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Authorised and notified according to Article 29 of the Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011

European Technical Assessment ETA-10/0415 of 25/02/2016

I General Part

Technical Assessment Body issuing the ETA and designated according to Article 29 of the Regulation (EU) No 305/2011: ETA-Danmark A/S	
Trade name of the construction product:	HTS-I-Beam
Product family to which the above construction product belongs:	Light composite wood-based beam
Manufacturer:	Meiser Vogtland OHG Am Lehmteich 3 D-08606 Oelsnitz/Vogtland Tel. +49 3 74 21 5 00 Fax +49 74 21 50 21 20 Internet www.meiser.de
Manufacturing plant:	Meiser Vogtland OHG Am Lehmteich 3 D-08606 Oelsnitz/Vogtland
This European Technical Assessment contains:	10 pages including 3 annexes which form an integral part of the document
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of:	Guideline for European Technical Approval (ETAG) No 011 for Light composite wood-based beams and columns, Edition 2002, used as European Assessment Document (EAD).
This version replaces:	The ETA with the same number and issued on 2011-02-25 and with expiry on 2016-02-25

II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of product

Technical description of the product
General

HTS-I-beams are light composite wood-based beams with a double symmetrical cross-section. The flanges either consist of softwood of strength class C24 or better according to EN 338:2003, or of glued laminated timber of strength class GL24 or better according to EN 1194:1999. The web is made of corrugated steel grade S550 GD / Z275 MAC according to EN 10326:2004 with $R_e \geq 550$ N/mm and with a zinc coating of 275 g/m². The mechanical connection between the flanges on top and bottom and the web is ensured via tooth-shaped integral fasteners in the web that are forced into the timber flanges during production. The beams have one or two parallel webs.

The HTS-I-beams have an overall height between 210 and 590 mm with dimensions of the flanges and web as listed in Annex A.

2 Specification of the intended use in accordance with the applicable EAD

HTS-I-beams as structural members are used as beams primarily subjected to bending, shear and concentrated loads at the supports as well as columns primarily subjected to compressive forces in the axial direction, but also to transversal forces. They are defined as slender and with low weight. The use is restricted to service classes 1 and 2 as defined in EN 1995-1-1. They may only be used when there is predominantly static loading.

The provisions made in this European Technical Assessment are based on an assumed intended working life of the beams of 50 years.

The indications given on the working life cannot be interpreted as a guarantee given by the producer or Assessment Body, 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

Characteristic	Assessment of characteristic
3.1 Mechanical resistance and stability (BWR1)	
Numeric values for resistance and stiffness as applicable on the intended use	See 3.10.1
Numeric values for k_{def} and k_{mod}	See 3.10.2
Numeric values for nominal sizes and permissible deviations	See 3.10.3
Load-displacement curves	No performance determined
3.2 Safety in case of fire (BWR2)	
Reaction to fire	The metal webs are classified as non-combustible and fulfil the requirements of class A1 according to EN 13501-1:2002. The timber flanges are classified as D-s2, d0 according to EN 14081-1:2005.
Resistance to fire	No performance determined
3.3 Hygiene, health and the environment (BWR3)	
Dangerous substances	The beam does not contain/release DS specified in TR 034, dated March 2012*)
3.7 Sustainable use of natural resources (BWR 7)	No performance determined
3.8 Related aspects of product performance	The HTS-I-Beam 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

*) 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 Construction Products Regulation, these requirements need also to be complied with, when and where they apply.

3.9 General aspects related to the performance of the product

Safety principles and partial factors

The characteristic load-carrying capacities are based on the characteristic values of the HTS-I-beams. To obtain design values the capacities have to be divided by the partial factors for the material property of timber γ_M and multiplied with the coefficient k_{mod}. In the serviceability limit state the coefficient k_{def} applies.

3.10 Mechanical resistance and stability

3.10.1 Mechanical resistance

In each individual case the design values of the bending and shear capacity have to be calculated according to annex B of EN 1995-1-1 or according to Annex B of this ETA, using the factors K_{ser} or K_u, respectively. In the calculation of the effective bending stiffness of HTS-I-beams the bending stiffness of the web is disregarded. The characteristic capacities for shear loading, pull-out at the connection timber flange to web and concentrated loading at the supports are summarized in Table 3 of Annex B. They should be used for design in accordance with EN 1995-1-1. In Annex C the calculations of the

ultimate limit state design values for the HTS-I-beam for the maximum bending stresses and shear forces per unit length along the connection timber flange to steel web are given.

3.10.2 Numeric values for k_{def} and k_{mod}

As coefficients k_{mod} and k_{def} the values for solid timber according to EN 1995-1-1 apply. They are listed in Table 4 and Table 5 of Annex B depending on the load duration class and the service class.

3.10.3 Numeric values for nominal sizes and permissible deviations

The numerical values for nominal sizes and permissible deviations are listed in Table 1 and Table 2 of Annex A with the configuration and the dimensions of the HTS-I-beams displayed in Figure 1.

3.10.4 Load-displacement curves

No performance has been determined in relation to the load-displacement curves to be used in the evaluation of the seismic behaviour of the work.

3.10.5 General aspects related to the fitness for use of the product

The beams are manufactured in accordance with the provisions of this European Technical Assessment 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 Attestation and verification of constancy of performance (AVCP)

4.1 AVCP system

According to the decision 1999/92/EC of the European Commission as amended, the system(s) of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) is 1.

5 Technical details necessary for the implementation of the AVCP system, as foreseen in the applicable EAD

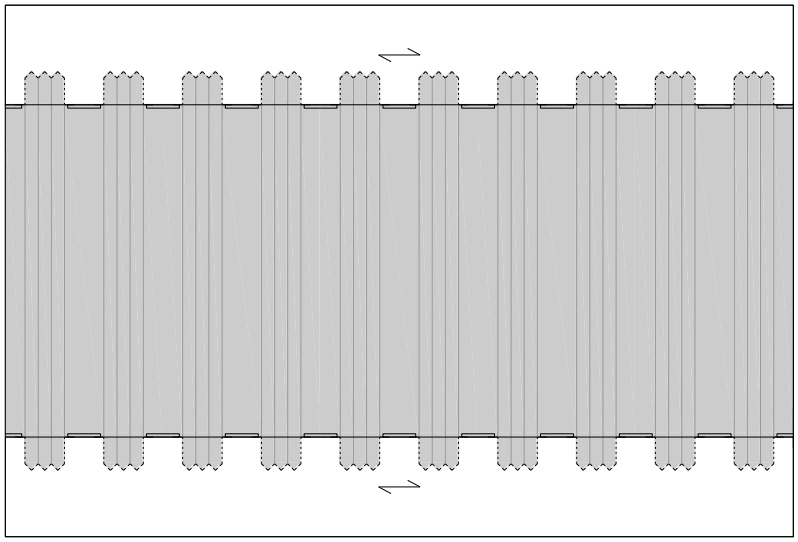
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at ETA-Danmark prior to the CE marking.

Issued in Copenhagen on 2016-02-25 by

Thomas Bruun
Managing Director, ETA-Danmark

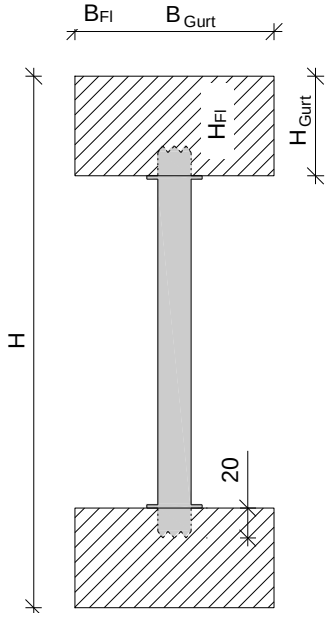
Annex A
Product details definitions

Elevation

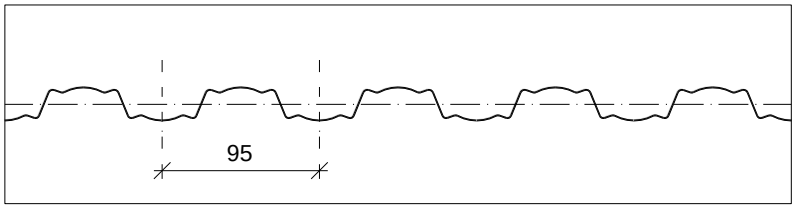


Thickness of the web: t=0,5mm

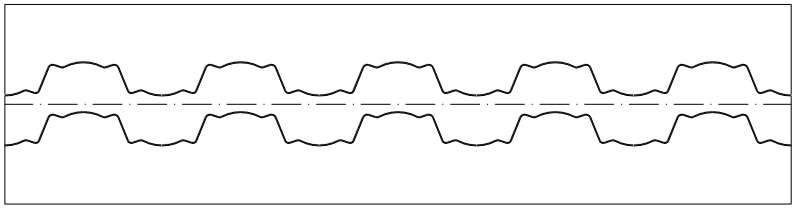
Cross section
(single web)



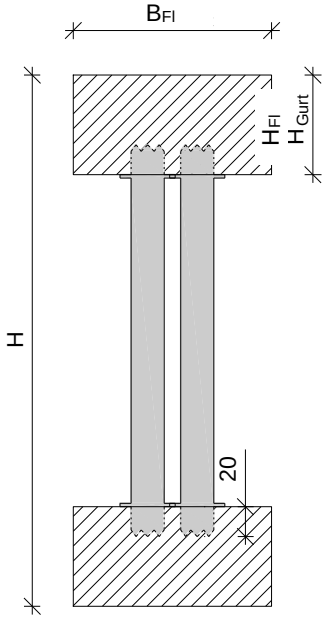
Longitudinal section
(single web)



Longitudinal section
(double web)



Cross section
(double web)



Dimensions in [mm]

Figure 1: Configuration and dimensions of HTS-I-beams

Table 1: Materials specification and range of sizes

Type	Thickness t/ Width B_{Fl} [mm]	Depth H_W /H_{Fl} [mm]	Minimum material specification	Coating specification
Steel web	0,5	110 to 350	S550 GD	Z 275
Timber flanges	80 to 200	50 to 120	C24 or GL24	-

Table 2: Tolerances of HTS-I-beams

		Unit	Tolerance
Total height	H	[mm]	± 2
Total length	ℓ	[mm]	± 5
Flanges	B_{Fl}	[mm]	± 2
Alignment flange – web	-	[mm]	± 5

Annex B
Characteristic load-carrying capacities

Table 3: Characteristic values for HTS-I-beams

Type	Symbol	Unit	Value
Slip modulus (serviceability limit state)	K_{ser}	[N/mm]	2500
Slip modulus (ultimate limit state)	K_u	[N/mm]	1700
Characteristic shear resistances – single web	$f_{v,k}$	[N/mm]	33
Characteristic shear resistances – double web	$f_{v,k}$	[N/mm]	60
Characteristic resistances against pull-out	$f_{ax,k}$	[N/mm]	1,0
Characteristic bearing capacity against concentrated loading at an end support	$F_{V,E,Rk}$	[kN]	15
Characteristic bearing capacity against concentrated loading at an intermediate support	$F_{V,in,Rk}$	[kN]	42
Fastener spacing – single web	s	[mm]	47,5
Fastener spacing – double web	s	[mm]	23,75

Design values are calculated as characteristic values, multiplied by k_{mod} and divided by γ_M for timber.

Effective bending stiffness of HTS-I-beams

The effective bending stiffness of the HTS-I-beams may be calculated as follows (with the symbols as defined in Table 1 to Table 3 and Figure 1):

$$I_{ef} = 2 \cdot I + 2 \cdot \gamma \cdot A \cdot a_1^2$$

where:

$$I = \frac{B_{Fl} \cdot H_{Fl}^3}{12}$$

$$A = B_{Fl} \cdot H_{Fl}$$

B_{Fl} is the flange width

H_{Fl} is the flange depth

$$a_1 = 0,5 \cdot \left(H - H_{Fl} \right)$$

$$\gamma = \left[1 + \frac{\pi^2 \cdot E \cdot A \cdot s}{K_i \cdot \ell^2} \right]^{-1}$$

$K_i = K_{ser}$ for serviceability limit state calculations

$K_i = K_u$ for ultimate limit state calculations

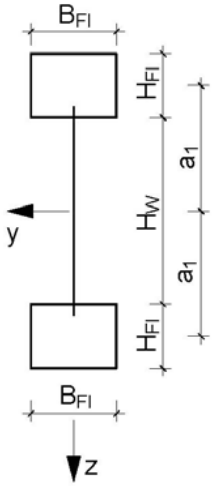


Table 4: Values of modification factors k_{mod} for service classes 1 and 2

Load duration class	Modification factor k_{mod}	Load duration class	Modification factor k_{mod}
Permanent	0,60	Short-term	0,90
Long-term	0,70	Instantaneous	1,10
Medium-term	0,80		

Table 5: Values of deformation factors k_{def}

Service class	Deformation factor k_{def}	Service class	Deformation factor k_{def}
1	0,60	2	0,80

Annex C
Ultimate limit state design values for bending and shear stresses

The ultimate limit state design stresses for the HTS-I-beam calculate as follows (with the symbols as defined in the preceding annexes). The maximum bending stress due to an external momentum is given by:

$$\sigma_{m,d} = \pm \frac{M_d}{I_{ef}} \cdot \left(\gamma \cdot a_1 + \frac{H_{Fl}}{2} \right)$$

where:

M_d = design value of external moment

The tensile and compression stresses in the centre line of the flanges due to an external momentum are given by:

$\sigma_{a1,t,d} = (M_d/I_{ef}) \cdot \gamma \cdot a_1$

$\sigma_{a1,c,d} = - (M_d/I_{ef}) \cdot \gamma \cdot a_1$

The maximum shear force per unit length along the intersection timber flange to steel web due to the maximum shear force in the beam is given by:

$$t_{inter,d} = \frac{V_{max,d} \cdot \gamma \cdot A \cdot a_1}{I_{ef}}$$

where:

$V_{max,d}$ = design value of maximum shear force