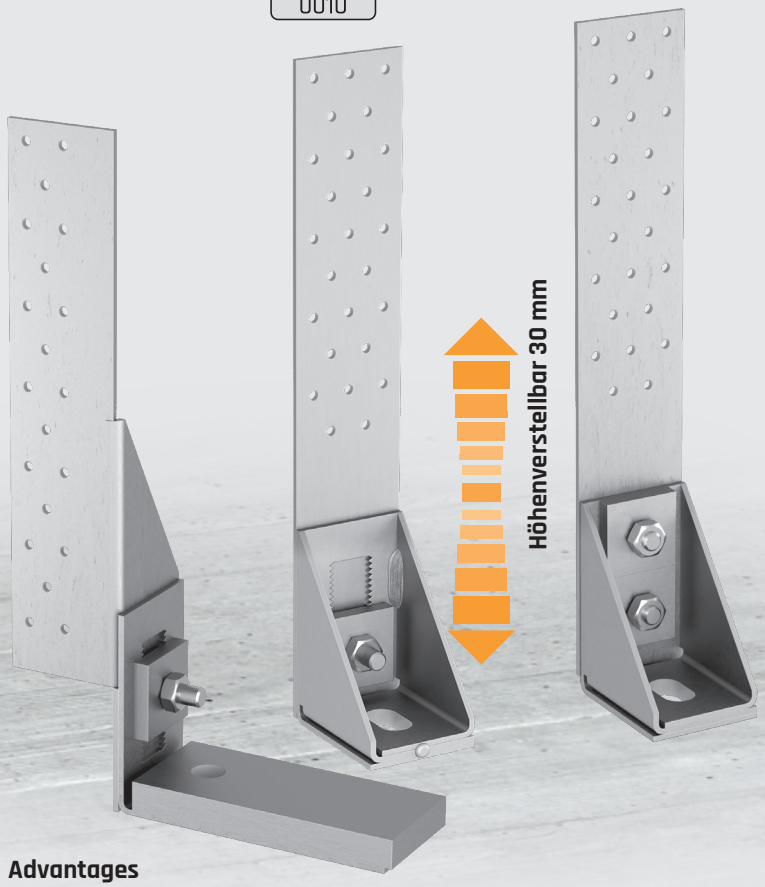
ZUGANKER HT2

TOPLINE GERMANY ETA-10 0010



Europäisches Patent EP 2 642 035

GH HT tension tie 2-piece
Preliminary assembly for wall production
The pull tabs are pre-assembled during the production of the walls and the wall is completely sealed.
For flush mounting of the panelling, a 3.0 mm deep cut-out is recommended in the sleeper.

Final assembly on the building site
On the building site, the foot angle is mounted flush with the baseplate. Unevenness in the baseplate of up to 30 mm are quickly and easily adjusted and fixed with a M10 nut.

Assembly options for pull tabs
Left type or right type
The pull tab is attached to the left or right on the handle with GH grooved nails or GH screws.
For absolute wind tightness, only a milled recess of 3.0 mm in the sleeper is recommended.

Straight type
The pull tab is mounted on the front of the handle. A recess of at least 5.0 mm in the handle + sleeper, or in the OSB panel, is recommended.
Alternatively, the pull tab can also be mounted over the intermediate in the handle.

All pull tabs and foot brackets can be combined in any way.

Advantages
- Assembly of pull tab in wall production
- Interior walls can be fully panelled and completed
- No protruding parts during transport
- Simple and quick height compensation on the building site
- Transfer of high tensile loads
- No improvement work on the building site

Fastening elements
- Wall/column, also via the intermediate layer with GH threaded/anchor nails or GH screws ETA-13/0523
- Ground fixing with bolt anchor, concrete screw

NOTES