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Authorised and notified according to Article 10 of the Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products

MEMBER OF EOTA

European Technical Approval ETA-08/0264

Trade name:

GH Joist Hangers type TOP, 04 kombi, 04 kombi I, 04 I schmal, 05 kombi, 05 kombi I

Holder of approval:

GH-Baubeschläge GmbH
Austraße 34
D-73235 Weilheim/Teck
Tel. +49 7023 743323 0
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Internet www.holzverbinder.de

Generic type and use of construction product:

Three-dimensional nailing plate (joist hanger for wood to wood connections and wood to concrete or steel connections)

Valid from:
to:

2008-09-18
2013-09-18

Manufacturing plant:

GH-Baubeschläge GmbH
Austraße 34
D-73235 Weilheim/Teck

This European Technical Approval contains:

55 pages including 4 annexes which form an integral part of the document



European Organisation for Technical Approvals

Europæisk Organisation for Tekniske Godkendelser

I LEGAL BASIS AND GENERAL CONDITIONS

1 This European Technical Approval is issued by ETA-Danmark A/S in accordance with:

- Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products¹⁾, as amended by Council Directive 93/68/EEC of 22 July 1993²⁾.
- Bekendtgørelse 559 af 27-06-1994 (afløser bekendtgørelse 480 af 25-06-1991) om ikrafttræden af EF direktiv af 21. december 1988 om indbyrdes tilnærmelse af medlemsstaternes love og administrative bestemmelser om byggevarer.
- Common Procedural Rules for Requesting, Preparing and the Granting of European Technical Approvals set out in the Annex to Commission Decision 94/23/EC³⁾.
- EOTA Guideline ETAG 015 *Three-dimensional nailing plates*, September 2002 edition.

2 ETA-Danmark A/S is authorized to check whether the provisions of this European Technical Approval are met. Checking may take place in the manufacturing plant. Nevertheless, the responsibility for the conformity of the products to the European Technical Approval and for their fitness for the intended use remains with the holder of the European Technical Approval.

3 This European Technical Approval is not to be transferred to manufacturers or agents of manufacturers other than those indicated on page 1, or manufacturing plants other than those indicated on page 1 of this European Technical Approval.

4 This European Technical Approval may be withdrawn by ETA-Danmark A/S pursuant to Article 5(1) of Council Directive 89/106/EEC.

- 1) Official Journal of the European Communities N° L40, 11 Feb 1989, p 12.
- 2) Official Journal of the European Communities N° L220, 30 Aug 1993, p 1.
- 3) Official Journal of the European Communities N° L 17, 20 Jan 1994, p 34.

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6 This European Technical Approval is issued by ETA-Danmark A/S in English. This version corresponds fully to the version circulated within EOTA. Translations into other languages have to be designated as such.

II SPECIAL CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

1 Definition of product and intended use

Definition of the product

GH joist hangers type TOP, 04 kombi and 05 kombi are one-piece non-welded, face-fixed joist hangers to be used in timber to timber connections as well as connections between a timber joist and a concrete structure or a steel member.

GH joist hangers type 04 kombi I, 04 I schmal and 05 kombi I are one-piece non-welded, face-fixed joist hangers to be used in timber to timber connections.

The joist hangers are made from pre-galvanized steel Grade S 250 GD or S 280 GD + Z (min Z275) according to EN 10326:2004 or stainless steel 1.4301, 1.4401, 1.4541 and/or 1.4571 according to EN 10088:1997. Dimensions, hole positions, steel type and typical installations are shown in Annex A.

Intended use

The joist hangers are intended for use in making end-grain to side-grain connections in load bearing timber structures, as a connection between a wood based joist and a solid timber or wood based header, where requirements for mechanical resistance and stability and safety in use in the sense of the Essential Requirements 1 and 4 of Council Directive 89/106/EEC shall be fulfilled. They are also intended for use in making an end-grain connection between a timber joist and a concrete structure or a steel member.

The joist hangers can be installed as connections between wood based members such as:

- Structural solid timber classified to C14-C40 according to EN 338 / EN 14081,
- Glulam classified to GL24-GL36 according to EN 1194 / EN 14080,
- LVL according to EN 14374,
- Parallam PSL,
- Intrallam LSL,
- Duo- and Triobalken,
- Layered wood plates,
- Kreuzbalken,
- I-beams with backer blocks on both sides of the web in the header and web stiffeners in the joist,
- Plywood according to EN 636.

For joist hangers TOP, 04 kombi, 04 kombi I or 04 I schmal the headers may also consist of wood-based panels as:

- OSB/3 and OSB/4 according to EN 300 with a minimum thickness of 11 mm,

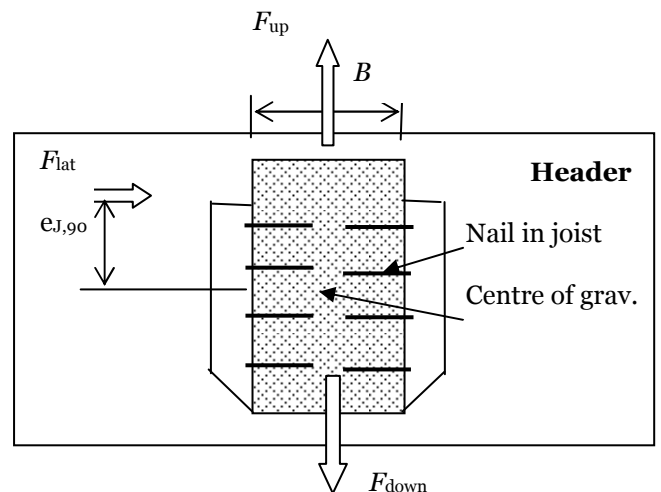
- Particleboard according to EN 312-4, 314-5, 312-6 or 312-7 with a minimum thickness of 13 mm,
- Plywood according to EN 636 with a minimum thickness of 13 mm.

Where an interlayer made of wood-based panel is placed between the joist hanger and the header, the influence of the interlayer on the load-carrying-capacity of the header fastener has to be taken into account.

However, the calculation methods are only allowed for a characteristic wood density of up to 460 kg/m^3 . Even though the wood based material may have a larger density, this must not be used in the formulas for the load-carrying capacities of the fasteners.

Annex B states the formulas for the characteristic load-carrying capacities of the joist hanger connections. The design of the connections shall be in accordance with Eurocode 5 or a similar national Timber Code.

It is assumed that the forces acting on the joist hanger connection are the following F_{up} , F_{down} and F_{lat} , as shown in the figure below. The forces F_{up} and F_{down} shall act in the middle of the joist hanger. The force F_{lat} is assumed to act $e_{J,90}$ above the centre of gravity of the nails in the joist. It is assumed that the forces are acting right at the end of the joist.



It is assumed that the header beam is prevented from rotating. Similarly it is assumed that the concrete structure or the steel member to which the joist hanger is bolted does not rotate. If the header beam only has installed a joist hanger on one side the eccentricity moment $M_v = F_d \cdot (B_H / 2 + 30\text{mm})$ shall be considered. The same applies when the header has joist hanger connections on both sides, but with vertical forces which differ more than 20%.

Headers made of wood-based panels are assumed to be pinned.

It is a condition for a force F_{lat} perpendicular to the vertical symmetry line that the joist hanger is connected to a wood-based header with nails in all holes (full nailing) or in all holes marked for partial nailing.

The joist hangers are intended for use for connections subject to static or quasi static loading.

The zinc-coated hangers are for use in timber structures subject to dry, internal conditions defined by the service classes 1 and 2 of EN 1995-1-1:2004, (Eurocode 5).

The joist hangers made from stainless steel are also intended for use in outdoor conditions defined by the service classes 3 of EN 1995-1-1:2004, (Eurocode 5). The fasteners (nails, screws and bolts) to be used shall be made from suitable stainless material.

Assumed working life

The assumed intended working life of the joist hangers for the intended use is 50 years, provided that they are subject to appropriate use and maintenance.

The information on the working life should not be regarded as a guarantee provided by the manufacturer or ETA Danmark. An “assumed intended working life” means that it is expected that, when this working life has elapsed, the real working life may be, in normal use conditions, considerably longer without major degradation affecting the essential requirements.

2 Characteristics of product and assessment

ETAG paragraph	Characteristic	Assessment of characteristic
2.1 Mechanical resistance and stability*)		
6.1.1	Characteristic load-carrying capacity	See Annex B
6.1.2	Stiffness	No performance determined
6.1.3	Ductility in cyclic testing	No performance determined
2.2 Safety in case of fire		
6.2.1	Reaction to fire	The joist hangers are made from steel classified as Euroclass A1 in accordance with EN 1350-1 and EC decision 96/603/EC, amended by EC Decision 2000/605/EC
2.3 Hygiene, health and the environment		
6.3.1	Influence on air quality	No dangerous materials **)
2.4 Safety in use		
2.5 Protection against noise		
2.6 Energy economy and heat retention		
2.7 Related aspects of serviceability		
6.7.1	Durability	The joist hangers have been assessed as having satisfactory durability and serviceability when used in timber structures using the timber species described in Eurocode 5 and subject to the conditions defined by service class 1 and 2
6.7.2	Serviceability	
6.7.3	Identification	

*) See page 5 of this ETA

**) In accordance with <http://europa.eu.int/-/comm/enterprise/construction/internal/dangsub/dangmain.htm> In addition to the specific clauses relating to dangerous substances contained in this European Technical Approval, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the EU Construction Products Directive, these requirements need also to be complied with, when and where they apply.

Safety principles and partial factors

2.1 Mechanical resistance and stability

See annex B for characteristic load-carrying capacities of the joist hangers.

The characteristic capacities of the joist hangers are determined by calculation assisted by testing as described in the EOTA Guideline 015 clause 5.1.2. They should be used for designs in accordance with Eurocode 5 or a similar national Timber Code.

The design models allow the use of fasteners described in the table on page 17 in Annex A.

Threaded nails (ringed shank nails) and screws in accordance with prEN 14592

In the formulas in Annex B the capacities for threaded nails or GH Connector screws calculated from the formulas of Eurocode 5 are used assuming a thick steel plate when calculating the lateral nail load-carrying-capacity.

Further, the joist hangers can be fastened to a concrete structure or steel member by bolts with a diameter of 8 mm, 10 mm or 12 mm in holes with a diameter up to 2 mm larger than the bolt.

The load bearing capacities of the hangers has been determined based on the use of connector nails 4,0 x min. 40 mm according to prEN 14592 and GH Connector screws 5,0 x min. 25 mm according to prEN 14592 and in accordance with the German national approval.

The characteristic withdrawal capacity of the nails has to be determined by calculation in accordance with EN 1995-1-1: 2004, paragraph 8.3.2 (head pull-through is not relevant):

$$F_{ax,Rk} = f_{ax,k} \times d \times t_{pen}$$

Where:

$f_{ax,k}$ Characteristic value of the withdrawal parameter in N/mm^2

d Nail diameter in mm

t_{pen} Penetration depth of the profiles shank in mm
 $t_{pen} \geq 31$ mm

Based on tests by Versuchsanstalt für Stahl, Holz und Steine, University of Karlsruhe, the characteristic value of the withdrawal resistance for the threaded nails used can be calculated as:

$$f_{ax,k} = 50 \times 10^{-6} \times \sigma_k^2$$

Where:

σ_k Characteristic density of the timber in kg/m^3

The shape of the nail directly under the head shall be in the form of a truncated cone with a diameter under the nail head which exceeds the hole diameter.

The design models allow the use of fasteners described in the table on page 17 in Annex A

No performance has been determined in relation to ductility of a joint under cyclic testing. The contribution to the performance of structures in seismic zones, therefore, has not been assessed.

No performance has been determined in relation to the joint's stiffness properties - to be used for the analysis of the serviceability limit state.

2.7 Related aspects of serviceability

2.7.1 Corrosion protection in service class 1 and 2.

In accordance with ETAG 015 the joist hanger have a zinc coating weight of min Z275. The steel employed is S250 GD or S280 GD with min Z275 according to EN 10326:2004.

2.7.2 Corrosion protection in service class 3.

In accordance with Eurocode 5 the joist hangers are made from stainless steel 1.4301, 1.4401, 1.4541 and/or 1.4571 according to EN 10088 and the nails or screws shall be produced from stainless steel.

3 Attestation of Conformity and CE marking

3.1 Attestation of Conformity system

The system of attestation of conformity is 2+ described in Council Directive 89/106/EEC (Construction Products Directive) Annex III.

- a) Tasks for the manufacturer:
- (1) Factory production control,
 - (2) Initial type testing of the product,
- b) Tasks for the notified body:
- (1) Initial inspection of the factory and the factory production control,
 - (2) Continuous surveillance

3.2 Responsibilities

3.2.1 Tasks of the manufacturer

3.2.1.1 Factory production control

The manufacturer has a factory production control system in the plant and exercises permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer are documented in a systematic manner in the form of written policies and procedures. This production control system ensures that the product is in conformity with the European Technical Approval.

The manufacturer shall only use raw materials supplied with the relevant inspection documents as laid down in the control plan⁴. The incoming raw materials shall be subject to controls and tests by the manufacturer before acceptance. Check of materials, such as sheet metal, shall include control of the inspection documents presented by suppliers (comparison with nominal values) by verifying dimension and determining material properties, e.g. chemical composition, mechanical properties and zinc coating thickness.

The manufactured components are checked visually and for dimensions.

The control plan, which is part of the technical documentation of this European Technical Approval, includes details of the extent, nature and frequency of

testing and controls to be performed within the factory production control and has been agreed between the approval holder and ETA Danmark.

The results of factory production control are recorded and evaluated. The records include at least the following information:

- Designation of the product, basic material and components;
- Type of control or testing;
- Date of manufacture of the product and date of testing of the product or basic material and components;
- Result of control and testing and, if appropriate, comparison with requirements;
- Signature of person responsible for factory production control.

The records shall be presented to ETA Danmark on request.

3.2.1.1 Initial type testing of the product

For initial type-testing the results of the tests performed as part of the assessment for the European Technical Approval shall be used unless there are changes in the production line or plant. In such cases the necessary initial type testing has to be agreed between ETA Danmark and the notified body.

3.2.2. Tasks of notified bodies

3.2.2.1 Initial inspection of the factory and the factory production control

The approved body should ascertain that, in accordance with the control plan, the factory, in particular the staff and equipment, and the factory production control, are suitable to ensure a continuous and orderly manufacturing of the joist hangers with the specifications given in part 2.

3.2.2.2 Continuous surveillance

The approved body shall visit the factory at least twice a year for routine inspections. It shall be verified that the system of factory production control and the specified manufacturing processes are maintained, taking account of the control plan.

The results of product certification and continuous surveillance shall be made available on demand by the certification body to ETA Danmark. Where the provisions of the European Technical Approval and the control plan are no longer fulfilled, the certificate

⁴ The control plan has been deposited at ETA-Danmark and is only made available to the approved bodies involved in the conformity attestation procedure.

of conformity shall be withdrawn by the approved body.

3.3 CE marking

The CE marking shall be affixed on each packaging of joist hangers. The initials "CE" shall be followed by the identification number of the notified body and shall be accompanied by the following information:

- Name or identifying mark of the manufacturer
- The last two digits of the year in which the marking was affixed
- Number of the European Technical Approval
- Name and size of product
- Number of the ETA Guideline (ETAG no. 015)
- Number of the EC Certificate of Conformity

4 Assumptions under which the fitness of the product for the intended use was favourably assessed

4.1 Manufacturing

GH joist hangers types TOP, 04 kombi, 04 kombi I, 04 I schmal, 05 kombi and 05 kombi I are manufactured in accordance with the provisions of this European Technical Approval using the manufacturing processes as identified in the inspection of the plant by the notified inspection body and laid down in the technical documentation.

4.2 Installation

Joist hanger connections

A joist hanger connection is deemed fit for its intended use provided:

Header – support conditions

- The header beam shall be restrained against rotation and be free from wane under the joist hanger.

If the header carries joists only on one side the eccentricity moment from the joists $M_{ec} = R_{joist} (b_{header}/2 + e_{J,0})$ shall be considered at the strength verification of the header.

R_{joist}	Reaction force from the joists
b_{header}	Width of header
$e_{J,0}$	Distance from the centroid of the nails in the joist to the surface of the header

- For a header with joists from both sides but with different reaction forces a similar consideration applies.
- Headers made of wood-based panels are assumed to be pinned and shall have a minimum thickness as specified in paragraph 1 “Definition of product and intended use”.

Wood to wood connections

- Joist hangers can be fastened to wood-based members by nails or screws. Joist hangers shall be connected to headers made of wood-based panels using GH connector screws.
- There shall be nails or screws in all holes or a partial nailing pattern as prescribed in Annex A-D can be used.
- The characteristic capacity of the joist hanger connection is calculated according to the manufacturer’s technical documentation, dated 2008-05-30.

- The joist hanger connection is designed in accordance with Eurocode 5 or an appropriate national code.
- The gap between the end of the joist and the surface, where contact stresses can occur during loading shall be limited. This means that for joist hangers with outward flaps shall the gap between the surface of the end of the joist and that of the header be maximum 3 mm.
Joist hangers with inward flaps shall the gap between the surface of the nail heads in the inward flaps and the end of the joist be maximum 8 mm.
- For joist hangers TOP, 04 kombi, 04 kombi I, 04 I schmal, 05 kombi and 05 kombi I the width of the joist shall be at least $l+4d$, where l is the length of the fasteners and d is the fastener diameter in the joist, for full nailing and partial nailing without staggering the fasteners in the joist. For nailing with staggered fasteners in the joist the width shall be at least the penetration length of the fasteners.
- The cross section of the joist at the joist hanger connection shall have sharp edges at the lower side against the bottom plate, i.e. it shall be without wane.
- The cross section of the header shall have a plane surface against the whole joist hanger.
- The width B_J of the joist shall correspond to that of the joist hanger. B_J shall not be smaller than $B-3$ mm, where B is the inner width of the joist hanger.
- The depth of the joist shall be so large that the top of the joist is at least 20 mm above the upper fastener in the joist.
- Joist hangers made from stainless steel should only be fastened with fasteners made from suitable stainless steel. Zinc-coated joist hangers shall not be fastened with fasteners of stainless steel.
- Nails or screws to be used shall have a diameter, which fits the holes of the joist hangers.

Wood to concrete or steel

The above mentioned rules for wood to wood connections are applicable also for the connection between the joist and the joist hanger.

- The joist hanger shall be in close contact with the concrete or steel over the whole face. There shall be no intermediate layers in between.
- The gap between the end of the joist and the surface, where contact stresses can occur during loading shall be limited. This means that the gap between the

surface of the end of the joist and that of the concrete or steel shall be maximum 3 mm.

- The bolt shall have a diameter not less than the hole diameter minus 2 mm.
- The bolts shall be placed symmetrically about the vertical symmetry line. There shall always be bolts in the 2 upper holes.
- The upper bolts shall have washers according to EN ISO 7094.

4.3 Maintenance and repair

Maintenance is not required during the assumed intended working life. Should repair prove necessary, it is normal to replace the joist hanger.



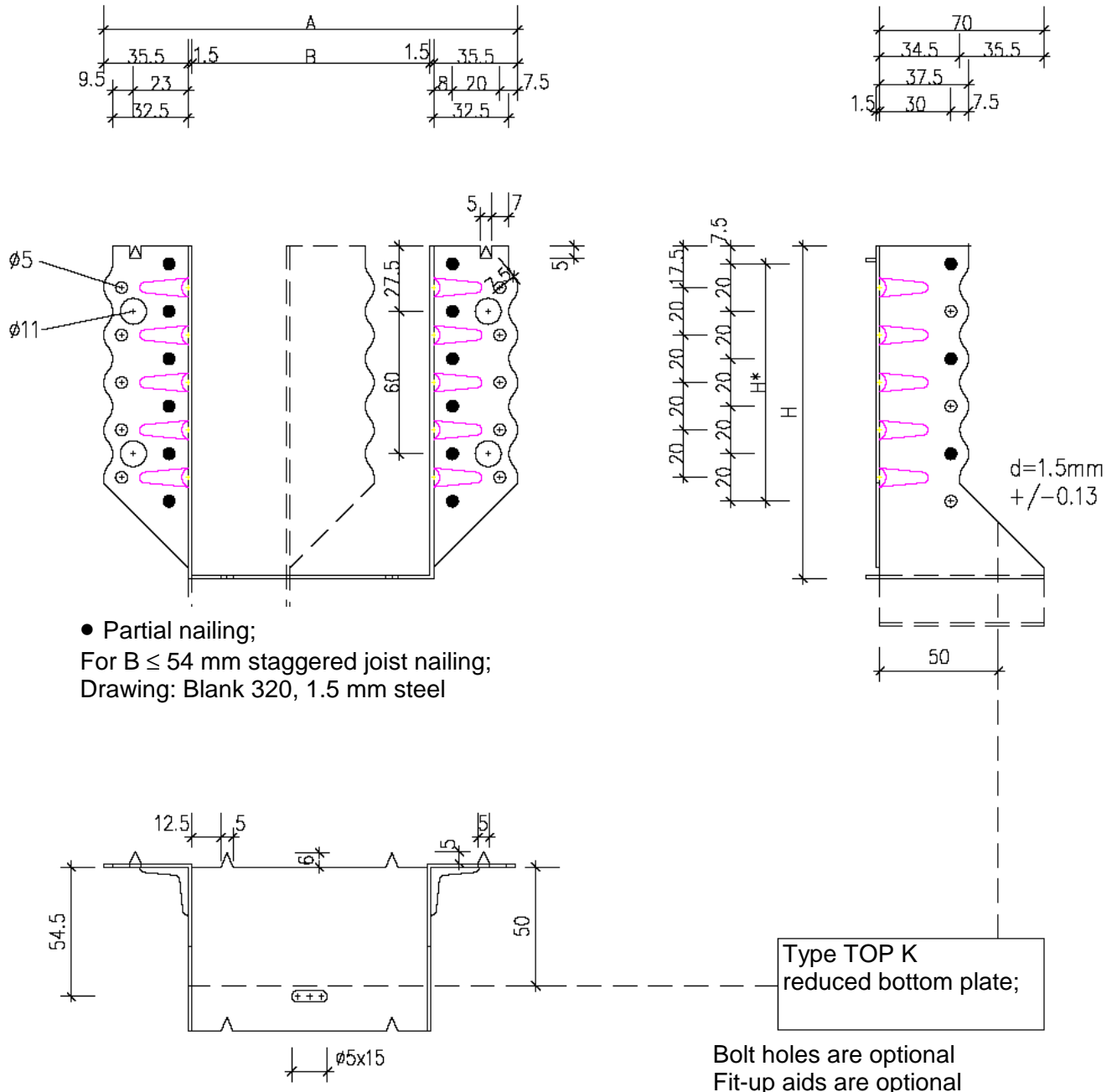
Thomas Bruun
Manager, ETA-Danmark

Annex A Product details and definitions

Joist hanger type TOP

Face mount hanger with external flanges

1.5 mm to 4.0 mm thick pre-galvanized steel S250GD or S280 + Z (min Z275) according to EN 10326:2004 with tolerances according to EN 10143:1993 or alternatively 1.5 mm to 4.0 mm thick stainless steel 1.4301, 1.4401, 1.4541 and/or 1.4571 according to EN 10088:1997.



- Partial nailing;
- For $B \leq 54$ mm staggered joist nailing;
- Drawing: Blank 320, 1.5 mm steel

Blank	Total n° of nail holes		Width interval		Height interval		Bolt holes		A
	n_H	n_J	min	max	min	max	n°	Diameter	
260	14	8	34	66	97	113	2	9/11	= B + 74
320	18	10	34	86	117	143	4	9/11	= B + 74
380	22	12	34	106	137	173	4	9/11	= B + 74
440	26	14	34	126	157	203	4	9/11	= B + 74
500	30	16	34	146	177	233	6	9/11	= B + 74
560	34	18	34	166	197	263	6	9/11	= B + 74

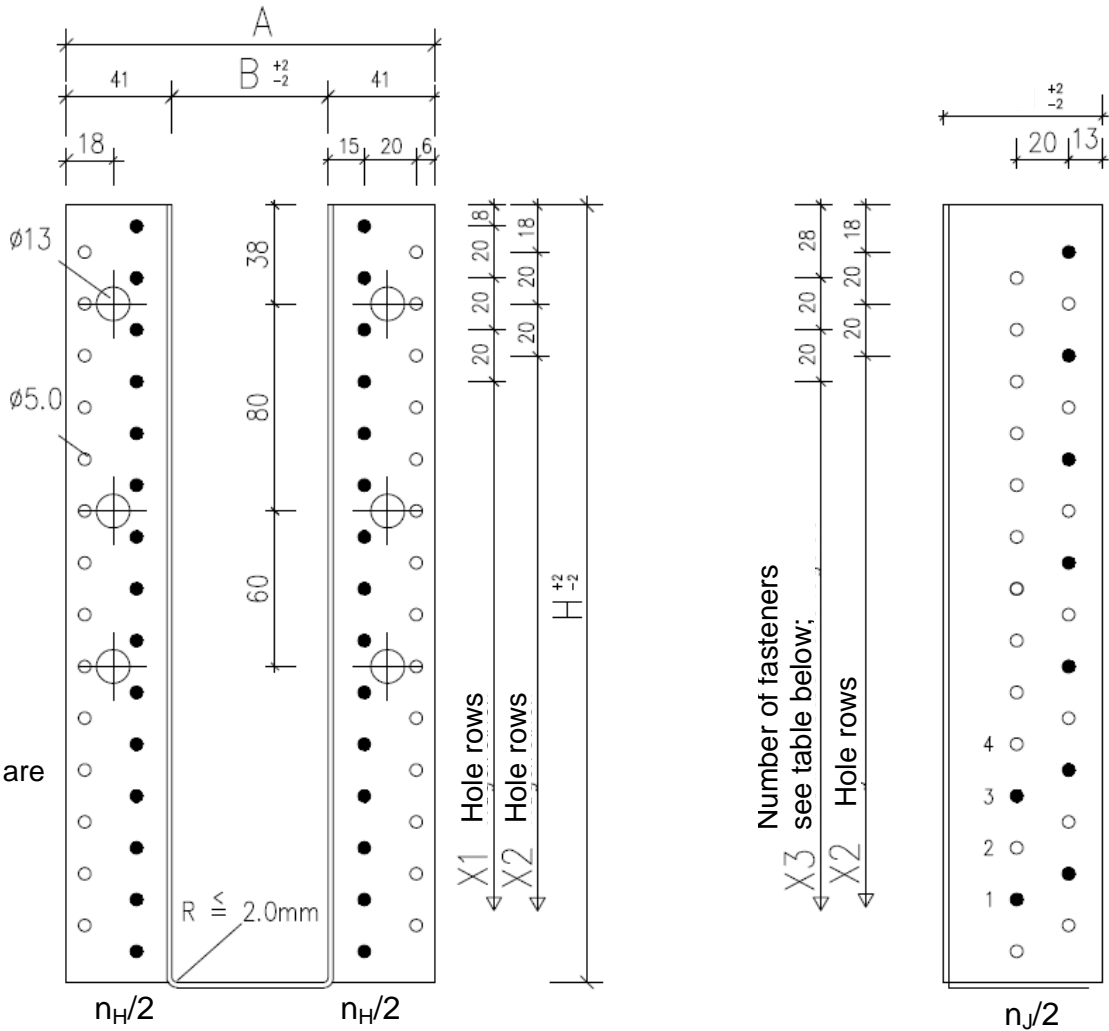
Joist hanger's height = (blank – width)/2

Joist hanger type 05 kombi

Face mount hanger with external flanges

2.0 mm to 4.0 mm thick pre-galvanized steel S250GD or S280 + Z (min Z275) according to EN 10326:2004 with tolerances according to EN 10143:1993 or alternatively 2.0 mm to 4.0 mm thick stainless steel 1.4301, 1.4401, 1.4541 and/or 1.4571 according to EN 10088:1997.

- Partial nailing;
- 13 mm bolt holes are optional



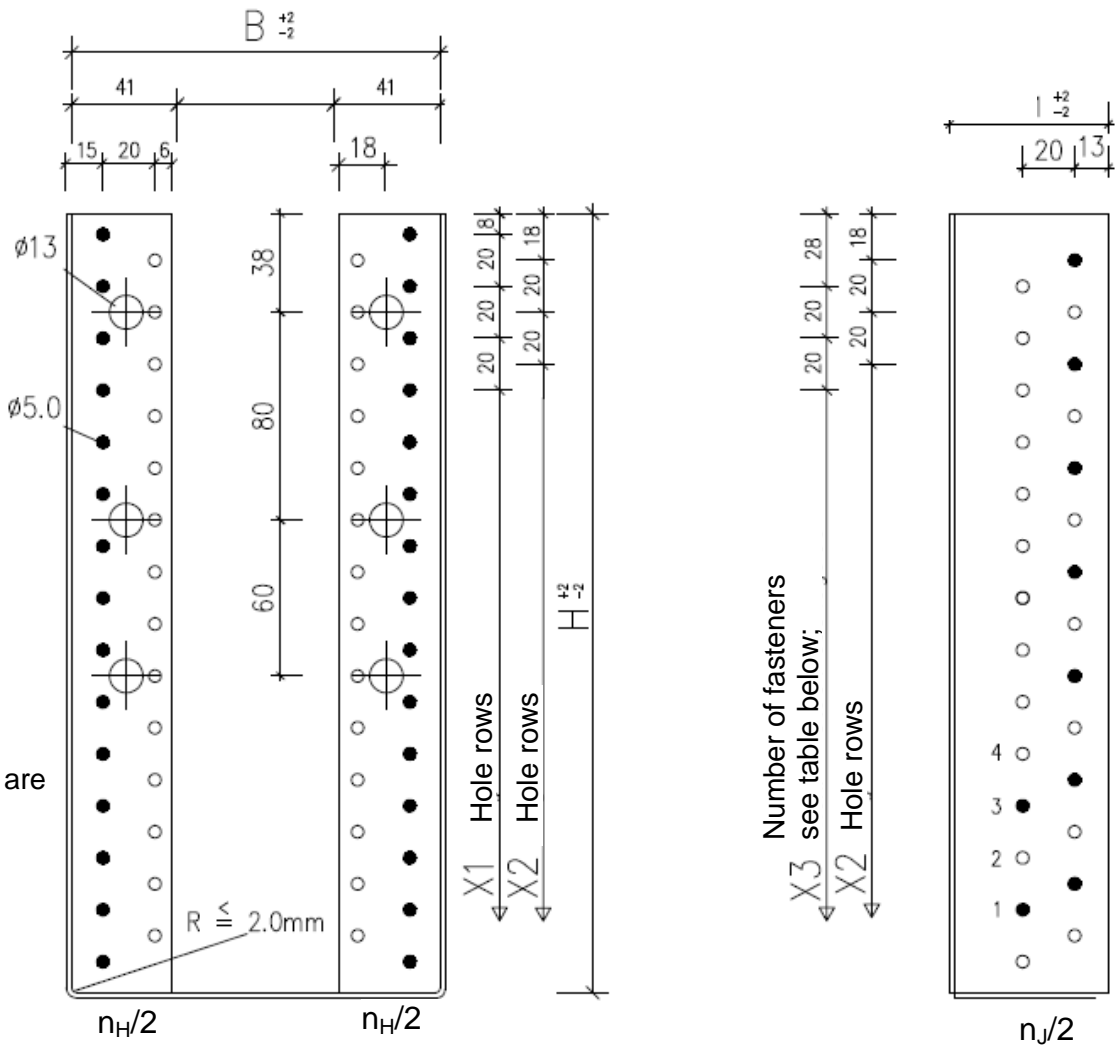
H	Full nailing					Partial nailing					A
	Total n° of fasteners		n° of fasteners in row			Total n° of fasteners		n° of fasteners in row			
	n _H	n _J	X1	X2	X3	n _H	n _J	X1	X2	X3	
160	30	18	8	7	2	16	10	8	4	1	= B + 82
180	34	20	9	8	2	18	10	9	4	1	= B + 82
200	38	22	10	9	2	20	12	10	5	1	= B + 82
220	42	26	11	10	3	22	14	11	5	2	= B + 82
240	46	30	12	11	4	24	16	12	6	2	= B + 82
260	50	32	13	12	4	26	16	13	6	2	= B + 82
280	54	34	14	13	4	28	18	14	7	2	= B + 82
300	58	36	15	14	4	30	18	15	7	2	= B + 82
320	62	38	16	15	4	32	20	16	8	2	= B + 82

Height interval: 160 mm – 320 mm; Width interval: 100 mm – 240 mm; Joist hanger's height = (blank – width)/2

Joist hanger type 05 kombi I

Face mount hanger with interior flanges

2.0 mm to 4.0 mm thick pre-galvanized steel S250GD or S280 + Z (min Z275) according to EN 10326:2004 with tolerances according to EN 10143:1993 or alternatively 2.0 mm to 4.0 mm thick stainless steel 1.4301, 1.4401, 1.4541 and/or 1.4571 according to EN 10088:1997.



- Partial nailing;
- 13 mm bolt holes are optional

H	Full nailing					Partial nailing				
	Total n° of fasteners	n° of fasteners in row			Total n° of fasteners	n° of fasteners in row				
	n_H	n_J	X1	X2	X3	n_H	n_J	X1	X2	X3
160	30	18	8	7	2	16	10	8	4	1
180	34	20	9	8	2	18	10	9	4	1
200	38	22	10	9	2	20	12	10	5	1
220	42	26	11	10	3	22	14	11	5	2
240	46	30	12	11	4	24	16	12	6	2
260	50	32	13	12	4	26	16	13	6	2
280	54	34	14	13	4	28	18	14	7	2
300	58	36	15	14	4	30	18	15	7	2
320	62	38	16	15	4	32	20	16	8	2

Height interval: 160 mm – 320 mm; Width interval: 100 mm – 240 mm; Joist hanger's height = (blank – width)/2

Fastener types and sizes

NAIL diameter	Length Min – max	Nail type
4.0	40 - 100	Ringed shank nails according to prEN 14592

SCREW diameter	Length Min – max	Screw type
5.0	25 - 70	GH Connector screws according to prEN 14592

BOLTS diameter	Correspondence Holes diameter	Bolts type
8.0	Max. 2 mm. larger than the bolt diameter	See specification of the manufacturer
10.0		
12.0		

Annex B

Characteristic values of load-carrying- capacities

Characteristic capacities of the joist hanger connections with nails or screws only.

The downward and the upward directed forces are assumed to act in the middle of the joist. The lateral force is assumed to act at an distance $e_{J,90}$ above the centre of gravity of the nails in the joist.

Two nails patterns are specified. A full nailing pattern, where there are nails in all the holes and a partial nailing pattern, where the number of nails in the joist and the header are at least half the numbers specified for full nailing. The nails in the joist may be staggered. The nails in the header shall be put in the holes closest to the bend line.

For GH joist hangers the width of the joist shall be at least $l+4d$, where l is the length of the nails and d is the diameter of the nails in the joist, for full nailing and partial nailing without staggering the nails in the joist. For partial nailing with staggered nails in the joist the width shall be at least the penetration length of the nails.

B.1 Joist hangers with outward or inward flaps and fastened with nails or screws

B.1.1 Threaded nails or screws in torsionally restrained header beams

This clause covers both the use of threaded nails and screws.

Force downward toward the bottom plate:

$$F_{Z,Rd} = \min \left\{ \frac{(n_J + 2) \cdot F_{v,J,Rd}}{1}, \sqrt{\left(\frac{1}{n_H \cdot F_{v,H,Rd}} \right)^2 + \left(\frac{1}{k_{H,1} \cdot F_{ax,H,Rd}} \right)^2} \right\} \quad (B.1.1.1)$$

Force upward away from the bottom plate:

$$F_{Z,Rd} = \min \left\{ \frac{n_J \cdot F_{v,J,Rd}}{1}, \sqrt{\left(\frac{1}{n_H \cdot F_{v,H,Rd}} \right)^2 + \left(\frac{1}{k_{H,2} \cdot F_{ax,H,Rd}} \right)^2} \right\} \quad (B.1.1.2)$$

Lateral force:

$$F_{Y,Rd} = \min \left\{ \frac{n_J \cdot F_{v,J,Rd}}{\sqrt{\left(\frac{2 \cdot \sqrt{e_{J,0}^2 + e_{J,90}^2}}{b_J} \right)^2 + \left(\frac{F_{v,J,Rd}}{F_{ax,J,Rd}} \right)^2}}, \frac{F_{v,H,Rd}}{\sqrt{\left(\frac{1}{n_H} + \frac{e_H}{e_1} \right)^2 + \left(\frac{e_H}{e_2} \right)^2}} \right\} \quad (B.1.1.3)$$

n_J total number of nails in both sides of the joist

n_H total number of nails in the side of the header

$F_{v,Rd}$ Characteristic lateral load-carrying capacity of the fasteners in the joist or in the header indicated by the indices J or H

$F_{ax,Rd}$ Characteristic axial load-carrying capacity of the fasteners in the joist or in the header indicated by the indices J or H

b_J width of the joist hanger, see figure B1.

$e_{J,90}$ distance of the lateral force above the centre of gravity of the nails in the joist, see figure B1.

$e_{J,0}$ distance from the nails in the joist to the surface of the header, see figure B1.

- e_H distance of the lateral force above the centre of gravity of the nails in the header.
- e_1 joist hanger dimension, see Annex C
- e_2 joist hanger dimension, see Annex C
- $k_{H,1}$ form factor, see Annex C
- $k_{H,2}$ form factor, see Annex C

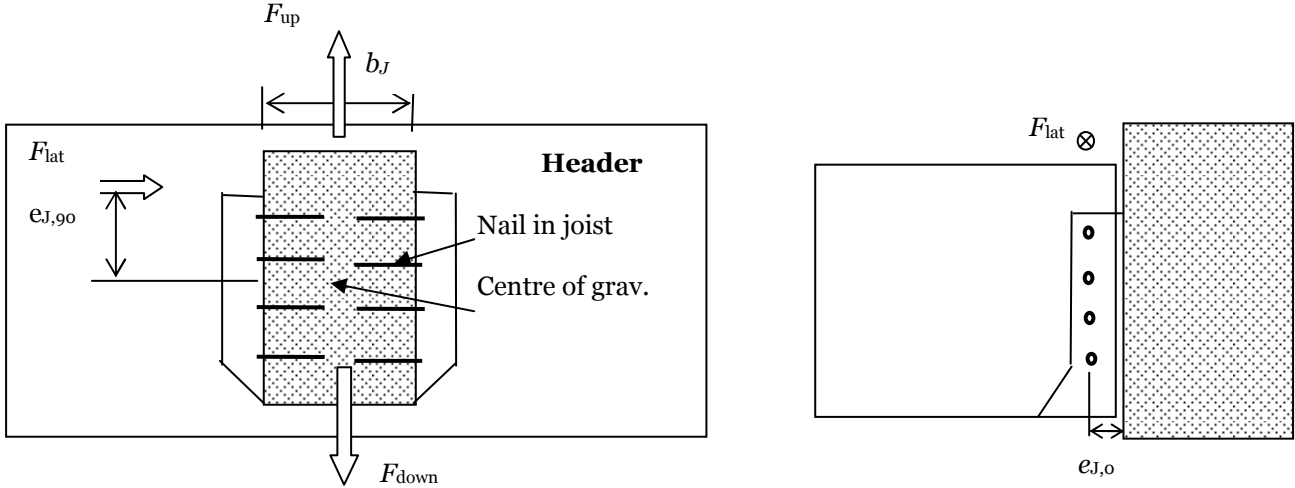


Figure B1: Definition of $e_{J,90}$ and $e_{J,0}$

B.1.2 Screws in headers made of wood-based panels

Force downward toward the bottom plate:

$$F_{Z,Rd} = \min \left\{ \begin{array}{l} n_H \cdot F_{v,H,Rd} \\ n_{J,ef} \cdot F_{v,J,Rd} \end{array} \right. \quad (B.1.2.1)$$

Where the following symbol, which was not defined in sub-clause B.1.1 is:

$n_{J,ef}$ effective number of nails in the side of the joist, see Annex C

Lateral force:

$$F_{Y,Rd} = \min \left\{ \begin{array}{l} \frac{n_J \cdot F_{v,J,Rd}}{\sqrt{\left(\frac{2 \cdot \sqrt{e_{J,0}^2 + e_{J,90}^2}}{b_J} \right)^2 + \left(\frac{F_{v,J,Rd}}{F_{ax,J,Rd}} \right)^2}} \\ \frac{F_{v,H,Rd}}{\sqrt{\left(\frac{1}{n_H} + \frac{e_H}{e_1} \right)^2 + \left(\frac{e_H}{e_2} \right)^2}} \end{array} \right. \quad (B.1.2.2)$$

B.1.3 Combined forces

In case of combined forces shall the following inequality be fulfilled:

$$\left(\frac{F_{Y,Ed}}{F_{Y,Rd}} \right)^2 + \left(\frac{F_{Z,Ed}}{F_{Z,Rd}} \right)^2 \leq 1 \quad (B.1.3.1)$$

B.2 Characteristic capacities of the joist hanger connections with bolts

For joist hangers connected to a wall of concrete, lightweight concrete or to a steel member the assumptions for the calculation of the load-carrying capacity of the connection are:

- The transfer of force from the joist to the joist hanger is as for a wood-wood connection, see clause B.1;
- The bolts shall always be positioned symmetrically about the vertical axis of the joist hanger;
- Washers according to EN ISO 7094 shall be installed at least under the upper 2 bolt heads or nuts.

Description of the static model

For a downward directed force toward the bottom plate the static behavior is basically the same as for a wood-wood connection with nails or screws.

The nails in the joist are subjected to a lateral force, which is equally distributed over all nails or screws in the joist.

Since the concrete and steel have a larger compressive strength than timber subjected perpendicular to the grain the rotation point may be assumed positioned at the top of the bottom plate.

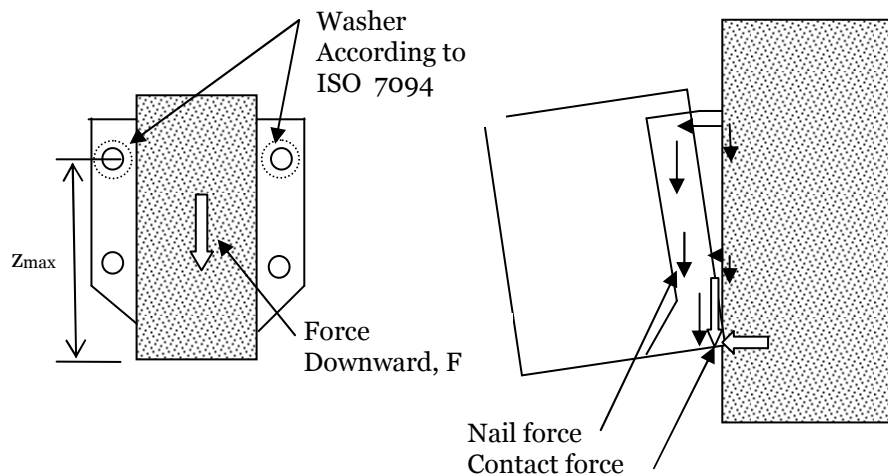


Figure B2 Left: Cross section in joist. Right: The joist will deflect and rotate, at the bottom a contact force will occur at the bottom plate, and the withdrawal forces in the bolts in the wall will vary linearly as assumed for nailed connections in the header.

The forces in the bolts will be partly lateral forces, partly withdrawal forces. The lateral forces are distributed evenly over all bolts. The withdrawal forces are on the safe side assumed to be taken by the 2 upper bolts with washers. The maximum withdrawal force in a upper bolt can be calculated from

$$F_{ax,bolt} = \frac{F \cdot e}{2 \cdot z_{max}} \quad (B.2.1)$$

where

F downward directed force toward the bottom plate;

e eccentricity = distance from the nail column in the joist to the surface of the header;

z_{max} max distance from upper bolt to the bottom plate (rotation point).

The upper 2 bolts are critical. They are subjected to a lateral force and a withdrawal force. The lateral force is determined assuming an even distribution of the downward force F .

$$F_{lat,bolt} = F / n_{bolt} \quad (B.2.2)$$

Characteristic capacities of a bolted joist hanger connection

The Characteristic capacity of the connection between the joist and the joist hanger may be calculated from the same assumptions and formulas as for joist hangers nailed or screwed to a wooden header beam.

$$F_{Z,Rk} = (n_J + 2) \cdot F_{v,J,Rk} \quad \text{for threaded nails and screws} \quad (\text{B.2.3})$$

The upper 2 bolts are critical. They are subjected to a lateral force calculated from formula (B.2.2).

The withdrawal force in an upper bolt is calculated from (B.2.1).

Where

F downward directed force toward the bottom plate

n_{bolt} total number of bolts in the joist hanger

e eccentricity = distance from the nail column in the joist to the surface of the header

z_{max} max distance from the upper bolt to the bottom plate (rotation point)

It shall be verified by the design of the bolted connection that the upper bolts have sufficient load-carrying capacity to carry the combined lateral and axial forces.

From the Characteristic load-carrying-capacity of the bearing resistance between the bolt and the plate of the joist hanger the following maximum characteristic capacity of the joist hanger connection can be determined.

$$F_{\text{bear},Rk} = n_{\text{bolt}} \cdot f_{u,k} \cdot d \cdot t \quad (\text{B.2.4})$$

where

n_{bolt} total number of bolts in the 2 flaps

$f_{u,k}$ characteristic ultimate tensile strength of the steel, 330 MPa

d diameter of the bolt

t thickness of the steel plate of the joist hanger

The characteristic load-carrying capacity of the joist hanger connections is the minimum of:

- The capacity determined from (B.2.3) from the fasteners in the joist;
- The capacity determined from (B.2.4) from the embedding strength of the steel plate against the bolt;
- The capacity controlled by the bolt forces given by (B.2.1) and (B.2.2).

Annex C
Form factors $k_{H,1}$ and $k_{H,2}$ and dimensions e_1 , e_2 and $e_{J,0}$

Table C1: Joist hanger type TOP with external flanges:
Form factors $k_{H,1}$ and $k_{H,2}$ and dimensions e_1 , e_2 ; $e_{J,0} = 31,5$ mm

B [mm]	H [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]
		Full nailing						Partial nailing					
34	113	14	8	21,8	6,05	806	520	8	4	12,7	3,72	321	363
36	112	14	8	21,4	6,11	840	530	8	4	12,5	3,76	335	365
38	111	14	8	21,1	6,18	874	540	8	4	12,3	3,80	350	368
40	110	14	8	20,7	6,25	909	551	8	4	12,1	3,84	365	372
42	109	14	8	20,3	6,31	945	561	8	4	11,9	3,89	381	375
44	108	14	8	19,9	6,38	982	572	8	4	11,7	3,93	398	379
46	107	14	8	19,6	6,46	1020	583	8	4	11,5	3,97	415	383
48	106	14	8	19,2	6,53	1058	593	8	4	11,3	4,02	433	387
50	105	14	8	18,8	6,60	1098	604	8	4	11,0	4,06	451	392
52	104	14	8	18,5	6,68	1139	616	8	4	10,8	4,11	469	397
54	103	14	8	18,1	6,76	1180	627	8	4	10,6	4,16	489	402
56	102	14	8	17,7	6,84	1223	638	8	4	10,4	4,21	508	407
58	101	14	8	17,4	6,92	1266	649	8	4	10,2	4,26	529	412
60	100	14	8	17,0	7,00	1311	661	8	4	10,0	4,31	549	417
62	99	14	8	16,6	7,09	1356	672	8	4	9,82	4,36	571	423
64	98	14	8	16,3	7,18	1402	684	8	4	9,62	4,42	593	428
66	97	14	8	15,9	7,27	1450	696	8	4	9,42	4,47	615	434
34	143	18	10	36,3	10,3	908	781	10	5	20,5	6,07	376	567
36	142	18	10	35,8	10,4	940	792	10	5	20,2	6,12	389	566
38	141	18	10	35,3	10,5	974	803	10	5	20,0	6,17	403	566
40	140	18	10	34,9	10,6	1008	814	10	5	19,7	6,22	418	566
42	139	18	10	34,4	10,7	1043	826	10	5	19,4	6,27	433	567
44	138	18	10	33,9	10,7	1079	838	10	5	19,2	6,32	448	569
46	137	18	10	33,4	10,8	1115	850	10	5	18,9	6,38	464	571
48	136	18	10	32,9	10,9	1153	862	10	5	18,7	6,43	481	574
50	135	18	10	32,5	11,0	1192	875	10	5	18,4	6,48	498	577
52	134	18	10	32,0	11,1	1231	887	10	5	18,1	6,54	515	580
54	133	18	10	31,5	11,2	1272	900	10	5	17,9	6,60	533	584
56	132	18	10	31,0	11,3	1313	913	10	5	17,6	6,65	552	588
58	131	18	10	30,6	11,4	1355	927	10	5	17,3	6,71	571	593
60	130	18	10	30,1	11,5	1398	940	10	5	17,1	6,77	590	598
62	129	18	10	29,6	11,6	1442	953	10	5	16,8	6,83	610	603
64	128	18	10	29,2	11,7	1487	967	10	5	16,6	6,90	631	608
66	127	18	10	28,7	11,8	1533	981	10	5	16,3	6,96	652	613
68	126	18	10	28,2	11,9	1580	995	10	5	16,1	7,02	673	619
70	125	18	10	27,8	12,0	1627	1009	10	5	15,8	7,09	695	625
72	124	18	10	27,3	12,2	1676	1023	10	5	15,6	7,15	718	631
74	123	18	10	26,8	12,3	1725	1038	10	5	15,3	7,22	741	637
76	122	18	10	26,4	12,4	1775	1052	10	5	15,1	7,29	764	643
78	121	18	10	25,9	12,5	1827	1067	10	5	14,8	7,36	788	650
80	120	18	10	25,5	12,6	1879	1081	10	5	14,6	7,43	813	657
82	119	18	10	25,0	12,8	1932	1096	10	5	14,3	7,51	838	663
84	118	18	10	24,6	12,9	1986	1111	10	5	14,1	7,58	863	670

Table C1 (cont.):

Joist hanger type TOP with external flanges:

Form factors $k_{H,1}$ and $k_{H,2}$ and dimensions e_1 , e_2 ; $e_{J,0} = 31,5$ mm

B [mm]	H [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]
		Full nailing						Partial nailing					
86	117	18	10	24,2	13,0	2040	1126	10	5	13,8	7,66	889	677
34	173	22	12	54,5	15,7	1041	1119	12	6	30,1	8,98	449	846
36	172	22	12	53,9	15,8	1073	1129	12	6	29,8	9,04	462	839
38	171	22	12	53,3	15,9	1105	1140	12	6	29,5	9,10	475	833
40	170	22	12	52,7	16,0	1139	1150	12	6	29,2	9,16	489	829
42	169	22	12	52,1	16,1	1173	1162	12	6	28,8	9,22	503	825
44	168	22	12	51,5	16,2	1209	1173	12	6	28,5	9,28	518	822
46	167	22	12	50,9	16,4	1245	1185	12	6	28,2	9,34	534	821
48	166	22	12	50,3	16,5	1282	1198	12	6	27,9	9,41	549	820
50	165	22	12	49,7	16,6	1320	1211	12	6	27,6	9,47	566	820
52	164	22	12	49,2	16,7	1359	1224	12	6	27,2	9,53	582	820
54	163	22	12	48,6	16,8	1398	1237	12	6	26,9	9,60	600	822
56	162	22	12	48,0	16,9	1439	1251	12	6	26,6	9,67	618	823
58	161	22	12	47,4	17,0	1480	1265	12	6	26,3	9,73	636	826
60	160	22	12	46,8	17,2	1523	1279	12	6	26,0	9,80	654	828
62	159	22	12	46,3	17,3	1566	1294	12	6	25,7	9,87	674	832
64	158	22	12	45,7	17,4	1610	1309	12	6	25,4	9,94	693	835
66	157	22	12	45,1	17,5	1655	1324	12	6	25,1	10,0	714	839
68	156	22	12	44,5	17,6	1701	1339	12	6	24,8	10,1	734	844
70	155	22	12	44,0	17,8	1747	1355	12	6	24,4	10,2	755	849
72	154	22	12	43,4	17,9	1795	1370	12	6	24,1	10,2	777	854
74	153	22	12	42,8	18,0	1843	1386	12	6	23,8	10,3	799	859
76	152	22	12	42,3	18,2	1893	1402	12	6	23,5	10,4	822	865
78	151	22	12	41,7	18,3	1943	1418	12	6	23,2	10,5	845	871
80	150	22	12	41,1	18,4	1994	1435	12	6	22,9	10,5	868	877
82	149	22	12	40,6	18,6	2046	1451	12	6	22,6	10,6	892	883
84	148	22	12	40,0	18,7	2099	1468	12	6	22,3	10,7	917	890
86	147	22	12	39,5	18,9	2153	1485	12	6	22,0	10,8	942	897
88	146	22	12	38,9	19,0	2207	1502	12	6	21,7	10,9	967	904
90	145	22	12	38,4	19,2	2263	1519	12	6	21,4	11,0	993	911
92	144	22	12	37,8	19,3	2319	1536	12	6	21,1	11,0	1019	918
94	143	22	12	37,3	19,5	2377	1553	12	6	20,8	11,1	1046	926
96	142	22	12	36,7	19,6	2435	1571	12	6	20,6	11,2	1074	933
98	141	22	12	36,2	19,8	2494	1588	12	6	20,3	11,3	1101	941
100	140	22	12	35,7	20,0	2554	1606	12	6	20,0	11,4	1130	949
102	139	22	12	35,1	20,1	2615	1624	12	6	19,7	11,5	1158	957
104	138	22	12	34,6	20,3	2676	1642	12	6	19,4	11,6	1188	966
106	137	22	12	34,1	20,5	2739	1660	12	6	19,1	11,7	1218	974
34	203	26	14	76,3	22,2	1203	1552	14	7	41,6	12,5	537	1216
36	202	26	14	75,6	22,4	1234	1559	14	7	41,2	12,5	550	1200
38	201	26	14	74,9	22,5	1267	1567	14	7	40,8	12,6	563	1185
40	200	26	14	74,2	22,6	1300	1575	14	7	40,4	12,7	576	1172
42	199	26	14	73,5	22,7	1334	1585	14	7	40,1	12,7	590	1161

Table C1 (cont.):

Joist hanger type TOP with external flanges:

Form factors $k_{H,1}$ and $k_{H,2}$ and dimensions e_1 , e_2 ; $e_{J,0} = 31,5$ mm

B [mm]	H [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]
		Full nailing						Partial nailing					
44	198	26	14	72,8	22,9	1369	1595	14	7	39,7	12,8	605	1152
46	197	26	14	72,1	23,0	1404	1605	14	7	39,3	12,9	620	1144
48	196	26	14	71,4	23,1	1441	1616	14	7	38,9	12,9	635	1138
50	195	26	14	70,7	23,3	1478	1628	14	7	38,6	13,0	651	1132
52	194	26	14	70,0	23,4	1517	1640	14	7	38,2	13,1	667	1128
54	193	26	14	69,3	23,5	1556	1652	14	7	37,8	13,2	684	1125
56	192	26	14	68,6	23,7	1596	1665	14	7	37,5	13,2	701	1122
58	191	26	14	67,9	23,8	1637	1679	14	7	37,1	13,3	719	1121
60	190	26	14	67,3	23,9	1679	1693	14	7	36,7	13,4	737	1120
62	189	26	14	66,6	24,1	1721	1707	14	7	36,4	13,5	756	1120
64	188	26	14	65,9	24,2	1765	1722	14	7	36,0	13,6	775	1121
66	187	26	14	65,2	24,3	1809	1737	14	7	35,6	13,6	795	1122
68	186	26	14	64,5	24,5	1855	1752	14	7	35,3	13,7	815	1124
70	185	26	14	63,8	24,6	1901	1768	14	7	34,9	13,8	835	1126
72	184	26	14	63,2	24,8	1948	1784	14	7	34,5	13,9	856	1129
74	183	26	14	62,5	24,9	1996	1801	14	7	34,2	14,0	878	1133
76	182	26	14	61,8	25,1	2044	1817	14	7	33,8	14,0	900	1137
78	181	26	14	61,1	25,2	2094	1834	14	7	33,5	14,1	922	1141
80	180	26	14	60,5	25,4	2144	1851	14	7	33,1	14,2	945	1146
82	179	26	14	59,8	25,6	2196	1869	14	7	32,8	14,3	968	1151
84	178	26	14	59,1	25,7	2248	1886	14	7	32,4	14,4	992	1156
86	177	26	14	58,5	25,9	2301	1904	14	7	32,0	14,5	1016	1162
88	176	26	14	57,8	26,0	2355	1922	14	7	31,7	14,6	1041	1168
90	175	26	14	57,2	26,2	2410	1941	14	7	31,3	14,7	1066	1174
92	174	26	14	56,5	26,4	2465	1959	14	7	31,0	14,8	1092	1181
94	173	26	14	55,8	26,5	2522	1978	14	7	30,6	14,9	1118	1187
96	172	26	14	55,2	26,7	2579	1997	14	7	30,3	15,0	1145	1195
98	171	26	14	54,5	26,9	2638	2016	14	7	29,9	15,1	1172	1202
100	170	26	14	53,9	27,1	2697	2035	14	7	29,6	15,2	1199	1209
102	169	26	14	53,2	27,2	2757	2055	14	7	29,3	15,3	1227	1217
104	168	26	14	52,6	27,4	2818	2074	14	7	28,9	15,4	1256	1225
106	167	26	14	52,0	27,6	2879	2094	14	7	28,6	15,5	1285	1233
108	166	26	14	51,3	27,8	2942	2114	14	7	28,2	15,6	1314	1242
110	165	26	14	50,7	28,0	3005	2134	14	7	27,9	15,7	1344	1250
112	164	26	14	50,0	28,2	3070	2154	14	7	27,6	15,8	1374	1259
114	163	26	14	49,4	28,4	3135	2175	14	7	27,2	15,9	1405	1268
116	162	26	14	48,8	28,6	3201	2195	14	7	26,9	16,0	1436	1277
118	161	26	14	48,2	28,8	3268	2216	14	7	26,5	16,1	1468	1286
120	160	26	14	47,5	29,0	3336	2236	14	7	26,2	16,2	1500	1295
122	159	26	14	46,9	29,2	3404	2257	14	7	25,9	16,3	1533	1305
124	158	26	14	46,3	29,4	3474	2278	14	7	25,6	16,4	1566	1314
126	157	26	14	45,7	29,6	3544	2299	14	7	25,2	16,6	1600	1324
34	233	30	16	102	29,9	1393	2097	16	8	54,8	16,5	641	1692

Table C1 (cont.): Joist hanger type TOP with external flanges:
Form factors $k_{H,1}$ and $k_{H,2}$ and dimensions e_1 , e_2 ; $e_{J,0} = 31,5$ mm

B [mm]	H [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]
		Full nailing						Partial nailing					
36	232	30	16	101	30,0	1424	2099	16	8	54,4	16,6	653	1662
38	231	30	16	100	30,2	1456	2102	16	8	54,0	16,7	666	1635
40	230	30	16	99,4	30,3	1489	2106	16	8	53,6	16,7	679	1611
42	229	30	16	98,6	30,5	1523	2111	16	8	53,1	16,8	693	1590
44	228	30	16	97,8	30,6	1557	2117	16	8	52,7	16,9	707	1571
46	227	30	16	97,0	30,8	1593	2124	16	8	52,3	17,0	721	1554
48	226	30	16	96,1	30,9	1629	2131	16	8	51,8	17,1	737	1539
50	225	30	16	95,3	31,1	1666	2140	16	8	51,4	17,1	752	1526
52	224	30	16	94,5	31,2	1704	2149	16	8	51,0	17,2	768	1514
54	223	30	16	93,7	31,4	1743	2159	16	8	50,6	17,3	785	1505
56	222	30	16	92,9	31,5	1783	2170	16	8	50,1	17,4	801	1496
58	221	30	16	92,1	31,7	1823	2182	16	8	49,7	17,5	819	1489
60	220	30	16	91,3	31,8	1865	2194	16	8	49,3	17,6	837	1483
62	219	30	16	90,6	32,0	1907	2206	16	8	48,9	17,6	855	1478
64	218	30	16	89,8	32,1	1950	2220	16	8	48,5	17,7	874	1474
66	217	30	16	89,0	32,3	1994	2233	16	8	48,0	17,8	893	1471
68	216	30	16	88,2	32,5	2039	2248	16	8	47,6	17,9	913	1468
70	215	30	16	87,4	32,6	2085	2262	16	8	47,2	18,0	933	1467
72	214	30	16	86,6	32,8	2131	2278	16	8	46,8	18,1	953	1466
74	213	30	16	85,8	33,0	2179	2293	16	8	46,4	18,2	974	1467
76	212	30	16	85,0	33,1	2227	2309	16	8	46,0	18,3	996	1467
78	211	30	16	84,3	33,3	2276	2326	16	8	45,5	18,4	1018	1469
80	210	30	16	83,5	33,5	2326	2343	16	8	45,1	18,5	1040	1471
82	209	30	16	82,7	33,7	2377	2360	16	8	44,7	18,6	1063	1473
84	208	30	16	81,9	33,8	2429	2378	16	8	44,3	18,7	1086	1476
86	207	30	16	81,2	34,0	2481	2396	16	8	43,9	18,8	1110	1480
88	206	30	16	80,4	34,2	2535	2414	16	8	43,5	18,9	1134	1484
90	205	30	16	79,6	34,4	2589	2433	16	8	43,1	19,0	1159	1489
92	204	30	16	78,8	34,6	2644	2451	16	8	42,7	19,1	1184	1493
94	203	30	16	78,1	34,7	2700	2471	16	8	42,3	19,2	1210	1499
96	202	30	16	77,3	34,9	2757	2490	16	8	41,9	19,3	1236	1504
98	201	30	16	76,5	35,1	2815	2510	16	8	41,5	19,4	1262	1510
100	200	30	16	75,8	35,3	2873	2530	16	8	41,1	19,5	1289	1517
102	199	30	16	75,0	35,5	2933	2550	16	8	40,7	19,6	1317	1523
104	198	30	16	74,3	35,7	2993	2571	16	8	40,3	19,7	1345	1530
106	197	30	16	73,5	35,9	3054	2591	16	8	39,9	19,8	1373	1538
108	196	30	16	72,8	36,1	3116	2612	16	8	39,5	19,9	1402	1545
110	195	30	16	72,0	36,3	3179	2633	16	8	39,1	20,0	1431	1553
112	194	30	16	71,3	36,5	3243	2655	16	8	38,7	20,1	1461	1561
114	193	30	16	70,5	36,7	3307	2676	16	8	38,3	20,3	1491	1569
116	192	30	16	69,8	36,9	3373	2698	16	8	37,9	20,4	1521	1578
118	191	30	16	69,0	37,1	3439	2720	16	8	37,5	20,5	1553	1587
120	190	30	16	68,3	37,4	3506	2742	16	8	37,1	20,6	1584	1595

Table C1 (cont.):

Joist hanger type TOP with external flanges:

Form factors $k_{H,1}$ and $k_{H,2}$ and dimensions e_1 , e_2 ; $e_{J,0} = 31,5$ mm

B [mm]	H [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]
Full nailing								Partial nailing					
122	189	30	16	67,6	37,6	3574	2765	16	8	36,7	20,7	1616	1605
124	188	30	16	66,8	37,8	3643	2787	16	8	36,3	20,9	1649	1614
126	187	30	16	66,1	38,0	3713	2810	16	8	36,0	21,0	1681	1623
128	186	30	16	65,4	38,2	3783	2832	16	8	35,6	21,1	1715	1633
130	185	30	16	64,7	38,5	3855	2855	16	8	35,2	21,2	1749	1643
132	184	30	16	63,9	38,7	3927	2878	16	8	34,8	21,4	1783	1653
134	183	30	16	63,2	38,9	4000	2902	16	8	34,4	21,5	1818	1663
136	182	30	16	62,5	39,2	4074	2925	16	8	34,1	21,6	1853	1674
138	181	30	16	61,8	39,4	4149	2949	16	8	33,7	21,7	1889	1684
140	180	30	16	61,1	39,7	4225	2972	16	8	33,3	21,9	1925	1695
142	179	30	16	60,4	39,9	4301	2996	16	8	32,9	22,0	1961	1705
144	178	30	16	59,7	40,2	4379	3020	16	8	32,6	22,2	1998	1716
146	177	30	16	59,0	40,4	4457	3044	16	8	32,2	22,3	2036	1727
34	263	34	18	131	38,7	1610	2771	18	9	70,0	21,1	758	2288
36	262	34	18	130	38,8	1641	2764	18	9	69,5	21,2	770	2240
38	261	34	18	129	39,0	1673	2760	18	9	69,0	21,3	783	2197
40	260	34	18	128	39,2	1706	2757	18	9	68,5	21,4	796	2158
42	259	34	18	127	39,3	1739	2755	18	9	68,0	21,5	809	2123
44	258	34	18	126	39,5	1774	2755	18	9	67,5	21,5	823	2091
46	257	34	18	125	39,7	1809	2756	18	9	67,1	21,6	838	2062
48	256	34	18	125	39,8	1845	2759	18	9	66,6	21,7	853	2036
50	255	34	18	124	40,0	1882	2762	18	9	66,1	21,8	868	2012
52	254	34	18	123	40,2	1920	2767	18	9	65,6	21,9	884	1991
54	253	34	18	122	40,3	1958	2773	18	9	65,1	22,0	900	1972
56	252	34	18	121	40,5	1998	2779	18	9	64,7	22,1	916	1955
58	251	34	18	120	40,7	2038	2787	18	9	64,2	22,2	934	1940
60	250	34	18	119	40,9	2079	2795	18	9	63,7	22,3	951	1926
62	249	34	18	118	41,0	2121	2805	18	9	63,2	22,4	969	1914
64	248	34	18	117	41,2	2164	2815	18	9	62,8	22,5	988	1904
66	247	34	18	116	41,4	2208	2826	18	9	62,3	22,6	1006	1894
68	246	34	18	116	41,6	2252	2837	18	9	61,8	22,7	1026	1886
70	245	34	18	115	41,8	2298	2850	18	9	61,3	22,8	1046	1880
72	244	34	18	114	41,9	2344	2863	18	9	60,9	22,9	1066	1874
74	243	34	18	113	42,1	2391	2876	18	9	60,4	23,0	1087	1869
76	242	34	18	112	42,3	2439	2891	18	9	59,9	23,1	1108	1866
78	241	34	18	111	42,5	2488	2905	18	9	59,5	23,2	1129	1863
80	240	34	18	110	42,7	2537	2921	18	9	59,0	23,3	1151	1861
82	239	34	18	109	42,9	2588	2937	18	9	58,5	23,4	1174	1859
84	238	34	18	108	43,1	2639	2953	18	9	58,1	23,5	1197	1859
86	237	34	18	107	43,3	2691	2970	18	9	57,6	23,6	1220	1859
88	236	34	18	107	43,5	2744	2987	18	9	57,1	23,7	1244	1860
90	235	34	18	106	43,7	2798	3005	18	9	56,7	23,8	1268	1862
92	234	34	18	105	43,9	2853	3023	18	9	56,2	23,9	1293	1864

Table C1 (cont.):

Joist hanger type TOP with external flanges:

Form factors $k_{H,1}$ and $k_{H,2}$ and dimensions e_1 , e_2 ; $e_{J,0} = 31,5$ mm

B [mm]	H [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]
		Full nailing						Partial nailing					
94	233	34	18	104	44,1	2909	3042	18	9	55,8	24,0	1318	1867
96	232	34	18	103	44,3	2965	3061	18	9	55,3	24,2	1344	1870
98	231	34	18	102	44,5	3022	3080	18	9	54,8	24,3	1370	1874
100	230	34	18	101	44,7	3081	3100	18	9	54,4	24,4	1397	1878
102	229	34	18	100	44,9	3140	3120	18	9	53,9	24,5	1424	1882
104	228	34	18	99,6	45,1	3199	3141	18	9	53,5	24,6	1451	1887
106	227	34	18	98,8	45,3	3260	3161	18	9	53,0	24,7	1479	1893
108	226	34	18	97,9	45,6	3322	3182	18	9	52,6	24,8	1507	1899
110	225	34	18	97,0	45,8	3384	3204	18	9	52,1	25,0	1536	1905
112	224	34	18	96,2	46,0	3447	3226	18	9	51,7	25,1	1565	1912
114	223	34	18	95,3	46,2	3511	3248	18	9	51,2	25,2	1595	1919
116	222	34	18	94,5	46,4	3576	3270	18	9	50,8	25,3	1625	1926
118	221	34	18	93,6	46,7	3642	3292	18	9	50,3	25,5	1656	1934
120	220	34	18	92,8	46,9	3709	3315	18	9	49,9	25,6	1687	1942
122	219	34	18	91,9	47,1	3776	3338	18	9	49,4	25,7	1718	1950
124	218	34	18	91,1	47,4	3845	3361	18	9	49,0	25,8	1750	1958
126	217	34	18	90,2	47,6	3914	3385	18	9	48,5	26,0	1783	1967
128	216	34	18	89,4	47,9	3984	3409	18	9	48,1	26,1	1816	1976
130	215	34	18	88,6	48,1	4055	3433	18	9	47,7	26,2	1849	1985
132	214	34	18	87,7	48,3	4127	3457	18	9	47,2	26,4	1883	1995
134	213	34	18	86,9	48,6	4199	3481	18	9	46,8	26,5	1917	2004
136	212	34	18	86,1	48,8	4273	3506	18	9	46,4	26,6	1951	2014
138	211	34	18	85,2	49,1	4347	3531	18	9	45,9	26,8	1987	2024
140	210	34	18	84,4	49,3	4422	3555	18	9	45,5	26,9	2022	2035
142	209	34	18	83,6	49,6	4498	3581	18	9	45,1	27,1	2058	2045
144	208	34	18	82,8	49,9	4575	3606	18	9	44,6	27,2	2095	2056
146	207	34	18	82,0	50,1	4653	3631	18	9	44,2	27,3	2131	2067
148	206	34	18	81,2	50,4	4731	3657	18	9	43,8	27,5	2169	2078
150	205	34	18	80,3	50,7	4811	3683	18	9	43,3	27,6	2207	2089
152	204	34	18	79,5	50,9	4891	3709	18	9	42,9	27,8	2245	2100
154	203	34	18	78,7	51,2	4972	3735	18	9	42,5	27,9	2284	2112
156	202	34	18	77,9	51,5	5054	3761	18	9	42,1	28,1	2323	2124
158	201	34	18	77,1	51,8	5137	3787	18	9	41,7	28,2	2362	2135
160	200	34	18	76,3	52,0	5220	3814	18	9	41,2	28,4	2402	2147
162	199	34	18	75,5	52,3	5305	3841	18	9	40,8	28,5	2443	2159
164	198	34	18	74,7	52,6	5390	3867	18	9	40,4	28,7	2484	2172
166	197	34	18	74,0	52,9	5476	3894	18	9	40,0	28,9	2525	2184

Table C2:

Joist hanger type 04 kombi with external flanges:

Form factors $k_{H,1}$ and $k_{H,2}$ and dimensions e_1 , e_2 and $e_{J,0}$

B [mm]	H [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	$e_{J,0}$ [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	$e_{J,0}$ [mm]
		Full nailing							Partial nailing						
50	70	8	4	7,18	1,68	1873	334	32	4	2	4,48	0,48	558	155	32
64	68	8	4	6,75	1,75	2427	385	32	4	2	4,25	0,50	780	181	32
60	80	10	6	9,90	3,02	1349	442	32	6	4	6,14	2,02	584	285	32
76	90	12	6	13,0	4,77	2324	674	32	6	4	7,74	1,74	800	327	32
32	114	14	8	21,7	5,92	823	525	32	8	4	12,6	3,65	328	364	32
40	110	14	8	20,2	6,18	963	567	32	8	4	11,8	3,80	390	377	32
42	109	14	8	19,8	6,25	1001	577	32	8	4	11,6	3,85	406	381	32
44	108	14	8	19,4	6,32	1039	588	32	8	4	11,4	3,89	424	385	32
46	107	14	8	19,1	6,39	1078	599	32	8	4	11,2	3,93	442	390	32
48	106	14	8	18,7	6,46	1118	610	32	8	4	11,0	3,98	460	394	32
50	105	14	8	18,3	6,54	1159	621	32	8	4	10,8	4,02	479	399	32
52	104	14	8	18,0	6,61	1202	632	32	8	4	10,6	4,07	498	404	32
54	103	14	8	17,6	6,69	1245	644	32	8	4	10,4	4,12	518	409	32
56	102	14	8	17,3	6,77	1288	655	32	8	4	10,2	4,17	539	415	32
58	101	14	8	16,9	6,85	1333	667	32	8	4	10,0	4,22	560	420	32
60	100	14	8	16,6	6,94	1379	678	32	8	4	9,77	4,27	582	426	32
64	98	14	8	15,9	7,11	1474	702	32	8	4	9,38	4,38	626	437	32
70	95	14	8	14,8	7,39	1622	737	32	8	4	8,80	4,55	698	455	32
90	90	10	6	11,9	2,5	2196	578	34	6	4	7,28	1,63	1021	365	34
40	120	14	8	22,5	5,25	963	567	34	8	4	13,1	3,23	390	377	34
42	119	14	8	22,2	5,30	1001	577	34	8	4	12,9	3,26	406	381	34
44	118	14	8	21,8	5,35	1039	588	34	8	4	12,7	3,29	424	385	34
46	117	14	8	21,5	5,41	1078	599	34	8	4	12,5	3,33	442	390	34
48	116	14	8	21,1	5,46	1118	610	34	8	4	12,3	3,36	460	394	34
50	115	14	8	20,8	5,52	1159	621	34	8	4	12,1	3,40	479	399	34
52	114	14	8	20,4	5,58	1202	632	34	8	4	11,9	3,43	498	404	34
54	113	14	8	20,0	5,63	1245	644	34	8	4	11,7	3,47	518	409	34
56	112	14	8	19,7	5,69	1288	655	34	8	4	11,5	3,50	539	415	34
58	111	14	8	19,3	5,76	1333	667	34	8	4	11,3	3,54	560	420	34
60	110	14	8	19,0	5,82	1379	678	34	8	4	11,1	3,58	582	426	34
62	109	14	8	18,6	5,88	1426	690	34	8	4	10,9	3,62	604	431	34
64	108	14	8	18,3	5,95	1474	702	34	8	4	10,7	3,66	626	437	34
66	107	14	8	18,0	6,01	1522	714	34	8	4	10,5	3,70	650	443	34
68	106	14	8	17,6	6,08	1572	725	34	8	4	10,3	3,74	673	449	34
70	105	14	8	17,3	6,15	1622	737	34	8	4	10,1	3,79	698	455	34
72	104	14	8	16,9	6,22	1674	749	34	8	4	9,9	3,83	722	461	34
74	103	14	8	16,6	6,30	1726	761	34	8	4	9,8	3,88	748	467	34
76	102	14	8	16,3	6,37	1779	774	34	8	4	9,6	3,92	774	474	34
78	101	14	8	15,9	6,45	1833	786	34	8	4	9,4	3,97	800	480	34
80	100	14	8	15,6	6,53	1888	798	34	8	4	9,2	4,02	827	486	34
95	95	12	6	13,7	4,20	3050	777	34	6	4	8,1	1,53	1107	378	34
100	90	12	6	12,0	4,56	3260	805	34	6	4	7,3	1,63	1196	392	34
32	144	18	10	32,9	9,25	924	786	35	10	6	18,6	5,44	382	566	35

Table C2 (contd.): Joist hanger type 04 kombi with external flanges:
Form factors $k_{H,1}$ and $k_{H,2}$ and dimensions e_1 , e_2 and $e_{J,0}$

B [mm]	H [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	$e_{J,0}$ [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	$e_{J,0}$ [mm]
		Full nailing							Partial nailing						
40	140	18	10	31,2	9,56	1060	832	35	10	6	17,6	5,62	440	568	35
42	139	18	10	30,7	9,63	1097	844	35	10	6	17,4	5,67	456	570	35
44	138	18	10	30,3	9,71	1134	856	35	10	6	17,1	5,71	472	572	35
46	137	18	10	29,9	9,80	1172	868	35	10	6	16,9	5,76	489	575	35
48	136	18	10	29,4	9,88	1211	881	35	10	6	16,7	5,81	506	579	35
50	135	18	10	29,0	10,0	1251	894	35	10	6	16,4	5,86	524	582	35
52	134	18	10	28,6	10,0	1292	907	35	10	6	16,2	5,91	542	586	35
54	133	18	10	28,1	10,1	1334	920	35	10	6	16,0	5,96	561	591	35
56	132	18	10	27,7	10,2	1376	933	35	10	6	15,7	6,02	580	595	35
58	131	18	10	27,3	10,3	1420	947	35	10	6	15,5	6,07	600	600	35
60	130	18	10	26,9	10,4	1464	960	35	10	6	15,3	6,12	620	605	35
62	129	18	10	26,4	10,5	1510	974	35	10	6	15,0	6,18	641	610	35
64	128	18	10	26,0	10,6	1556	988	35	10	6	14,8	6,23	662	616	35
66	127	18	10	25,6	10,7	1603	1002	35	10	6	14,6	6,29	684	622	35
68	126	18	10	25,2	10,8	1651	1016	35	10	6	14,3	6,35	706	628	35
70	125	18	10	24,8	10,9	1700	1030	35	10	6	14,1	6,41	729	634	35
72	124	18	10	24,4	11,0	1750	1045	35	10	6	13,9	6,47	752	640	35
74	123	18	10	24,0	11,1	1801	1059	35	10	6	13,7	6,53	776	647	35
76	122	18	10	23,6	11,2	1852	1074	35	10	6	13,5	6,59	800	653	35
78	121	18	10	23,1	11,3	1905	1089	35	10	6	13,2	6,66	825	660	35
80	120	18	10	22,7	11,4	1958	1103	35	10	6	13,0	6,72	850	667	35
40	150	18	10	36,6	9,09	1172	868	34	10	6	20,6	5,35	489	575	34
42	149	18	10	36,2	9,16	1211	881	34	10	6	20,4	5,39	506	579	34
44	148	18	10	35,7	9,23	1251	894	34	10	6	20,1	5,43	524	582	34
46	147	18	10	35,2	9,30	1292	907	34	10	6	19,9	5,47	542	586	34
48	146	18	10	34,8	9,38	1334	920	34	10	6	19,6	5,51	561	591	34
50	145	18	10	34,3	9,45	1376	933	34	10	6	19,4	5,56	580	595	34
52	144	18	10	33,9	9,52	1420	947	34	10	6	19,1	5,60	600	600	34
54	143	18	10	33,4	9,60	1464	960	34	10	6	18,9	5,65	620	605	34
56	142	18	10	33,0	9,68	1510	974	34	10	6	18,6	5,69	641	610	34
58	141	18	10	32,5	9,76	1556	988	34	10	6	18,4	5,74	662	616	34
60	140	18	10	32,1	9,84	1603	1002	34	10	6	18,1	5,79	684	622	34
62	139	18	10	31,6	9,92	1651	1016	34	10	6	17,9	5,83	706	628	34
64	138	18	10	31,2	10,0	1700	1030	34	10	6	17,6	5,88	729	634	34
66	137	18	10	30,7	10,1	1750	1045	34	10	6	17,4	5,93	752	640	34
68	136	18	10	30,3	10,2	1801	1059	34	10	6	17,2	5,98	776	647	34
70	135	18	10	29,8	10,3	1852	1074	34	10	6	16,9	6,03	800	653	34
72	134	18	10	29,4	10,3	1905	1089	34	10	6	16,7	6,09	825	660	34
74	133	18	10	29,0	10,4	1958	1103	34	10	6	16,4	6,14	850	667	34
76	132	18	10	28,5	10,5	2013	1118	34	10	6	16,2	6,19	876	674	34
78	131	18	10	28,1	10,6	2068	1133	34	10	6	16,0	6,25	902	681	34
80	130	18	10	27,7	10,7	2124	1148	34	10	6	15,7	6,30	929	688	34
82	129	18	10	27,2	10,8	2181	1163	34	10	6	15,5	6,36	956	695	34

Table C2 (contd.): Joist hanger type 04 kombi with external flanges:
Form factors $k_{H,1}$ and $k_{H,2}$ and dimensions e_1 , e_2 and $e_{J,0}$

B [mm]	H [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	$e_{J,0}$ [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	$e_{J,0}$ [mm]
Full nailing									Partial nailing						
84	128	18	10	26,8	10,9	2239	1179	34	10	6	15,2	6,42	984	703	34
86	127	18	10	26,4	11,0	2298	1194	34	10	6	15,0	6,48	1012	710	34
88	126	18	10	25,9	11,1	2358	1209	34	10	6	14,8	6,54	1041	718	34
90	125	18	10	25,5	11,2	2418	1225	34	10	6	14,5	6,60	1070	726	34
92	124	18	10	25,1	11,3	2480	1240	34	10	6	14,3	6,66	1100	733	34
94	123	18	10	24,7	11,4	2542	1256	34	10	6	14,1	6,72	1130	741	34
96	122	18	10	24,2	11,5	2606	1271	34	10	6	13,8	6,79	1161	749	34
98	121	18	10	23,8	11,7	2670	1287	34	10	6	13,6	6,85	1192	757	34
100	120	18	10	23,4	11,8	2735	1302	34	10	6	13,4	6,92	1224	765	34
40	160	22	12	43,1	15,9	1301	1204	34	12	6	23,9	9,11	557	820	34
42	159	22	12	42,6	16,1	1339	1217	34	12	6	23,6	9,18	574	820	34
44	158	22	12	42,1	16,2	1378	1231	34	12	6	23,4	9,24	591	821	34
46	157	22	12	41,5	16,3	1418	1244	34	12	6	23,1	9,31	609	822	34
48	156	22	12	41,0	16,4	1459	1258	34	12	6	22,8	9,38	627	824	34
50	155	22	12	40,5	16,5	1501	1272	34	12	6	22,5	9,45	645	827	34
52	154	22	12	39,9	16,7	1544	1287	34	12	6	22,2	9,52	664	830	34
54	153	22	12	39,4	16,8	1588	1301	34	12	6	21,9	9,59	683	833	34
56	152	22	12	38,9	16,9	1632	1316	34	12	6	21,7	9,66	703	837	34
58	151	22	12	38,4	17,0	1678	1331	34	12	6	21,4	9,73	724	842	34
60	150	22	12	37,9	17,2	1724	1347	34	12	6	21,1	9,80	745	846	34
62	149	22	12	37,3	17,3	1771	1362	34	12	6	20,8	9,88	766	851	34
64	148	22	12	36,8	17,4	1819	1378	34	12	6	20,5	10,0	788	856	34
66	147	22	12	36,3	17,6	1868	1394	34	12	6	20,3	10,0	810	862	34
68	146	22	12	35,8	17,7	1918	1410	34	12	6	20,0	10,1	833	868	34
70	145	22	12	35,3	17,8	1968	1426	34	12	6	19,7	10,2	856	874	34
72	144	22	12	34,8	18,0	2020	1443	34	12	6	19,4	10,3	880	880	34
74	143	22	12	34,3	18,1	2072	1459	34	12	6	19,2	10,4	904	887	34
76	142	22	12	33,8	18,3	2126	1476	34	12	6	18,9	10,4	929	893	34
78	141	22	12	33,3	18,4	2180	1493	34	12	6	18,6	10,5	954	900	34
80	140	20	10	32,6	13,7	2511	1357	34	10	6	18,1	5,8	929	688	34
120	120	18	10	23,4	11,8	3436	1462	34	10	6	13,4	6,92	1569	848	34
40	170	22	12	50,0	15,4	1301	1204	33	12	6	27,7	8,77	557	820	33
42	169	22	12	49,5	15,5	1339	1217	33	12	6	27,4	8,83	574	820	33
44	168	22	12	48,9	15,6	1378	1231	33	12	6	27,1	8,89	591	821	33
46	167	22	12	48,3	15,7	1418	1244	33	12	6	26,8	8,95	609	822	33
48	166	22	12	47,8	15,8	1459	1258	33	12	6	26,5	9,01	627	824	33
50	165	22	12	47,2	15,9	1501	1272	33	12	6	26,2	9,07	645	827	33
52	164	22	12	46,6	16,0	1544	1287	33	12	6	25,9	9,13	664	830	33
54	163	22	12	46,1	16,1	1588	1301	33	12	6	25,6	9,20	683	833	33
56	162	22	12	45,5	16,2	1632	1316	33	12	6	25,3	9,26	703	837	33
58	161	22	12	45,0	16,3	1678	1331	33	12	6	25,0	9,32	724	842	33
60	160	22	12	44,4	16,4	1724	1347	33	12	6	24,7	9,39	745	846	33
62	159	22	12	43,9	16,5	1771	1362	33	12	6	24,4	9,46	766	851	33

Table C2 (contd.): Joist hanger type 04 kombi with external flanges:
Form factors $k_{H,1}$ and $k_{H,2}$ and dimensions e_1 , e_2 and $e_{J,0}$

B [mm]	H [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	$e_{J,0}$ [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	$e_{J,0}$ [mm]
		Full nailing							Partial nailing						
64	158	22	12	43,3	16,7	1819	1378	33	12	6	24,1	9,52	788	856	33
66	157	22	12	42,8	16,8	1868	1394	33	12	6	23,8	9,59	810	862	33
68	156	22	12	42,2	16,9	1918	1410	33	12	6	23,5	9,66	833	868	33
70	155	22	12	41,7	17,0	1968	1426	33	12	6	23,2	9,73	856	874	33
72	154	22	12	41,2	17,2	2020	1443	33	12	6	22,9	9,80	880	880	33
74	153	22	12	40,6	17,3	2072	1459	33	12	6	22,6	9,88	904	887	33
76	152	22	12	40,1	17,4	2126	1476	33	12	6	22,3	10,0	929	893	33
78	151	22	12	39,5	17,5	2180	1493	33	12	6	22,0	10,0	954	900	33
80	150	22	12	39,0	17,7	2235	1510	33	12	6	21,7	10,1	980	907	33
82	149	22	12	38,5	17,8	2291	1527	33	12	6	21,5	10,2	1006	915	33
84	148	22	12	37,9	17,9	2348	1545	33	12	6	21,2	10,3	1033	922	33
86	147	22	12	37,4	18,1	2406	1562	33	12	6	20,9	10,3	1060	930	33
88	146	22	12	36,9	18,2	2464	1580	33	12	6	20,6	10,4	1087	937	33
90	145	22	12	36,4	18,4	2524	1597	33	12	6	20,3	10,5	1115	945	33
92	144	22	12	35,9	18,5	2584	1615	33	12	6	20,0	10,6	1144	953	33
94	143	22	12	35,3	18,7	2645	1633	33	12	6	19,8	10,7	1173	962	33
96	142	22	12	34,8	18,8	2707	1651	33	12	6	19,5	10,8	1203	970	33
98	141	22	12	34,3	19,0	2770	1669	33	12	6	19,2	10,8	1233	978	33
100	140	22	12	33,8	19,1	2834	1687	33	12	6	18,9	10,9	1263	987	33
40	180	22	12	57,5	14,9	1301	1204	32	12	6	31,7	8,49	557	820	32
42	179	22	12	56,9	14,9	1339	1217	32	12	6	31,4	8,54	574	820	32
44	178	22	12	56,3	15,0	1378	1231	32	12	6	31,1	8,59	591	821	32
46	177	22	12	55,7	15,1	1418	1244	32	12	6	30,8	8,65	609	822	32
48	176	22	12	55,1	15,2	1459	1258	32	12	6	30,5	8,70	627	824	32
50	175	22	12	54,5	15,3	1501	1272	32	12	6	30,1	8,76	645	827	32
52	174	22	12	53,9	15,4	1544	1287	32	12	6	29,8	8,81	664	830	32
54	173	22	12	53,3	15,5	1588	1301	32	12	6	29,5	8,87	683	833	32
56	172	22	12	52,8	15,6	1632	1316	32	12	6	29,2	8,93	703	837	32
58	171	22	12	52,2	15,7	1678	1331	32	12	6	28,9	8,99	724	842	32
60	170	22	12	51,6	15,8	1724	1347	32	12	6	28,5	9,05	745	846	32
62	169	22	12	51,0	15,9	1771	1362	32	12	6	28,2	9,11	766	851	32
64	168	22	12	50,4	16,0	1819	1378	32	12	6	27,9	9,17	788	856	32
66	167	22	12	49,8	16,1	1868	1394	32	12	6	27,6	9,23	810	862	32
68	166	22	12	49,3	16,3	1918	1410	32	12	6	27,3	9,29	833	868	32
70	165	22	12	48,7	16,4	1968	1426	32	12	6	27,0	9,35	856	874	32
72	164	22	12	48,1	16,5	2020	1443	32	12	6	26,7	9,42	880	880	32
74	163	22	12	47,5	16,6	2072	1459	32	12	6	26,4	9,48	904	887	32
76	162	22	12	47,0	16,7	2126	1476	32	12	6	26,0	9,55	929	893	32
78	161	22	12	46,4	16,8	2180	1493	32	12	6	25,7	9,62	954	900	32
80	160	22	12	45,8	16,9	2235	1510	32	12	6	25,4	9,68	980	907	32
82	159	22	12	45,3	17,1	2291	1527	32	12	6	25,1	9,75	1006	915	32
84	158	22	12	44,7	17,2	2348	1545	32	12	6	24,8	9,82	1033	922	32
86	157	22	12	44,1	17,3	2406	1562	32	12	6	24,5	9,89	1060	930	32

Table C2 (contd.): Joist hanger type 04 kombi with external flanges:
Form factors $k_{H,1}$ and $k_{H,2}$ and dimensions e_1 , e_2 and $e_{J,0}$

B [mm]	H [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	$e_{J,0}$ [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	$e_{J,0}$ [mm]
		Full nailing							Partial nailing						
88	156	22	12	43,6	17,4	2464	1580	32	12	6	24,2	10,0	1087	937	32
90	155	22	12	43,0	17,6	2524	1597	32	12	6	23,9	10,0	1115	945	32
92	154	22	12	42,4	17,7	2584	1615	32	12	6	23,6	10,1	1144	953	32
94	153	22	12	41,9	17,8	2645	1633	32	12	6	23,3	10,2	1173	962	32
96	152	22	12	41,3	18,0	2707	1651	32	12	6	23,0	10,3	1203	970	32
98	151	22	12	40,8	18,1	2770	1669	32	12	6	22,7	10,3	1233	978	32
100	150	22	12	40,2	18,2	2834	1687	32	12	6	22,4	10,4	1263	987	32
102	149	22	12	39,7	18,4	2899	1705	32	12	6	22,1	10,5	1294	995	32
104	148	22	12	39,1	18,5	2965	1724	32	12	6	21,8	10,6	1325	1004	32
106	147	22	12	38,6	18,7	3031	1742	32	12	6	21,5	10,7	1357	1013	32
108	146	22	12	38,0	18,8	3099	1761	32	12	6	21,2	10,7	1390	1022	32
110	145	22	12	37,5	18,9	3167	1779	32	12	6	21,0	10,8	1423	1031	32
112	144	22	12	37,0	19,1	3236	1798	32	12	6	20,7	10,9	1456	1040	32
114	143	22	12	36,4	19,3	3306	1817	32	12	6	20,4	11,0	1490	1049	32
116	142	22	12	35,9	19,4	3377	1835	32	12	6	20,1	11,1	1524	1058	32
118	141	22	12	35,4	19,6	3449	1854	32	12	6	19,8	11,2	1559	1068	32
120	140	22	12	34,8	19,7	3521	1873	32	12	6	22,4	10,4	1594	1077	32
40	190	26	14	65,9	23,6	1460	1622	32	14	8	36,0	13,2	643	1135	32
42	189	26	14	65,2	23,8	1498	1634	32	14	8	35,6	13,3	659	1130	32
44	188	26	14	64,5	23,9	1536	1646	32	14	8	35,3	13,4	676	1126	32
46	187	26	14	63,9	24,0	1576	1659	32	14	8	34,9	13,5	693	1123	32
48	186	26	14	63,2	24,2	1616	1672	32	14	8	34,5	13,5	710	1121	32
50	185	26	14	62,5	24,3	1658	1686	32	14	8	34,2	13,6	728	1120	32
52	184	26	14	61,8	24,5	1700	1700	32	14	8	33,8	13,7	747	1120	32
54	183	26	14	61,2	24,6	1743	1715	32	14	8	33,5	13,8	766	1120	32
56	182	26	14	60,5	24,8	1787	1729	32	14	8	33,1	13,9	785	1121	32
58	181	26	14	59,9	24,9	1832	1745	32	14	8	32,8	14,0	805	1123	32
60	180	26	14	59,2	25,1	1878	1760	32	14	8	32,4	14,0	825	1125	32
62	179	26	14	58,5	25,2	1924	1776	32	14	8	32,1	14,1	846	1128	32
64	178	26	14	57,9	25,4	1972	1792	32	14	8	31,7	14,2	867	1131	32
66	177	26	14	57,2	25,6	2020	1809	32	14	8	31,4	14,3	889	1135	32
68	176	26	14	56,6	25,7	2069	1826	32	14	8	31,0	14,4	911	1139	32
70	175	26	14	55,9	25,9	2119	1843	32	14	8	30,7	14,5	934	1143	32
72	174	26	14	55,3	26,0	2170	1860	32	14	8	30,3	14,6	957	1148	32
74	173	26	14	54,6	26,2	2222	1878	32	14	8	30,0	14,7	980	1153	32
76	172	26	14	54,0	26,4	2274	1895	32	14	8	29,6	14,8	1004	1159	32
78	171	26	14	53,4	26,6	2328	1913	32	14	8	29,3	14,9	1029	1165	32
80	170	26	14	52,7	26,7	2382	1932	32	14	8	29,0	15,0	1054	1171	32
82	169	26	14	52,1	26,9	2438	1950	32	14	8	28,6	15,1	1079	1177	32
84	168	26	14	51,5	27,1	2494	1969	32	14	8	28,3	15,2	1105	1184	32
86	167	26	14	50,8	27,3	2551	1987	32	14	8	28,0	15,3	1131	1191	32
88	166	26	14	50,2	27,4	2608	2006	32	14	8	27,6	15,4	1158	1198	32
90	165	26	14	49,6	27,6	2667	2026	32	14	8	27,3	15,5	1186	1206	32

Table C2 (contd.): Joist hanger type 04 kombi with external flanges:
Form factors $k_{H,1}$ and $k_{H,2}$ and dimensions e_1 , e_2 and $e_{J,0}$

B [mm]	H [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	$e_{J,0}$ [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	$e_{J,0}$ [mm]
		Full nailing							Partial nailing						
92	164	26	14	49,0	27,8	2727	2045	32	14	8	27,0	15,6	1213	1213	32
94	163	26	14	48,3	28,0	2787	2065	32	14	8	26,6	15,7	1242	1221	32
96	162	26	14	47,7	28,2	2848	2084	32	14	8	26,3	15,8	1270	1229	32
98	161	26	14	47,1	28,4	2911	2104	32	14	8	26,0	15,9	1299	1238	32
100	160	24	12	46,3	22,3	3248	1934	32	12	6	25,4	9,7	1263	987	32
140	140	22	12	34,8	19,7	4297	2066	32	12	6	19,5	11,3	1973	1175	32
40	200	26	14	72,7	22,3	1460	1622	32	14	8	39,6	12,5	643	1135	32
42	199	26	14	72,0	22,4	1498	1634	32	14	8	39,3	12,6	659	1130	32
44	198	26	14	71,3	22,6	1536	1646	32	14	8	38,9	12,6	676	1126	32
46	197	26	14	70,6	22,7	1576	1659	32	14	8	38,5	12,7	693	1123	32
48	196	26	14	69,9	22,8	1616	1672	32	14	8	38,2	12,8	710	1121	32
50	195	26	14	69,3	23,0	1658	1686	32	14	8	37,8	12,9	728	1120	32
52	194	26	14	68,6	23,1	1700	1700	32	14	8	37,4	12,9	747	1120	32
54	193	26	14	67,9	23,2	1743	1715	32	14	8	37,1	13,0	766	1120	32
56	192	26	14	67,2	23,3	1787	1729	32	14	8	36,7	13,1	785	1121	32
58	191	26	14	66,5	23,5	1832	1745	32	14	8	36,3	13,2	805	1123	32
60	190	26	14	65,9	23,6	1878	1760	32	14	8	36,0	13,2	825	1125	32
62	189	26	14	65,2	23,8	1924	1776	32	14	8	35,6	13,3	846	1128	32
64	188	26	14	64,5	23,9	1972	1792	32	14	8	35,3	13,4	867	1131	32
66	187	26	14	63,9	24,0	2020	1809	32	14	8	34,9	13,5	889	1135	32
68	186	26	14	63,2	24,2	2069	1826	32	14	8	34,5	13,5	911	1139	32
70	185	26	14	62,5	24,3	2119	1843	32	14	8	34,2	13,6	934	1143	32
72	184	26	14	61,8	24,5	2170	1860	32	14	8	33,8	13,7	957	1148	32
74	183	26	14	61,2	24,6	2222	1878	32	14	8	33,5	13,8	980	1153	32
76	182	26	14	60,5	24,8	2274	1895	32	14	8	33,1	13,9	1004	1159	32
78	181	26	14	59,9	24,9	2328	1913	32	14	8	32,8	14,0	1029	1165	32
80	180	26	14	59,2	25,1	2382	1932	32	14	8	32,4	14,0	1054	1171	32
82	179	26	14	58,5	25,2	2438	1950	32	14	8	32,1	14,1	1079	1177	32
84	178	26	14	57,9	25,4	2494	1969	32	14	8	31,7	14,2	1105	1184	32
86	177	26	14	57,2	25,6	2551	1987	32	14	8	31,4	14,3	1131	1191	32
88	176	26	14	56,6	25,7	2608	2006	32	14	8	31,0	14,4	1158	1198	32
90	175	26	14	55,9	25,9	2667	2026	32	14	8	30,7	14,5	1186	1206	32
92	174	26	14	55,3	26,0	2727	2045	32	14	8	30,3	14,6	1213	1213	32
94	173	26	14	54,6	26,2	2787	2065	32	14	8	30,0	14,7	1242	1221	32
96	172	26	14	54,0	26,4	2848	2084	32	14	8	29,6	14,8	1270	1229	32
98	171	26	14	53,4	26,6	2911	2104	32	14	8	29,3	14,9	1299	1238	32
100	170	26	14	52,7	26,7	2974	2124	32	14	8	29,0	15,0	1329	1246	32
102	169	26	14	52,1	26,9	3038	2144	32	14	8	28,6	15,1	1359	1255	32
104	168	26	14	51,5	27,1	3102	2164	32	14	8	28,3	15,2	1390	1263	32
106	167	26	14	50,8	27,3	3168	2185	32	14	8	28,0	15,3	1421	1272	32
108	166	26	14	50,2	27,4	3234	2205	32	14	8	27,6	15,4	1452	1281	32
110	165	26	14	49,6	27,6	3302	2226	32	14	8	27,3	15,5	1484	1291	32
112	164	26	14	49,0	27,8	3370	2247	32	14	8	27,0	15,6	1517	1300	32

Table C2 (contd.): Joist hanger type 04 kombi with external flanges:
Form factors $k_{H,1}$ and $k_{H,2}$ and dimensions e_1 , e_2 and $e_{J,0}$

B [mm]	H [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	$e_{J,0}$ [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	$e_{J,0}$ [mm]
Full nailing									Partial nailing						
114	163	26	14	48,3	28,0	3439	2268	32	14	8	26,6	15,7	1550	1309	32
116	162	26	14	47,7	28,2	3509	2289	32	14	8	26,3	15,8	1583	1319	32
118	161	26	14	47,1	28,4	3580	2310	32	14	8	26,0	15,9	1617	1329	32
120	160	26	14	46,5	28,6	3652	2331	32	14	8	25,6	16,0	1651	1339	32
40	210	26	14	79,7	21,2	1460	1622	32	14	8	43,3	11,8	643	1135	32
42	209	26	14	79,0	21,3	1498	1634	32	14	8	43,0	11,9	659	1130	32
44	208	26	14	78,3	21,4	1536	1646	32	14	8	42,6	12,0	676	1126	32
46	207	26	14	77,6	21,5	1576	1659	32	14	8	42,2	12,0	693	1123	32
48	206	26	14	76,9	21,6	1616	1672	32	14	8	41,9	12,1	710	1121	32
50	205	26	14	76,2	21,7	1658	1686	32	14	8	41,5	12,2	728	1120	32
52	204	26	14	75,5	21,8	1700	1700	32	14	8	41,1	12,2	747	1120	32
54	203	26	14	74,8	22,0	1743	1715	32	14	8	40,7	12,3	766	1120	32
56	202	26	14	74,1	22,1	1787	1729	32	14	8	40,4	12,4	785	1121	32
58	201	26	14	73,4	22,2	1832	1745	32	14	8	40,0	12,4	805	1123	32
60	200	26	14	72,7	22,3	1878	1760	32	14	8	39,6	12,5	825	1125	32
62	199	26	14	72,0	22,4	1924	1776	32	14	8	39,3	12,6	846	1128	32
64	198	26	14	71,3	22,6	1972	1792	32	14	8	38,9	12,6	867	1131	32
66	197	26	14	70,6	22,7	2020	1809	32	14	8	38,5	12,7	889	1135	32
68	196	26	14	69,9	22,8	2069	1826	32	14	8	38,2	12,8	911	1139	32
70	195	26	14	69,3	23,0	2119	1843	32	14	8	37,8	12,9	934	1143	32
72	194	26	14	68,6	23,1	2170	1860	32	14	8	37,4	12,9	957	1148	32
74	193	26	14	67,9	23,2	2222	1878	32	14	8	37,1	13,0	980	1153	32
76	192	26	14	67,2	23,3	2274	1895	32	14	8	36,7	13,1	1004	1159	32
78	191	26	14	66,5	23,5	2328	1913	32	14	8	36,3	13,2	1029	1165	32
80	190	26	14	65,9	23,6	2382	1932	32	14	8	36,0	13,2	1054	1171	32
82	189	26	14	65,2	23,8	2438	1950	32	14	8	35,6	13,3	1079	1177	32
84	188	26	14	64,5	23,9	2494	1969	32	14	8	35,3	13,4	1105	1184	32
86	187	26	14	63,9	24,0	2551	1987	32	14	8	34,9	13,5	1131	1191	32
88	186	26	14	63,2	24,2	2608	2006	32	14	8	34,5	13,5	1158	1198	32
90	185	26	14	62,5	24,3	2667	2026	32	14	8	34,2	13,6	1186	1206	32
92	184	26	14	61,8	24,5	2727	2045	32	14	8	33,8	13,7	1213	1213	32
94	183	26	14	61,2	24,6	2787	2065	32	14	8	33,5	13,8	1242	1221	32
96	182	26	14	60,5	24,8	2848	2084	32	14	8	33,1	13,9	1270	1229	32
98	181	26	14	59,9	24,9	2911	2104	32	14	8	32,8	14,0	1299	1238	32
100	180	26	14	59,2	25,1	2974	2124	32	14	8	32,4	14,0	1329	1246	32
102	179	26	14	58,5	25,2	3038	2144	32	14	8	32,1	14,1	1359	1255	32
104	178	26	14	57,9	25,4	3102	2164	32	14	8	31,7	14,2	1390	1263	32
106	177	26	14	57,2	25,6	3168	2185	32	14	8	31,4	14,3	1421	1272	32
108	176	26	14	56,6	25,7	3234	2205	32	14	8	31,0	14,4	1452	1281	32
110	175	26	14	55,9	25,9	3302	2226	32	14	8	30,7	14,5	1484	1291	32
112	174	26	14	55,3	26,0	3370	2247	32	14	8	30,3	14,6	1517	1300	32
114	173	26	14	54,6	26,2	3439	2268	32	14	8	30,0	14,7	1550	1309	32
116	172	26	14	54,0	26,4	3509	2289	32	14	8	29,6	14,8	1583	1319	32

Table C2 (contd.): Joist hanger type 04 kombi with external flanges:
Form factors $k_{H,1}$ and $k_{H,2}$ and dimensions e_1 , e_2 and $e_{J,0}$

B [mm]	H [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	$e_{J,0}$ [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	$e_{J,0}$ [mm]
		Full nailing							Partial nailing						
118	171	26	14	53,4	26,6	3580	2310	32	14	8	29,3	14,9	1617	1329	32
120	170	26	14	52,7	26,7	3652	2331	32	14	8	29,0	15,0	1651	1339	32
122	169	26	14	52,1	26,9	3724	2352	32	14	8	28,6	15,1	1686	1349	32
124	168	26	14	51,5	27,1	3798	2374	32	14	8	28,3	15,2	1721	1359	32
126	167	26	14	50,8	27,3	3872	2395	32	14	8	28,0	15,3	1757	1369	32
128	166	26	14	50,2	27,4	3947	2417	32	14	8	27,6	15,4	1793	1379	32
130	165	26	14	49,6	27,6	4023	2438	32	14	8	27,3	15,5	1830	1390	32
132	164	26	14	49,0	27,8	4100	2460	32	14	8	27,0	15,6	1867	1400	32
134	163	26	14	48,3	28,0	4178	2482	32	14	8	26,6	15,7	1904	1411	32
136	162	26	14	47,7	28,2	4256	2504	32	14	8	26,3	15,8	1942	1421	32
138	161	26	14	47,1	28,4	4336	2526	32	14	8	26,0	15,9	1981	1432	32
140	160	26	14	46,5	28,6	4416	2548	32	14	8	25,6	16,0	2020	1443	32
40	220	30	16	89,5	31,4	1647	2136	32	16	8	48,3	17,3	744	1532	32
42	219	30	16	88,7	31,6	1685	2145	32	16	8	47,9	17,4	760	1520	32
44	218	30	16	88,0	31,7	1723	2154	32	16	8	47,5	17,5	776	1509	32
46	217	30	16	87,2	31,9	1763	2165	32	16	8	47,1	17,6	793	1500	32
48	216	30	16	86,4	32,0	1803	2176	32	16	8	46,7	17,7	810	1492	32
50	215	30	16	85,6	32,2	1844	2188	32	16	8	46,3	17,8	828	1486	32
52	214	30	16	84,9	32,4	1886	2200	32	16	8	45,9	17,9	846	1480	32
54	213	30	16	84,1	32,5	1928	2213	32	16	8	45,4	17,9	864	1476	32
56	212	30	16	83,3	32,7	1972	2226	32	16	8	45,0	18,0	883	1472	32
58	211	30	16	82,6	32,9	2016	2240	32	16	8	44,6	18,1	903	1469	32
60	210	30	16	81,8	33,0	2062	2255	32	16	8	44,2	18,2	923	1468	32
62	209	30	16	81,0	33,2	2108	2270	32	16	8	43,8	18,3	943	1467	32
64	208	30	16	80,3	33,4	2155	2285	32	16	8	43,4	18,4	964	1466	32
66	207	30	16	79,5	33,6	2203	2301	32	16	8	43,0	18,5	985	1467	32
68	206	30	16	78,7	33,7	2251	2318	32	16	8	42,6	18,6	1007	1468	32
70	205	30	16	78,0	33,9	2301	2334	32	16	8	42,2	18,7	1029	1470	32
72	204	30	16	77,2	34,1	2351	2351	32	16	8	41,8	18,8	1051	1472	32
74	203	30	16	76,5	34,3	2403	2369	32	16	8	41,4	18,9	1075	1475	32
76	202	30	16	75,7	34,5	2455	2387	32	16	8	41,0	19,0	1098	1478	32
78	201	30	16	75,0	34,7	2508	2405	32	16	8	40,6	19,1	1122	1482	32
80	200	30	16	74,2	34,9	2562	2423	32	16	8	40,2	19,2	1147	1486	32
82	199	30	16	73,5	35,0	2616	2442	32	16	8	39,8	19,3	1171	1491	32
84	198	30	16	72,7	35,2	2672	2461	32	16	8	39,4	19,4	1197	1496	32
86	197	30	16	72,0	35,4	2728	2480	32	16	8	39,1	19,6	1223	1501	32
88	196	30	16	71,3	35,6	2786	2500	32	16	8	38,7	19,7	1249	1507	32
90	195	30	16	70,5	35,8	2844	2520	32	16	8	38,3	19,8	1276	1513	32
92	194	30	16	69,8	36,0	2903	2540	32	16	8	37,9	19,9	1303	1520	32
94	193	30	16	69,1	36,3	2963	2560	32	16	8	37,5	20,0	1331	1527	32
96	192	30	16	68,3	36,5	3023	2581	32	16	8	37,1	20,1	1359	1534	32
98	191	30	16	67,6	36,7	3085	2602	32	16	8	36,7	20,2	1387	1541	32
100	190	30	16	66,9	36,9	3147	2623	32	16	8	36,3	20,3	1416	1549	32

Table C2 (contd.): Joist hanger type 04 kombi with external flanges:
Form factors $k_{H,1}$ and $k_{H,2}$ and dimensions e_1 , e_2 and $e_{J,0}$

B [mm]	H [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	$e_{J,0}$ [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	$e_{J,0}$ [mm]
		Full nailing							Partial nailing						
102	189	30	16	66,2	37,1	3211	2644	32	16	8	36,0	20,5	1446	1557	32
104	188	30	16	65,4	37,3	3275	2666	32	16	8	35,6	20,6	1476	1565	32
106	187	30	16	64,7	37,5	3340	2687	32	16	8	35,2	20,7	1506	1573	32
108	186	30	16	64,0	37,8	3406	2709	32	16	8	34,8	20,8	1537	1582	32
110	185	30	16	63,3	38,0	3472	2731	32	16	8	34,5	21,0	1568	1591	32
112	184	30	16	62,6	38,2	3540	2753	32	16	8	34,1	21,1	1600	1600	32
114	183	30	16	61,9	38,4	3608	2776	32	16	8	33,7	21,2	1632	1609	32
116	182	30	16	61,2	38,7	3678	2798	32	16	8	33,3	21,3	1665	1619	32
118	181	30	16	60,5	38,9	3748	2821	32	16	8	33,0	21,5	1698	1628	32
120	180	28	14	59,6	31,6	4098	2616	32	14	8	32,4	14,0	1651	1339	32
40	230	30	16	97,4	29,9	1647	2136	32	16	8	52,5	16,5	744	1532	32
42	229	30	16	96,6	30,1	1685	2145	32	16	8	52,1	16,6	760	1520	32
44	228	30	16	95,8	30,2	1723	2154	32	16	8	51,7	16,7	776	1509	32
46	227	30	16	95,0	30,4	1763	2165	32	16	8	51,2	16,7	793	1500	32
48	226	30	16	94,2	30,5	1803	2176	32	16	8	50,8	16,8	810	1492	32
50	225	30	16	93,5	30,6	1844	2188	32	16	8	50,4	16,9	828	1486	32
52	224	30	16	92,7	30,8	1886	2200	32	16	8	50,0	17,0	846	1480	32
54	223	30	16	91,9	30,9	1928	2213	32	16	8	49,6	17,1	864	1476	32
56	222	30	16	91,1	31,1	1972	2226	32	16	8	49,2	17,2	883	1472	32
58	221	30	16	90,3	31,3	2016	2240	32	16	8	48,7	17,2	903	1469	32
60	220	30	16	89,5	31,4	2062	2255	32	16	8	48,3	17,3	923	1468	32
62	219	30	16	88,7	31,6	2108	2270	32	16	8	47,9	17,4	943	1467	32
64	218	30	16	88,0	31,7	2155	2285	32	16	8	47,5	17,5	964	1466	32
66	217	30	16	87,2	31,9	2203	2301	32	16	8	47,1	17,6	985	1467	32
68	216	30	16	86,4	32,0	2251	2318	32	16	8	46,7	17,7	1007	1468	32
70	215	30	16	85,6	32,2	2301	2334	32	16	8	46,3	17,8	1029	1470	32
72	214	30	16	84,9	32,4	2351	2351	32	16	8	45,9	17,9	1051	1472	32
74	213	30	16	84,1	32,5	2403	2369	32	16	8	45,4	17,9	1075	1475	32
76	212	30	16	83,3	32,7	2455	2387	32	16	8	45,0	18,0	1098	1478	32
78	211	30	16	82,6	32,9	2508	2405	32	16	8	44,6	18,1	1122	1482	32
80	210	30	16	81,8	33,0	2562	2423	32	16	8	44,2	18,2	1147	1486	32
82	209	30	16	81,0	33,2	2616	2442	32	16	8	43,8	18,3	1171	1491	32
84	208	30	16	80,3	33,4	2672	2461	32	16	8	43,4	18,4	1197	1496	32
86	207	30	16	79,5	33,6	2728	2480	32	16	8	43,0	18,5	1223	1501	32
88	206	30	16	78,7	33,7	2786	2500	32	16	8	42,6	18,6	1249	1507	32
90	205	30	16	78,0	33,9	2844	2520	32	16	8	42,2	18,7	1276	1513	32
92	204	30	16	77,2	34,1	2903	2540	32	16	8	41,8	18,8	1303	1520	32
94	203	30	16	76,5	34,3	2963	2560	32	16	8	41,4	18,9	1331	1527	32
96	202	30	16	75,7	34,5	3023	2581	32	16	8	41,0	19,0	1359	1534	32
98	201	30	16	75,0	34,7	3085	2602	32	16	8	40,6	19,1	1387	1541	32
100	200	30	16	74,2	34,9	3147	2623	32	16	8	40,2	19,2	1416	1549	32
102	199	30	16	73,5	35,0	3211	2644	32	16	8	39,8	19,3	1446	1557	32
104	198	30	16	72,7	35,2	3275	2666	32	16	8	39,4	19,4	1476	1565	32

Table C2 (contd.): Joist hanger type 04 kombi with external flanges:
Form factors $k_{H,1}$ and $k_{H,2}$ and dimensions e_1 , e_2 and $e_{J,0}$

B [mm]	H [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	$e_{J,0}$ [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	$e_{J,0}$ [mm]
Full nailing									Partial nailing						
106	197	30	16	72,0	35,4	3340	2687	32	16	8	39,1	19,6	1506	1573	32
108	196	30	16	71,3	35,6	3406	2709	32	16	8	38,7	19,7	1537	1582	32
110	195	30	16	70,5	35,8	3472	2731	32	16	8	38,3	19,8	1568	1591	32
112	194	30	16	69,8	36,0	3540	2753	32	16	8	37,9	19,9	1600	1600	32
114	193	30	16	69,1	36,3	3608	2776	32	16	8	37,5	20,0	1632	1609	32
116	192	30	16	68,3	36,5	3678	2798	32	16	8	37,1	20,1	1665	1619	32
118	191	30	16	67,6	36,7	3748	2821	32	16	8	36,7	20,2	1698	1628	32
120	190	30	16	66,9	36,9	3819	2844	32	16	8	36,3	20,3	1732	1638	32
122	189	30	16	66,2	37,1	3891	2867	32	16	8	36,0	20,5	1766	1648	32
124	188	30	16	65,4	37,3	3963	2890	32	16	8	35,6	20,6	1800	1658	32
126	187	30	16	64,7	37,5	4037	2913	32	16	8	35,2	20,7	1835	1668	32
128	186	30	16	64,0	37,8	4111	2937	32	16	8	34,8	20,8	1871	1679	32
130	185	30	16	63,3	38,0	4187	2960	32	16	8	34,5	21,0	1907	1689	32
132	184	30	16	62,6	38,2	4263	2984	32	16	8	34,1	21,1	1943	1700	32
134	183	30	16	61,9	38,4	4340	3008	32	16	8	33,7	21,2	1980	1711	32
136	182	30	16	61,2	38,7	4418	3032	32	16	8	33,3	21,3	2017	1722	32
138	181	30	16	60,5	38,9	4496	3056	32	16	8	33,0	21,5	2055	1733	32
140	180	30	16	59,8	39,2	4576	3080	32	16	8	32,6	21,6	2093	1744	32

Table C3:

Joist hanger type 04 kombi I with interior flanges:

Form factors $k_{H,1}$ and $k_{H,2}$ and dimensions e_1 , e_2 and $e_{J,0}$

B [mm]	H [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	$e_{J,0}$ [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	$e_{J,0}$ [mm]
		Full nailing							Partial nailing						
90	90	10	6	11,9	2,45	513	293	34	6	4	7,28	1,63	448	256	34
80	100	14	8	15,6	6,53	447	447	34	8	4	9,19	4,02	373	373	34
100	90	16	6	12,5	15,1	1329	664	34	6	4	7,28	1,63	560	280	34
95	95	12	6	14,1	4,33	689	367	33	6	4	8,30	1,57	502	268	33
80	120	18	10	24,1	12,1	545	727	33	10	6	13,8	7,13	425	567	33
80	140	20	10	32,6	13,7	663	883	34	10	6	18,1	5,79	425	567	34
80	130	18	10	28,5	11,0	545	727	33	10	6	16,2	6,49	396	566	33
82	129	18	10	28,0	11,1	564	728	33	10	6	15,9	6,55	410	566	33
84	128	18	10	27,6	11,2	585	731	33	10	6	15,7	6,61	425	567	33
86	127	18	10	27,2	11,3	564	728	33	10	6	15,5	6,67	440	568	33
88	126	18	10	26,7	11,4	585	731	33	10	6	15,2	6,73	456	570	33
90	125	18	10	26,3	11,6	606	735	33	10	6	15,0	6,80	472	572	33
92	124	18	10	25,8	11,7	628	739	33	10	6	14,7	6,86	489	575	33
94	123	18	10	25,4	11,8	651	744	33	10	6	14,5	6,93	506	579	33
96	122	18	10	25,0	11,9	675	750	33	10	6	14,3	6,99	524	582	33
98	121	18	10	24,5	12,0	700	757	33	10	6	14,0	7,06	542	586	33
100	120	18	10	24,1	12,1	726	764	33	10	6	13,8	7,13	561	591	33
120	120	18	10	24,1	12,1	1033	861	33	10	6	13,8	7,13	776	647	33
80	150	22	12	39,0	17,7	676	1127	33	12	6	21,7	10,1	496	827	33
82	149	22	12	38,5	17,8	695	1121	33	12	6	21,5	10,2	511	824	33
84	148	22	12	37,9	17,9	715	1117	33	12	6	21,2	10,3	526	822	33
86	147	22	12	37,4	18,1	735	1114	33	12	6	20,9	10,3	541	820	33
88	146	22	12	36,9	18,2	757	1113	33	12	6	20,6	10,4	557	820	33
90	145	22	12	36,4	18,4	779	1113	33	12	6	20,3	10,5	574	820	33
92	144	22	12	35,9	18,5	802	1114	33	12	6	20,0	10,6	591	821	33
94	143	22	12	35,3	18,7	826	1117	33	12	6	19,8	10,7	609	822	33
96	142	22	12	34,8	18,8	851	1120	33	12	6	19,5	10,8	627	824	33
98	141	22	12	34,3	19,0	877	1125	33	12	6	19,2	10,8	645	827	33
100	140	22	12	33,8	19,1	904	1130	33	12	6	18,9	10,9	664	830	33
80	170	26	14	52,7	26,7	802	1719	32	14	8	29,0	15,0	556	1192	32
82	169	26	14	52,1	26,9	819	1695	32	14	8	28,6	15,1	570	1178	32
84	168	26	14	51,5	27,1	837	1673	32	14	8	28,3	15,2	583	1167	32
86	167	26	14	50,8	27,3	855	1655	32	14	8	28,0	15,3	598	1157	32
88	166	26	14	50,2	27,4	874	1640	32	14	8	27,6	15,4	612	1148	32
90	165	26	14	49,6	27,6	895	1626	32	14	8	27,3	15,5	627	1141	32
92	164	26	14	49,0	27,8	916	1616	32	14	8	27,0	15,6	643	1135	32
94	163	26	14	48,3	28,0	938	1607	32	14	8	26,6	15,7	659	1130	32
96	162	26	14	47,7	28,2	960	1600	32	14	8	26,3	15,8	676	1126	32
98	161	26	14	47,1	28,4	984	1596	32	14	8	26,0	15,9	693	1123	32
100	160	24	12	46,3	22,3	996	1311	32	12	6	25,4	9,7	627	824	32
140	140	22	12	34,8	19,7	1536	1324	32	12	6	19,5	11,3	1087	937	32
80	160	22	12	45,8	16,9	641	1145	32	12	6	25,4	9,7	468	836	32

Table C3 (contd.): Joist hanger type 04 kombi I with interior flanges:
Form factors $k_{H,1}$ and $k_{H,2}$ and dimensions e_1 , e_2 and $e_{J,0}$

B [mm]	H [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	$e_{J,0}$ [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	$e_{J,0}$ [mm]
		Full nailing							Partial nailing						
82	159	22	12	45,3	17,1	658	1135	32	12	6	25,1	9,8	482	831	32
84	158	22	12	44,7	17,2	676	1127	32	12	6	24,8	9,8	496	827	32
86	157	22	12	44,1	17,3	695	1121	32	12	6	24,5	9,9	511	824	32
88	156	22	12	43,6	17,4	715	1117	32	12	6	24,2	10,0	526	822	32
90	155	22	12	43,0	17,6	735	1114	32	12	6	23,9	10,0	541	820	32
92	154	22	12	42,4	17,7	757	1113	32	12	6	23,6	10,1	557	820	32
94	153	22	12	41,9	17,8	779	1113	32	12	6	23,3	10,2	574	820	32
96	152	22	12	41,3	18,0	802	1114	32	12	6	23,0	10,3	591	821	32
98	151	22	12	40,8	18,1	826	1117	32	12	6	22,7	10,3	609	822	32
100	150	22	12	40,2	18,2	851	1120	32	12	6	22,4	10,4	627	824	32
102	149	22	12	39,7	18,4	877	1125	32	12	6	22,1	10,5	645	827	32
104	148	22	12	39,1	18,5	904	1130	32	12	6	21,8	10,6	664	830	32
106	147	22	12	38,6	18,7	932	1136	32	12	6	21,5	10,7	683	833	32
108	146	22	12	38,0	18,8	960	1143	32	12	6	21,2	10,7	703	837	32
110	145	22	12	37,5	18,9	990	1151	32	12	6	21,0	10,8	724	842	32
112	144	22	12	37,0	19,1	1020	1159	32	12	6	20,7	10,9	745	846	32
114	143	22	12	36,4	19,3	1051	1168	32	12	6	20,4	11,0	766	851	32
116	142	22	12	35,9	19,4	1083	1177	32	12	6	20,1	11,1	788	856	32
118	141	22	12	35,4	19,6	1116	1187	32	12	6	19,8	11,2	810	862	32
120	140	22	12	34,8	19,7	1150	1198	32	12	6	19,5	11,3	833	868	32
80	180	26	14	59,2	25,1	837	1673	32	14	8	32,4	14,0	583	1167	32
82	179	26	14	58,5	25,2	855	1655	32	14	8	32,1	14,1	598	1157	32
84	178	26	14	57,9	25,4	874	1640	32	14	8	31,7	14,2	612	1148	32
86	177	26	14	57,2	25,6	895	1626	32	14	8	31,4	14,3	627	1141	32
88	176	26	14	56,6	25,7	916	1616	32	14	8	31,0	14,4	643	1135	32
90	175	26	14	55,9	25,9	938	1607	32	14	8	30,7	14,5	659	1130	32
92	174	26	14	55,3	26,0	960	1600	32	14	8	30,3	14,6	676	1126	32
94	173	26	14	54,6	26,2	984	1596	32	14	8	30,0	14,7	693	1123	32
96	172	26	14	54,0	26,4	1008	1592	32	14	8	29,6	14,8	710	1121	32
98	171	26	14	53,4	26,6	1034	1590	32	14	8	29,3	14,9	728	1120	32
100	170	26	14	52,7	26,7	1060	1590	32	14	8	29,0	15,0	747	1120	32
102	169	26	14	52,1	26,9	1087	1591	32	14	8	28,6	15,1	766	1120	32
104	168	26	14	51,5	27,1	1115	1593	32	14	8	28,3	15,2	785	1121	32
106	167	26	14	50,8	27,3	1144	1596	32	14	8	28,0	15,3	805	1123	32
108	166	26	14	50,2	27,4	1174	1600	32	14	8	27,6	15,4	825	1125	32
110	165	26	14	49,6	27,6	1204	1606	32	14	8	27,3	15,5	846	1128	32
112	164	26	14	49,0	27,8	1236	1612	32	14	8	27,0	15,6	867	1131	32
114	163	26	14	48,3	28,0	1268	1619	32	14	8	26,6	15,7	889	1135	32
116	162	26	14	47,7	28,2	1301	1626	32	14	8	26,3	15,8	911	1139	32
118	161	26	14	47,1	28,4	1335	1635	32	14	8	26,0	15,9	934	1143	32
120	160	26	14	46,5	28,6	1370	1644	32	14	8	25,6	16,0	957	1148	32
80	200	30	16	74,2	34,9	992	2480	32	16	8	40,2	19,2	659	1648	32
82	199	30	16	73,5	35,0	1008	2434	32	16	8	39,8	19,3	672	1623	32

Table C3 (contd.): Joist hanger type 04 kombi I with interior flanges:
Form factors $k_{H,1}$ and $k_{H,2}$ and dimensions e_1 , e_2 and $e_{J,0}$

B [mm]	H [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	$e_{J,0}$ [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	$e_{J,0}$ [mm]
		Full nailing							Partial nailing						
84	198	30	16	72,7	35,2	1026	2393	32	16	8	39,4	19,4	686	1600	32
86	197	30	16	72,0	35,4	1044	2357	32	16	8	39,1	19,6	700	1580	32
88	196	30	16	71,3	35,6	1063	2325	32	16	8	38,7	19,7	714	1562	32
90	195	30	16	70,5	35,8	1083	2297	32	16	8	38,3	19,8	729	1546	32
92	194	30	16	69,8	36,0	1103	2272	32	16	8	37,9	19,9	744	1532	32
94	193	30	16	69,1	36,3	1125	2250	32	16	8	37,5	20,0	760	1520	32
96	192	30	16	68,3	36,5	1147	2231	32	16	8	37,1	20,1	776	1509	32
98	191	30	16	67,6	36,7	1171	2215	32	16	8	36,7	20,2	793	1500	32
100	190	30	16	66,9	36,9	1195	2201	32	16	8	36,3	20,3	810	1492	32
102	189	30	16	66,2	37,1	1220	2189	32	16	8	36,0	20,5	828	1486	32
104	188	30	16	65,4	37,3	1246	2180	32	16	8	35,6	20,6	846	1480	32
106	187	30	16	64,7	37,5	1272	2172	32	16	8	35,2	20,7	864	1476	32
108	186	30	16	64,0	37,8	1300	2167	32	16	8	34,8	20,8	883	1472	32
110	185	30	16	63,3	38,0	1328	2163	32	16	8	34,5	21,0	903	1469	32
112	184	30	16	62,6	38,2	1358	2160	32	16	8	34,1	21,1	923	1468	32
114	183	30	16	61,9	38,4	1388	2159	32	16	8	33,7	21,2	943	1467	32
116	182	30	16	61,2	38,7	1419	2159	32	16	8	33,3	21,3	964	1466	32
118	181	30	16	60,5	38,9	1451	2161	32	16	8	33,0	21,5	985	1467	32
120	180	28	14	59,6	31,6	1479	1849	32	14	8	32,4	14,0	911	1139	32
80	190	26	14	65,9	23,6	802	1719	32	14	8	36,0	13,2	556	1192	32
82	189	26	14	65,2	23,8	819	1695	32	14	8	35,6	13,3	570	1178	32
84	188	26	14	64,5	23,9	837	1673	32	14	8	35,3	13,4	583	1167	32
86	187	26	14	63,9	24,0	855	1655	32	14	8	34,9	13,5	598	1157	32
88	186	26	14	63,2	24,2	874	1640	32	14	8	34,5	13,5	612	1148	32
90	185	26	14	62,5	24,3	895	1626	32	14	8	34,2	13,6	627	1141	32
92	184	26	14	61,8	24,5	916	1616	32	14	8	33,8	13,7	643	1135	32
94	183	26	14	61,2	24,6	938	1607	32	14	8	33,5	13,8	659	1130	32
96	182	26	14	60,5	24,8	960	1600	32	14	8	33,1	13,9	676	1126	32
98	181	26	14	59,9	24,9	984	1596	32	14	8	32,8	14,0	693	1123	32
100	180	26	14	59,2	25,1	1008	1592	32	14	8	32,4	14,0	710	1121	32
102	179	26	14	58,5	25,2	1034	1590	32	14	8	32,1	14,1	728	1120	32
104	178	26	14	57,9	25,4	1060	1590	32	14	8	31,7	14,2	747	1120	32
106	177	26	14	57,2	25,6	1087	1591	32	14	8	31,4	14,3	766	1120	32
108	176	26	14	56,6	25,7	1115	1593	32	14	8	31,0	14,4	785	1121	32
110	175	26	14	55,9	25,9	1144	1596	32	14	8	30,7	14,5	805	1123	32
112	174	26	14	55,3	26,0	1174	1600	32	14	8	30,3	14,6	825	1125	32
114	173	26	14	54,6	26,2	1204	1606	32	14	8	30,0	14,7	846	1128	32
116	172	26	14	54,0	26,4	1236	1612	32	14	8	29,6	14,8	867	1131	32
118	171	26	14	53,4	26,6	1268	1619	32	14	8	29,3	14,9	889	1135	32
120	170	26	14	52,7	26,7	1301	1626	32	14	8	29,0	15,0	911	1139	32
122	169	26	14	52,1	26,9	1335	1635	32	14	8	28,6	15,1	934	1143	32
124	168	26	14	51,5	27,1	1370	1644	32	14	8	28,3	15,2	957	1148	32
126	167	26	14	50,8	27,3	1406	1654	32	14	8	28,0	15,3	980	1153	32

Table C3 (contd.): Joist hanger type 04 kombi I with interior flanges:
Form factors $k_{H,1}$ and $k_{H,2}$ and dimensions e_1 , e_2 and $e_{J,0}$

B [mm]	H [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	$e_{J,0}$ [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	$e_{J,0}$ [mm]
		Full nailing							Partial nailing						
128	166	26	14	50,2	27,4	1442	1664	32	14	8	27,6	15,4	1004	1159	32
130	165	26	14	49,6	27,6	1480	1675	32	14	8	27,3	15,5	1029	1165	32
132	164	26	14	49,0	27,8	1518	1687	32	14	8	27,0	15,6	1054	1171	32
134	163	26	14	48,3	28,0	1558	1699	32	14	8	26,6	15,7	1079	1177	32
136	162	26	14	47,7	28,2	1598	1712	32	14	8	26,3	15,8	1105	1184	32
138	161	26	14	47,1	28,4	1639	1725	32	14	8	26,0	15,9	1131	1191	32
140	160	26	14	46,5	28,6	1680	1738	32	14	8	25,6	16,0	1158	1198	32
80	210	30	16	81,8	33,0	992	2480	32	16	8	44,2	18,2	659	1648	32
82	209	30	16	81,0	33,2	1008	2434	32	16	8	43,8	18,3	672	1623	32
84	208	30	16	80,3	33,4	1026	2393	32	16	8	43,4	18,4	686	1600	32
86	207	30	16	79,5	33,6	1044	2357	32	16	8	43,0	18,5	700	1580	32
88	206	30	16	78,7	33,7	1063	2325	32	16	8	42,6	18,6	714	1562	32
90	205	30	16	78,0	33,9	1083	2297	32	16	8	42,2	18,7	729	1546	32
92	204	30	16	77,2	34,1	1103	2272	32	16	8	41,8	18,8	744	1532	32
94	203	30	16	76,5	34,3	1125	2250	32	16	8	41,4	18,9	760	1520	32
96	202	30	16	75,7	34,5	1147	2231	32	16	8	41,0	19,0	776	1509	32
98	201	30	16	75,0	34,7	1171	2215	32	16	8	40,6	19,1	793	1500	32
100	200	30	16	74,2	34,9	1195	2201	32	16	8	40,2	19,2	810	1492	32
102	199	30	16	73,5	35,0	1220	2189	32	16	8	39,8	19,3	828	1486	32
104	198	30	16	72,7	35,2	1246	2180	32	16	8	39,4	19,4	846	1480	32
106	197	30	16	72,0	35,4	1272	2172	32	16	8	39,1	19,6	864	1476	32
108	196	30	16	71,3	35,6	1300	2167	32	16	8	38,7	19,7	883	1472	32
110	195	30	16	70,5	35,8	1328	2163	32	16	8	38,3	19,8	903	1469	32
112	194	30	16	69,8	36,0	1358	2160	32	16	8	37,9	19,9	923	1468	32
114	193	30	16	69,1	36,3	1388	2159	32	16	8	37,5	20,0	943	1467	32
116	192	30	16	68,3	36,5	1419	2159	32	16	8	37,1	20,1	964	1466	32
118	191	30	16	67,6	36,7	1451	2161	32	16	8	36,7	20,2	985	1467	32
120	190	30	16	66,9	36,9	1483	2163	32	16	8	36,3	20,3	1007	1468	32
122	189	30	16	66,2	37,1	1517	2167	32	16	8	36,0	20,5	1029	1470	32
124	188	30	16	65,4	37,3	1551	2172	32	16	8	35,6	20,6	1051	1472	32
126	187	30	16	64,7	37,5	1587	2178	32	16	8	35,2	20,7	1075	1475	32
128	186	30	16	64,0	37,8	1623	2185	32	16	8	34,8	20,8	1098	1478	32
130	185	30	16	63,3	38,0	1660	2192	32	16	8	34,5	21,0	1122	1482	32
132	184	30	16	62,6	38,2	1698	2201	32	16	8	34,1	21,1	1147	1486	32
134	183	30	16	61,9	38,4	1736	2210	32	16	8	33,7	21,2	1171	1491	32
136	182	30	16	61,2	38,7	1776	2220	32	16	8	33,3	21,3	1197	1496	32
138	181	30	16	60,5	38,9	1816	2231	32	16	8	33,0	21,5	1223	1501	32
140	180	30	16	59,8	39,2	1858	2242	32	16	8	32,6	21,6	1249	1507	32

Table C4:

Joist hanger type 05 kombi with external flanges:

Form factors $k_{H,1}$ and $k_{H,2}$ and dimensions e_1 , e_2 and $e_{J,0}$

B [mm]	H [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	$e_{J,0}$ [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	$e_{J,0}$ [mm]
Full nailing									Partial nailing						
100	160	30	18	34,2	32,8	3211	2644	43,6	16	10	17,1	16,4	1446	1557	48
120	160	30	18	34,2	32,8	3891	2867	43,6	16	10	17,1	16,4	1766	1648	48
140	160	30	18	34,2	32,8	4656	3104	43,6	16	10	17,1	16,4	2131	1755	48
160	160	30	18	34,2	32,8	5508	3353	43,6	16	10	17,1	16,4	2543	1874	48
180	160	30	18	34,2	32,8	6445	3609	43,6	16	10	17,1	16,4	3000	2000	48
200	160	30	18	34,2	32,8	7468	3872	43,6	16	10	17,1	16,4	3503	2132	48
220	160	30	18	34,2	32,8	8576	4140	43,6	16	10	17,1	16,4	4051	2269	48
240	160	30	18	34,2	32,8	9771	4413	43,6	16	10	17,1	16,4	4646	2409	48
100	180	34	20	43,5	42,0	3416	3215	44,0	18	10	21,7	21,0	1551	1908	48
120	180	34	20	43,5	42,0	4091	3445	44,0	18	10	21,7	21,0	1866	1990	48
140	180	34	20	43,5	42,0	4851	3696	44,0	18	10	21,7	21,0	2226	2095	48
160	180	34	20	43,5	42,0	5696	3962	44,0	18	10	21,7	21,0	2631	2215	48
180	180	34	20	43,5	42,0	6626	4240	44,0	18	10	21,7	21,0	3081	2347	48
200	180	34	20	43,5	42,0	7641	4528	44,0	18	10	21,7	21,0	3576	2487	48
220	180	34	20	43,5	42,0	8741	4822	44,0	18	10	21,7	21,0	4116	2634	48
240	180	34	20	43,5	42,0	9926	5123	44,0	18	10	21,7	21,0	4701	2786	48
100	200	38	22	54,0	52,2	3651	3865	44,4	20	12	26,9	26,1	1672	2315	48
120	200	38	22	54,0	52,2	4322	4094	44,4	20	12	26,9	26,1	1983	2380	48
140	200	38	22	54,0	52,2	5077	4352	44,4	20	12	26,9	26,1	2339	2476	48
160	200	38	22	54,0	52,2	5917	4631	44,4	20	12	26,9	26,1	2739	2595	48
180	200	38	22	54,0	52,2	6842	4926	44,4	20	12	26,9	26,1	3183	2729	48
200	200	38	22	54,0	52,2	7851	5234	44,4	20	12	26,9	26,1	3672	2874	48
220	200	38	22	54,0	52,2	8944	5551	44,4	20	12	26,9	26,1	4206	3028	48
240	200	38	22	54,0	52,2	10122	5877	44,4	20	12	26,9	26,1	4783	3189	48
100	220	42	26	67,4	65,5	3915	4605	43,4	22	14	32,7	31,8	1810	2784	48
120	220	42	26	67,4	65,5	4583	4824	43,4	22	14	32,7	31,8	2118	2823	48
140	220	42	26	67,4	65,5	5335	5080	43,4	22	14	32,7	31,8	2470	2905	48
160	220	42	26	67,4	65,5	6171	5366	43,4	22	14	32,7	31,8	2866	3016	48
180	220	42	26	67,4	65,5	7091	5672	43,4	22	14	32,7	31,8	3306	3148	48
200	220	42	26	67,4	65,5	8095	5996	43,4	22	14	32,7	31,8	3790	3295	48
220	220	42	26	67,4	65,5	9183	6333	43,4	22	14	32,7	31,8	4318	3454	48
240	220	42	26	67,4	65,5	10355	6680	43,4	22	14	32,7	31,8	4890	3622	48
90	235	46	30	79,4	82,6	3905	5370	42,3	24	16	37,4	38,9	1825	3347	48
100	240	46	30	82,3	80,1	4207	5444	42,7	24	16	39,0	38,0	1962	3320	48
120	240	46	30	82,3	80,1	4872	5642	42,7	24	16	39,0	38,0	2267	3325	48
140	240	46	30	82,3	80,1	5621	5889	42,7	24	16	39,0	38,0	2616	3386	48
160	240	46	30	82,3	80,1	6454	6173	42,7	24	16	39,0	38,0	3009	3484	48
180	240	46	30	82,3	80,1	7370	6486	42,7	24	16	39,0	38,0	3445	3610	48
200	240	46	30	82,3	80,1	8370	6820	42,7	24	16	39,0	38,0	3925	3755	48
220	240	46	30	82,3	80,1	9454	7172	42,7	24	16	39,0	38,0	4449	3915	48
240	240	46	30	82,3	80,1	10621	7538	42,7	24	16	39,0	38,0	5016	4087	48
100	260	50	32	96,5	94,2	4527	6391	43,0	26	16	45,8	44,8	2129	3930	48
120	260	50	32	96,5	94,2	5190	6556	43,0	26	16	45,8	44,8	2432	3891	48

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

B [mm]	H [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	$e_{J,0}$ [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	$e_{J,0}$ [mm]
		Full nailing							Partial nailing						
140	260	50	32	96,5	94,2	5937	6785	43,0	26	16	45,8	44,8	2779	3923	48
160	260	50	32	96,5	94,2	6767	7061	43,0	26	16	45,8	44,8	3169	4003	48
180	260	50	32	96,5	94,2	7680	7373	43,0	26	16	45,8	44,8	3602	4117	48
200	260	50	32	96,5	94,2	8677	7713	43,0	26	16	45,8	44,8	4079	4256	48
220	260	50	32	96,5	94,2	9757	8075	43,0	26	16	45,8	44,8	4599	4415	48
240	260	50	32	96,5	94,2	10920	8455	43,0	26	16	45,8	44,8	5162	4589	48
100	280	54	34	112	109	4875	7456	43,3	28	18	53,3	52,1	2310	4620	48
120	280	54	34	112	109	5537	7576	43,3	28	18	53,3	52,1	2612	4527	48
140	280	54	34	112	109	6281	7777	43,3	28	18	53,3	52,1	2956	4521	48
160	280	54	34	112	109	7109	8036	43,3	28	18	53,3	52,1	3344	4576	48
180	280	54	34	112	109	8020	8340	43,3	28	18	53,3	52,1	3775	4673	48
200	280	54	34	112	109	9013	8680	43,3	28	18	53,3	52,1	4248	4803	48
220	280	54	34	112	109	10090	9047	43,3	28	18	53,3	52,1	4765	4956	48
240	280	54	34	112	109	11250	9436	43,3	28	18	53,3	52,1	5325	5128	48
100	300	58	36	128	126	5250	8648	43,6	30	18	61,2	60,0	2505	5396	48
120	300	58	36	128	126	5910	8710	43,6	30	18	61,2	60,0	2805	5237	48
140	300	58	36	128	126	6653	8871	43,6	30	18	61,2	60,0	3148	5185	48
160	300	58	36	128	126	7479	9105	43,6	30	18	61,2	60,0	3534	5208	48
180	300	58	36	128	126	8388	9394	43,6	30	18	61,2	60,0	3963	5283	48
200	300	58	36	128	126	9379	9726	43,6	30	18	61,2	60,0	4434	5398	48
220	300	58	36	128	126	10453	10093	43,6	30	18	61,2	60,0	4948	5542	48
240	300	58	36	128	126	11610	10487	43,6	30	18	61,2	60,0	5505	5709	48
100	320	62	38	146	143	5653	9976	43,8	32	20	69,8	68,4	2715	6265	48
120	320	62	38	146	143	6312	9966	43,8	32	20	69,8	68,4	3013	6027	48
140	320	62	38	146	143	7053	10076	43,8	32	20	69,8	68,4	3355	5920	48
160	320	62	38	146	143	7877	10274	43,8	32	20	69,8	68,4	3739	5903	48
180	320	62	38	146	143	8784	10540	43,8	32	20	69,8	68,4	4165	5950	48
200	320	62	38	146	143	9773	10859	43,8	32	20	69,8	68,4	4635	6045	48
220	320	62	38	146	143	10845	11219	43,8	32	20	69,8	68,4	5147	6176	48
240	320	62	38	146	143	12000	11613	43,8	32	20	69,8	68,4	5701	6335	48

Table C5:

Joist hanger type 05 kombi I with interior flanges:

Form factors $k_{H,1}$ and $k_{H,2}$ and dimensions e_1 , e_2 and $e_{J,0}$

B [mm]	H [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	$e_{J,0}$ [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	$e_{J,0}$ [mm]
		Full nailing							Partial nailing						
100	160	30	18	34,2	32,8	1171	2215	43,6	16	10	17,1	16,4	793	1500	48
120	160	30	18	34,2	32,8	1451	2161	43,6	16	10	17,1	16,4	985	1467	48
140	160	30	18	34,2	32,8	1816	2231	43,6	16	10	17,1	16,4	1223	1501	48
160	160	30	18	34,2	32,8	2268	2369	43,6	16	10	17,1	16,4	1506	1573	48
180	160	30	18	34,2	32,8	2805	2550	43,6	16	10	17,1	16,4	1835	1668	48
200	160	30	18	34,2	32,8	3428	2758	43,6	16	10	17,1	16,4	2210	1778	48
220	160	30	18	34,2	32,8	4136	2985	43,6	16	10	17,1	16,4	2631	1898	48
240	160	30	18	34,2	32,8	4931	3226	43,6	16	10	17,1	16,4	3097	2026	48
100	180	34	20	43,5	42,0	1386	2996	44,0	18	10	21,7	21,0	908	1963	48
120	180	34	20	43,5	42,0	1663	2830	44,0	18	10	21,7	21,0	1097	1867	48
140	180	34	20	43,5	42,0	2025	2842	44,0	18	10	21,7	21,0	1331	1868	48
160	180	34	20	43,5	42,0	2472	2951	44,0	18	10	21,7	21,0	1610	1922	48
180	180	34	20	43,5	42,0	3004	3121	44,0	18	10	21,7	21,0	1934	2009	48
200	180	34	20	43,5	42,0	3621	3329	44,0	18	10	21,7	21,0	2303	2118	48
220	180	34	20	43,5	42,0	4323	3565	44,0	18	10	21,7	21,0	2717	2241	48
240	180	34	20	43,5	42,0	5110	3820	44,0	18	10	21,7	21,0	3176	2375	48
100	200	38	22	54,0	52,2	1629	3962	44,4	20	12	26,9	26,1	1038	2524	48
120	200	38	22	54,0	52,2	1903	3645	44,4	20	12	26,9	26,1	1224	2344	48
140	200	38	22	54,0	52,2	2262	3572	44,4	20	12	26,9	26,1	1455	2298	48
160	200	38	22	54,0	52,2	2706	3635	44,4	20	12	26,9	26,1	1731	2325	48
180	200	38	22	54,0	52,2	3234	3780	44,4	20	12	26,9	26,1	2051	2397	48
200	200	38	22	54,0	52,2	3846	3979	44,4	20	12	26,9	26,1	2415	2499	48
220	200	38	22	54,0	52,2	4543	4215	44,4	20	12	26,9	26,1	2824	2620	48
240	200	38	22	54,0	52,2	5325	4479	44,4	20	12	26,9	26,1	3278	2757	48
100	220	42	26	67,4	65,5	1899	5132	43,4	22	14	32,7	31,8	1181	3192	48
120	220	42	26	67,4	65,5	2172	4621	43,4	22	14	32,7	31,8	1366	2906	48
140	220	42	26	67,4	65,5	2529	4436	43,4	22	14	32,7	31,8	1595	2798	48
160	220	42	26	67,4	65,5	2969	4432	43,4	22	14	32,7	31,8	1868	2787	48
180	220	42	26	67,4	65,5	3494	4538	43,4	22	14	32,7	31,8	2184	2837	48
200	220	42	26	67,4	65,5	4103	4716	43,4	22	14	32,7	31,8	2545	2925	48
220	220	42	26	67,4	65,5	4796	4944	43,4	22	14	32,7	31,8	2950	3041	48
240	220	42	26	67,4	65,5	5573	5208	43,4	22	14	32,7	31,8	3399	3176	48
90	235	46	30	79,4	82,6	2092	7192	42,3	24	16	37,4	38,9	1263	4343	48
100	240	46	30	82,3	80,1	2196	6530	42,7	24	16	39,0	38,0	1339	3980	48
120	240	46	30	82,3	80,1	2468	5776	42,7	24	16	39,0	38,0	1522	3562	48
140	240	46	30	82,3	80,1	2823	5447	42,7	24	16	39,0	38,0	1749	3375	48
160	240	46	30	82,3	80,1	3261	5354	42,7	24	16	39,0	38,0	2019	3315	48
180	240	46	30	82,3	80,1	3783	5405	42,7	24	16	39,0	38,0	2334	3334	48
200	240	46	30	82,3	80,1	4389	5550	42,7	24	16	39,0	38,0	2691	3403	48
220	240	46	30	82,3	80,1	5079	5759	42,7	24	16	39,0	38,0	3093	3507	48
240	240	46	30	82,3	80,1	5852	6016	42,7	24	16	39,0	38,0	3538	3637	48
100	260	50	32	96,5	94,2	2521	8176	43,0	26	16	45,8	44,8	1510	4897	48
120	260	50	32	96,5	94,2	2791	7126	43,0	26	16	45,8	44,8	1692	4320	48

Table C5 (contd.): Joist hanger type 05 kombi I with interior flanges:
Form factors $k_{H,1}$ and $k_{H,2}$ and dimensions e_1 , e_2 and $e_{J,0}$

B [mm]	H [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	$e_{J,0}$ [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	$e_{J,0}$ [mm]
		Full nailing							Partial nailing						
140	260	50	32	96,5	94,2	3144	6620	43,0	26	16	45,8	44,8	1917	4036	48
160	260	50	32	96,5	94,2	3581	6414	43,0	26	16	45,8	44,8	2186	3915	48
180	260	50	32	96,5	94,2	4101	6391	43,0	26	16	45,8	44,8	2498	3893	48
200	260	50	32	96,5	94,2	4704	6489	43,0	26	16	45,8	44,8	2853	3936	48
220	260	50	32	96,5	94,2	5391	6669	43,0	26	16	45,8	44,8	3252	4023	48
240	260	50	32	96,5	94,2	6161	6910	43,0	26	16	45,8	44,8	3694	4143	48
100	280	54	34	112	109	2873	10093	43,3	28	18	53,3	52,1	1695	5955	48
120	280	54	34	112	109	3142	8689	43,3	28	18	53,3	52,1	1876	5188	48
140	280	54	34	112	109	3494	7968	43,3	28	18	53,3	52,1	2100	4789	48
160	280	54	34	112	109	3929	7623	43,3	28	18	53,3	52,1	2367	4592	48
180	280	54	34	112	109	4447	7508	43,3	28	18	53,3	52,1	2677	4520	48
200	280	54	34	112	109	5048	7543	43,3	28	18	53,3	52,1	3030	4528	48
220	280	54	34	112	109	5732	7683	43,3	28	18	53,3	52,1	3427	4592	48
240	280	54	34	112	109	6500	7897	43,3	28	18	53,3	52,1	3866	4697	48
100	300	58	36	128	126	3251	12302	43,6	30	18	61,2	60,0	1893	7164	48
120	300	58	36	128	126	3519	10483	43,6	30	18	61,2	60,0	2073	6176	48
140	300	58	36	128	126	3870	9505	43,6	30	18	61,2	60,0	2296	5640	48
160	300	58	36	128	126	4304	8993	43,6	30	18	61,2	60,0	2562	5353	48
180	300	58	36	128	126	4820	8764	43,6	30	18	61,2	60,0	2871	5219	48
200	300	58	36	128	126	5420	8721	43,6	30	18	61,2	60,0	3222	5185	48
220	300	58	36	128	126	6102	8807	43,6	30	18	61,2	60,0	3616	5219	48
240	300	58	36	128	126	6867	8985	43,6	30	18	61,2	60,0	4053	5303	48
100	320	62	38	146	143	3657	14824	43,8	32	20	69,8	68,4	2105	8535	48
120	320	62	38	146	143	3924	12523	43,8	32	20	69,8	68,4	2285	7291	48
140	320	62	38	146	143	4274	11246	43,8	32	20	69,8	68,4	2506	6596	48
160	320	62	38	146	143	4706	10536	43,8	32	20	69,8	68,4	2771	6204	48
180	320	62	38	146	143	5221	10171	43,8	32	20	69,8	68,4	3078	5996	48
200	320	62	38	146	143	5819	10033	43,8	32	20	69,8	68,4	3428	5910	48
220	320	62	38	146	143	6500	10051	43,8	32	20	69,8	68,4	3821	5908	48
240	320	62	38	146	143	7263	10182	43,8	32	20	69,8	68,4	4256	5966	48

Table C6: Joist hanger type TOP and 04 kombi with external flanges and 04 kombi I and 04 I schmal with interior flanges:
Effective number of nails $n_{J,ef}$ for headers made of wood-based panels

Joist hanger	Blank	Number of nails in the joist		$n_{J,ef}$	
		Full nailing	Partial nailing	Full nailing	Partial nailing
TOP	260	8	4	3,44	1,72
	320	10	5	5,36	2,68
	380	12	6	7,61	3,80
	440	14	7	9,98	4,99
	500	16	8	12,4	6,18
	560	18	9	14,7	7,36
04 kombi, 04 kombi I and 04 I schmal	260	8	4	3,23	2,03
	280	8	4	3,23	2,03
	320	10	6	4,96	3,44
	340	10	6	4,96	3,44
	360	12	6	7,40	3,44
	380	12	6	7,40	3,44
	400	12	6	7,40	3,44
	420	14	8	9,90	5,98
	440	14	8	9,90	5,98
	460	14	8	9,90	5,98
	480	16	8	12,3	5,98
	500	16	8	12,3	5,98

Table C7:

Joist hanger type 04 I schmal with interior flanges:
Form factors $k_{H,1}$ and $k_{H,2}$ and dimensions e_1 , e_2 and $e_{J,0}$

B [mm]	H [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	$e_{J,0}$ [mm]
Partial nailing								
50	70	4	2	4,48	0,48	118	85	32
64	68	4	2	4,25	0,50	216	103	32
60	80	6	4	6,14	2,02	188	198	32
76	90	6	4	7,74	1,74	299	221	32
40	110	8	4	11,8	3,80	155	516	32
42	109	8	4	11,6	3,85	160	480	32
44	108	8	4	11,4	3,89	166	452	32
46	107	8	4	11,2	3,93	172	429	32
48	106	8	4	11,0	3,98	178	412	32
50	105	8	4	10,8	4,02	186	398	32
52	104	8	4	10,6	4,07	193	387	32
54	103	8	4	10,4	4,12	202	378	32
56	102	8	4	10,2	4,17	210	371	32
58	101	8	4	10,0	4,22	220	366	32
60	100	8	4	9,77	4,27	230	363	32
64	98	8	4	9,38	4,38	251	358	32
70	95	8	4	8,80	4,55	287	359	32
40	120	8	4	13,1	3,23	160	480	34
42	119	8	4	12,9	3,26	166	452	34
44	118	8	4	12,7	3,29	172	429	34
46	117	8	4	12,5	3,33	178	412	34
48	116	8	4	12,3	3,36	186	398	34
50	115	8	4	12,1	3,40	193	387	34
52	114	8	4	11,9	3,43	202	378	34
54	113	8	4	11,7	3,47	210	371	34
56	112	8	4	11,5	3,50	220	366	34
58	111	8	4	11,3	3,54	230	363	34
60	110	8	4	11,1	3,58	240	360	34
62	109	8	4	10,9	3,62	251	358	34
64	108	8	4	10,7	3,66	262	358	34
66	107	8	4	10,5	3,70	274	358	34
68	106	8	4	10,3	3,74	287	359	34
70	105	8	4	10,1	3,79	300	360	34
72	104	8	4	9,95	3,83	314	362	34
74	103	8	4	9,76	3,88	328	364	34
76	102	8	4	9,57	3,92	342	367	34
78	101	8	4	9,38	3,97	358	370	34
40	140	10	6	17,6	5,62	225	900	35
42	139	10	6	17,4	5,67	230	837	35
44	138	10	6	17,1	5,71	236	787	35
46	137	10	6	16,9	5,76	242	745	35
48	136	10	6	16,7	5,81	249	711	35
50	135	10	6	16,4	5,86	256	683	35

Table C7 (contd.): Joist hanger type 04 I schmal with interior flanges:
Form factors $k_{H,1}$ and $k_{H,2}$ and dimensions e_1 , e_2 and $e_{J,0}$

B [mm]	H [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	$e_{J,0}$ [mm]
Partial nailing								
52	134	10	6	16,2	5,91	264	660	35
54	133	10	6	16,0	5,96	272	641	35
56	132	10	6	15,7	6,02	281	624	35
58	131	10	6	15,5	6,07	290	611	35
60	130	10	6	15,3	6,12	300	600	35
62	129	10	6	15,0	6,18	310	591	35
64	128	10	6	14,8	6,23	321	584	35
66	127	10	6	14,6	6,29	332	578	35
68	126	10	6	14,3	6,35	344	573	35
70	125	10	6	14,1	6,41	356	570	35
72	124	10	6	13,9	6,47	369	568	35
74	123	10	6	13,7	6,53	382	566	35
76	122	10	6	13,5	6,59	396	566	35
78	121	10	6	13,2	6,66	410	566	35
40	150	10	6	20,6	5,35	225	900	34
42	149	10	6	20,4	5,39	230	837	34
44	148	10	6	20,1	5,43	236	787	34
46	147	10	6	19,9	5,47	242	745	34
48	146	10	6	19,6	5,51	249	711	34
50	145	10	6	19,4	5,56	256	683	34
52	144	10	6	19,1	5,60	264	660	34
54	143	10	6	18,9	5,65	272	641	34
56	142	10	6	18,6	5,69	281	624	34
58	141	10	6	18,4	5,74	290	611	34
60	140	10	6	18,1	5,79	300	600	34
62	139	10	6	17,9	5,83	310	591	34
64	138	10	6	17,6	5,88	321	584	34
66	137	10	6	17,4	5,93	332	578	34
68	136	10	6	17,2	5,98	344	573	34
70	135	10	6	16,9	6,03	356	570	34
72	134	10	6	16,7	6,09	369	568	34
74	133	10	6	16,4	6,14	382	566	34
76	132	10	6	16,2	6,19	396	566	34
78	131	10	6	16,0	6,25	410	566	34
40	160	12	6	23,9	9,11	304	1520	34
42	159	12	6	23,6	9,18	309	1405	34
44	158	12	6	23,4	9,24	315	1311	34
46	157	12	6	23,1	9,31	321	1233	34
48	156	12	6	22,8	9,38	327	1168	34
50	155	12	6	22,5	9,45	334	1113	34
52	154	12	6	22,2	9,52	341	1067	34
54	153	12	6	21,9	9,59	349	1028	34
56	152	12	6	21,7	9,66	358	994	34

Table C7 (contd.): Joist hanger type 04 I schmal with interior flanges:
Form factors $k_{H,1}$ and $k_{H,2}$ and dimensions e_1 , e_2 and $e_{J,0}$

B [mm]	H [mm]	n_H	n_J	$k_{H,1}$	$k_{H,2}$	e_1 [mm]	e_2 [mm]	$e_{J,0}$ [mm]
Partial nailing								
58	151	12	6	21,4	9,73	367	965	34
60	150	12	6	21,1	9,80	376	940	34
62	149	12	6	20,8	9,88	386	919	34
64	148	12	6	20,5	9,95	396	900	34
66	147	12	6	20,3	10,0	407	885	34
68	146	12	6	20,0	10,1	418	871	34
70	145	12	6	19,7	10,2	430	860	34
72	144	12	6	19,4	10,3	442	850	34
74	143	12	6	19,2	10,4	455	843	34
76	142	12	6	18,9	10,4	468	836	34
78	141	12	6	18,6	10,5	482	831	34
40	170	12	6	27,7	8,77	304	1520	33
42	169	12	6	27,4	8,83	309	1405	33
44	168	12	6	27,1	8,89	315	1311	33
46	167	12	6	26,8	8,95	321	1233	33
48	166	12	6	26,5	9,01	327	1168	33
50	165	12	6	26,2	9,07	334	1113	33
52	164	12	6	25,9	9,13	341	1067	33
54	163	12	6	25,6	9,20	349	1028	33
56	162	12	6	25,3	9,26	358	994	33
58	161	12	6	25,0	9,32	367	965	33
60	160	12	6	24,7	9,39	376	940	33
62	159	12	6	24,4	9,46	386	919	33
64	158	12	6	24,1	9,52	396	900	33
66	157	12	6	23,8	9,59	407	885	33
68	156	12	6	23,5	9,66	418	871	33
70	155	12	6	23,2	9,73	430	860	33
72	154	12	6	22,9	9,80	442	850	33
74	153	12	6	22,6	9,88	455	843	33
76	152	12	6	22,3	9,95	468	836	33
78	151	12	6	22,0	10,0	482	831	33
40	180	12	6	31,7	8,49	304	1520	32
42	179	12	6	31,4	8,54	309	1405	32
44	178	12	6	31,1	8,59	315	1311	32
46	177	12	6	30,8	8,65	321	1233	32
48	176	12	6	30,5	8,70	327	1168	32
50	175	12	6	30,1	8,76	334	1113	32
52	174	12	6	29,8	8,81	341	1067	32
54	173	12	6	29,5	8,87	349	1028	32
56	172	12	6	29,2	8,93	358	994	32
58	171	12	6	28,9	8,99	367	965	32
60	170	12	6	28,5	9,05	376	940	32
62	169	12	6	28,2	9,11	386	919	32

Table C7 (contd.): Joist hanger type 04 I schmal with interior flanges:
Form factors $k_{H,1}$ and $k_{H,2}$ and dimensions e_1 , e_2 and $e_{J,0}$

B [mm]	H [mm]	n_H	n_J	k_{H,1}	k_{H,2}	e₁ [mm]	e₂ [mm]	e_{J,0} [mm]
Partial nailing								
64	168	12	6	27,9	9,17	396	900	32
66	167	12	6	27,6	9,23	407	885	32
68	166	12	6	27,3	9,29	418	871	32
70	165	12	6	27,0	9,35	430	860	32
72	164	12	6	26,7	9,42	442	850	32
74	163	12	6	26,4	9,48	455	843	32
76	162	12	6	26,0	9,55	468	836	32
78	161	12	6	25,7	9,62	482	831	32
40	190	14	8	36,0	13,2	397	2380	32
42	189	14	8	35,6	13,3	402	2190	32
44	188	14	8	35,3	13,4	407	2035	32
46	187	14	8	34,9	13,5	413	1905	32
48	186	14	8	34,5	13,5	419	1796	32
50	185	14	8	34,2	13,6	426	1703	32
52	184	14	8	33,8	13,7	433	1624	32
54	183	14	8	33,5	13,8	441	1556	32
56	182	14	8	33,1	13,9	449	1496	32
58	181	14	8	32,8	14,0	458	1445	32
60	180	14	8	32,4	14,0	467	1400	32
62	179	14	8	32,1	14,1	476	1361	32
64	178	14	8	31,7	14,2	486	1326	32
66	177	14	8	31,4	14,3	497	1296	32
68	176	14	8	31,0	14,4	508	1269	32
70	175	14	8	30,7	14,5	519	1246	32
72	174	14	8	30,3	14,6	531	1226	32
74	173	14	8	30,0	14,7	543	1208	32
76	172	14	8	29,6	14,8	556	1192	32
78	171	14	8	29,3	14,9	570	1178	32
40	200	14	8	39,6	12,5	397	2380	32
42	199	14	8	39,3	12,6	402	2190	32
44	198	14	8	38,9	12,6	407	2035	32
46	197	14	8	38,5	12,7	413	1905	32
48	196	14	8	38,2	12,8	419	1796	32
50	195	14	8	37,8	12,9	426	1703	32
52	194	14	8	37,4	12,9	433	1624	32
54	193	14	8	37,1	13,0	441	1556	32
56	192	14	8	36,7	13,1	449	1496	32
58	191	14	8	36,3	13,2	458	1445	32
60	190	14	8	36,0	13,2	467	1400	32
62	189	14	8	35,6	13,3	476	1361	32
64	188	14	8	35,3	13,4	486	1326	32
66	187	14	8	34,9	13,5	497	1296	32
68	186	14	8	34,5	13,5	508	1269	32

Table C7 (contd.): Joist hanger type 04 I schmal with interior flanges:
Form factors $k_{H,1}$ and $k_{H,2}$ and dimensions e_1 , e_2 and $e_{J,0}$

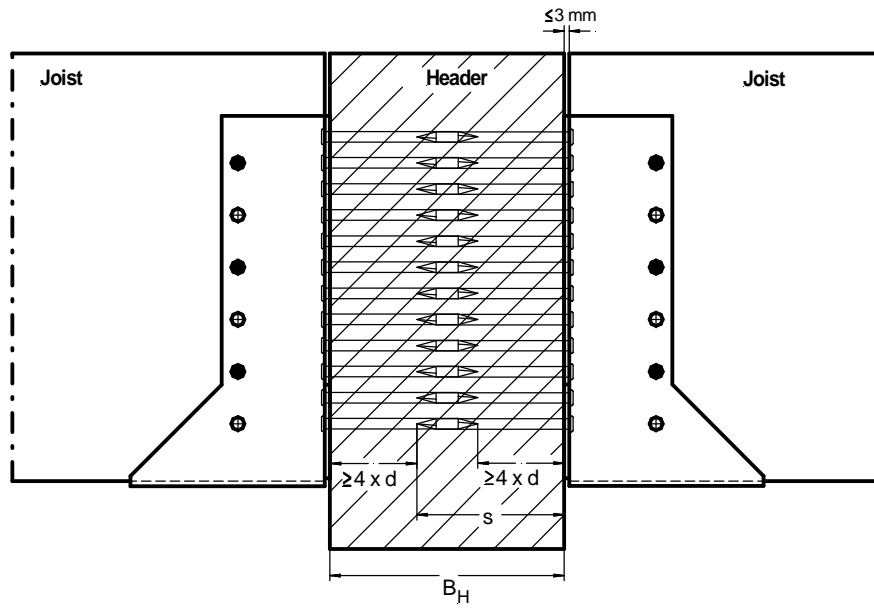
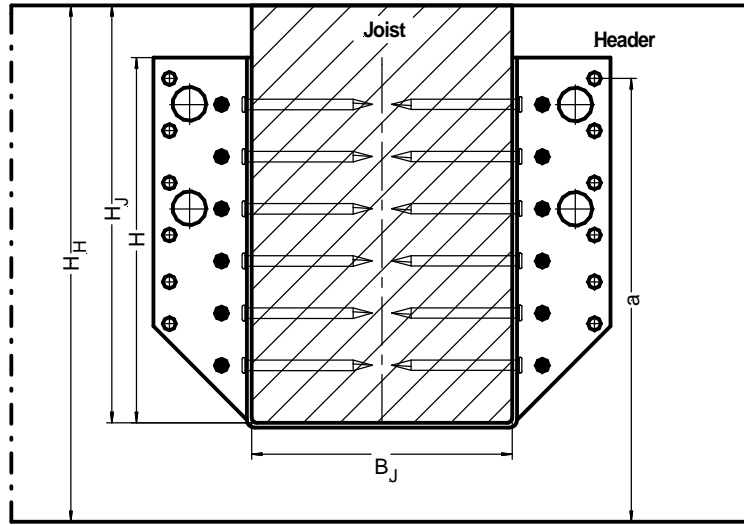
B [mm]	H [mm]	n_H	n_J	k_{H,1}	k_{H,2}	e₁ [mm]	e₂ [mm]	e_{J,0} [mm]
Partial nailing								
70	185	14	8	34,2	13,6	519	1246	32
72	184	14	8	33,8	13,7	531	1226	32
74	183	14	8	33,5	13,8	543	1208	32
76	182	14	8	33,1	13,9	556	1192	32
78	181	14	8	32,8	14,0	570	1178	32
40	210	14	8	43,3	11,8	397	2380	32
42	209	14	8	43,0	11,9	402	2190	32
44	208	14	8	42,6	12,0	407	2035	32
46	207	14	8	42,2	12,0	413	1905	32
48	206	14	8	41,9	12,1	419	1796	32
50	205	14	8	41,5	12,2	426	1703	32
52	204	14	8	41,1	12,2	433	1624	32
54	203	14	8	40,7	12,3	441	1556	32
56	202	14	8	40,4	12,4	449	1496	32
58	201	14	8	40,0	12,4	458	1445	32
60	200	14	8	39,6	12,5	467	1400	32
62	199	14	8	39,3	12,6	476	1361	32
64	198	14	8	38,9	12,6	486	1326	32
66	197	14	8	38,5	12,7	497	1296	32
68	196	14	8	38,2	12,8	508	1269	32
70	195	14	8	37,8	12,9	519	1246	32
72	194	14	8	37,4	12,9	531	1226	32
74	193	14	8	37,1	13,0	543	1208	32
76	192	14	8	36,7	13,1	556	1192	32
78	191	14	8	36,3	13,2	570	1178	32
40	220	16	8	48,3	17,3	503	3520	32
42	219	16	8	47,9	17,4	508	3231	32
44	218	16	8	47,5	17,5	513	2992	32
46	217	16	8	47,1	17,6	519	2793	32
48	216	16	8	46,7	17,7	525	2624	32
50	215	16	8	46,3	17,8	531	2480	32
52	214	16	8	45,9	17,9	539	2356	32
54	213	16	8	45,4	17,9	546	2248	32
56	212	16	8	45,0	18,0	554	2155	32
58	211	16	8	44,6	18,1	563	2072	32
60	210	16	8	44,2	18,2	571	2000	32
62	209	16	8	43,8	18,3	581	1936	32
64	208	16	8	43,4	18,4	591	1879	32
66	207	16	8	43,0	18,5	601	1829	32
68	206	16	8	42,6	18,6	612	1784	32
70	205	16	8	42,2	18,7	623	1744	32
72	204	16	8	41,8	18,8	635	1708	32
74	203	16	8	41,4	18,9	647	1676	32

Table C7 (contd.): Joist hanger type 04 I schmal with interior flanges:
Form factors $k_{H,1}$ and $k_{H,2}$ and dimensions e_1 , e_2 and $e_{J,0}$

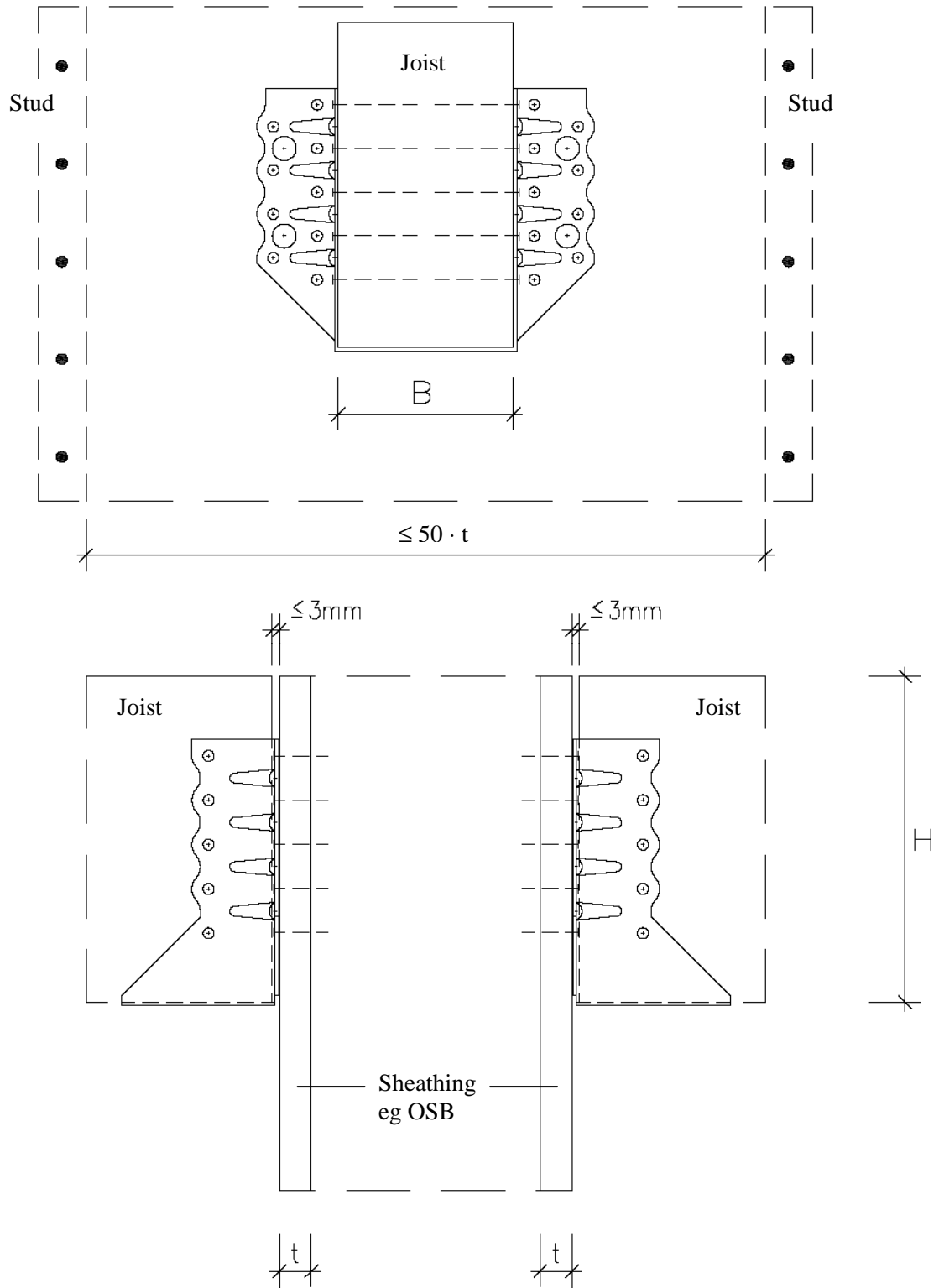
B [mm]	H [mm]	n_H	n_J	k_{H,1}	k_{H,2}	e₁ [mm]	e₂ [mm]	e_{J,0} [mm]
Partial nailing								
76	202	16	8	41,0	19,0	659	1648	32
78	201	16	8	40,6	19,1	672	1623	32
40	230	16	8	52,5	16,5	503	3520	32
42	229	16	8	52,1	16,6	508	3231	32
44	228	16	8	51,7	16,7	513	2992	32
46	227	16	8	51,2	16,7	519	2793	32
48	226	16	8	50,8	16,8	525	2624	32
50	225	16	8	50,4	16,9	531	2480	32
52	224	16	8	50,0	17,0	539	2356	32
54	223	16	8	49,6	17,1	546	2248	32
56	222	16	8	49,2	17,2	554	2155	32
58	221	16	8	48,7	17,2	563	2072	32
60	220	16	8	48,3	17,3	571	2000	32
62	219	16	8	47,9	17,4	581	1936	32
64	218	16	8	47,5	17,5	591	1879	32
66	217	16	8	47,1	17,6	601	1829	32
68	216	16	8	46,7	17,7	612	1784	32
70	215	16	8	46,3	17,8	623	1744	32
72	214	16	8	45,9	17,9	635	1708	32
74	213	16	8	45,4	17,9	647	1676	32
76	212	16	8	45,0	18,0	659	1648	32
78	211	16	8	44,6	18,1	672	1623	32

Annex D
Installation of joist hangers

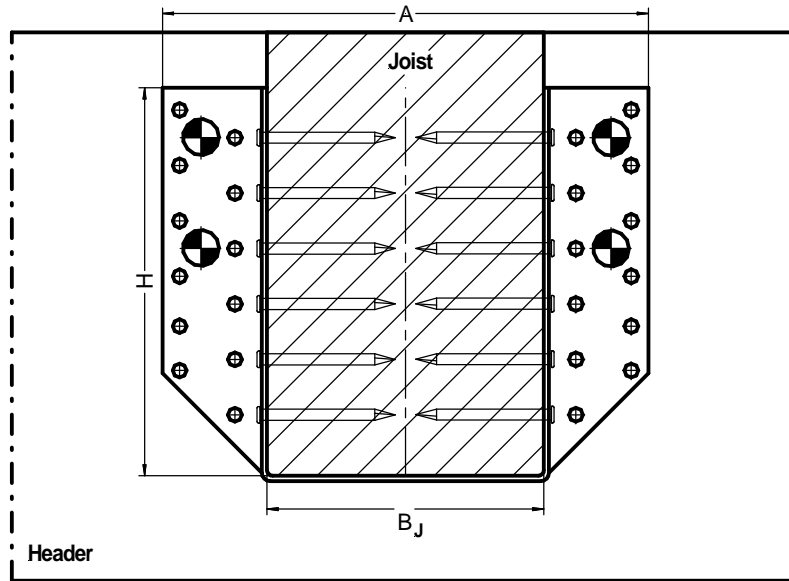
Joist hanger in wood/wood connection



Joist hanger in wood/wood-based panel connection (eg joist connection to timber frame wall)



**Joist hanger connected to concrete, lightweight concrete
or a steel member by bolts**



Bolts M8, M10, M12

Washer according to
EN ISO 7094

