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Member of EOTA
www.eota.eu

European Technical Assessment

ETA 11/0313
of 30/06/2015

General Part

Technical Assessment Body issuing the ETA	SP Sveriges Tekniska Forskningsinstitut
Trade name of the construction product	Roxtec Modular Penetration Sealing System
Product family to which the construction product belongs	Fire stopping and fire sealing products – Penetration seals
Manufacturer	Roxtec International AB, Box 540, SE-371 23 Karlskrona, Sweden, Internet: www.roxtec.com
Manufacturing plant(s)	Roxtec International AB, Karlskrona, Sweden
This European Technical Assessment contains	30 pages including 4 Annexes which form an integral part of this assessment. Annex 5 contains confidential information and is not included in the European Technical Assessment when that assessment is publicly available.
This European Technical Assessment is issued in accordance with regulation (EU) No 305/2011, on the basis of	ETAG 026-1, edition 9 April 2013 and ETAG 026-2, edition August 2011, used as European Assessment Document (EAD)
This version replaces	ETA-11/0313 issued on 16/12/2011

Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and should be identified as such.

1 Technical description of the product

This ETA refers to cable penetration seal with the designation “Roxtec Modular Penetration Sealing System”.

The Roxtec Modular Penetration Sealing System consists of rectangular frames: G Frame and B frame and round frames: R frame (multiple cables), RS series (single cables) and H3-seals (three cables). The frames are used together with elastometric blocks and a compression unit.

The frames can either be cast, bolted, welded or fitted into sleeves. The frames and other steel components are made of stainless steel or galvanised steel. Steel sleeves and frames are also available in coated mild steel.

Details of the systems are shown in Annexes 2-3.

Detailed design specifications for components are shown in the supporting document Annex 5. Annex 5 is a formal part of the ETA, and the valid version of the document is the latest version filed by SP Sveriges Tekniska Forskningsinstitut.

2 Specification of the intended use(s) in accordance with the applicable European Assessment Document (hereinafter EAD)

The intended use of Roxtec Modular Penetration Sealing System is to reinstate the fire resistance performance of flexible and rigid wall constructions and rigid floor constructions, where they are penetrated by various cables.

Details of the supporting constructions, cables etc are shown in Annexes 2-4. For the installation procedure, see Annex 1.

The provisions made in this ETA are based on an assumed working life of the Roxtec Modular Penetration Sealing System of 25 years. 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.

Use category

The use category of Roxtec Modular Penetration Sealing System is

Type X, for the system with components made of stainless steel or galvanised steel.

and

Type Z_2, for the system with components made of coated mild steel

Type X: intended for use in conditions exposed to weathering
Type Y_1: intended for use at temperatures below 0°C with exposure to UV but no exposure to rain

Type Y_2: intended for use at temperatures below 0°C, but with no exposure to rain nor UV

Type Z_1: intended for use in internal conditions with humidity equal to or higher than 85 % RH, excluding temperatures below 0°C. These uses apply for internal humidity class 5 in accordance with EN ISO 13788

Type Z_2: intended for uses in internal conditions with humidity lower than 85 % RH, excluding temperatures below 0°C

Note: Products that meet requirements for type X, meet the requirements for all other types. Products that meet requirements for type Y_1 also meet the requirements for type Y_2, Z_1 and Z_2. Products that meet the requirements for type Y_2 also meet the requirements for type Z_1 and Z_2. Products that meet the requirements for type Z_1, also meet the requirements for type Z_2.

3 Performance of the product and references to the methods used for its assessment

The characteristics given in this chapter are applicable to all combinations of materials, components and dimensions described in this ETA if no other provisions are specified.

Provisions shall be taken such that floor penetration seals cannot be stepped on, e.g. by covering with a wire mesh.

The service support construction shall be fixed to the building element on both sides of the penetration in such a manner that in the case of fire no additional load is imposed on the seal. Furthermore it is assumed that this support is maintained for the required period of fire resistance.

3.1 Essential characteristics and their performance

Basic requirement for construction work		**Characteristic**	**Performance**
BWR 1	Mechanical resistance and stability	None	Clause 3.1.1
BWR 2	Safety in case of fire	Reaction to fire	Clause 3.1.2.1
		Resistance to fire	Clause 3.1.2.2 and Annex 2
BWR 3	Hygiene, health and environment	Air permeability	Clause 3.1.3.1
		Water permeability	Clause 3.1.3.2
		Content and/or release of dangerous substances	Clause 3.1.3.3
BWR 4	Safety in use	Mechanical resistance and stability	Clause 3.1.4.1
		Resistance to impact and movement	Clause 3.1.4.2
		Adhesion	Clause 3.1.4.3
BWR 5	Protection against noice	Airborne sound insulation	Clause 3.1.5.1
BWR 6	Energy economy and heat retention	Thermal properties	Clause 3.1.6.1
		Water vapour permeability	Clause 3.1.6.2
BWR 7	Sustainable use of natural resources	None	Clause 3.1.7
	General aspects relating to fitness for use – Durability and serviceability	Use category regarding environemental conditions	Clause 3.1.8

3.1.1 Mechanical resistance and stability (BWR 1)

Not relevant, no performace assessed (NPA).

3.1.2 Safety in case of fire (BWR 2)

3.1.2.1 Reaction to fire

Roxtec Modular Penetration Sealing System fulfils the requirement for reaction to fire class B-s1,d0 in accordance with EN 13501-1.

3.1.2.2 Resistance to fire

The Roxtec Modular Penetration Sealing System has been tested in accordance with EN 1366-3:2009 and classified in accordance with EN 13501-2, as given in Annex 2.

3.1.3 Hygiene, health and environment (BWR 3)

3.1.3.1 Air permeability

No Performance Assessed (NPA).

3.1.3.2 Water permeability

No Performance Assessed (NPA).

3.1.3.3 Release of dangerous substances

According to the manufacturer's declaration, the product specification has been compared with the list of dangerous substances of the European Commission to verify that that it does not contain such substances above the acceptable limits.

A written declaration in this respect was submitted by the ETA-holder.

Note: In addition to the specific clauses relating to dangerous substances contained in this ETA, 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 Product Directive, these requirements need also to be complied with, when and where they apply.

3.1.4 Safety in use (BWR 4)

3.1.4.1 Mechanical resistance and stability

No Performance Assessed (NPA).

3.1.4.2 Resistance to impact and movement

No Performance Assessed (NPA).

3.1.4.3 Adhesion

No Performance Assessed (NPA).

3.1.5 Protection against noise (BWR 5)

3.1.5.1 Airborne sound insulation

No Performance Assessed (NPA).

3.1.6 Energy economy and heat retention (BWR 6)

3.1.6.1 Thermal properties

The thermal transmittance coefficient (U) has been calculated in accordance to EN ISO 10077-2 for the G frame system:

G frame + 100 mm stone wool, density 100 kg/m^3	U = 0.33 W/(m^{2}K)
G 8+8x2	U = 2.7 W/(m^{2}K)
G 6x1	U = 3.3 W/(m^{2}K)

3.1.6.2 Water vapour permeability

No Performance Assessed (NPA).

3.1.7 Sustainable use of natural resources (BWR 7)

Not relevant, No Performance Assessed (NPA).

3.1.8 General aspects relating to fitness for use - Durability and serviceability

Roxtec Modular Penetration Sealing System has been tested in accordance with EOTA Technical Report – TR024 – Edition 2009-07 and ETAG 026-2 for the type X and Z_2 use categories. The results were:

Type X for the system with components of stainless steel or galvanised steel: intended for use at conditions exposed to weathering

Type Z_2 for the system with components of coated mild steel: intended for use in internal conditions with humidity lower than 85 % RH, excluding temperatures below 0°C

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

According to the decision 1999/454/EC - Commission decision of date 22 June 1999 (OJ L 178/52 of 14/07/99, p. 3, as amended by Decision of the Commission 2001/596/EC of 8 January 2001 (OJ L 209/33 of 2/8/2001, p. 2) the system of assessment and verification of constancy of performance (see Annex V to the regulation (EU) No 305/2011 and EC delegated act no. 568/2014 of 18 February 2014) given in the following table applies:

Product(s)	Intended use(s)	Level(s) or class(es)	System(s)
Fire stopping and fire sealing products	For fire compartmentation and/or fire protection or fire performance	Any	1

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 at SP Sveriges Tekniska Forskningsinstitut.

Issued in Borås on 30.06.2015
By SP Sveriges Tekniska Forskningsinstitut

Lennart Månsson
Certification Manager

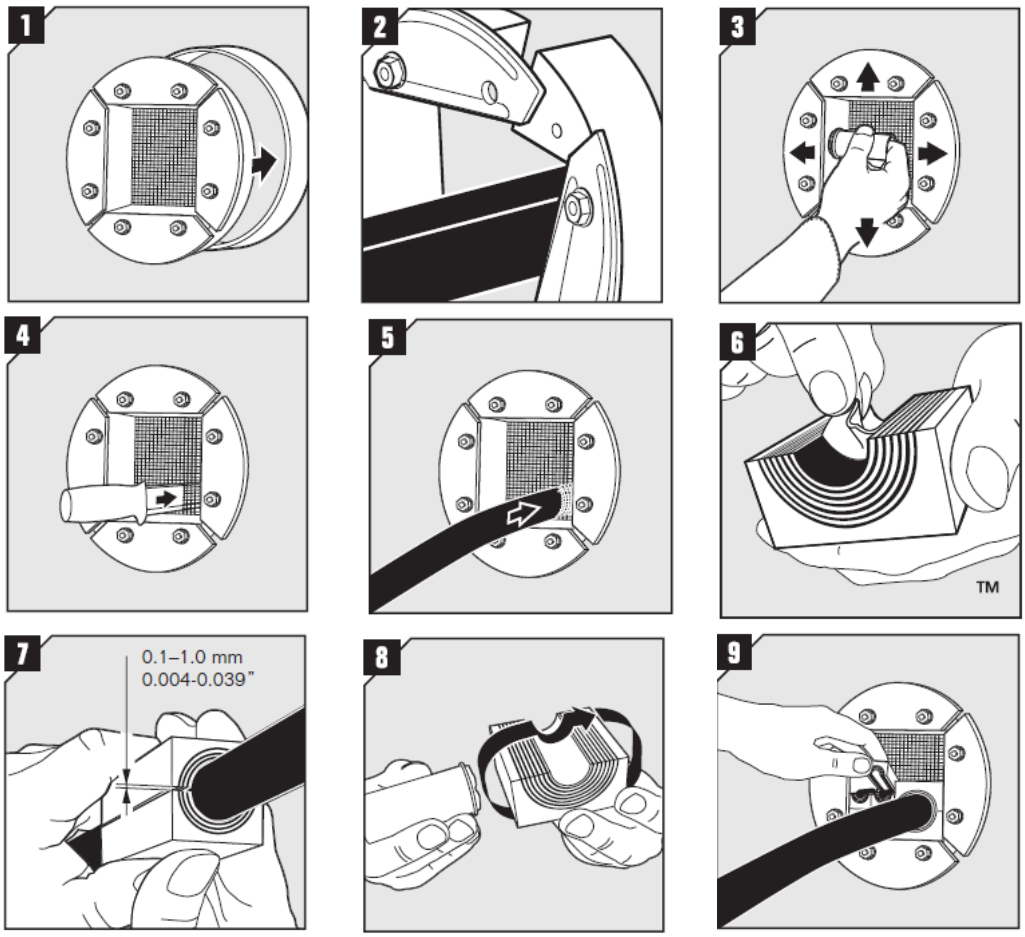
ANNEX 1 Installation and maintenance

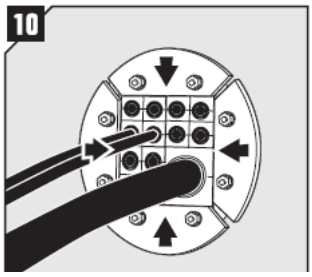
A1.1 Installation

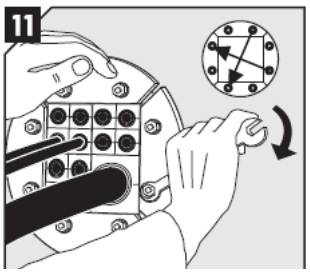
Installation of the Roxtec Modular Penetration Sealing System should be performed in accordance to the following installation instructions:

Insulation placed in cavities is packed in place. Insulation placed around cables is fixed in position by using a wire which will keep the insulation in place even if exposed to fire.
The insulation around cables is put around the cable with an overlap of approx. 50 mm in order to avoid gaps in the insulation into the cable. The wire used is placed around the insulation and tightened, checking for gaps in the insulation towards the cable. As described before, the use of a wire, is to keep the insulation in place in order to avoid for the insulation to slide of or loosen. The wire should be placed with an approximate CC distance of 100 mm. In general minimum 2 wires should be used securing the insulation. After the insulation is secured and tightened around the cables, the insulation is pushed towards the sealing as much as possible to avoid a gap between insulation of the seal and insulation of the cables.

A1.1.1 Roxtec R frame





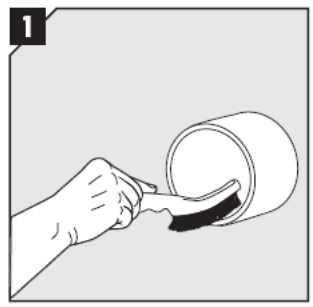


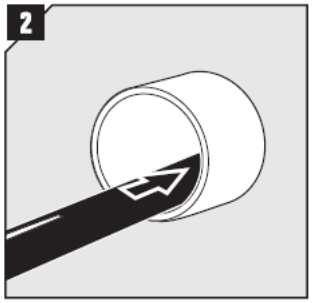
Type:	Rec. torque* (Nm)
R 70-R 127	6-7
R 150-R 200	9-11

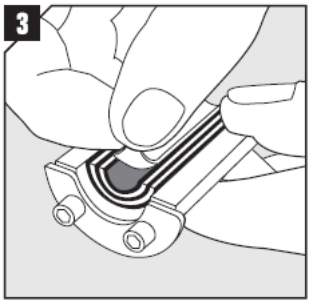
Aperture dimensions

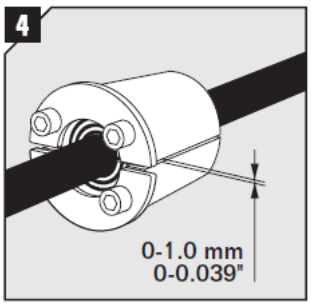
Type:	Aperture Ø (mm)	Clearance depth (mm)
R 70	70-71	75
R 75	75-76	75
R 100	100-102	80
R 125	125-127	75
R 127	127-129	75
R 150	150-152	75
R 200	200-202	75

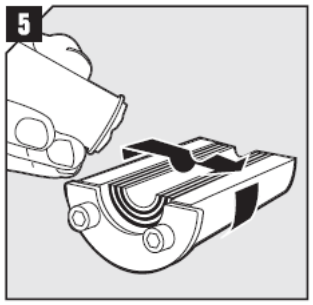
A1.1.2 Roxtec RS seal

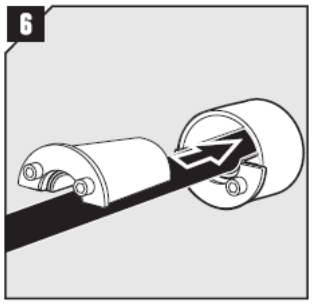


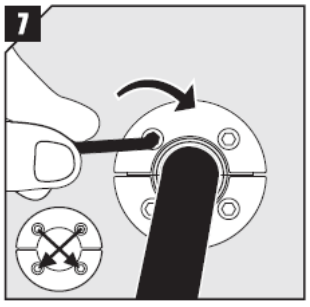












Aperture dimensions

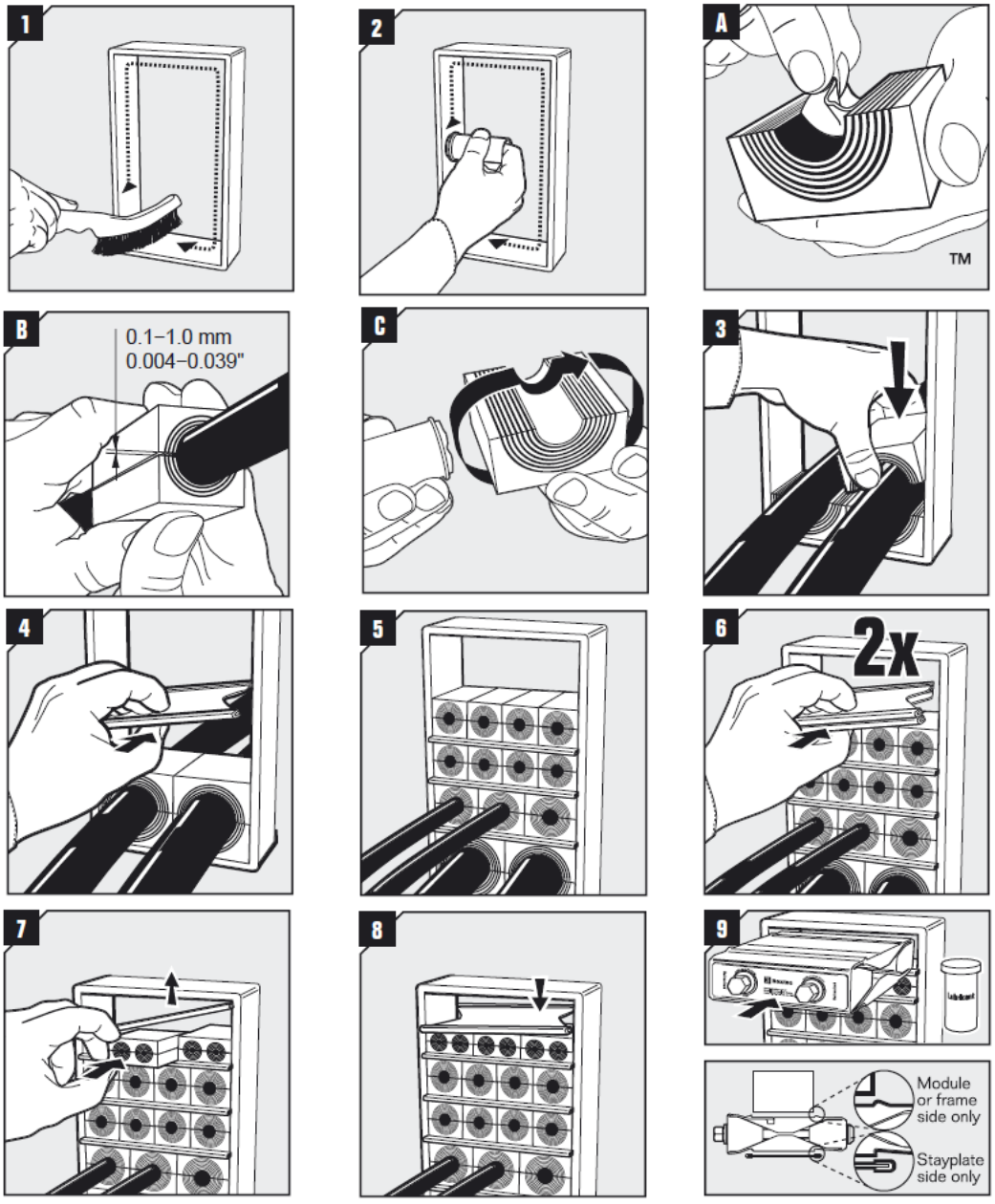
Type:	Aperture Ø (mm)	Clearance depth (mm)
RS 31	31-32	45
RS 68	68-70	83
RS 75	75-77	83
RS 100	100-102	83
RS 125	125-127	83

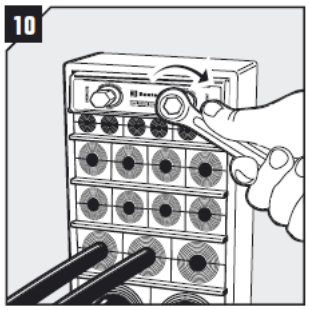
Recommended torque

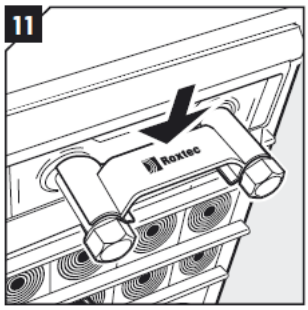
Size: RS	Rec. torque* (Nm)
31	1
43 - 100	4
125	7

* The recommended torque depends on several things, e.g cable size, amount of used lubricant, sleeve size or material in the cable sheath.

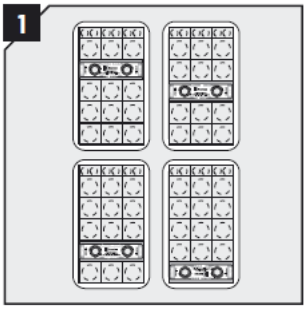
A1.1.3 Roxtec Wedge/G frame

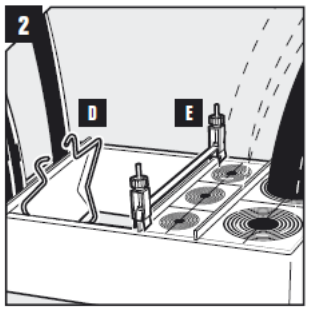


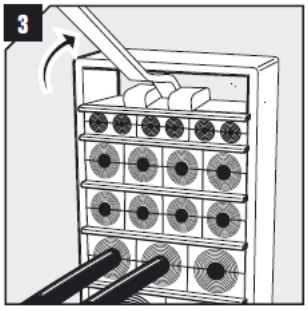




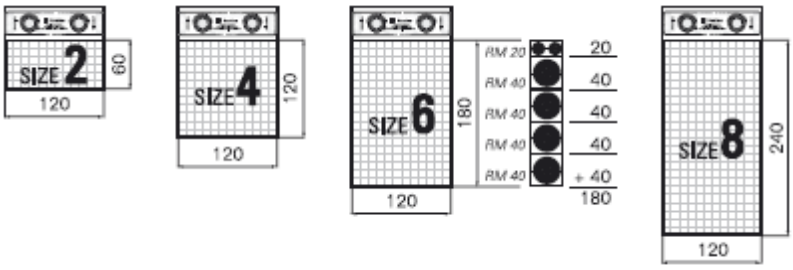
Installation options and tools





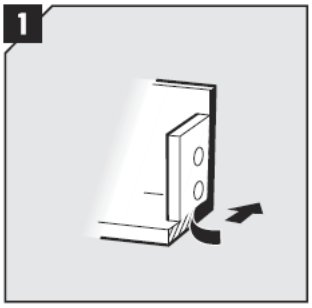


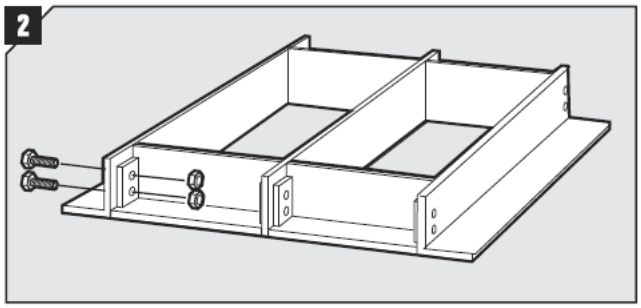
Packaging space



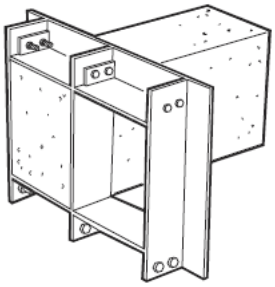
A1.1.4 Roxtec B frame

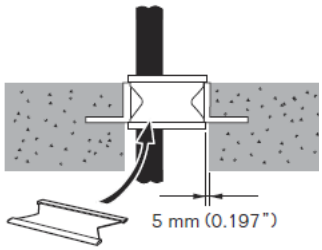
Frame assembly

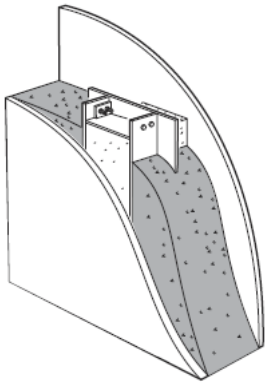


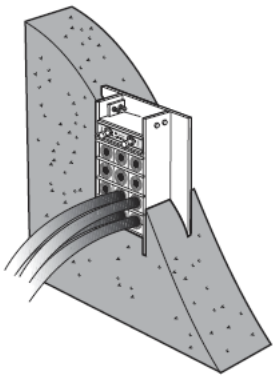


Installation, casting

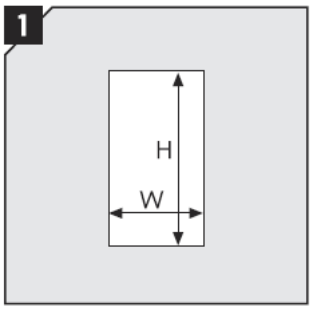


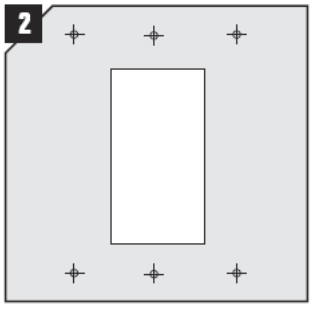


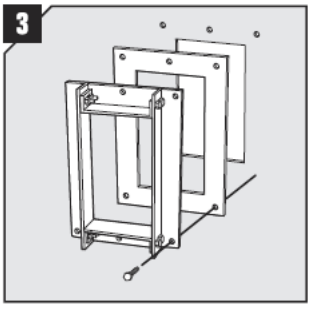


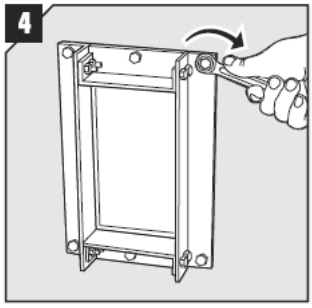


Installation, bolting





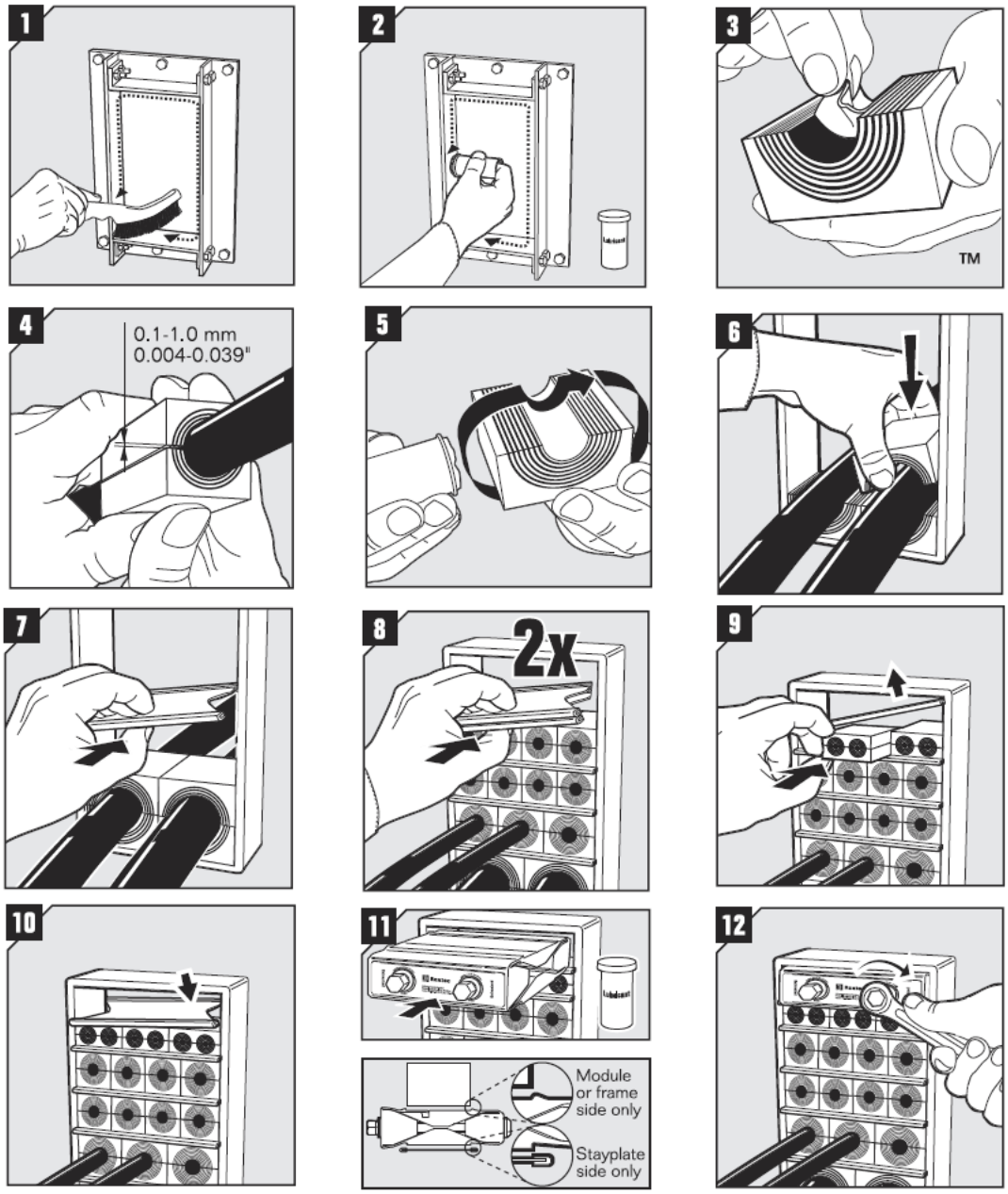


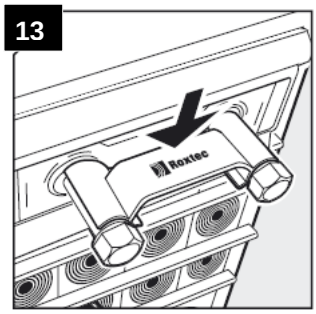


B frame, aperture dimensions for bolted installations

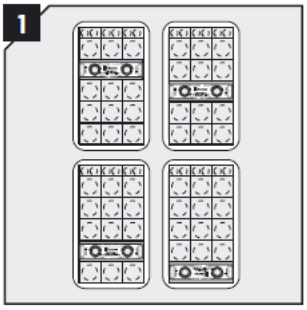
Frame	Height tolerance ± 5 mm, ±0.197" 1 opening in width (mm)	(in)	Width tolerance ± 5 mm, ±0.197" x1	x2	x3 (mm)/(in)	x4	x5
B 2	116	4,567					
B 4	175	6,890	141	270	398	527	655
B 6	233	9,173	5,551	10,630	15,669	20,748	25,787
B 8	293	11,535					

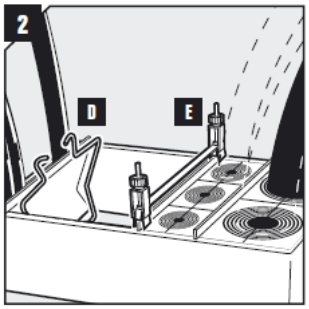
Module installation



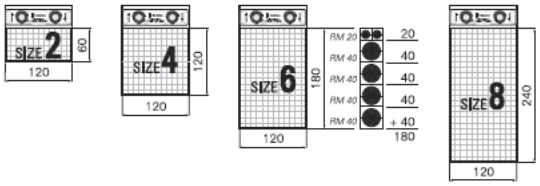


Installation options and tools

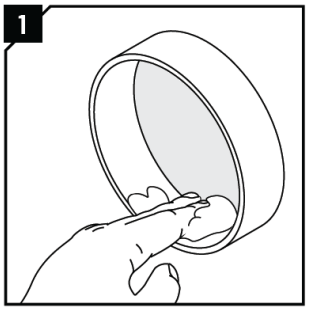




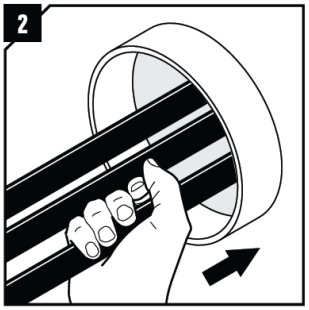
Packing space



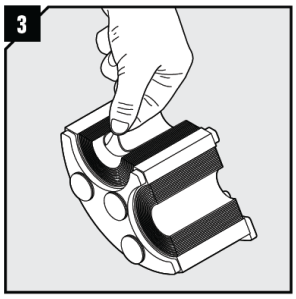
A1.1.5 Roxtec H3-seals



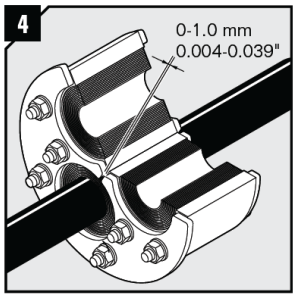
Clean the empty sleeve from paint, dirt etc.



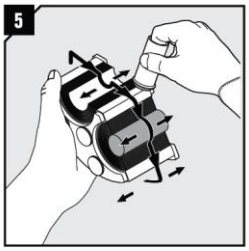
Route the cables through the sleeve.



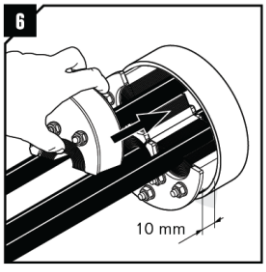
Make sure that the bolts of the seal are loose. Adapt rubber layers to fit the cables.



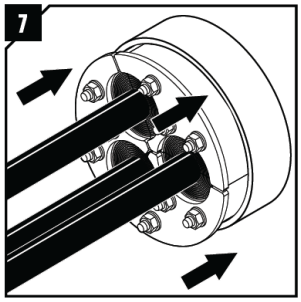
Test with a cable. Achieve a gap of 0-1.0 mm between the halves. If not, repeat 3. Adapt the layers for all cables. The halves may not differ by more than one layer.

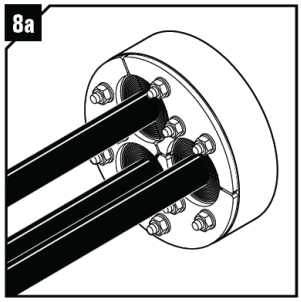


Lubricate the three parts of the seal thoroughly all around. Lubricate remaining cores on the sealing surface.

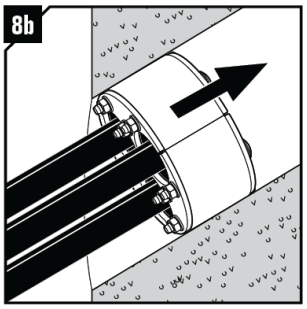


Insert the seal parts into the sleeve. Leave a 10 mm margin to simplify installation.

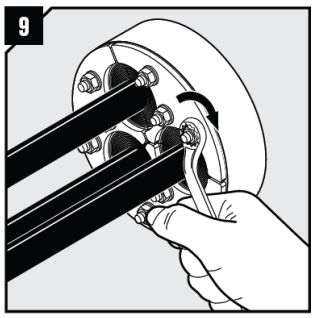


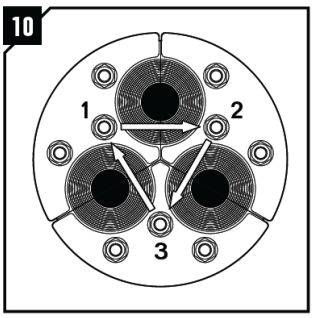


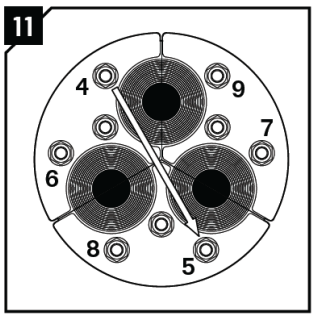
Press all three parts of the seal into the sleeve simultaneously.



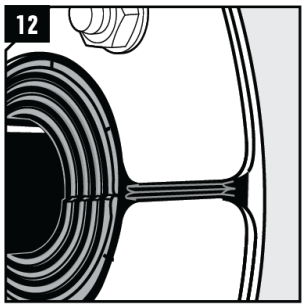
Use an insertable seal if the hole is not perpendicular to the wall.



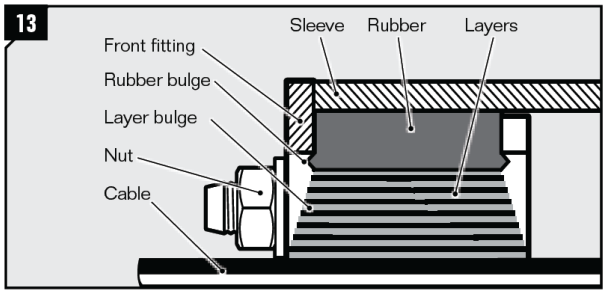




Start by tightening the screws crosswise one turn at a time to approximately 12 Nm. Start with the inner screws.



The seal is compressed when rubber almost expands over the front fittings and the inner part bulges.



Sectional view of the seal showing when rubber expands and bulges. The recommended torque depends on several things, e.g cable or pipe size, amount of used lubricant, sleeve size or material in the cable sheath.

A1.2 Indications to the manufacturer

A1.2.1 Packaging, transport and storage

During storage, the Roxtec Modular Penetration Sealing System or part there of, shall be kept indoors in its original packaging at room temperature.
No other special measures are required with regard to the packaging, transport and storage.

A1.2.2 Use, maintenance, repair

The Roxtec Modular Penetration Sealing System should be installed and used as described earlier in this document.

The Roxtec Modular Penetration Sealing System which is damaged should not be used or if damaged after installation, should be removed and replaced with undamaged components.

ANNEX 2

Resistance to fire classification of Roxtec Modular Penetration Sealing System:

A2.1 R frame

A2.1.1 System description

The element R frame in sizes (R 70, R 75, R 100, R 125, R 127, R 150 and R 200) is constructed of a set of components: a flanged steel frame, stone wool insulation, a sealing compound (Roxtec Lubricant), screws and a system of elastometric blocks and a compression device. The elastometric blocks are RM 30 and RM 40 of thickness 60 mm. The element is unsymmetrical with the flange of the steel sleeves on one side and the stone wool insulation on the other side of the element. The system is shown in the drawing no. S1022840, see annex 3.1.

A2.1.1.1 Supporting constructions

The floor is to be classified in at least EI 60 in accordance with EN 13501-2
All other information is shown in annex 3.1.

A2.1.1.2 Seal size

Maximum size of the single opening is diameter 202 mm.

A2.1.1.3 Number of penetrations

In cases where several elements are included in a single floor the minimum distance between two adjacent elements is 200 mm.

A2.1.1.4 Cables

See the annex 3.1 and 4.

A2.1.1.5 Insulation of the steel frame and the cables

The insulation shall be made of stone wool with density 100 kg/m^3 and CE marked in class A1 in accordance to EN 13163 or EN 14303.
See also the annex 3.1.

A2.1.1.6 Fire resistant sealant

The fire resistant sealant should be a one-component low-modulus silicone rubber which is to be used for cable penetrations through floors which is to be fire-rated at least EI 60. The sealant should be classed for usage on constructions made of concrete.
Reaction to fire performance: requirement R2; hazard level HL1 and HL2 in accordance with CEN/TS 45545-2.
The sealant should be installed according to the supplier's installation guides.

A2.2.1.1.7 Service support construction

See the annex 3.1.

A2.2.1.1.8 Blank seals

Allowed

A2.1.2 Resistance to fire classification

EI 60 in accordance to EN 13501-2

A2.2 RS series

A2.2.1 System description

The element RS series (RS 31-RS 125) is constructed of a set of components: a flanged steel sleeve with a rubber frame, a rubber core and a compression device, stone wool insulation, a sealing compound (Roxtec Lubricant) and screws. The element is unsymmetrical with the flange of the steel sleeves on one side and the stone wool insulation on the other side of the elements. The system is shown in the drawing no. S1022819, see annex 3.2.

A2.2.2.1 Supporting constructions

- The wall and floor is to be classified in at least EI 60 in accordance with EN 13501-2
- Flexible walls with timber studs shall be mounted with a minimum distance of 100 mm to the studs, the cavities between the aperture framing and the studs shall be closed and minimum 100 mm insulation of class A1 or A2 according to EN 13501-1 and shall be provided within the cavities between the aperture framing and the studs of the wall.

All other information is shown in annex 3.2.

A2.2.2.1 Seal size

Maximum size of the single opening is diameter 127 mm.

A2.2.2.2 Number of penetrations

In cases where several elements are included in a single wall the minimum distance between two adjacent elements is 200 mm.

A2.2.2.2.3 Aperture framing

Flexible walls shall be constructed with aperture framing consisting of lintel transoms and lintel studs. The lintel transoms are mounted between two adjacent studs of the wall and the lintel studs are mounted between the upper and lower transoms. The lintels are minimum 0,7 mm thick rolled steel C-studs. The space between the lintels, the boards and the sleeves of the elements is filled with stone wool insulation of class A1 in accordance to EN 13501-1.

A2.2.2.2.4 Cables

See the annex B2 and C.

A2.2.2.2.5 Insulation of the sleeve and cables

The insulation shall be made of stone wool with density 100 kg/m^3 and CE marked in class A1 in accordance to EN 13163 or EN 14303.
See also the annex 3.2.

A2.2.2.2.6 Fire resistant sealant

The fire resistant sealant should be a one-component low-modulus silicone rubber which is to be used for cable penetrations through walls and floors which is to be fire-rated at least EI 60. The sealant should be classed for usage on constructions made of concrete and gypsum.
Reaction to fire performance: requirement R2; hazard level HL1 and HL2 in accordance with CEN/TS 45545-2.
The sealant should be installed according to the supplier's installation guides.

A2.2.2.7 Service support construction

See the annex 3.2.

A2.2.2.2.8 Blank seals

Allowed.

A2.2.2.2.9 Resistance to fire classification

EI 60 in accordance to EN 13501-2

A2.3 G Frame

A2.3.1 System description

The element G Frame is constructed of a set of components: a flanged steel combination frame, stone wool insulation, a sealing compound (Roxtec Lubricant), screws and a system of elastometric blocks and one or more compression devices. The elastometric blocks are RM 20, RM 20W40, RM 30, RM 40, RM 60, RM 90 and RM 120 of 60 mm thickness. The element is unsymmetrical with the flange of the steel frame on one side and the stone wool insulation on the other side of the element. The system is shown in the drawing no. S1022839 (EI 60), S1501645 (EI 90) and S1501658 (EI 120), see annex 3.3, 3.4 and 3.5.

A2.3.1.1 Supporting constructions

EI 60

- The wall and floor is to be classified in at least EI 60 in accordance with EN 13501-2
- Flexible walls with timber studs shall be mounted with a minimum distance of 100 mm to the studs, the cavities between the aperture framing and the studs shall be closed and minimum 100 mm insulation of class A1 or A2 according to EN 13501-1 and shall be provided within the cavities between the aperture framing and the studs of the wall.

All other information is shown in annex 3.3, 3.4 and 3.5.

EI 90, EI 120

- The wall and floor shall be of conrete or masonry of a thickness equal or greater than 150 mm and a density equal or greater than 550 kg/m^3 and is to be classified in at least EI 90/EI 120 in accordance with EN 13501-2.

A2.3.1.2 Seal size

EI 60

Maximum size of single frame opening (width x height): 120 x 278 mm (equal to size 8).

EI 90, EI 120

Maximum size of single frame opening (width x height): 120 x 278 mm (equal to size 8) provided the total amount of cross sections of the services does not exceed 60 % of the penetration area.

A2.3.1.3 Number of penetrations

EI 60

Any number of single openings in rigid walls and rigid floors.
Up to 4 x 1 or 2 x 2 single openings when mounted in flexible walls.
The minimum distance between two adjacent single frames or combination frames is 200 mm.

EI 90, EI 120

Any number of single openings in rigid walls and rigid floors.
The minimum distance between two adjacent single frames or combination frames is 200 mm.

A2.3.1.4 Aperture framing

Flexible walls shall be constructed with aperture framing consisting of lintel transoms and lintel studs. The lintel transoms are mounted between two adjacent studs of the wall and the lintel studs are mounted between the upper and lower transoms. The lintels are minimum 0.7 mm thick rolled steel C-studs. The space between the lintels, the boards and the frames of the elements is filled with stone wool insulation of class A1 in accordance to EN 13501-1.

A2.3.1.5 Cables

EI 60
See the annex 3.3 and 4.

EI 90, EI 120
See the annex 3.4, 3.5 and 4.

A2.3.1.6 Insulation of the steel frame and the cables

The insulation shall be made of stone wool with density 100 kg/m^3 and CE marked in class A1 in accordance to EN 13163 or EN 14303.
See also the annex 3.3, 3.4 and 3.5.

A2.3.1.7 Fire resistant sealant

EI 60
The fire resistant sealant should be a one-component low-modulus silicone rubber which is to be used for cable penetrations through walls and floors which is to be fire-rated EI 60. The sealant should be classed for usage on constructions made of concrete and gypsum.
Reaction to fire classification: requirement R2; hazard level HL1 and HL2 in accordance with CEN/TS 45545-2.
The sealant should be installed according to the supplier's installation guides.
See also the annex 3.3.

EI 90, EI 120
The fire resistant sealant should be a one-component low-modulus silicone rubber which is to be used for cable penetrations through walls and floors which is to be fire-rated EI 90/EI 120. The sealant should be classed for usage on constructions made of concrete and gypsum.
Reaction to fire performance: requirement R2; hazard level HL1 and HL2 in accordance with CEN/TS 45545-2.
The sealant should be installed according to the supplier's installation guides.
See also the annex 3.4 and 3.5.

A2.3.1.8 Service support construction

See the annex 3.3, 3.4 and 3.5.
Max distance 450 mm between the seal and the first support.

A2.3.1.9 Blank seals

Allowed.

A2.3.2 Resistance to fire classification

EI 60, EI 90 and EI 120 in accordance to EN 13501-2.

A2.4 B Frame

A2.4.1 System description

The element B Frame is constructed of a set of components: a flanged steel combination frame, stone wool insulation, a sealing compound (Roxtec Lubricant), screws and a system of elastometric blocks and one or more compression devices. The elastometric blocks are RM 20, RM 20W40, RM 30, RM 40, RM 60, RM 90 and RM 120 of 60 mm thickness. The element is unsymmetrical with the flange of the steel frame on one side and the stone wool insulation on the other side of the element. The system is shown in the drawing no. S1022839 (EI 60) and S1501645 (EI 90), see annex 3.3 and 3.4.

A2.4.1.1 Supporting constructions

EI 60

- The wall and floor is to be classified in at least EI 60 in accordance with EN 13501-2
- Flexible walls with timber studs shall be mounted with a minimum distance of 100 mm to the studs, the cavities between the aperture framing and the studs shall be closed and minimum 100 mm insulation of class A1 or A2 according to EN 13501-1 and shall be provided within the cavities between the aperture framing and the studs of the wall.

All other information is shown in annex 3.3.

EI 90

The floor is to be classified in at least EI 90 in accordance with EN 13501-2.

A2.4.1.2 Seal size

Maximum size of single frame opening (width x height): 120 x 278 mm (equal to size 8).

A2.4.1.3 Number of penetrations

EI 60

Any number of single openings in rigid walls and rigid floors. Up to B 8 x 4 in flexible walls. Minimum 200 mm between two adjacent single frames or combination frames.

EI 90

Any number of single openings in rigid floors. Minimum 200 mm between two adjacent single frames or combination frames.

A2.4.1.4 Aperture framing

Flexible walls shall be constructed with aperture framing consisting of lintel transoms and lintel studs. The lintel transoms are mounted between two adjacent studs of the wall and the lintel studs are mounted between the upper and lower transoms. The lintels are minimum 0.7 mm thick rolled steel C-studs. The space between the lintels, the boards and the frames of the elements is filled with stone wool insulation of class A1 in accordance to EN 13501-1.

A2.4.1.5 Cables

EI 60

See the annex 3.3 and 4.

EI 90

See the annex 3.4 and 4.

A2.4.1.6 Insulation of the steel frame and the cables

The insulation shall be made of stone wool with density 100 kg/m^3 and CE marked in class A1 in accordance to EN 13163 or EN 14303.

See also the annex 3.3.

A2.4.1.7 Fire resistant sealant

EI 60

The fire resistant sealant should be a one-component low-modulus silicone rubber which is to be used for cable penetrations through walls and floors which is to be fire-rated EI 60. The sealant should be classed for usage on constructions made of concrete and gypsum.
Reaction to fire performance: requirement R2; hazard level HL1 and HL2 in accordance with CEN/TS 45545-2.
The sealant should be installed according to the supplier's installation guides.
See also the annex 3.3.

EI 90

The fire resistant sealant should be a one-component low-modulus silicone rubber which is to be used for cable penetrations through floors which is to be fire-rated EI 90. The sealant should be classed for usage on constructions made of concrete.
Reaction to fire performance: requirement R2; hazard level HL1 and HL2 in accordance with CEN/TS 45545-2.
The sealant should be installed according to the supplier's installation guides.
See also the annex 3.4.

A2.4.1.8 Service support construction

See the annex 3.3 and 3.4.

A2.4.1.9 Blank seals

Allowed

A2.4.2 Resistance to fire classification

EI 60 and EI 90 in accordance to EN 13501-2.

A2.5 H3-seals

A2.5.1 System description

The element H3-seal (size 150 and 200 mm) is a circular seal adapted for three cables. The seal can be installed directly in core-drilled or casted aperture or in a welded sleeve. The cables are insulated with stone wool and the remaining cavity is filled up with stone wool. The element is unsymmetrical with the flange of the steel frame on one side and the stone wool insulation on the other side of the element. The system is shown in the drawing no. 1501809, see annex 3.6.

A2.5.1.1 Supporting constructions

EI 60
The wall and floor is to be classified in at least EI 60 in accordance with EN 13501-2.

EI 90
The floor is to be classified in at least EI 90 in accordance with EN 13501-2.

A2.5.1.2 Seal size

Maximum size of opening (diameter): 200 mm.

A2.5.1.3 Number of penetrations

EI 60
Any number of single openings in rigid walls and rigid floors. Minimum 200 mm between two adjacent transits.

EI 90
Any number of single openings in rigid floors. Minimum 200 mm between two adjacent transits.

A2.5.1.4 Aperture framing

-

A2.5.1.5 Cables

EI 60/EI 90
See the annex 3.6.

A2.5.1.6 Insulation of the steel frame and the cables

The insulation shall be made of stone wool with density 100 kg/m^3 and CE marked in class A1 in accordance to EN 13163 or EN 14303.
See also the annex 3.6.

A2.5.1.7 Fire resistant sealant

EI 60
The fire resistant sealant should be a one-component low-modulus silicone rubber which is to be used for cable penetrations through walls and floors which is to be fire-rated EI 60. The sealant should be classed for usage on constructions made of concrete.
Reaction to fire performance: requirement R2; hazard level HL1 and HL2 in accordance with CEN/TS 45545-2.
The sealant should be installed according to the supplier’s installation guides.
See also the annex 3.6.

EI 90
The fire resistant sealant should be a one-component low-modulus silicone rubber which is to be used for cable penetrations through floors which is to be fire-rated EI 90. The sealant should be classed for usage on constructions made of concrete.
Reaction to fire performance: requirement R2; hazard level HL1 and HL2 in accordance with CEN/TS 45545-2.

The sealant should be installed according to the supplier's installation guides.
See also the annex 3.6.

A2.5.1.8 Service support construction

See the annex 3.6.

A2.5.1.9 Blank seals

Allowed

A2.5.2 Resistance to fire classification

EI 60 and EI 90 in accordance to EN 13501-2.

INSULATION DRAWING EI 60.
CE-MARKING R FRAME SERIES WITH CABLES CONCRETE.

FIRE HAZARD SIDE	FIRE RATING	CABLE TYPE	INSULATION (L)	INS. THICKNESS
INSULATED/UNINSULATED	EI 60	A1	50	30
INSULATED/UNINSULATED	EI 60	A2	50	30
INSULATED/UNINSULATED	EI 60	A3	50	30
INSULATED/UNINSULATED	EI 60	B	300	30
INSULATED/UNINSULATED	EI 60	E	300	30

FLOOR, FIRE CLASS EI 60

ANNEX 3.1 R frame EI 60
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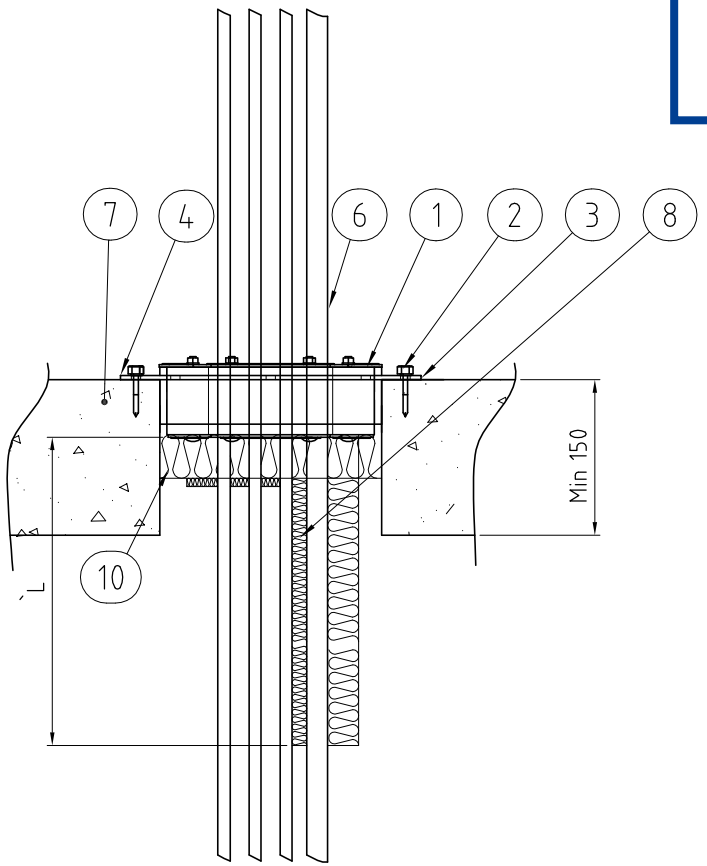
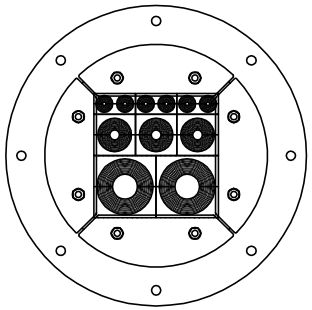
SP Certifiering



TEST SETUP



Item	Qty	Designation	Specification	NetWeight
10	1	STONE WOOL INSULATION	A1 class, min 100kg/m3. Concrete/masonry: Cavity filled min 30 mm.	
8	1	ADDITIONAL CABLE INSULATION (STONE WOOL)	A1 class, min 100kg/m3	
7	1	MASONRY OR CONCRETE		
6	1	CABLES	See matrix	
4	1	ROXTEC R SLEEVE 70-200	S1006852	
3	1	FIRE RESISTANT SEALANT	i.e. FireSeal 3000 or similary	
2	1	SUITABLE SELF TAPPING SCREW	i.e. Essve concrete screw or similary	
1	1	ROXTEC R FRAME 70-200	S1005511, S1005512, S1005506	

General tolerance ISO 2768-1/2-m/K EN ISO 13920-BF | Welded details EN ISO 5817-B EN ISO 10042-B | General surface roughness, Ra 12,5
Designed by: tc_service | Created Date: 2011-02-10 | Latest save date: 2015-04-08 | Format: A3 | Scale: 1:5 | Sheet no | TotWeight: –

Roxtec
www.roxtec.com

Title: CE-MARKING
R FRAME SERIES CABLES EI 60

Projection method

Restricted due to: Certificate

Drawing number: S1022840

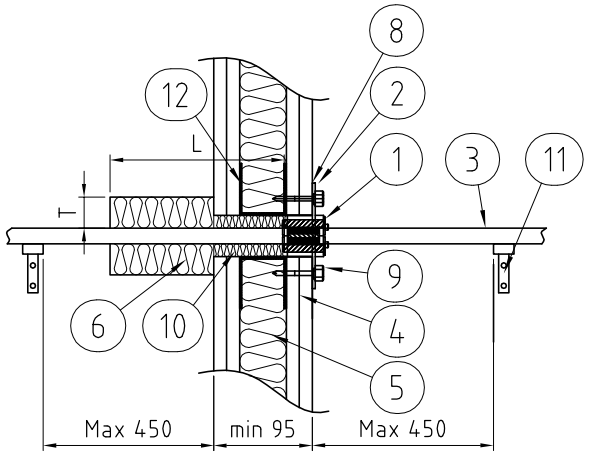
Rev: F

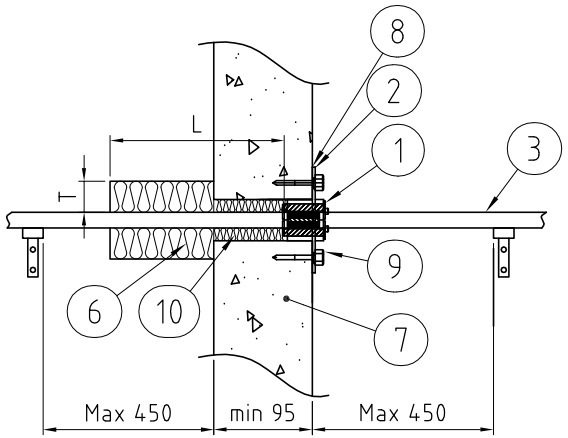
Rev	Type of revision	Date	Sign
F	UPDATE OF PARTLIST	2015-02-10	se-ronpet

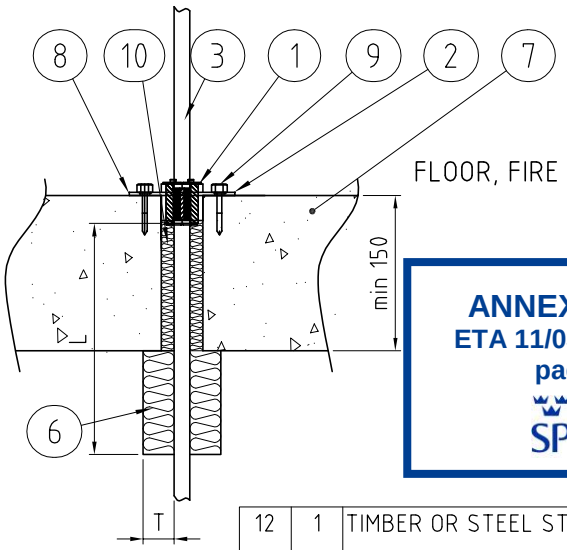
INSULATION DRAWING EI 60
CE-MARKING RS-SERIES WITH CABLES
CONCRETE, MASONRY OR GYPSUM WALL

SEALING	WALL/FLOOR	FIRE RATING	FIRE HAZARD SIDE	CABLE TYPE	INSULATION L	INS. THICKNESS
RS 31	WALL/FLOOR	EI 60	INSULATED/UNINSULATED	F, A1, A2, A3	70 (WALL) / 50 (FLOOR)	30
RS 68	WALL/FLOOR	EI 60	INSULATED/UNINSULATED	C1	250	30
RS 68	WALL/FLOOR	EI 60	INSULATED/UNINSULATED	C3	300	30
RS 100	WALL/FLOOR	EI 60	INSULATED/UNINSULATED	D1	300	30
RS 100	WALL/FLOOR	EI 60	INSULATED/UNINSULATED	D3	200	30
RS 100	WALL/FLOOR	EI 60	INSULATED/UNINSULATED	C2	150	30
RS 125	WALL/FLOOR	EI 60	INSULATED/UNINSULATED	D2	50	30

WALL, FIRE CLASS EI 60

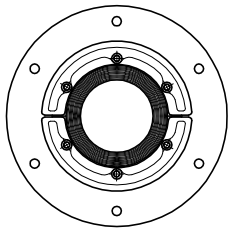






FLOOR, FIRE CLASS EI 60

TEST SETUP



ANNEX 3.2 RS EI 60
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SP Certifiering

Item	Qty	Designation	Specification	NetWeight
12	1	TIMBER OR STEEL STUDS	Element mounted with min distance of 100 mm to the timber studs.	
11	1	SERVICE SUPPORT		
10	1	STONE WOOL INSULATION	A1, min 100kg/m3. Gypsum: Cavity filled up. Concrete/masonry: Cavity filled min 30 mm	
9	1	SUITABLE SELF TAPPING SCREW	i.e. Essve concrete screw or similary	
8	1	FIRE RESISTANT SEALANT	i.e. FireStop 3000 or similary	
7	1	CONCRETE OR MASONRY		
6	1	ADDITIONAL CABLE INSULATION (STONE WOOL)	A1 class, min 100kg/m3	
5	1	INSULATION	A1 classed insulation material	
4	1	GYPSUM	T = min 2x12,5mm	
3	1	CABLE	See matrix	
2	1	ROXTEC RS SLEEVE 31-125	S1006852	
1	1	ROXTEC RS SEAL 31-125	S1005507, S1005509, S1005510	

Rev	Type of revision	Date	Sign
G	UPDATE OF PARTLIST	2015-02-09	se-ronpet

General tolerance ISO 2768-1/2-m/K EN ISO 13920-BF | Welded details EN ISO 5817-B EN ISO 10042-B | General surface roughness, Ra 12,5

Designed by: tc_service | Created Date: 2011-02-07 | Latest save date: 2015-04-08 | Format: A3 | Scale: 1:5 | Sheet no | TotWeight: –

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Title: CE-MARKING
RS SEAL SERIES CABLES EI 60

Projection method

Restricted due to: Certificate

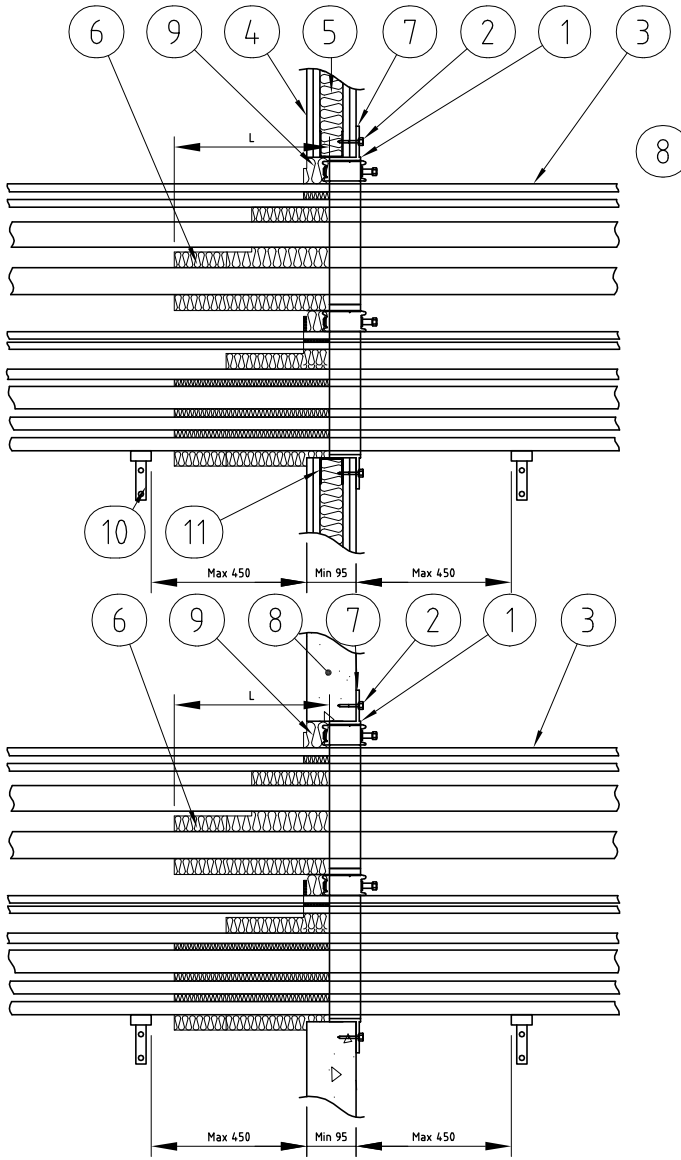
Drawing number: S1022819

Rev: G

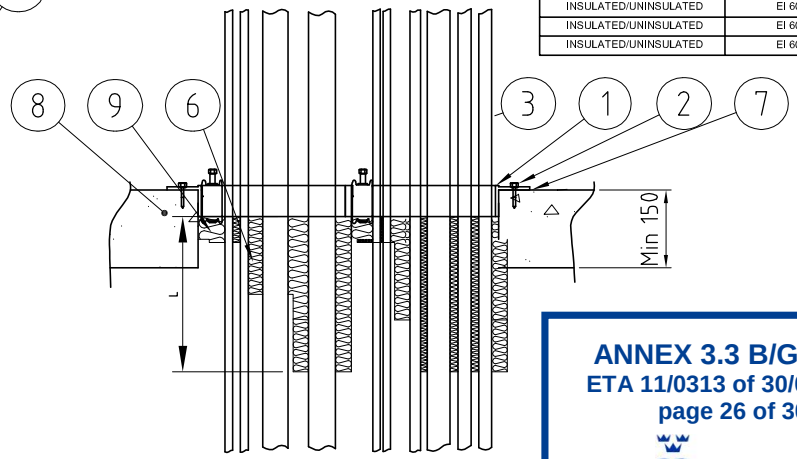
INSULATION DRAWING EI 60
CE-MARKING B/G-SERIES FRAMES WITH CABLES CONCRETE, MASONRY OR GYPSUM

FIRE HAZARD SIDE	FIRE RATING	CABLE TYPE	INSULATION (L)	INS. THICKNESS
INSULATED/UNINSULATED	EI 60	A1	50	30
INSULATED/UNINSULATED	EI 60	A2	50	30
INSULATED/UNINSULATED	EI 60	A3	50	30
INSULATED/UNINSULATED	EI 60	B	300	30
INSULATED/UNINSULATED	EI 60	C1	250	30
INSULATED/UNINSULATED	EI 60	C2	150	30
INSULATED/UNINSULATED	EI 60	C3	300	30
INSULATED/UNINSULATED	EI 60	D1	300	30
INSULATED/UNINSULATED	EI 60	D2	50	30
INSULATED/UNINSULATED	EI 60	D3	200	30
INSULATED/UNINSULATED	EI 60	E	300	30
INSULATED/UNINSULATED	EI 60	F	50	30

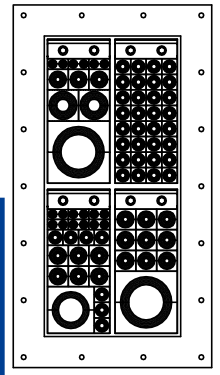
WALL, FIRE CLASS EI 60



FLOOR, FIRE CLASS EI 60



TEST SETUP



ANNEX 3.3 B/G EI 60
ETA 11/0313 of 30/06/2015
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SP Certifiering

11	1	STEEL OR TIMBER STUDS	Element mounted with min distance of 100 mm to the timber studs.
10	1	SERVICE SUPPORT	
9	1	STONE WOOL INSULATION	A1 class, min 100kg/m3. Gypsum: Cavity filled up. Concrete/masonry filled min 30mm.
8	1	MASONRY OR CONCRETE	
7	1	FIRE RESISTANT SEALANT	i.e FireSeal 3000 or similary
6	1	ADDITIONAL CABLE INSULATION (STONE WOOL)	A1 class, min 100kg/m3
5	1	INSULATION	A1 classed insulation material
4	1	GYPSUM	T=min 2x12,5 mm
3	1	CABLES	See matrix
2	1	SUITABLE SELF TAPPING SCREW	i.e Essve concrete screw or similary
1	1	ROXTEC B/G-FRAME SERIES	S1000000/S1000009

Item	Qty	Designation	Specification	NetWeight

General tolerance	Welded details	General surface roughness, Ra	Designed by	Created Date	Latest save date	Format	Scale	Sheet no	TotWeight
ISO 2768-1/2-m/K EN ISO 13920-BF	EN ISO 5817-B EN ISO 10042-B	12,5	tc service	2011-02-10	2015-04-08	A3	1:10		–

Roxtec
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Title: CE-MARKING B/G-SERIES CABLES EI 60

Projection method

Restricted due to: Certificate

Drawing number: S1022839

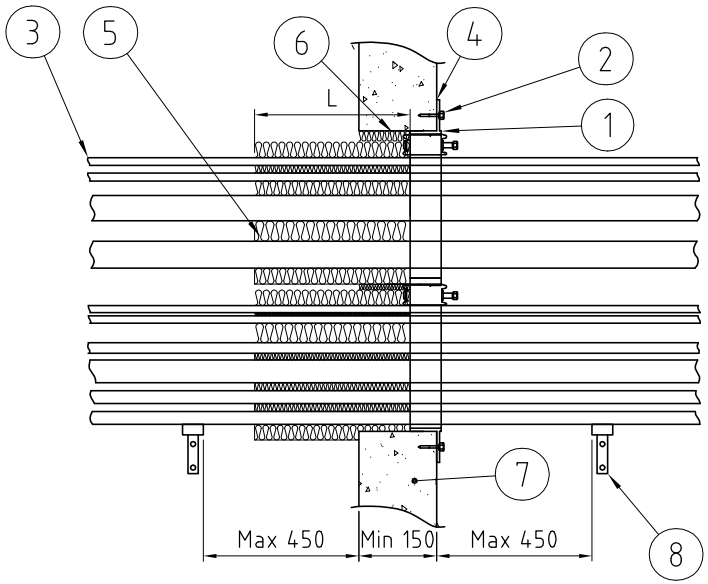
Rev: G

Rev	Type of revision	Date	Sign
G	DRAWING TYPE CHANGED.	2015-02-11	se-larlar

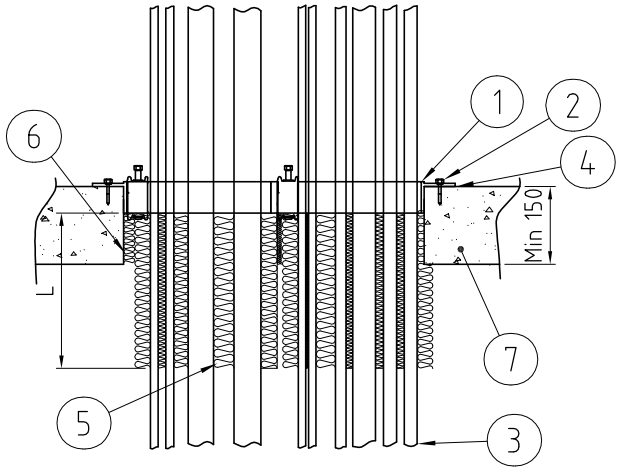
INSULATION DRAWING EI 90
CE-MARKING B/G-SERIES FRAMES WITH CABLES
CONCRETE OR MASONRY

FIRE HAZARD SIDE	FIRE RATING	CABLE TYPE	INSULATION (L)	INSUL. THICKNESS
INSULATED/UNINSULATED	EI 90	A1	300	30
INSULATED/UNINSULATED	EI 90	A2	300	30
INSULATED/UNINSULATED	EI 90	A3	300	30
INSULATED/UNINSULATED	EI 90	B	300	30
INSULATED/UNINSULATED	EI 90	C1	300	30
INSULATED/UNINSULATED	EI 90	C2	300	30
INSULATED/UNINSULATED	EI 90	C3	300	30
INSULATED/UNINSULATED	EI 90	D1	300	30
INSULATED/UNINSULATED	EI 90	D2	300	30
INSULATED/UNINSULATED	EI 90	D3	300	30
INSULATED/UNINSULATED	EI 90	E	300	30
INSULATED/UNINSULATED	EI 90	F	300	30

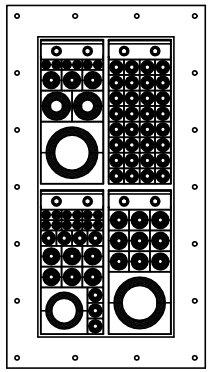
WALL, FIRE CLASS EI 90
G-SERIES



FLOOR, FIRE CLASS EI 90
B/G-SERIES



TEST SETUP



ANNEX 3.4 B/G EI 90
ETA 11/0313 of 30/06/2015
page 27 of 30
SP Certifiering

Item	Qty	Designation	Specification	NetWeight
8	-	SERVICE SUPPORT		
7	1	MASONRY OR CONCRETE		
6	1	STONE WOOL INSULATION	A1 class, min 100kg/m3. Cavity filled up	
5	1	ADDITINAL CABLE INSULATION (STONE WOOL)	A1 class, min 100kg/m3	
4	1	FIRE RESISTANT SEALANT	i.e FireSeal 3000 or similary	
3	1	CABLES	See matrix	
2	1	SUITABLE SELF TAPPING SCREW	i.e Essve concrete screw or similary	
1	1	ROXTEC B/G-FRAME SERIES	S1000000/S1000009	

General tolerance ISO 2768-1/2-m/K EN ISO 13920-BF | Welded details EN ISO 5817-B EN ISO 10042-B | General surface roughness, Ra 12,5

Designed by: se-ronpet | Created Date: 2015-02-05 | Latest save date: 2015-04-08 | Format: A3 | Scale: 1:10 | Sheet no | TotWeight: -

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Title: CE-MARKING
B/G-SERIES CABLES EI 90

Projection method

Restricted due to: Certificate

Drawing number: S1501645

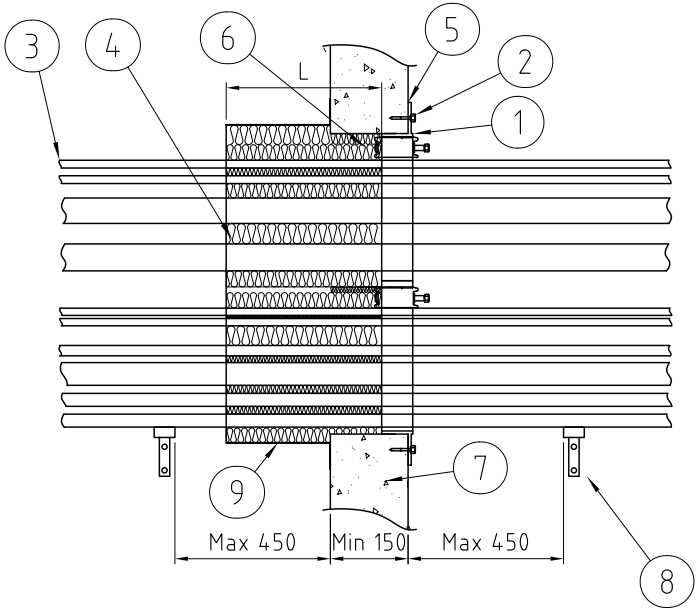
Rev: B

Rev	Type of revision	Date	Sign
B	Pos 7 Spelling correction	2015-04-08	se-mareng

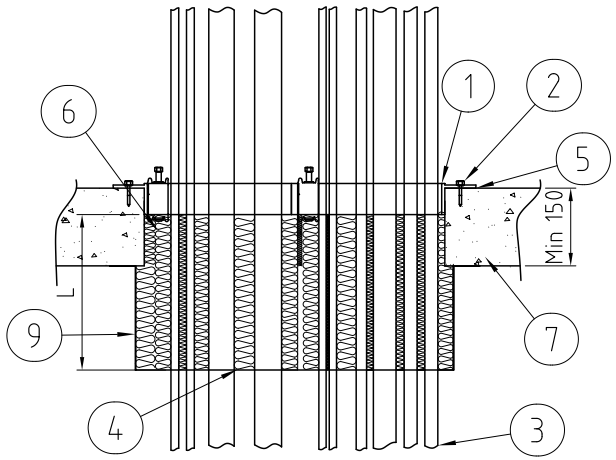
INSULATION DRAWING EI 120
CE-MARKING G-SERIES FRAMES WITH CABLES
CONCRETE OR MASONRY

FIRE HAZARD SIDE	FIRE RATING	CABLE TYPE	INSULATION (L)	INSUL. THICKNESS
INSULATED/UNINSULATED	EI 120	A1	600	30
INSULATED/UNINSULATED	EI 120	A2	600	30
INSULATED/UNINSULATED	EI 120	A3	600	30
INSULATED/UNINSULATED	EI 120	B	600	30
INSULATED/UNINSULATED	EI 120	C1	600	30
INSULATED/UNINSULATED	EI 120	C2	600	30
INSULATED/UNINSULATED	EI 120	C3	600	30
INSULATED/UNINSULATED	EI 120	D1	600	30
INSULATED/UNINSULATED	EI 120	D2	600	30
INSULATED/UNINSULATED	EI 120	D3	600	30
INSULATED/UNINSULATED	EI 120	E	600	30
INSULATED/UNINSULATED	EI 120	F	600	30

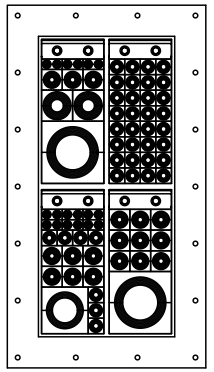
WALL, FIRE CLASS EI 120
G-SERIES



FLOOR, FIRE CLASS EI 120
G-SERIES



TEST SETUP



ANNEX 3.5 G EI 120
ETA 11/0313 of 30/06/2015
page 28 of 30
SP Certifiering

Item	Qty	Designation	Specification	Net Weight
9	-	EXTENSION FRAME	FOR HOLDING INSULATION IN PLACE	
8	-	SERVICE SUPPORT		
7	1	MASONRY OR CONCRETE		
6	1	STONE WOOL INSULATION	A1 class, min 100kg/m3. Cavity filled up	
5	1	FIRE RESISTANT SEALANT	i.e FireSeal 3000 or similary	
4	1	ADDITINAL CABLE INSULATION (STONE WOOL)	A1 class, min 100kg/m3	
3	1	CABLES	See matrix	
2	1	SUITABLE SELF TAPPING SCREW	i.e Essve concrete screw or similary	
1	1	ROXTEC G-FRAME SERIES	S1000009	

General tolerance ISO 2768-1/2-m/K EN ISO 13920-BF | Welded details EN ISO 5817-B EN ISO 10042-B | General surface roughness, Ra 12,5

Designed by: se-ronpet | Created Date: 2015-02-06 | Latest save date: 2015-04-14 | Format: A3 | Scale: 1:10 | Sheet no | Tot Weight: -

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Title: CE-MARKING
G-SERIES CABLES EI 120

Projection method

Restricted due to: Certificate

Drawing number: S1501658

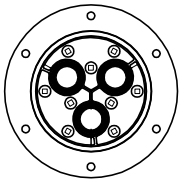
Rev: C

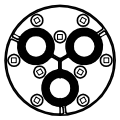
Rev	Type of revision	Date	Sign
C	EXTENSION FRAME ADDED	2015-04-14	se-ronpet

INSULATION DRAWING EI 60/90
CE-MARKING H3 SEAL SERIES WITH CABLES
CONCRETE OR MASONRY
WITH OR WITHOUT SLEEVE

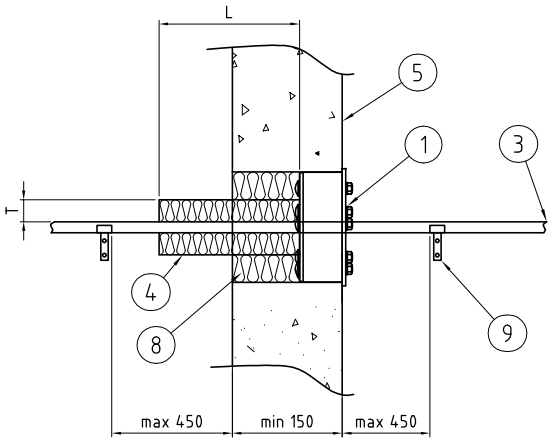
CABLE TYPE	INSULATION (L)	INSUL. THICKNESS
D2	190	30
D3	290	30
E	390	30

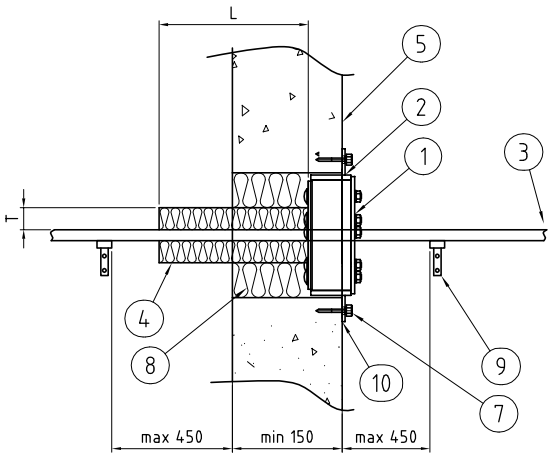
TEST SETUP



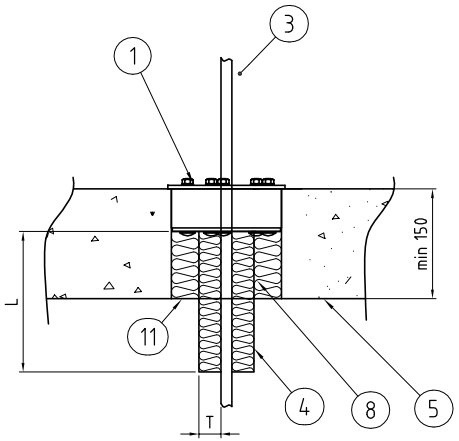


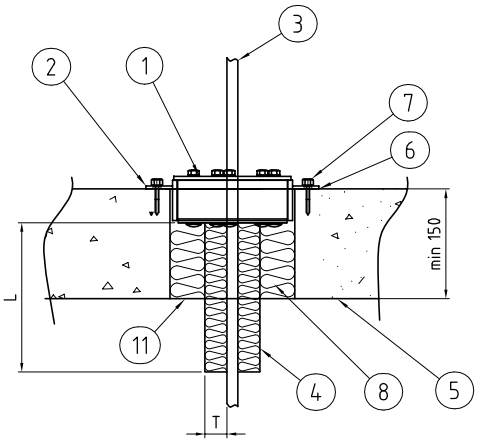
WALL, FIRE CLASS EI 60





FLOOR, FIRE CLASS EI 60/90





ANNEX 3.6 H3 EI 60, EI 90
ETA 11/0313 of 30/06/2015
page 29 of 30
SP Certifiering

Item	Qty	Designation	Specification	Net Weight
11	1	STEEL WIRE	Stainless steel, min 0.7mm, to keep insulation in place	
10	1	FIRE RESISTANT SEALANT	i.e FireStop 3000 or similary version	
9	1	SERVICE SUPPORT		
8	1	STONE WOOL INSULATION	A1 class, min 100kg/m3, cavity filled up	
7	1	SUITALBE SELF TAPPING SCREW	i.e Essve concrete screw or similary	
6	1	FIRE RESISTANT SEALANT	i.e Butyl sealing strip or similary version	
5	1	CONCRETE OR MASONRY		
4	1	ADDITIONAL CABLE INSULATION (STONE WOOL)	A1 class, min 100kg/m3	
3	1	CABLE	See matrix	
2	1	ROXTEC RS SLEEVE 150-200	S1006852	
1	1	ROXTEC H3 SEAL 150-200	S1039325	

General tolerance ISO 2768-1/2-m/K EN/ISO 13920-BF | Welded details EN ISO 5817-B EN ISO 10042-B | General surface roughness, Ra 12.5
Designed by: se-ronpet | Created Date: 2015-02-13 | Latest save date: 2015-04-08 | Format: A2 | Scale: 1:5 | Sheet no | Tot Weight: –
Roxtec www.roxtec.com
Title: CE-MARKING H3 SEAL SERIES CABLES EI 60/90
Projection method
Restricted due to: Certificate
Drawing number: S1501809
Rev: B

Rev	Type of revision	Date	Sign
B	CORRECTION ACC TO TEST SETUP	2015-02-25	se-ronpet

ANNEX 4 - Services

Cable type	Dimensions	Designation	Standard	Insulation / sheath material
A1	5 x 1,5 mm^2	bfb	HD 603.3	PVC / PVC b)
A2	5 x 1,5 mm^2	bff	HD 22.4	EPR / PO d)
A3	5 x 1,5 mm^2	bfdb	HD 604.5	XLPE / EVA f)
B	1 x 95 mm^2	bbff	HD 603.3	HD 603.3
C1	4 x 95 mm^2		HD 22.4	PVC / PVC b)
C2	4 x 95 mm^2	H07RN-F 4G95	HD 22.4	EPR / PO d)
C3	4 x 95 mm^2	YMz1Kmbzh 0,6/1 kV 4G95 PVIK-LS-HF 4x95 N2XH-J 4x95SM or N2XH-O 4x95SM n.n. E-NGNG-J 4x95SM or E-3G3G-J 4x95SM or E-NGNG-O 4x95SM or E-3G3G-O 4x95SM	HD 604.5	XLPE / EVA f)
D1	4 x 185 mm^2	E-YCWY 4x185SM/95 MCMK 4x815/95 NYCWY 4x185SM/95 PFSP CU 4x185/95 FKKJ 4x185/95 S	HD 603.3	PVC / PVC b)
D2	4 x 185 mm^2	H07RN-F 4G185		EPR / PO d)
D3	4 x 185 mm^2	YMz1Kmbzh 0,6/1 kV 4G185 svs PVIK-LS-HF 4x185 N2XH-J 4x185SM or N2XH-O 4x185SM n.n. E-NGNG-J 4x185SM or E-3G3G-J 4x185SM or E-NGNG-O 4x185SM or E-3G3G-O 4x185SM	HD 604.5	XLPE /EVA f)
E	1 x 185 mm^2	E-YY-J 1x185RM or E-YY-O 1x185RM NYY-J 1x185RM or NYY-O 1x185RM VV 1x185 TT 1x185 RM 0,6/1 kV	HD 603.3	PVC / PVC b)
F	20 x 2 mm^2 x 0,6 mm screened		-	PE / PE m)

b) PVC = Polyvinyl chloride
d) EPR = Ethylene-propylene rubber compound, PO = Polyolefin, synthetic rubber compound
f) XLPE = Cross-linked Polyethylene, EVA = Ethylene-vinyl-acetate copolymer compound
m) PE = Polyethylene, solid or cellular