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European Technical Assessment

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of 07/07/2014**

Technical Assessment Body issuing the ETA and designated according to Article 29 of the Regulation (EU) No 305/2011	Technical and Test Institute for Construction Prague
Trade name of the construction product	„Dudek I-beam“, (“DIB”)
Product family to which the construction product belongs	Product area: 13 Light Composite Wood-based Beams and Columns for structural purpose
Manufacturer	Stolarstwo Import-Export, DUDEK H&H Sp.J. ul. Opolska 48 46-045 Kotórz Mały Republic of Poland
Manufacturing plant	Stolarstwo Import-Export, DUDEK H&H Sp.J. ul. Opolska 48 46-045 Kotórz Mały Republic of Poland
This European Technical Assessment contains	20 pages including 3 Annexes which form an integral part of this assessment
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of	ETAG 011, edition January 2002, used as European Assessment Document (EAD)

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TABLE OF CONTENTS

1	TECHNICAL DESCRIPTION OF THE PRODUCT	4
1.1	Identification	4
2	SPECIFICATION OF THE INTENDED USE(S) IN ACCORDANCE WITH THE APPLICABLE EAD	4
2.1	Intended working life	4
3	PERFORMANCE OF THE PRODUCT AND REFERENCES TO THE METHODS USED FOR ITS	4
3.1	BWR 1 Mechanical resistance and stability	4
3.2	BWR 2 Safety in case of fire	4
3.3	BWR 3 Hygiene, health and environment	5
3.4	BWR 4 Safety and accessibility in use	5
3.5	BWR 5 Protection against noise	5
3.6	BWR 6 Energy economy and heat retention	5
3.7	BWR 7 Sustainable use of natural resources	5
3.8	Aspects of durability, serviceability and identification	5
4	ASSESSMENT AND VERIFICATION OF CONSTANCY OF PERFORMANCE (HEREINAFTER AVCP) SYSTEM APPLIED, WITH REFERENCE TO ITS LEGAL BASE	6
4.1	AVCP system	6
5	TECHNICAL DETAILS NECESSARY FOR THE IMPLEMENTATION OF THE AVCP SYSTEM, AS PROVIDED FOR IN THE APPLICABLE EAD	6
5.1	Tasks of the manufacturer	6
5.1.1.	Factory production control	6
5.1.2	Further testing of samples taken at the factory	7
5.2	Tasks of notified product certification body	7
5.2.1	Determination of the product type	7
5.2.2	Initial inspection of the manufacturing plant and of factory production control	7
5.2.3	Continuous surveillance, assessment and evaluation of factory production control	7
5.3	CE marking	7
ANNEX 1		9
DESCRIPTION OF THE BEAMS AND COLUMNS, TYPE DIB		9

1	CROSS SECTIONS AND SIZES	9
2	SPECIFICATION OF COMPONENTS	11
2.1	Beams and columns	11
2.2	Moisture content	11
	ANNEX 2	12
	MECHANICAL PROPERTIES OF THE BEAMS AND COLUMNS	12
1	RESISTANCE AND STIFFNESS	12
1.1	General	12
1.2	Design principles	12
1.3	Mechanical properties	16
	ANNEX 3	20
	INSTALLATION GUIDE FOR THE BEAMS AND COLUMNS	20

Specific conditions of the European Technical Assessment

1 TECHNICAL DESCRIPTION OF THE PRODUCT

Dudek H&H I-beams and columns (hereinafter "DIB" in the further text) are light wood-based composite products with I-shaped cross section. The flanges are made of structural timber which is finger jointed and the web of oriented strand board OSB.

The web is adhesively bonded to the flanges. The standard cross sections, materials, dimensions and tolerances are given in Annex 1.

1.1 Identification

The identification parameters and reference to product specifications for identifying the materials and components which constitute the beams and columns are given in Annexes 1 and 2.

2 SPECIFICATION OF THE INTENDED USE(S) IN ACCORDANCE WITH THE APPLICABLE EAD

DIB beams and columns are intended for use as load-bearing parts of building constructions. With regard to the moisture effect has on the product, the use is limited in service classes 1 and 2 as defined in Eurocode 5 (EN 1995-1-1 Eurocode 5: Design of timber structures - Part 1-1: General - Common rules and rules for buildings).

2.1 Intended working life

The provisions made in this European Technical Assessment are based on an assumed working life of DIB and columns of 50 years, provided that the conditions laid down in sections 6.2, 7.1 and 7.2 are met. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

3 PERFORMANCE OF THE PRODUCT AND REFERENCES TO THE METHODS USED FOR ITS ASSESSMENT

3.1 BWR 1 Mechanical resistance and stability

The mechanical properties of DIB are given in Annex 2.

No Performance Determined regarding use in areas where seismic actions may occur.

In case the beams are to be used in areas where seismic actions may occur, the DIB are individually designed for each individual building according to national requirements for seismic loads.

3.2 BWR 2 Safety in case of fire

Reaction to fire: Flanges and webs have the classification D-s2, d0 according to EN 13501-1+A1.

Resistance to fire: No Performance Determined.¹

3.3 BWR 3 Hygiene, health and environment

All wood-based boards in the webs satisfy formaldehyde class E1 in EN 13986.

Based on the declaration of the manufacturer, the DIB do not contain any other harmful or dangerous substances as defined in the EU database. The DIB do not contain pentachlorophenol.

In addition to the specific clauses relating to dangerous substances contained in this European Technical Assessment, 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 Regulation, these requirements need also to be complied with, when and where they apply.

3.4 BWR 4 Safety and accessibility in use

Not relevant.

3.5 BWR 5 Protection against noise

Not relevant.

3.6 BWR 6 Energy economy and heat retention

The thermal conductivity λ is 0.13 W/(m·K) for OSB webs and for flange material 0.13 W/(m·K) according to EN ISO 10456. The natural density variation of the materials is taken into account in this value.

3.7 BWR 7 Sustainable use of natural resources

For the sustainable use of natural resources no performance was determined for this product.

3.8 Aspects of durability, serviceability and identification

The DIB can be used in service classes 1 and 2 according to Eurocode 5, and in hazard classes 1 and 2 as specified in EN 335. The products may be exposed to the weather for a short time during installation. In service classes 1 and 2, where the moisture content of timbers will not exceed 20 %, the risks of fungal decay are low.

The timber flanges are untreated and so do not withstand attacks from funghi, although spruce (*Picea abies*) is classified as slightly durable according to EN 350-2.

Durability may be reduced by attack from insects such as longhorn beetle, dry wood termites and anobium in regions where these may be found.

Serviceability of the DIB is understood as their ability to resist loads without unacceptable deformation. This characteristic is treated under ER 1.

The beams and columns are identified by the flanges being of spruce timber and the web being of oriented strand board.

¹ Resistance for structures where DIB elements are incorporated shall be determined for the complete construction.

4 ASSESSMENT AND VERIFICATION OF CONSTANCY OF PERFORMANCE (HEREINAFTER AVCP) SYSTEM APPLIED, WITH REFERENCE TO ITS LEGAL BASE

4.1 AVCP system

According to the decision 99/92/EC² of the European Commission, as amended, the system(s) of assessment and verification of constancy of performance (see Annex V of Regulation (EU) No 305/2011) is 1.

This system is defined as follows:

- (a) the manufacturer shall carry out:
 - (1) factory production control;
 - (2) further testing of samples taken at the factory by the manufacturer in accordance with a prescribed test plan;

- (b) the notified product certification body shall issue the certificate of constancy of performance of the product on the basis of:
 - (3) determination of the product type on the basis of type testing (including sampling), type calculation, tabulated values or descriptive documentation of the product;
 - (4) initial inspection of factory and of factory production control;
 - (5) continuous surveillance, assessment and evaluation of factory production control.

5 TECHNICAL DETAILS NECESSARY FOR THE IMPLEMENTATION OF THE AVCP SYSTEM, AS PROVIDED FOR IN THE APPLICABLE EAD

5.1 Tasks of the manufacturer

5.1.1. Factory production control

The manufacturer shall exercise permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures, including records of results performed. This factory production control shall ensure that the product is in conformity with this European Technical Assessment.

The manufacturer shall only use materials stated in the technical documentation³ of this European Technical Assessment.

In the framework of factory production control the manufacturer carries out controls in accordance with the control plan⁴ which are fixed with this European Technical Assessment. Details of the extent, nature and frequency of controls to be performed within the factory

² Official Journal of the European Communities N^o L 178, 14.7.1999, p. 56

³ The technical documentation of this European Technical Assessment has been deposited at the Technický a zkušební ústav stavební Praha, s.p. and, as far as relevant for the tasks of the notified product certification body involved in the assessment and verification of constancy of performance, is handed over to the notified product certification body

⁴ The control plan has been deposited at Technický a zkušební ústav stavební Praha, s.p. and is handed over only to the notified product certification body involved in the assessment and verification of constancy of performance.

production control correspond to this control plan which is part of the technical documentation of this European Technical Assessment.

The results of factory production control are recorded in checklist signed by the person responsible and are evaluated. The records shall be presented to the notified product certification body involved in continuous surveillance. On request the records must be presented to the Technický a zkušební ústav stavební Praha, s.p.

5.1.2 Further testing of samples taken at the factory

Testing of samples taken at the factory by the manufacturer is not required.

5.2 Tasks of notified product certification body

5.2.1 Determination of the product type

Notified bodies undertaking tasks under System 1 shall consider the European Technical Assessment issued for the construction product in question as the assessment of the performance of that product. Notified bodies shall therefore not undertake the tasks referred to in point 1.2 (b)(i), in Annex V of Regulation (EU) No 305/2011, unless there are changes in the manufacture or manufacturing plant. In such cases the necessary initial type-testing has to be agreed between the Technický a zkušební ústav stavební Praha, s.p. and notified product certification body involved.

5.2.2 Initial inspection of the manufacturing plant and of factory production control

The notified product certification body shall ascertain that, in accordance with the control plan, the manufacturing plant, in particular personnel and equipment, and the factory production control are suitable to ensure a continuous and orderly manufacturing of the beams and columns according to the specifications given in clause 2 and in the Annexes of the European Technical Assessment.

5.2.3 Continuous surveillance, assessment and evaluation of factory production control

The notified product certification body shall visit the factory at least twice a year for surveillance of the manufacturer.

It has to be verified that the system of factory production control and the specified manufacturing process are maintained taking into account the control plan.

Continuous surveillance and assessment of factory production control have to be performed according to the control plan.

The results of continuous surveillance shall be made available on demand by the notified product certification body or the Technical and Test Institute for Construction Praha. In cases where the provisions of the European Technical Assessment and the control plan are no longer fulfilled, the certificate of constancy of performance shall be withdrawn.

5.3 CE marking

The CE marking shall be affixed on each beam or column. The letters CE shall be followed by the identification number of the notified product certification body, where relevant, and be accompanied by the following additional information:

- identification number of the notified product certification body
- the name or identifying mark of the producer and the registered address of the producer
- last two digits of the year in which the marking was affixed
- the number of the certificate of constancy of performance of the product
- number of the ETA, valid as indication to identify the characteristics of the beam/column

Issued in Prague on 07.07.2014



signed by

Ing. Václav Hadrava

Head of the department Technical Assessment Body

ANNEX 1**DESCRIPTION OF THE BEAMS AND COLUMNS, TYPE DIB****1 CROSS SECTIONS AND SIZES**

The shape of the beams and columns is shown in Figure 1.

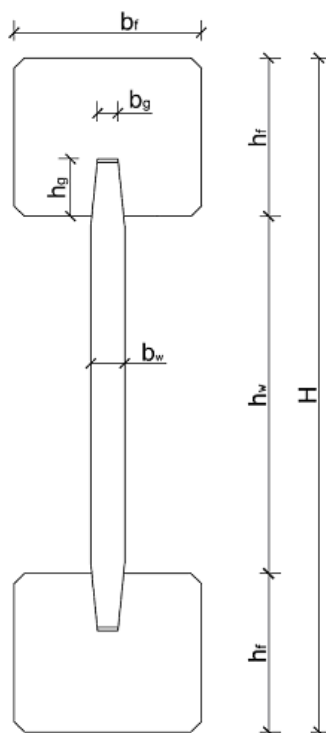


Figure 1 Cross section

Table 1 Cross-sectional sizes of DIB 47

Symbol	Dimensions [mm]				
	H	b_f	h_f	h_w	b_w
DIB 47/200	200	47	47	106	10
DIB 47/220	220	47	47	126	10
DIB 47/240	240	47	47	146	10
DIB 47/250	250	47	47	156	10
DIB 47/300	300	47	47	206	10
DIB 47/350	350	47	47	256	10
DIB 47/360	360	47	47	266	10
DIB 47/400	400	47	47	306	10
DIB 47/450	450	47	47	356	10
DIB 47/500	500	47	47	406	10

Table 2 Instantaneous cross-sectional characteristics and stiffnesses of DIB 47

Type	Cross-section area	Bending stiffness	Shear stiffness
	$A_{\text{eff,inst}}$ [mm ²]	$E_{0,\text{mean}} I_{y,\text{eff,inst}}$ [kNm ²]	$G_{w,\text{inst}} A_w$ [kN]
DIB 47/200	4510.51	285.62	1352.16
DIB 47/220	4579.60	363.39	1568.16
DIB 47/240	4648.69	451.23	1784.16
DIB 47/250	4683.24	498.97	1892.16
DIB 47/300	4855.96	776.72	2432.16
DIB 47/350	5028.69	1121.24	2972.16
DIB 47/360	5063.24	1198.37	3080.16
DIB 47/400	5201.42	1534.91	3512.16
DIB 47/450	5374.15	2020.09	4052.16
DIB 47/500	5546.87	2579.17	4592.16

Table 3 Cross-sectional sizes of DIB 72

Symbol	Dimensions [mm]				
	H	b_f	h_f	h_w	b_w
DIB 72/200	200	72	47	106	10
DIB 72/220	220	72	47	126	10
DIB 72/240	240	72	47	146	10
DIB 72/250	250	72	47	156	10
DIB 72/300	300	72	47	206	10
DIB 72/350	350	72	47	256	10
DIB 72/360	360	72	47	266	10
DIB 72/400	400	72	47	306	10
DIB 72/450	450	72	47	356	10
DIB 72/500	500	72	47	406	10

Table 4 Instantaneous cross-sectional characteristics and stiffnesses of DIB 72

Type	Cross-section area	Bending stiffness	Shear stiffness
	$A_{\text{eff,inst}}$ [mm ²]	$E_{0,\text{mean}} I_{y,\text{eff,inst}}$ [kNm ²]	$G_{w,\text{inst}} A_w$ [kN]
DIB 72/200	6860.51	441.66	1352.16
DIB 72/220	6929.60	561.56	1568.16
DIB 72/240	6998.69	696.71	1784.16
DIB 72/250	7033.24	770.05	1892.16
DIB 72/300	7205.96	1195.14	2432.16
DIB 72/350	7378.69	1719.32	2972.16
DIB 72/360	7413.24	1836.25	3080.16
DIB 72/400	7551.42	2344.95	3512.16
DIB 72/450	7724.15	3074.42	4052.16
DIB 72/500	7896.87	3910.09	4592.16

Table 5 Tolerances in millimetres

Overall depth	H	± 1.5 mm
Length	l	± 10 mm
Flange width	b_f	± 1.5 mm
Flange depth	h_f	± 2 mm
Web thickness	b_w	± 0.8 mm

The joints on a length of the web are made as a V-shaped adhesive bonded joint deliberately spaced

2 SPECIFICATION OF COMPONENTS

2.1 Beams and columns

The flanges consist of machine or visual strength graded spruce timber in accordance with EN 140801-1+A1. Grading is carried out in either of the following ways:

- Flanges graded in their final dimension
- Original dimension graded and after that splitting into flange dimension and planed. In addition to this a visual override according to special rules is required. In particular the size of knots is checked

The machine settings are controlled based on the results from bending tests of full-sized beams.

One flange material quality is used, strength and stiffness values in class C24 (S10) comply to requirements according to standard EN 338.

The flanges are produced from timber which is finger jointed in accordance with EN 14080.

The web consists of 10 mm oriented strand board of class OSB/3 according to EN 13986, with characteristic values for structural design according to EN 300.

2.2 Moisture content

When the beams are manufactured, the maximum moisture content of the flanges shall be (15 ± 3) %, which is above the equilibrium value in normal use condition. The moisture content of the web is approximately 8 %, which corresponds to the value in normal use conditions. Due to changing temperature and relative humidity of the surrounding air the moisture content will continuously change.

ANNEX 2

MECHANICAL PROPERTIES OF THE BEAMS AND COLUMNS

1 RESISTANCE AND STIFFNESS

1.1 General

The products are intended for use in service classes 1 and 2 as defined in Eurocode 5. Characteristic resistances and stiffness values for beams are given in Tables below. The basis of these values is as follows:

Beams

Bending stiffness and moment resistance:	Calculation assisted by testing
Shear stiffness and shear resistance:	Calculation assisted by testing
Bearing resistance (minimum length of fastening):	Calculation assisted by testing

Columns

Pressure resistance:	Calculation
Buckling resistance:	Calculation

Finger joint

Finger joint capacity:	Testing
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The structural performance of the product relies on adequate restraint to the compression flange.

1.2 Design principles

Table 6 Explanatory notes

b_f	width of flange
h_f	flange depth
H	beam depth
b_w	width of web
$A_{\text{eff,fin}}$	final cross-section area
$E_{0,\text{mean,inst}} I_{y,\text{eff,inst}}$	instantaneous bending stiffness
$E_{0,\text{mean,fin}} I_{y,\text{eff,fin}}$	final bending stiffness
$G_{w,\text{fin}} A_w$	final shear stiffness
V_k / V_d	characteristic / design value of the shear force if the web area only is considered
$V_{k,l,t} / V_{d,l,t}$	characteristic / design value of the longitudinal shear force (in the place of web tongues)
$V_{k,f} / V_{d,f}$	characteristic / design value of shear force at the edge of flanges if an entire cross-sectional area is considered
$V_{k,w} / V_{d,w}$	characteristic / design value of shear force at the edge of web if an entire cross-sectional area is considered
$M_{k,f1} / M_{d,f1}$	characteristic / design value of the bending moment at the edge of the flange
$M_{k,f2} / M_{d,f2}$	characteristic / design value of the bending moment at the centroid of the flange
$M_{k,w} / M_{d,w}$	characteristic / design value of the bending moment at the edge of the web
N_k / N_d	characteristic / design value of buckling resistance for column (length of column = 3.0 m)
$N_{d,c,\text{end}} / N_{d,c,\text{end}}$	characteristic / design value of pressure resistance in the end column fastening
$N_{d,c,\text{int}} / N_{d,c,\text{int}}$	characteristic / design value of pressure resistance in the intermediate column fastening
<i>inst</i>	Instantaneous values for situation at the beginning of the use of construction
<i>fin</i>	Final values for situation at the end of construction life

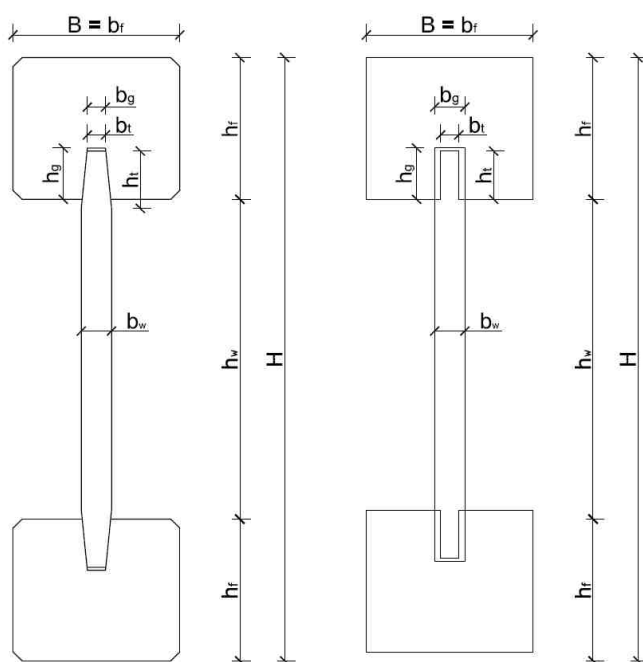


Figure 2 Simplified beam model used for calculations

Table 7 Original dimensions

H	200, 220, ..., 500	mm
B	47; 72	mm
h_f	47	mm
b_f	47; 72	mm
h_w	$H - 2h_f$	mm
b_w	10	mm
h_g	17	mm
b_g	6	mm
h_t	19	mm
b_t	6	mm

Table 8 Calculation dimensions

H	200, 220, ..., 500	mm
B	47; 72	mm
h_f	47	mm
b_f	47; 72	mm
h_w	$H - 2h_f$	mm
b_w	10	mm
h_g	17	mm
b_g	10	mm
h_t	16	mm
b_t	6	mm

Material

Table 9 Strength, stiffness characteristic and density values of solid wood (C24) for flanges

$f_{m,k,f}$	24	MPa
$f_{t,0,k,f}$	14	MPa
$f_{t,90,k,f}$	0.5	MPa
$f_{c,0,k,f}$	21	MPa
$f_{c,90,k,f}$	2.5	MPa
$f_{v,k,f}$	4.0	MPa
$E_{0,mean,f}$	11	GPa
$E_{0,05,f}$	7.4	GPa
$\rho_{k,f}$	350	kg/m ³

Table 10 Strength, stiffness characteristic and density values of OSB/3 board for web

$f_{m,k,w}$	16.4	MPa
$f_{t,0,k,w}$	9.4	MPa
$f_{v,0,k,w}$	6.8	MPa
$f_{v,90,k,w}$	1.0	MPa
$E_{0,mean,w}$	3.8	GPa
$G_{v,w}$	1.08	GPa
$\rho_{k,w}$	600	kg/m ³

Partial factors, modification factors for tests

Flanges:

$$\gamma_{M,f} = 1.3$$

$$k_{mod,f} = 1.0$$

Web:

$$\gamma_{M,w} = 1.2$$

$$k_{mod,w} = 1.0$$

Shear resistance for beams with web holes

Circular holes

The design shear capacity, $V_{d,hole}$ in a beam cross section containing a circular hole in the web can be calculated according to:

$$V_{d,hole} = V_d \cdot k$$

with V_d being the design shear capacity of the beam without a hole, and with k being a reduction factor determined by

$$k = \frac{h - h_f - 0,9D}{h - h_f}$$

with

$$\begin{array}{ll} h & \text{beam depth} \\ D & \text{hole diameter, } D \leq h - 2h_f \\ h_f & \text{flange depth} \end{array}$$

The restriction for hole placement are according to the figure 3. All holes should be placed centrally aligned in the web depth direction. The restrictions apply to holes with a diameter exceeding 20 mm, smaller diameter holes can be placed anywhere in the web, although with a minimum distance of 40 mm between hole edges. Point loads should not be applied closer than h mm from the hole edge, h being the beam depth.

1.3 Mechanical properties

DIB 47

Table 11 Instantaneous characteristic values of resistances
(for $k_{mod,f} = 1.0$; $k_{mod,w} = 1.0$ and $\gamma_{M,f} = 1.3$; $\gamma_{M,w} = 1.2$)

	Shear resistance				Moment resistance			Buckling resistance	Pressure resistance in column fastening	
	V_d	$V_{d,l,t}$	$V_{d,f}$	$V_{d,w}$	$M_{d,f1}$	$M_{d,f2}$	$M_{d,w}$	N_d	$N_{d,c,end}$	$N_{d,c,int}$
Type	[kN]	[kN]	[kN]	[kN]	[kNm]	[kNm]	[kNm]	[kN]	[kN]	[kN]
47/200	8.67	4.37	23.69	23.77	4.79	3.60	11.11	64.85	17.40	24.18
47/220	9.80	4.92	26.70	26.59	5.54	4.05	11.89	67.92	17.40	24.18
47/240	10.94	5.49	29.76	29.41	6.31	4.52	12.74	70.40	17.40	24.18
47/250	11.50	5.77	31.31	30.82	6.70	4.75	13.19	71.50	17.40	24.18
47/300	14.34	7.23	39.20	37.85	8.69	5.95	15.55	76.20	17.40	24.18
47/350	17.17	8.73	47.33	44.83	10.75	7.19	18.06	80.18	17.40	24.18
47/360	17.74	9.03	48.98	46.22	11.17	7.44	18.57	80.93	17.40	24.18
47/400	20.00	10.27	55.68	51.76	12.88	8.45	20.68	83.83	17.40	24.18
47/450	22.45	11.85	64.24	58.63	15.07	9.75	23.39	87.28	17.40	24.18
47/500	22.13	13.46	73.02	65.44	17.31	11.09	26.19	90.62	17.40	24.18

DIB 72

Table 12 Instantaneous characteristic values of resistances
(for $k_{mod,f} = 1.0$; $k_{mod,w} = 1.0$ and $\gamma_{M,f} = 1.3$; $\gamma_{M,w} = 1.2$)

Type	Shear resistance				Moment resistance			Buckling resistance	Pressure resistance in column fastening	
	V_d	$V_{d,l,t}$	$V_{d,f}$	$V_{d,w}$	$M_{d,f1}$	$M_{d,f2}$	$M_{d,w}$	N_d	$N_{d,c,end}$	$N_{d,c,int}$
	[kN]	[kN]	[kN]	[kN]	[kNm]	[kNm]	[kNm]	[kN]	[kN]	[kN]
72/200	8.67	4.31	35.81	23.81	7.41	5.59	17.18	98.90	23.05	29.83
72/220	9.80	4.85	40.31	26.68	8.57	6.30	18.37	103.03	23.05	29.83
72/240	10.94	5.40	44.87	29.55	9.74	7.01	19.67	106.24	23.05	29.83
72/250	11.50	5.68	47.17	30.98	10.34	7.37	20.35	107.62	23.05	29.83
72/300	14.34	7.08	58.83	38.16	13.37	9.19	23.92	113.30	23.05	29.83
72/350	17.17	8.52	70.74	45.31	16.49	11.05	27.69	117.87	23.05	29.83
72/360	17.74	8.81	73.15	46.74	17.12	11.43	28.46	118.71	23.05	29.83
72/400	20.00	9.98	82.88	52.43	19.68	12.95	31.59	121.91	23.05	29.83
72/450	22.45	11.46	95.23	59.52	22.93	14.88	35.60	125.66	23.05	29.83
72/500	22.13	12.98	107.80	66.56	26.25	16.84	39.71	129.22	23.05	29.83

Bearing capacity

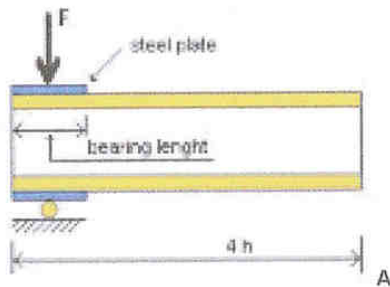


Figure 5 End bearing (45 mm)

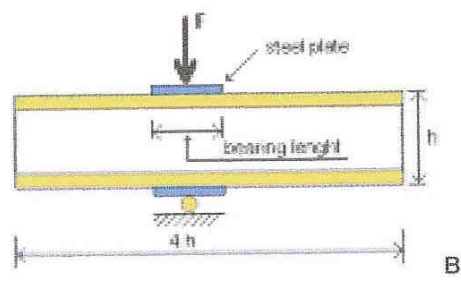


Figure 6 Inner bearing (80 mm)

Table 13 Bearing capacity (DIB 47, without stiffener)

Type DIB	Instantaneous values		Characteristic values		Design values (example)	
	$k_{mod,f} = 1.0$ $\gamma_{M,f} = 1.3$		$k_{mod,f} = 1.0$ $\gamma_{M,f} = 1.0$		$k_{mod,f} = 0.8$ $\gamma_{M,f} = 1.3$	
	V_{end}	V_{int}	$V_{k,end}$	$V_{k,int}$	$V_{d,end}$	$V_{d,int}$
47/200	8.47	15.82	11.02	20.56	6.78	12.65
47/220	8.47	15.82	11.02	20.56	6.78	12.65
47/240	8.47	15.82	11.02	20.56	6.78	12.65
47/250	8.47	15.82	11.02	20.56	6.78	12.65
47/300	8.47	15.82	11.02	20.56	6.78	12.65
47/350	8.47	15.82	11.02	20.56	6.78	12.65
47/360	8.47	15.82	11.02	20.56	6.78	12.65
47/400	8.47	15.82	11.02	20.56	6.78	12.65
47/450	8.47	15.82	11.02	20.56	6.78	12.65
47/500	8.47	15.82	11.02	20.56	6.78	12.65

Table 14 Bearing capacity (DIB 72, without stiffener)

Type DIB	Instantaneous values		Characteristic values		Design values (example)	
	$k_{mod,f} = 1.0$ $\gamma_{M,f} = 1.3$		$k_{mod,f} = 1.0$ $\gamma_{M,f} = 1.0$		$k_{mod,f} = 0.8$ $\gamma_{M,f} = 1.3$	
	V_{end}	V_{int}	$V_{k,end}$	$V_{k,int}$	$V_{d,end}$	$V_{d,int}$
72/200	12.98	24.23	16.88	31.50	10.38	19.38
72/220	12.98	24.23	16.88	31.50	10.38	19.38
72/240	12.98	24.23	16.88	31.50	10.38	19.38
72/250	12.98	24.23	16.88	31.50	10.38	19.38
72/300	12.98	24.23	16.88	31.50	10.38	19.38
72/350	12.98	24.23	16.88	31.50	10.38	19.38
72/360	12.98	24.23	16.88	31.50	10.38	19.38
72/400	12.98	24.23	16.88	31.50	10.38	19.38
72/450	12.98	24.23	16.88	31.50	10.38	19.38
72/500	12.98	24.23	16.88	31.50	10.38	19.38

ANNEX 3

INSTALLATION GUIDE FOR THE BEAMS AND COLUMNS

The installation guide of the manufacturer shall be followed. Especially the following points shall be noticed:

- The instructions of the manufacturer regarding the restraint of the compression flange and temporary bracing shall be followed. For moment resistance it should be taken into account that the characteristic values apply when the compression flanges are laterally supported at every 350 mm or less.
- The bearing length to be used shall be ≥ 45 mm.
- Web stiffeners may be used according to the instructions of the manufacturer.
- During installation, the finished product may be exposed for conditions corresponding to hazard class 3 during a short time before immediate protection against rain.