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European Technical Assessment Body
for construction products



European Technical Assessment

ETA-08/0134
of 5 January 2026

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the
European Technical Assessment:

Deutsches Institut für Bautechnik

Trade name of the construction product

VELOX

Product family
to which the construction product belongs

Non-load bearing permanent shuttering system "VELOX"
based on shuttering elements of wood-chip concrete
shuttering leaves with steel clips of construction or spacer
webs of wood chip concrete

Manufacturer

VELOX-Werk Ges.m.b.H
Dachberg 10
9422 Maria Rojach
ÖSTERREICH
GERMANY

Manufacturing plant

VELOX-Werk Ges.m.b.H
Dachberg 10
9422 Maria Rojach
ÖSTERREICH
VELOX - Werk s.r.o.
Belotinska 288
75301 HRANICE
TSCHECHISCHE REPUBLIK

This European Technical Assessment
contains

8 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

EAD 340309-00-0305

This version replaces

ETA-08/0134 issued on 3 July 2019

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Specific part

1 Technical description of the product

1.1 Description of the construction product

The shuttering system "VELOX" is a non-load-bearing permanent shuttering kit for non-reinforced and reinforced, non-load-bearing and load-bearing, internal and external concrete walls cast in situ.

The shuttering elements (see Annexes A2 and A3) consist of inner and outer shuttering leaves of mineral-bonded boards made of wood chips connected by steel clips for construction (see Annexes A2 to A4 and 1.4.1) or by wood-chip concrete spacer webs (see Annexes A5 and 1.4.2). The spacer webs are fixed to mineral-bonded boards made of wood chips using wood screws.

The shuttering elements with steel clips for construction are assembled on site from individual mineral-bonded boards made of wood chips and steel clips for construction (see Annex A3) or prefabricated in the factory for the shuttering of complete wall sections (see Annex A4). The individual shuttering sections for shuttering to the height of one storey are connected together using screwed metal connector plates (see Annex A4).

The shuttering elements with wood-chip concrete spacer webs (see Annex A5) are not assembled on site from individual mineral-bonded boards made of wood chips and spacer webs but are prefabricated in the factory for the shuttering of complete wall sections only.

The "VELOX" shuttering system does not comprise finishes.

1.2 Shuttering elements

The shuttering elements consist of factory-made inner and outer shuttering leaves (see Annexes A2 to A5) of mineral-bonded boards made of wood chips held together with steel clips for construction (see Annex A3 and A4) or with spacer webs made of wood-chip concrete (see Annex A5) in order to resist the pressure of the concrete.

Shuttering elements without internal thermal insulation (see Annex A2, 1.) have inner and outer shuttering leaves made of single-layer wood-chip concrete (see 1.3.1).

The most important dimensions of the shuttering elements without thermal insulation are within the following ranges:

- concrete core thicknesses: 80 to 430 mm
- total wall thicknesses without rendering: 130 to 600 mm
- thickness of inner shuttering leaf: 25 to 85 mm
- thickness of outer shuttering leaf: 25 to 85 mm
- length of standard shuttering leaves: 2000 mm
- height of standard shuttering leaves: 500 mm

Shuttering elements with internal thermal insulation (see Annex A2, 2.) have 2-layer shuttering leaves on the outside, consisting of wood-chip concrete and insulating material (see 1.3.2) and on the inside, single-layer shuttering leaves made of wood-chip concrete (see 1.3.1).

The most important dimensions of the shuttering elements with thermal insulation are within the following ranges:

- concrete core thicknesses: 120 to 430 mm
- total wall thicknesses without rendering: 190 to 930 mm
- thickness of inner shuttering leaf: 25 to 85 mm
- thickness of outer shuttering leaf: 25 to 85 mm

1.4.2 Wood-chip concrete spacer webs

The inner and outer wood-chip concrete shuttering leaves can also be screw-connected using wood-chip concrete spacer webs. The webs are made from the same material as the WSD 50 mineral-bonded boards made of wood chips (see Annex A5).

1.4.3 Wood screws for screwing the wood-chip concrete spacer webs to the mineral-bonded boards made of wood chips for prefabricated wall shuttering.

The connection between the shuttering leaf and the wood-chip concrete spacer web is made by wood screws according to EN 14592. The wood screws shall be at least 4 mm in diameter. The minimum penetration in the spacer webs is 9 times the screw diameter (see also Annex A5). The edge distance must be between 5 cm and 6 cm. The vertical centre distance of the wood screws within a distance strip may not exceed 10 cm.

1.4.4 Metal connector plates for prefabricated wall shuttering

Metal connector plates in accordance with Annex A4 (see bottom) are used, which are connected to the shuttering leaves using nails in accordance with 1.4.5, as set out in Annex A4.

1.4.5 Nails (Annex A3)

Nails in accordance with EN 14592 are used to interconnect the wood-chip concrete shuttering leaves to form a tight joint between the wood-chip concrete shuttering leaves in horizontal and vertical direction as well as at head joints or corners. For this, three nails are distributed over the height and one nail over the length of the shuttering leaf, see Annex 3, B4.1 and B4.2)

The nails are made of steel or galvanised steel.

1.4.6 Wall end leaves (vertical and horizontal) (Annex A3, B4.1 and B4.2)

Wall end leaves are used to define the vertical (e.g. for door or window openings) and horizontal edges (e.g. for parapets or lintels) of a wall; they are inserted at the ends of the shuttering leaves between the inner and outer wood-chip concrete shuttering leaves and are fixed using nails. All panels listed in Section 1.3.1 can be used for this purpose.

2 Specification of the intended use in accordance with EAD 340309-00-0305

The kit is intended to be used for the construction of internal and external walls above or below ground, either load-bearing or non-load-bearing, including walls subject to fire safety regulations. When this type of construction is used below ground, a waterproofing liner in accordance with the national regulations shall be provided, depending on the presence of pressurised or non-pressurised water. The waterproofing liner shall be protected from mechanical damage by an impact resistant protective layer.

In accordance with EOTA TR 034 the following use categories apply:

- Category IA 2: product with indirect contact to indoor air (e.g. covered by impermeable products).
- Category S/W 3: product with no contact to soil-, ground- or surface water

The performances given in Section 3 are only valid if the shuttering kit is used in compliance with the specifications and conditions given in Annex B1.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the shuttering kit of 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the manufacturer, 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 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Resulting structural pattern	Grid type according to EAD 340309-00-0305, chapter 1.3.3
Efficiency of filling	see Annex C1
Possibility of steel reinforcement	see Annex C1

3.2 Safety in case of fire (BWR 2)

Wesentliches Merkmal	Leistung
Reaction to fire	
Shuttering blocks made off wood chip concrete without supplementary thermal insulation	
"Velox" shuttering elements without thermal insulation (see Annex A2, 1.)	class A2-s1, d0 in accordance with EN 13501-1 requirements: see Annex C2, paragraph a)
Shuttering blocks made off wood-chip concrete with supplementary thermal insulation	
"Velox" shuttering elements with thermal insulation (see Annex A2, 2.) as well as storey-height wall elements made from them	Class B-s1, d0 to DIN EN 13501-1 requirements: see Annex C2, paragraph b)
Shuttering elements with an insulation layer which does not meet the conditions set out in Annex C2, paragraph b	class E in accordance with EN 13501-1 requirements: see Annex C2, paragraph c)

3.3 Hygiene, health and the environment (BWR 3)

Essential characteristic	Performance
Content, emission and/or release of dangerous substances	
Substances classified as Carc. 1A/1B ^{a)}	None of these raw materials are actively used in the manufacture of the construction product. ^{b) c)}
Substances classified as Muta. 1A/1B ^{a)}	
Substances classified as Acute Tox. 1, 2, 3; Repr. 1A/1B; STOT SE 1 and STOT RE 1 ^{a)}	
Use scenarios regarding BWR 3:	
IA 3	Product with no contact to indoor air
Water vapour permeability	water vapour resistance factor $\mu = 30$ (max. value) see Annex C3

Essential characteristic	Performance
Water absorption	No performance assessed
Water tightness	No performance assessed (finishes are not part of this ETA)

a) In accordance with Regulation (EC) No 1272/2008

b) Assessment based on the detailed manufacturers' statements on dangerous substances

c) Active use is the targeted use of substances to achieve specific product properties. Substances that are present as impurities and/or as a secondary component in the product are therefore not to be regarded as "actively used".

3.4 Safety and accessibility in use (BWR 4)

Essential characteristic	Performance
Bond strength	
Leaf to leaf	see Annex C4
Leaf (type WS) to concrete	$\geq 0.5 \text{ N/mm}^2$
Leaf (type WSD) to concrete	$\geq 1.0 \text{ N/mm}^2$
Resistance to impact load	
global resistance	see Annex C4
local resistance	No performance assessed
Resistance to filling pressure	bending tensile strength of the shuttering leaves $\geq 150 \text{ kPa}$ tensile strength of the web (tie) $\geq 70 \text{ kPa}$
Leaf type WS	bending tensile strength $\geq 500 \text{ kPa}$
Leaf type WSD	bending tensile strength $\geq 1000 \text{ kPa}$
connection between steel clip for construction and shuttering leave (see 1.4.1)	tensile strength $\geq 1,5 \text{ kN}$
connection between spacer web and shuttering leave (see 1.4.2)	tensile strength $\geq 1,5 \text{ kN}$
factory-applied thermal insulation	see Annex C4
Safety to personal injuries	When delivered on site the shuttering elements do not have sharp or cutting edges. Due to a certain risk of abrasion or of cutting people on rough surfaces of the shuttering blocks handling on site shall be done with gloves

3.5 Protection against noise (BWR 5)

Essential characteristic	Performance
Airborne sound insulation	See Annex C5
Sound absorption	No performance assessed

3.6 Energy economy and heat retention (BWR 6)

Essential characteristic	Performance
Thermal resistance	See Annex C6
Thermal inertia	$c = 1,50 \text{ kJ}/(\text{kg} \times \text{K})$ See Annex C6

3.7 Aspects of durability

Built-in finishes are not part of the assessed shuttering kit.

Essential characteristic	Performance
Resistance to deterioration	
Chemical agent	Built-in finishes are not part of the ETA

4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

In accordance with EAD No 340309-00-0305, January 2019, the applicable European legal act is Decision 98/279/EC as amended by Commission Decision 2001/596/EC of 8 January 2001.

The system to be applied is: 2+

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

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

Issued in Berlin on 5 January 2026 by Deutsches Institut für Bautechnik

LBD Dipl.-Ing. Andreas Kummerow
Head of Department

beglaubigt:
Groth

Characteristics of product

The shuttering kit "VELOX" consists of the following components:

- inner and outer shuttering leaves of mineral-bonded boards made of wood chips and
- accessory parts,

see section 1 of the "Special Part".

1. Mineral-bonded boards made of wood chips

Examples for the use of the mineral-bonded boards made of wood chips for the inner and outer shuttering leaves are given Annex A2. In the Table of Annex A2 are also given the dimensions of the shuttering leaves.

The most important material characteristics of the shuttering leaves of wood chip concrete are given in Table 1.

Table 1: Characteristics of the mineral-bonded boards made of wood chips according to EN 13168

Type of shuttering leaf	Characteristics
Same properties of WS and WSD	Tolerances of the dimensions of the wood-chip concrete shuttering leaves Length according to EN 822: +3 mm, -5 mm Width according to EN 822: ±3 mm Thickness according to EN 823: +3 mm, -2 mm Squereness according to EN 824: ≤ 4 mm/m Chloride content according to Annex D.1 of EN 13168: ≤ 0,35 % Dimensional stability after 48 h storage at (70 ± 2) ° C and (90 ± 5)% relative humidity: Change in thickness: +3 %, Change in length: +0,5 %, Change in width: +0,5 %
WS	Nominal value of bulk density: max 810 kg/m ³ Compressive stress at 10% compression or compressive strength according to EN 826: ≥ 1000 kPa Bending strength as a function of the thickness according to EN 12089: ≥ 500 kPa
WSD	Nominal value of bulk density: max 1200 kg/m ³ Compressive stress at 10% compression or compressive strength according to EN 826: ≥ 1000 kPa Bending strength as a function of the thickness according to EN 12089: ≥ 1000 kPa

The nominal values of the thermal conductivity of the wood-chip concrete shuttering leaves as a function of the apparent density correspond to Table 2 of the "Special Part" of the ETA.

As factory-applied thermal insulation for the shuttering element according to (see Annex A2, 2.), only insulating materials in accordance with harmonised European product standards or European Assessment Documents (EADs) shall be used. In addition, the stress at 10% compression and/or the compressive strength (if both are given, the lower value shall be taken) shall not be lower than 80 kPa. Furthermore, in order to ensure that the thermal conductivity is not compromised, the fresh concrete shall not penetrate into the integrated thermal insulation. If this cannot be guaranteed, a waterproof sheet must be applied to the inside of the integrated thermal insulation in such a way that it prevents the penetration of fresh concrete into the integrated thermal insulation when the concrete is poured.

VELOX

Characteristics of product

Annex A1
Page 1 of 2

2. Accessory parts

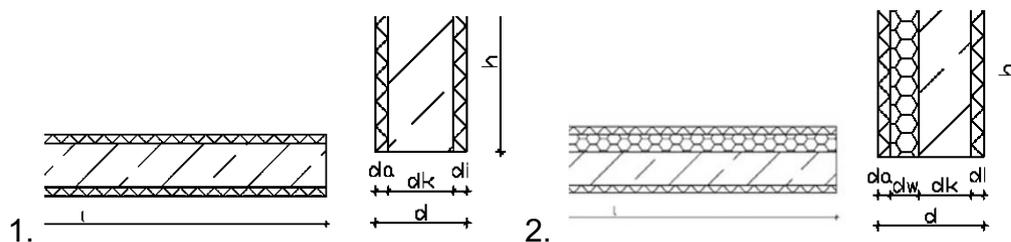
The accessory parts include:

- steel clips for construction ES, DS, RB, AB, HB and STB (see section 1.4.1),
- wood-chip concrete spacer webs (see section 1.4.2),
- wood screws for screwing the wood-chip concrete spacer webs to the mineral-bonded boards made of wood chips for prefabricated wall shuttering (see section 1.4.3),
- metal connector plates for prefabricated wall shuttering (see section 1.4.5),
- nails (see section 1.4.5) and wall end leaves (see section 1.4.6).

VELOX

Characteristics of product

Annex A1
Page 2 of 2



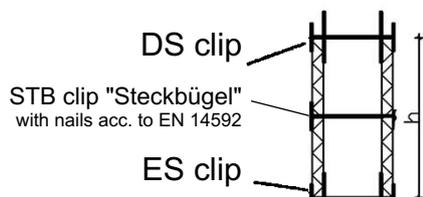
Type	Fig.	L	d	dk	da	di	dw	h
		[mm]	[mm]	[mm]	[mm]	[mm]	(mm)	[mm]
NN18	1	2000	180	120	30	30	-	500
TT15	1	2000	150	80	35	35	-	500
TT20	1	2000	200	130	35	35	-	500
TT22	1	2000	220	150	35	35	-	500
TT25	1	2000	250	180	35	35	-	500
TT27	1	2000	270	200	35	35	-	500
TT30	1	2000	300	230	35	35	-	500
GT25	1	2000	250	165	50	35	-	500
GT30	1	2000	300	215	50	35	-	500
GG25	1	2000	250	150	50	50	-	500
GG30	1	2000	300	200	50	50	-	500
XG30	1	2000	300	175	50	75	-	500
GU30	1	2000	300	200	50	50	-	500
ET27	2	2000	270	150	35	35	50	500
ET30	2	2000	300	150	35	35	80	500
ET32	2	2000	320	150	35	35	100	500
ET33,5	2	2000	335	150	35	50	100	500
ET34	2	2000	340	150	35	35	120	500
ET35	2	2000	350	130	35	35	150	500
ET35,5	2	2000	355	150	35	50	120	500
ET37	2	2000	370	150	35	35	150	500
ET38,5	2	2000	385	150	35	50	150	500
ET40	2	2000	400	180	35	35	180	500

VELOX

Examples of types of shuttering elements

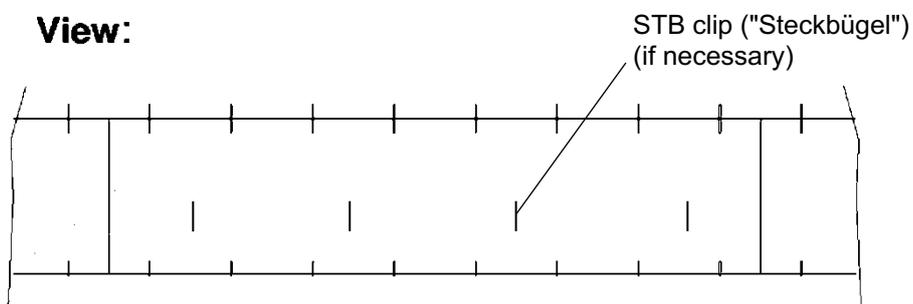
Annex A2

Shuttering system VELOX

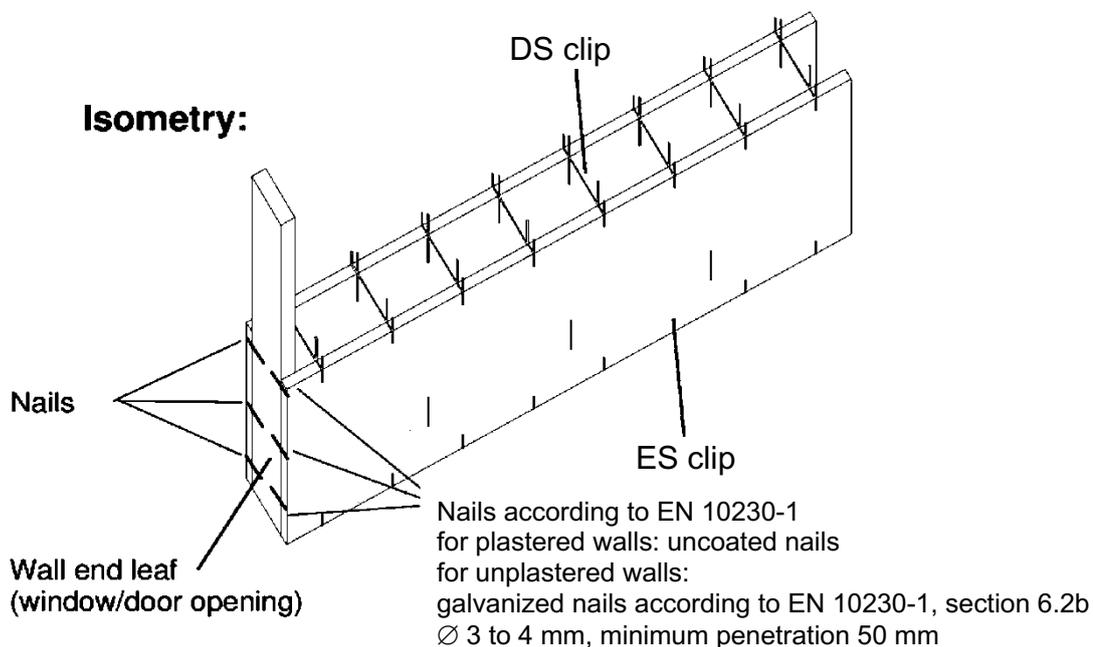


Cross section:
1. layer

View:



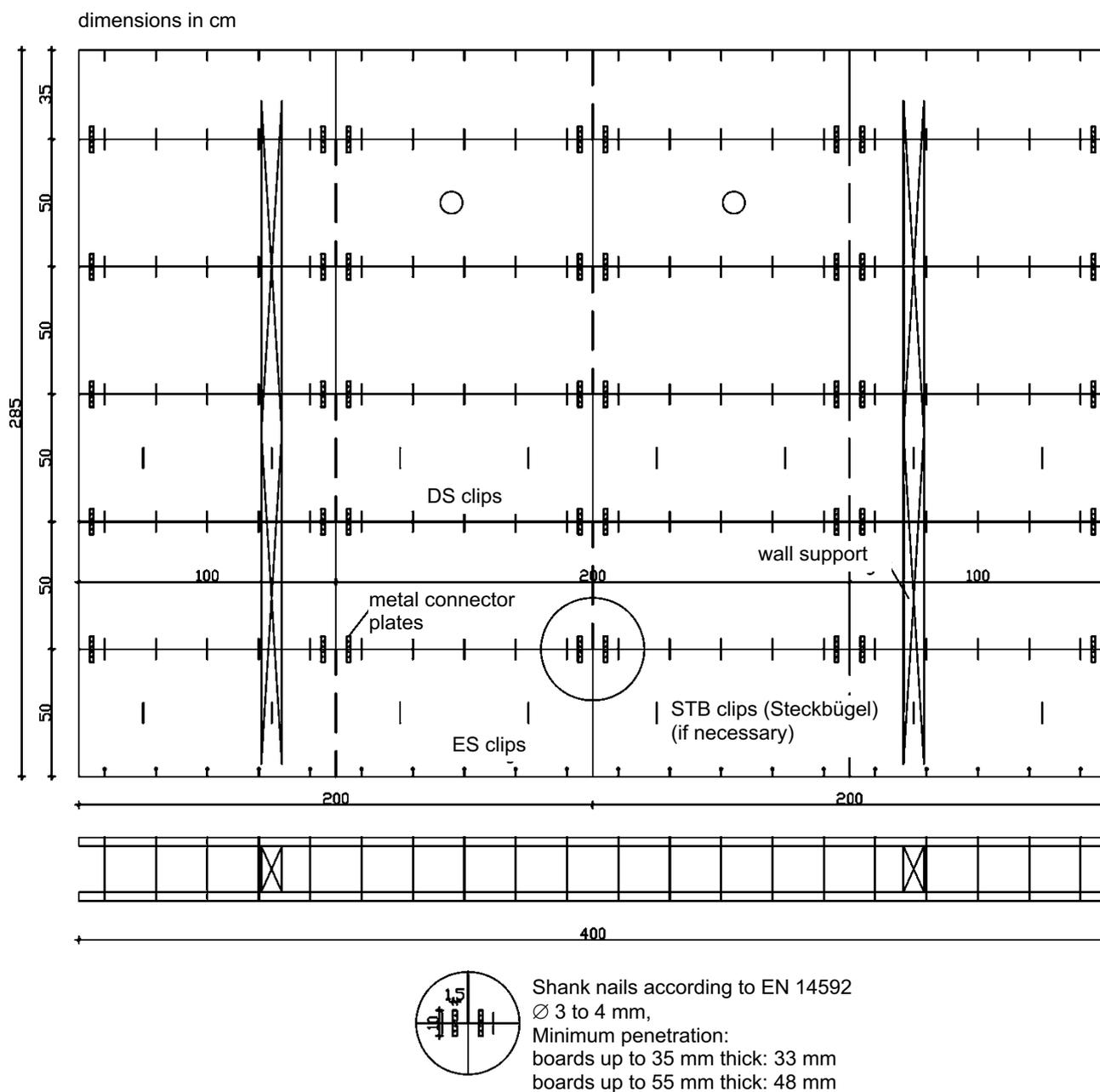
Isometry:



sketches not to scale

VELOX	Annex A3
Shuttering system "VELOX"	

Prefabricated wall section with steel clips for construction



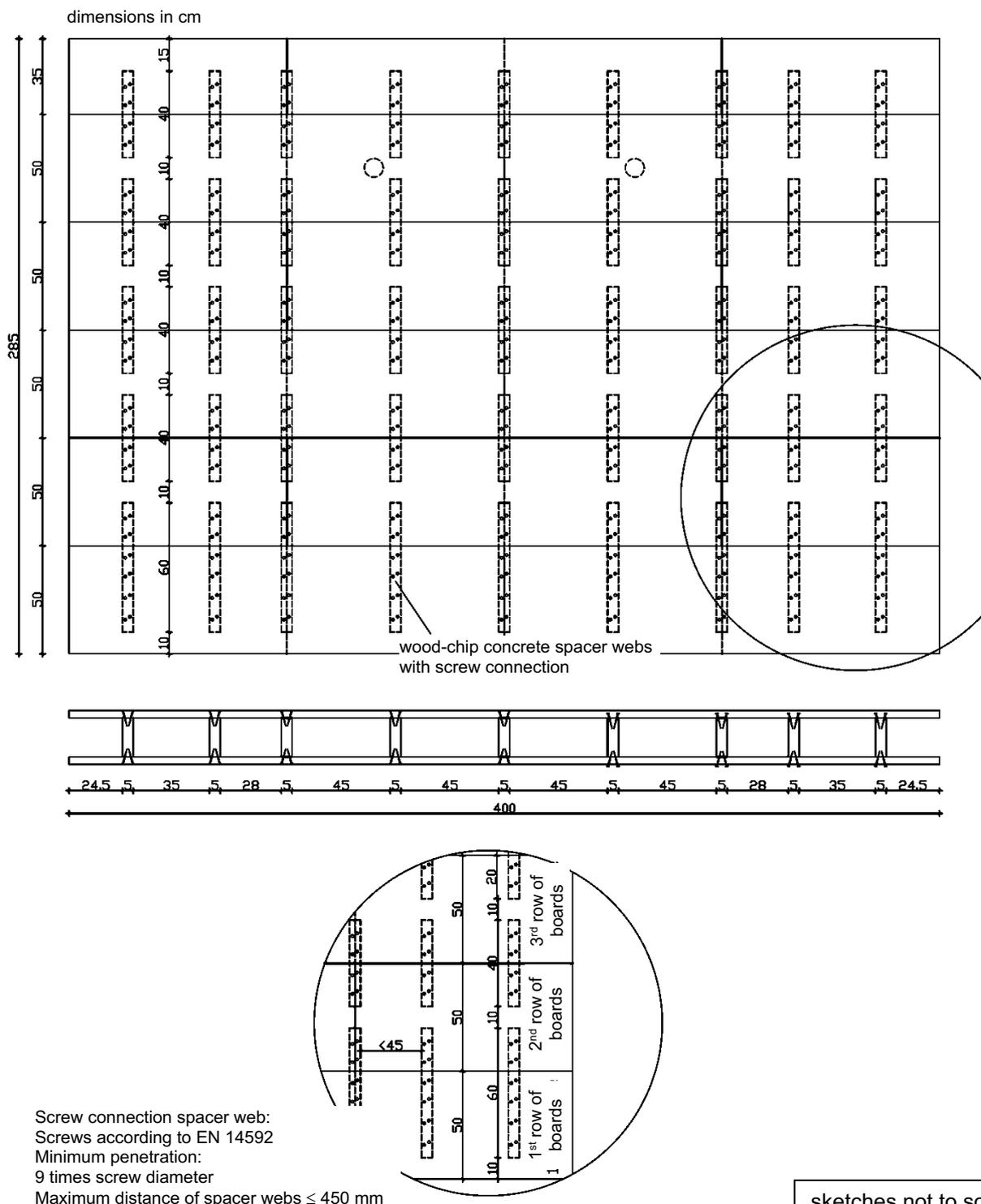
sketches not to scale

VELOX

Prefabricated wall section with steel clips for construction

Annex A4

Prefabricated wall section with wood-chip concrete spacer webs



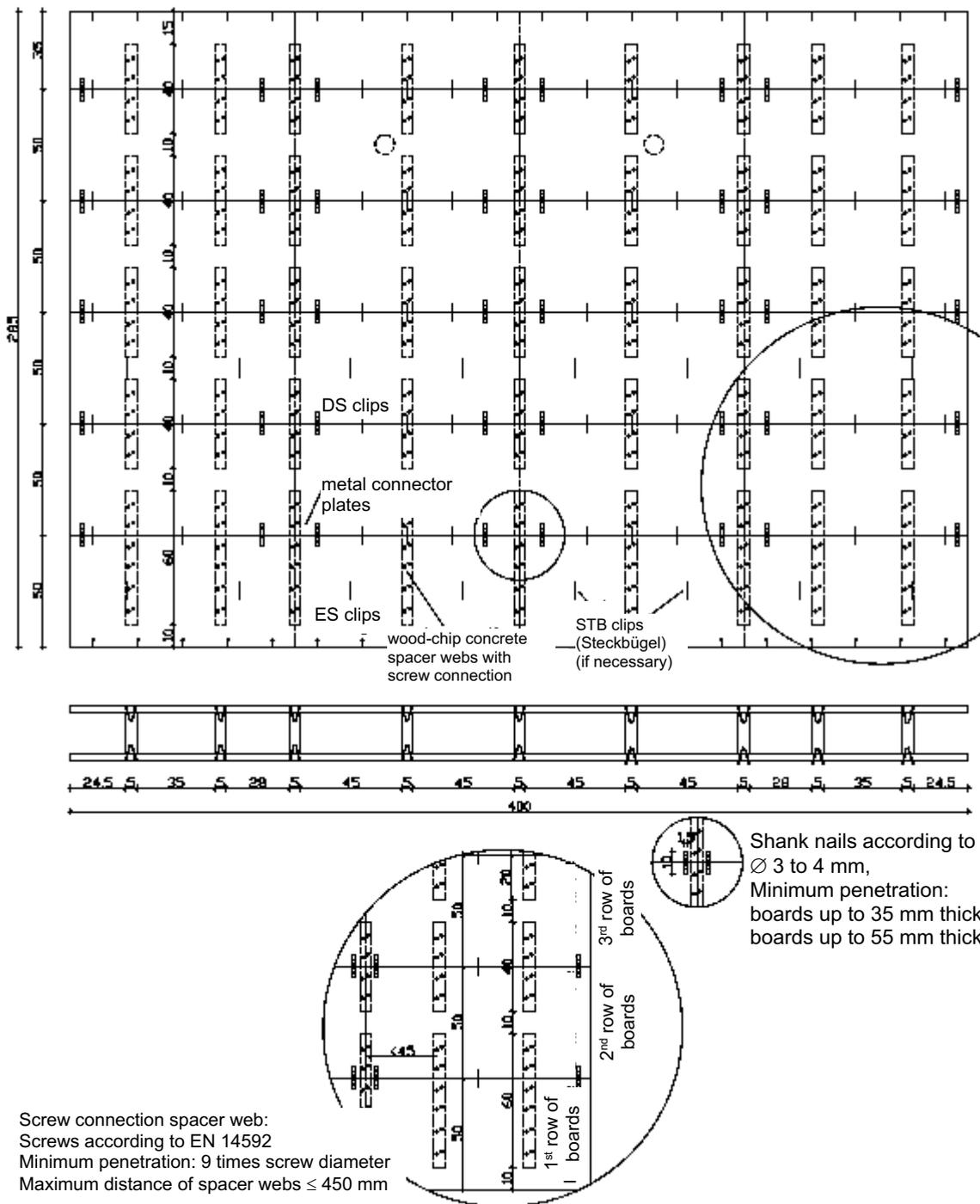
VELOX

Prefabricated wall section with wood-chip concrete spacer webs

Annex A5

Prefabricated wall section with steel clips and wood-chip concrete spacer webs

dimensions in cm



sketches not to scale

VELOX	Annex A6
Prefabricated wall section with wood-chip concrete spacer webs	

Standards and Guidelines		Issue	Title
EN	206	2013 + A2:2021	Concrete – Specification, performance, production and conformity
EN	1992-1-1	2011-01 + A1:2015-03	Eurocode 2: Design of concrete structures. – Part 1-1: General rules and rules for buildings
EN	13163	2012+A2:2016	Thermal insulation products for buildings – Factory made products of expanded polystyrene (EPS) – Specification
EN	13168	2012+A1:2015	Thermal insulation products for buildings – Factory made products of expanded cork (ICB) – Specification
EN	13501-1	2010-01	Fire classification of construction products and building elements – Part 1: Classification using test data from reaction to fire tests
EN	13501-2	2016	Fire classification of construction products and building elements – Part 2: Classification using data from fire resistance tests, excluding ventilation services
EN	14474	2004	Precast concrete products - Concrete with wood-chips as aggregate - Requirements and test methods
EN	15498	2008	Precast concrete products – Wood-chip concrete shuttering blocks – Product properties and performance
EN ISO	717-1	2013	Acoustics – Rating of sound insulation in buildings and of building elements – Part 1: Airborne sound insulation
EN ISO	6946	2018	Building components and building elements – Thermal resistance and thermal transmittance – Calculation method
EN ISO	10456	2010	Building materials and products - Hygrothermal properties - Tabulated design values and procedures for determining declared and design thermal values (ISO 10456:2007 + Cor. 1:2009)
EN ISO	13788	2013	Hygrothermal performance of building components and building elements – Internal surface temperature to avoid critical surface humidity and interstitial condensation – Calculation methods
EAD	040083- 00-0404	2019-01	External thermal insulation composite systems (ETICS) with renderings
EAD	340309- 00-0305	2019-01	Non load-bearing permanent shuttering kits/systems based on hollow blocks or panels of insulating materials and sometimes concrete
VELOX			Annex B1
Prefabricated wall section with wood-chip concrete spacer webs			

Instructions for determining the resistance to fire for the intended use

The walls are only exposed to fire on one side.

The fire resistance of non-load-bearing walls constructed with the shuttering elements "VELOX" with wood-chip concrete spacer webs (see chapter 1.4.2 in the "Special Part" and Annex A5) may be determined under the following conditions according to EN 1992-1-2, Table 5.3 in conjunction with national annexes in force at the place of use:

- The reaction to fire class according to 3.1.6 of the shuttering elements "VELOX" corresponds to at least B-s1, d0.
- The concrete of the concrete core meets at least the concrete strength class C16/20.
- As wall thickness according to EN 1992-1-2, Table 5.3 is used the thickness of the concrete core.
- All requirements according to EN 1992-1-2, sections 5.1 and 5.2 with the national annexes in force at the place of use are fulfilled.

The fire resistance of load-bearing walls constructed with the shuttering elements "VELOX" with wood-chip concrete spacer webs (see chapter 1.4.2 in the "Special Part" and Annex A5) may be determined under the following conditions according to EN 1992-1-2, Table 5.4, columns "wall exposed on one side" in conjunction with national annexes in force at the place of use:

- The reaction to fire class according to 3.1.6 of the shuttering elements "VELOX" corresponds to at least B-s1, d0.
- The wall was designed in accordance with EN 1992-1-1 only taking into account the load-bearing effect of the concrete or reinforced concrete.
- The concrete of the concrete core meets at least the concrete strength class C16/20.
- As wall thickness according to EN 1992-1-2, Table 5.4 is used the thickness of the concrete core
- All requirements according to EN 1992-1-2, sections 5.1 and 5.2 with the national Annexes in force at the place of use are fulfilled.

If the class of reaction to fire according to 3.1.6 of the used "VELOX" shuttering elements with wood-chip concrete spacer webs (see chapter 1.4.2 in the "Special Part" and Annex A5) is lower than B-s1, d0, the fire resistance of the therewith erected walls may be determined with regard to stability (structural safety criterion R) under the following conditions according to EN 1992-1-2, Table 5.4, columns "Wall exposed on two sides" in conjunction with national annexes in force at the place of use:

- The wall was designed in accordance with EN 1992-1-1 only taking into account the load-bearing effect of the concrete or reinforced concrete.
- The concrete of the concrete core meets at least the concrete strength class C16/20.
- As wall thickness according to EN 1992-1-2, Table 5.4 is used the thickness of the concrete core.
- All requirements according to EN 1992-1-2, sections 5.1 and 5.2 with the national annexes in force at the place of use are fulfilled.
- The fulfilment of the thermal insulation criterion I and integrity criterion E of such walls is not detectable in this case without additional investigations.

The preconditions for this classification are:

- The design of the building has to take into consideration the secondary effects of fire. Especially constraints, introduced by thermal strain, should be sufficiently low and appropriate building joints should be foreseen. The rules, valid in place of use, govern. Structural requirements on work in normal conditions, valid in the place of use, may require larger dimensions. Concrete cover for the reinforcement has to be observed according to the rules valid in the place of use.

VELOX	Annex B2 Page 1 of 2
Instructions for determining the resistance to fire for the intended use	

- A normal weight concrete as defined in EN 206 shall be used. As far as European standards EN 206 is not in force, an equivalent concrete according to national rules, valid in the place of use, is acceptable. The strength class of concrete shall be between C16/20 and C50/60 according to EN 206.
- The shuttering elements shall on both sides either be plastered/rendered or at least the joints on both sides shall be sealed with plastering/rendering mortar. The mortar for plastering/rendering or for sealing shall be based on inorganic aggregates, gypsum, cement or lime or on suitable combinations of these three binders.

Note: The classification of walls constructed with the shuttering system "VELOX" regarding to fire resistance are valid only for walls without openings (for windows or doors for examples).

VELOX

Instructions for determining the resistance to fire for the intended use

Annex B2
Page 2 of 2

Instructions for determining the thermal resistance for the intended use

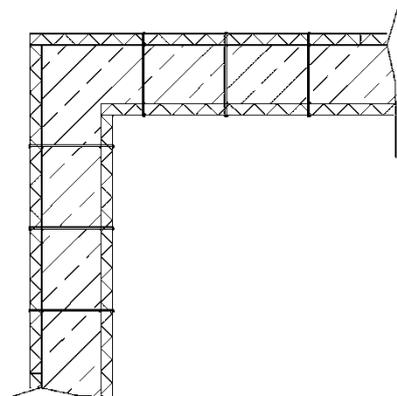
The nominal value of the thermal resistance $R_{D,wall}$ of the walls made of shuttering elements "VELOX" (with core concrete and, if present, with thermal insulation and plaster) shall be obtained in accordance with EN ISO 6946. The nominal value of the thermal conductivity of the wood-chip concrete shuttering elements $\lambda_{D,w}$ shall be taken from Table 2 of the "Special" Part ", the nominal value of the thermal conductivity of the core concrete λ_C is given in EN ISO 10456 as a function of the density ρ and the nominal value of the thermal conductivity λ_D shall be taken from the declaration of performance (DoP) of the manufacturer of the thermal insulation insert used.

The consideration of the influence of the steel clips for construction can be made by exact procedures according to EN ISO 946, section 5.3 or approximately according to EN ISO 6946, F.3.

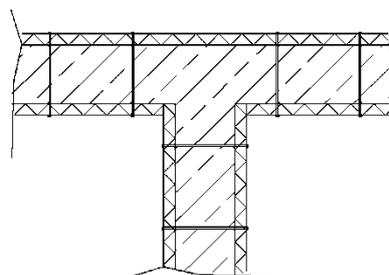
VELOX	Annex B3
Instructions for determining the thermal resistance for the intended use	

Internal and external walls

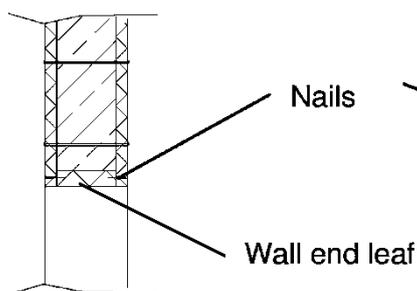
Layout:
Rectangular corner



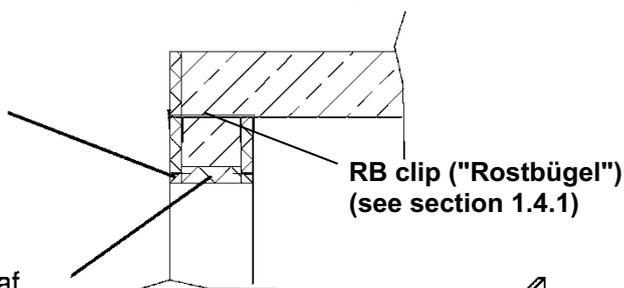
Layout:
T-wall



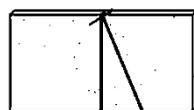
Layout:
window/door opening



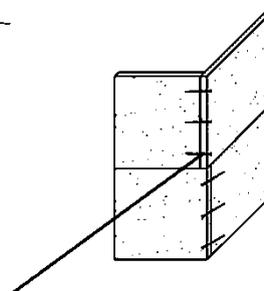
Cross section:
lintel/ceiling construction



Nails:
drive in slightly angled
(~15°)



Nails



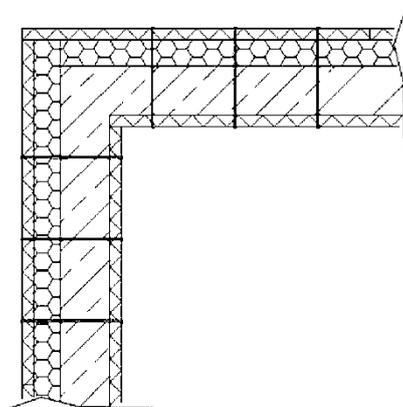
VELOX

Interior and exterior walls

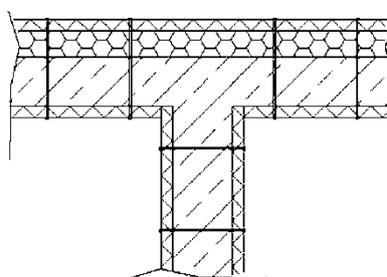
Annex B4.1

External walls

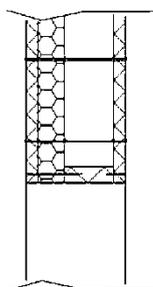
Layout:
Rectangular corner



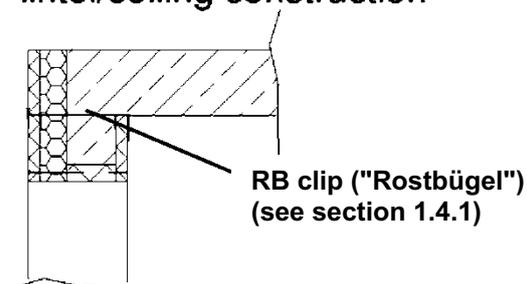
Layout:
T-wall



Layout:
window/door opening



Cross section:
lintel/ceiling construction



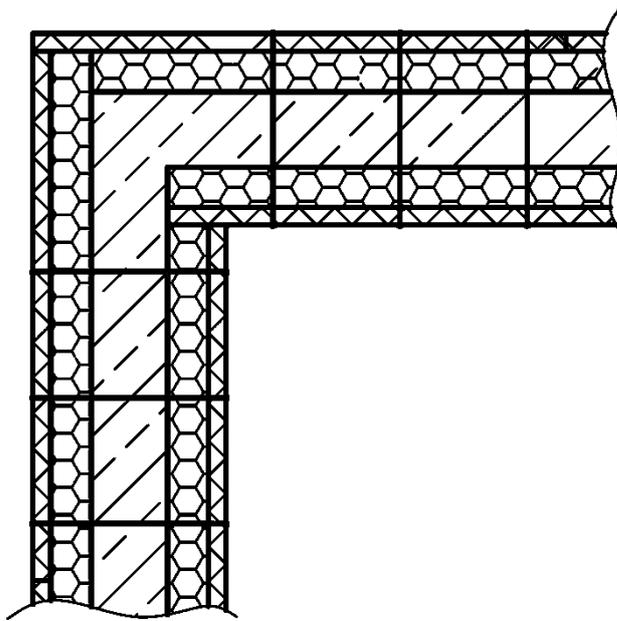
VELOX

External walls

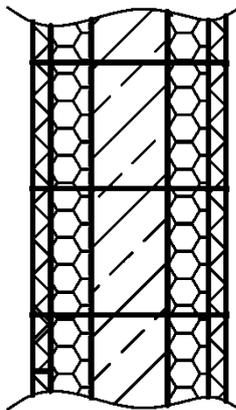
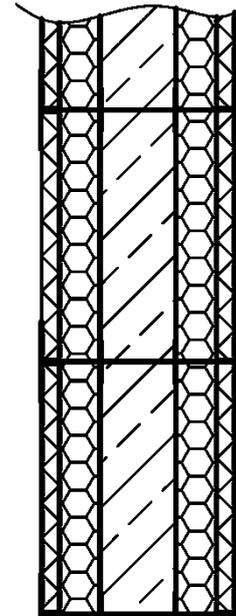
Annex B4.2

attic and parapet walls

top view



section



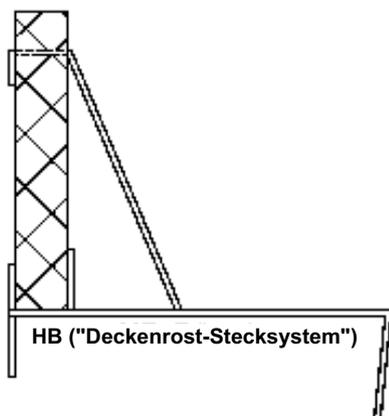
VELOX

attic and parapet walls

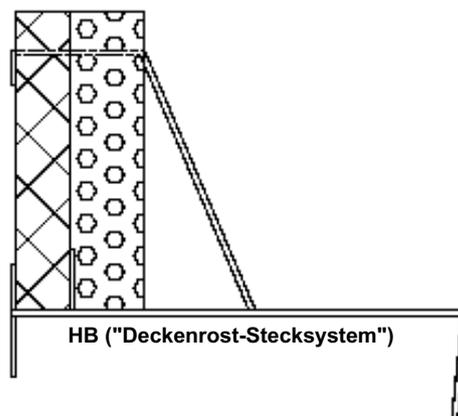
Annex B4.3

Ceiling grate and wall grate

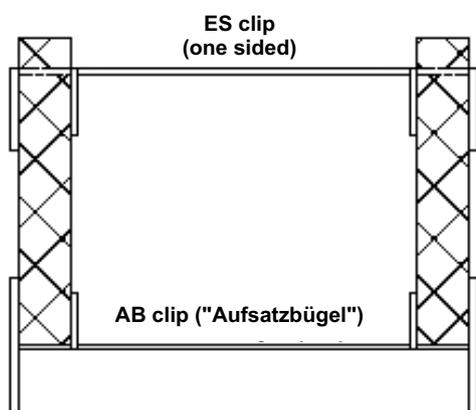
Ceiling grate without thermal insulation



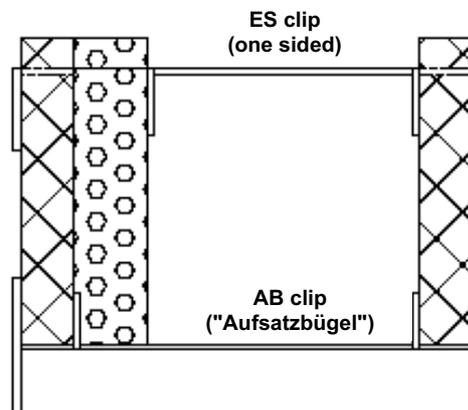
Ceiling grate with thermal insulation



Wall grate without thermal insulation



Wall grate with thermal insulation



VELOX

Ceiling grate and wall grate

Annex B4.4

Type	Case according to Annex A2	Types of shuttering leaves		Assumed weight of the wall (without rendering)	Unit weight of the wood-chip concrete	
					Outer leaf	Inner leaf
		outside	inside	[kg/m ²]	[kg/m ³]	[kg/m ³]
NN18	1	WSD 30	WSD 30	319	750	750
TT15	1	WSD 35	WSD 35	239	750	750
TT20	1	WSD 35	WSD 35	349	750	750
TT22	1	WSD 35	WSD 35	382,5	750	750
TT25	1	WSD 35	WSD 35	448,6	750	750
TT27	1	WSD 35	WSD 35	492,6	750	750
TT30	1	WSD 35	WSD 35	558,6	750	750
GT25	1	WS 50	WSD 35	415,6	560	750
GT30	1	WS 50	WSD 35	527,3	595	750
GG25	1	WS 50	WS 50	390	595	595
GG30	1	WS 50	WS 50	500	595	595
XG30	1	WS 75	WS 50	565	560	595
GU30	1	WS 50	WSD 50	540	595	750
ET27	2	WS-EPS 85	WSD 35	353,0	650	750
ET30	2	WS-EPS 115	WSD 35	270,0	650	750
ET32	2	WS-EPS 135	WSD 35	387,3	650	750
ET33,5	2	WS-EPS 135	WS 50	395	650	595
ET34	2	WS-EPS 155	WSD 35	390	650	750
ET35	2	WS-EPS 185	WSD 35	345	650	750
ET35,5	2	WS-EPS 155	WS 50	395	650	595
ET37	2	WS-EPS 185	WSD 35	391	650	750
ET38,5	2	WS-EPS 185	WS 50	396	650	595
ET40	2	WS-EPS 185	WSD 35	455	650	750

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Thickness of concrete core and weight of the wall per m² without plaster for the examples of according elements according to Annex A2

Annex B5

Description to BWR 1 – Mechanical resistance and stability

Efficiency of filling

Considering the instructions of Annex B1 and the installation guide of the ETA holder the efficient filling without bursting of the shuttering and without voids or any uncovered reinforcement in the concrete core is possible.

Possibility of steel reinforcement

The instructions in the installation guide of the ETA holder are appropriate to install steel reinforcement for walls according to EN 1992-1-1 or corresponding national rules.

VELOX	Annex C1
Description of Performance to BWR 1 Mechanical resistance and stability	

Beschreibung zu BWR 2 - Brandschutz

Brandverhalten

- a) This classification applies to wood-chip concrete shuttering leaves in accordance with
- the material datasheets deposited with DIBt
 - with apparent densities of between 500 and 825 kg/m³ and
 - a minimum shuttering leaf thickness of 25 mm.
- b) conditions:
- The insulation layer is made from EPS with a minimum fire classification of class E, an apparent density of 15 kg/m³ ± 10% and a maximum thickness of 165 mm.
 - The minimum thickness of the shuttering leaf is 35 mm and the minimum apparent density of the wood-chip concrete is 560 kg/m³.
- c) conditions:
- the integrated insulation material meets the requirements of class E in accordance with EN 13501-1.

VELOX	Annex C2
Anlagenbeschreibung	

Description to BWR 3 – hygiene, health and environment

Water vapour permeability

The maximum nominal value of the wood-chip concrete shuttering leaves water vapour transmission coefficient is $\mu= 30$.

Tabulated water vapour transmission coefficient values for the concrete columns, depending on type and apparent density as well as the thermal insulation can be found in EN ISO 10456.

Using these values, the calculation of the maximum annual interstitial condensation in accordance with EN ISO 13788 showed a safe margin.

VELOX	Annex C3
Description of Performance to BWR 3 hygiene, health and environment	

Beschreibung zu BWR 4 - Sicherheit und Barrierefreiheit bei der Nutzung

Bond strength

Between the leaves The shuttering leaves are single layered, hence there is no determination of the bond strength between shuttering leaves.

Resistance to impact load

Global resistance

Concrete walls (without consideration of the finishes), constructed with shuttering system "ISOSPAN" and designed according EN 1992-1-1 respectively in lack of availability of EN 1992-1-1 according national design rules, lead to the assumption that concrete core insures an adequate resistance of the complete wall to normal use impact loads.

Resistance to filling pressure

As supplementary insulation for the shuttering blocks according to Figure 2 only insulation materials according to harmonized European product standards or European Assessment Documents (EADs) may be used.

In addition, the compressive stress at 10 % compression strain or/and the compressive strength (if both are specified, the smallest value is decisive) shall not be less than 80 kPa. In addition, the fresh concrete shall not penetrate into the integrated thermal insulation, so that the thermal conductivity is not reduced.

If this is not guaranteed, a waterproof film must be applied to the inside of the integrated thermal insulation in such a way that it prevents the fresh concrete from penetrating into the integrated thermal insulation during concreting.

VELOX	Annex C4
Description of Performance to BWR 4 Safety and accessibility in use	

Description to BWR 5 - Protection against noise

Airborne sound insulation

The values for the weighted sound insulation rating R_W in accordance with EN ISO 717-1 of walls made with "VELOX" shuttering elements are tabulated in Table 1 depending on the mass per wall area (including plaster).

Table 1: Weighted sound insulation rating R_W depending on the mass per wall area (including gypsum plaster of 1,5 cm thickness inn- and outside) and the shuttering element types.

Shuttering element type	Mass per wall area (including rendering)	Weighted sound insulation rating R_W in accordance with EN ISO 717-1
	[kg/m ²]	[dB]
TT25	≥ 487	60
GT25	≥ 460	60
TT27	≥ 537	60
TT30	≥ 597	63
TT35	≥ 713	63
GT30	≥ 566	64
GU30	≥ 550	62
XG30	≥ 492	61

other types of "VELOX" shuttering elements, not listed in table above No performance assessed

VELOX

Description of Performance to BWR 5
Protection against noise

Annex C5

Description to BWR 6 - Energy Economy and heat retention

Thermal Resistance

The declared value of thermal resistance $R_{D,element}$ of the shuttering elements in end use conditions (with concrete core without plaster/finishes) is the sum of

- the declared value of thermal resistance of the wood chip concrete shuttering leaves $R_{D,Velox}$
- and the concrete core $R_{D,concrete}$.

The nominal value of the thermal resistance of the formwork walls $R_{D,Velox}$ is calculated in accordance with EN ISO 6946 using a nominal value for the thermal conductivity λ_D of the formwork walls as specified in Table C6-1.

The declared value of the thermal conductivity λ_D of the wood-chip concrete of the shuttering blocks determined in accordance with EN ISO 10456, Annex B.2 is given in Table C6-1 as a function of the dry bulk density ρ_{dry}

The declared value of thermal resistance of the concrete core $R_{D,concrete}$ shall be calculated in accordance with EN ISO 6946 with a value of thermal conductivity λ of the concrete core depending on the density ρ tabulated in EN ISO 10456

Table C6-1: Nominal thermal conductivity value $\lambda_{D,w}$ of wood-chip concrete depending on dry apparent density $\rho_{dry,w}$

Dry apparent density $\rho_{dry,w}$ [kg/m ³]	Nominal thermal conductivity value $\lambda_{D,w}$ [W/(m × K)]
475	0,100
550	0,114
650	0,123
800	0,200
1000	0,370

Heat capacity

The value of the heat capacity c of the shuttering blocks of wood-chip concrete is $c = 1,50$ kJ/(kg × K) according to EN 15498, clause 5.2.8.2.

The values of the heat capacity c of the concrete columns and of the materials of supplementary thermal insulation are tabulated values in EN ISO 10456.

VELOX	Annex C6
Description of Performance to BWR 6 Energy Economy and heat retention	