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Designated according to Article 29 of Regulation (EU) No 305/2011

Member of EOTA

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European Technical Assessment

ETA 16/0645 of 06.09.2022

General part

Technical Assessment Body issuing the ETA: ITeC ITeC has been designated according to Article 29 of Regulation (EU) No 305/2011 and is member of EOTA (European Organisation for Technical Assessment)	
Trade name of the construction product	**FAVEKER® FV**
Product family to which the construction product belongs	Kits for external wall claddings.
Manufacturer	**GRES DE ARAGÓN, S.A.** Ctra. Escatrón km 9 ES-44600 Alcañiz (Teruel) Spain
Manufacturing plant(s)	**GRES DE ARAGÓN** Ctra. Escatrón km 9 ES-44600 Alcañiz (Teruel) Spain **FAVEKER** Polígono El Regatillo, 2 Ctra. Alcorisa a Andorra, km 3,5 ES-44550 Alcorisa (Teruel) Spain
This European Technical Assessment contains	46 pages including 3 annexes which form an integral part of this assessment.
This European Technical Assessment is issued in accordance with Regulation (EU) 305/2011, on the basis of	EAD 090062-00-0404 *Kits for external wall claddings mechanically fixed.*
This version replaces	ETA 16/0645 issued on 04.09.2019.

General comments

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

Specific parts of the European Technical Assessment

1 Technical description of the product

This ETA refers to FAVEKER® FV kits for external wall cladding in ventilated façades.

FAVEKER® GA and FAVEKER® GAV kits components are given in table 1.1.

Detailed information and data of all the components are given in the annexes of this ETA.

Fixings between brackets and substrate are not part of the kit assessed in this ETA.

Table 1.1: Kits components.

N.	Generic component		FAVEKER® FV kits (family C)				Technical description in Annex 1
1	Cladding element (*)		FAVEKER® GA16 FAVEKER® GA20 FAVEKER® GA30	FAVEKER® GA20		FAVEKER® GA16 FAVEKER® GAV	A1.1
2	Cladding fixing	Fixing device	Stainless steel clips	Aluminium alloy small rails	Aluminium alloy L-shaped continuous horizontal profiles	Aluminium alloy C-shaped continuous horizontal profiles	A1.2
		Screw	Stainless steel screws				
3	Subframe	Vertical profile	Aluminium alloy profiles				A1.3
		Bracket	Aluminium alloy brackets				
		Subframe fixing	Stainless steel screws				
		Ancillary components	EPDM joint profiles	Elastomeric filler		---	

(*) Extruded ceramic tiles according to EN 14411.

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

FAVEKER® FV kit is intended to be used as external wall claddings in ventilated façades (rainscreens). The walls are made of masonry (clay, concrete or stone), concrete (cast on site or as prefabricated panels), timber or metal frame in new or existing buildings (retrofit).

The characteristics of the walls shall be verified prior to use of FAVEKER® FV kit, especially regarding conditions for reaction to fire classification and for mechanical fixing of FAVEKER® FV kit.

The provisions made in this European Technical Assessment are based on an assumed working life of at least 25 years for FAVEKER® FV kit. 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.

FAVEKER® FV kit is made of non-load bearing construction components. They do not contribute directly to the stability of the wall on which they are installed, but they can contribute to its durability by providing enhanced protection from the effect of weathering.

FAVEKER® FV kit is not intended to ensure the airtightness of the building envelope.

Detailed information and data regarding design, installation, maintenance and repair criteria are given in Annexes 2 and 3.

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

The assessment of FAVEKER® FV kit for the intended use was performed following EAD 090062-00-0404 *Kits for external wall claddings mechanically fixed.*

Table 3.1: Summary of the FAVEKER® FV kit performance (see also detailed performance in relevant clauses).

Product: FAVEKER® FV kit **Intended use:** External wall claddings in ventilated façades (rainscreens).

Basic Works Requirement	**ETA clause**	**Essential characteristic**		**Performance**
BWR 2 Safety in case of fire	3.1	Reaction to fire		See clause 3.1
	---	Façade fire performance		Not assessed
	---	Propensity to undergo continuous smouldering		Not relevant (thermal insulation is not a kit component)
BWR 3 Hygiene, health and the environment	3.2	Watertightness of joints (protection against driving rain)		Not watertight (open joints)
	---	Water absorption		Not relevant
	---	Water vapour permeability		Not relevant
	3.3	Drainability		See figures in Annex 2
	---	Content and/or release of dangerous substances		Not assessed
BWR 4 Safety and accessibility in use	3.4	Wind load resistance		See tables 3.2
	---	Resistance to horizontal point loads		Not assessed
	3.5	Impact resistance		See table 3.3
	3.6	Bending strength of cladding element	FAVEKER® GA16	> 14,5 MPa
			FAVEKER® GA20	> 14,5 MPa
			FAVEKER® GA30	> 20,0 MPa
			FAVEKER® GAV	> 17,0 MPa
	3.7	Resistance of grooved cladding elements		≥ 854 N
	3.8	Resistance to vertical load		< 0,1 mm after 1 h
	3.9	Pull-through resistance of fixings from profile		≥ 6,16 kN
	3.10	Resistance of metal clip		≥ 467 N
	3.11	Resistance of profiles		See clause 3.11
	3.12	Tension/ Pull-out resistance of subframe fixings		≥ 0,92 kN
	3.13	Shear load of subframe fixings		≥ 4,9 kN
	3.14	Bracket resistance (horizontal and vertical load)		See clause 3.14
BWR 5 Protection against noise	---	Airborne sound insulation		Not assessed
BWR 6 Energy economy and heat retention	---	Thermal resistance of the kit		Not relevant (use in ventilated façades and the thermal insulation is not a kit component)
	---	Thermal resistance of thermal insulation product		
Durability aspects	---	Hygrothermal behaviour		Not relevant
	---	Behaviour after pulsating load		Not assessed
	3.15	Freeze-thaw resistance		No defects
	---	Behaviour after immersion in water		Not relevant

Table 3.1: Summary of the FAVEKER® FV kit performance (see also detailed performance in relevant clauses).

Product: FAVEKER® FV kit		**Intended use:** External wall claddings in ventilated façades (rainscreens).		
Basic Works Requirement	**ETA clause**	**Essential characteristic**		**Performance**
	3.16	Dimensional stability	by temperature	≤ 6,0 µm/(m·ºC)
			by humidity	≤ 0,1 mm/m
	---	Chemical and biological resistance		Not relevant
	---	UV radiation resistance		Not relevant
	3.17	Corrosion		See clause 3.17

Complementary information:

Requirements with respect to the mechanical resistance and stability of non-load bearing parts of the works are not included in the Basic Works Requirement *Mechanical resistance and stability* (BWR 1) but are treated under the Basic Works Requirement *Safety and accessibility in use* (BWR 4).

The fire resistance requirement is applicable to the wall (made of masonry, concrete, timber or metal frame) and not to the FAVEKER® FV kit itself.

3.1 Reaction to fire

Reaction to fire of FAVEKER® FV kit according to Commission Delegated Regulation (EU) 2016/364 and EN 13501-1 is:

- For FAVEKER® FV kit with horizontal profiles and small rails as cladding fixings which does not contain the EPDM joint profiles:
  - class A1 without need of testing according to Decision 96/603/EC as amended. The elastomeric filler is considered as small component (see clause A1.3.4), therefore its contribution to the reaction to fire is neglected.
- For FAVEKER® FV kit with clips as cladding fixings which contains the EPDM joint profiles:
  - class B-s1,d0. It is based on the relevant tests according to EN 13501-1.

These classes are valid provided that the insulation layer placed behind the cladding elements is made of non-combustible materials (e.g. mineral wool) or that the layer behind the cladding elements is a mineral substrate like masonry or concrete (class A1 or A2-s1, d0). For other end use conditions (for example: with insulation layer made of EPS, XPS, PUR or PF), the reaction to fire of the external wall claddings for ventilated façades will be the reaction to fire of the insulation material.

Note: A European reference fire scenario has not been laid down for façades. In some Member States, the classification of external wall claddings according to EN 13501-1 might not be sufficient for the use in façades. An additional assessment of external wall claddings according to national provisions (e.g. on the basis of a large-scale test) might be necessary to comply with Member State regulations, until the existing European classification system has been completed.

3.2 Watertightness of joints (protection against driving rain)

Joints between the cladding elements in the external wall claddings for ventilated façades are open, therefore the FAVEKER® FV kit are not watertight.

3.3 Drainability

On the basis of the construction details (see Annex 2), the available technical knowledge, experience and the installation criteria, it is considered that the water which penetrates into the air space or the condensation water can be drained out from the cladding without accumulation or moisture damage or leakage into the substrate.

3.4 Wind load resistance

Wind load resistance has been determined considering the wind suction resistance tests and the mechanical resistance of components (see clauses 3.6 to 3.14). Different cases have been tested depending on the cladding fixing (clips, horizontal profiles and small rails) and the cladding element.

The worst cases have been tested: minimum bending strength, minimum thickness, maximum width and the maximum separation between clips, small rails or vertical profiles (1500 mm). In addition other configurations have been tested. Test results are given in table 3.2.

For other assembled systems, wind load resistance obtained by calculation on the basis of the mechanical resistance of the kit components should not be higher than the maximum load obtained in the tests.

Table 3.2.1: Wind suction test results GA16 FTS502B.

Test	Cladding element	Cladding fixing	Maximum load Q (Pa)	Deflection under maximum load (mm)	Deflection after 1 min recovery (mm)
Suction (1)	FAVEKER® GA16	Clips GA16 Simple 13 mm – Double 13 mm	3800 (5)	9,61 (9)	0,66
Suction (2)			2200 (6)	8,63 (10)	1,11 (13)
Suction (3)			1800 (7)	7,87 (11)	0,61
Suction (4)			2200 (8)	8,09 (12)	0,71

(1) Test specimen 1: two tiles 1200 mm x 400 mm (length x width), four tiles 600 mm x 400 mm, four tiles 1200 mm x 300 mm and eight tiles 600 mm x 300 mm with four clips at each tile; four vertical grooved profiles at distances 1200 mm and 600 mm, four EPDM profiles; twelve brackets 80 x 60 x 3 x 60 mm (span 750 mm), and subframe fixings.

(2) Test specimen 2: four tiles 1200 mm x 500 mm (length x width) and eight tiles 600 mm x 500 mm with four clips at each tile; four vertical grooved profiles at distances 1200 mm and 600 mm, four EPDM profiles; eight brackets 60 x 60 x 3 x 60 mm and four brackets 60 x 60 x 3 x 120 mm (span 750 mm), and subframe fixings.

(3) Test specimen 3: four tiles 1500 mm x 500 mm (length x width) and eight tiles 450 mm x 500 mm with four clips at each tile; four vertical grooved profiles at distances 1500 mm and 450 mm, four EPDM profiles; eight brackets 60 x 60 x 3 x 60 mm and four brackets 60 x 60 x 3 x 120 mm (span 750 mm), and subframe fixings.

(4) Test specimen 4: four tiles 1800 mm x 500 mm (length x width) with six clips at each tile and eight tiles 300 mm x 500 mm with four clips at each tile; five vertical grooved profiles at distances 900 mm and 300 mm, five EPDM profiles; ten brackets 60 x 60 x 3 x 60 mm and five brackets 60 x 60 x 3 x 120 mm (span 750 mm), and subframe fixings.

(5) Maximum load reached without kit failure (at test equipment limit).

(6) Groove breakage on the four corners, at fixing point with clips, of the central 1200 mm x 500 mm tile.

(7) Groove breakage on the upper corners, at fixing point with clips, of the central 1500 mm x 500 mm tile.

(8) Groove breakage at all fixing points with clips of the central 1800 mm x 500 mm tiles.

(9) Maximum displacement and deformation measured on the horizontal border of the central 1200 mm x 400 mm tile.

(10) Maximum displacement measured on the horizontal border of the central 1200 mm x 500 mm tile.

(11) Maximum displacement and deformation measured on the centre of the central 1500 mm x 500 mm tile.

(12) Maximum displacement and deformation measured on the right-span horizontal border of the 1800 mm x 500 mm tile.

(13) Maximum deformation measured on the corner of the central 1200 mm x 500 mm tile.

Table 3.2.2: Wind suction test results GA20 FTS502B and GA20 FTS502B+.

Test	Cladding element	Cladding fixing	Maximum load Q (Pa)	Deflection under maximum load (mm)	Deflection after 1 min recovery (mm)
Suction (1)	FAVEKER® GA20	Clip GA20 Simple 15 mm	3600 (7)	15,71 (12)	4,33
Suction (2)			3800 (7)	5,34 (13)	0,00
Suction (3)			1600 (8)	6,11 (14)	0,39
Suction (4)			2400 (9)	9,26 (15)	3,51
Suction (5)			1800 (10)	12,52 (16)	1,46
Suction (6)		Clip GA20+ Simple 16 mm	3600 (11)	11,40 (17)	1,33 (18)

Table 3.2.2: Wind suction test results GA20 FTS502B and GA20 FTS502B+.

(1) Test specimen 1: five tiles 1200 mm x 400 mm (length x width) and ten tiles 600 mm x 400 mm with four clips for each tile; four vertical grooved profiles at distances 1200 mm and 600 mm, four EPDM profiles; twelve brackets 80 x 60 x 3 x 60 mm (span 750 mm), and subframe fixings.

(2) Tests specimen 2: four tiles 1000 mm x 300 mm (length x width) and eight tiles 700 mm x 300 mm with four clips for each tile, four vertical grooved profiles at distances 1200 mm and 600 mm, four EPDM profiles, 12 brackets 60 x 60 x 3 x 60 mm (span 750 mm), and subframe fixings.

(3) Test specimen 3: two tiles 1500 mm x 600 mm (length x width), two tiles 1500 mm x 400 mm, four tiles 450 mm x 600 mm and four tiles 450 mm x 400 mm with four clips at each tile; four vertical grooved profiles at distances 1500 mm and 450 mm, four EPDM profiles; eight brackets 60 x 60 x 3 x 60 mm and four brackets 60 x 60 x 3 x 120 mm (span 750 mm), and subframe fixings.

(4) Test specimen 4: two tiles 1800 mm x 600 mm (length x width) with six clips at each tile, four tiles 1200 mm x 600 mm and four tiles 300 mm x 600 mm with four clips for each tile; five vertical grooved profiles at distances 900 mm and 300 mm, five EPDM profiles; ten brackets 60 x 60 x 3 x 60 mm and five brackets 60 x 60 x 3 x 120 mm (span 750 mm), and subframe fixings.

(5) Test specimen 5: vertical configuration (all tiles are placed vertically): two tiles 1800 mm x 600 mm (length x width), four tiles 100 mm x 600 mm, three tiles 1500 mm x 400 mm and six tiles 250 mm x 400 mm with four clips at each tile; six vertical grooved profiles at distances 600 mm and 400 mm, six EPDM profiles; twelve brackets 60 x 60 x 3 x 60 mm and six brackets 60 x 60 x 3 x 120 mm (span 750 mm), and subframe fixings.

(6) Test specimen 6: ceramic two tiles 1200 mm x 600 mm (length x width), two tiles 1200 mm x 400 mm, four tiles 600 mm x 600 mm and four tiles 600 mm x 400 mm with four clips at each tile; four vertical grooved profiles at distances 1200 mm and 600 mm, four EPDM profiles; eight brackets, four of 60 x 60 x 3 x 120 mm and eight of 60 x 60 x 3 x 60 mm (span 750 mm), and subframe fixings.

(7) Maximum load reached without kit failure (at test equipment limit).

(8) Groove breakage on the corners, at fixing point with clips, of one side of the central 1500 mm x 600 mm tile.

(9) Groove breakage at all fixing points with clips of the central 1800 mm x 600 mm tiles.

(10) Groove breakage on the corners, at fixing points with clips, of the left-side 1800 mm x 600 mm tile.

(11) Groove breakage on the corners, at all fixing points with clips, of the 1200 mm x 600 mm tile and 1200 mm x 400 mm tile.

(12) Maximum displacement and deformation measured on the centre of the central 1200 mm x 400 mm tile.

(13) Maximum displacement measured on the centre of the central 1000 mm x 300 mm tile.

(14) Maximum displacement and deformation measured on the centre of tiles 1500 mm x 600 and tiles 1500 mm x 400 mm.

(15) Maximum displacement and deformation measured on the corner of the central 1800 mm x 600 tile, at the fixing point with the clip.

(16) Maximum displacement and deformation measured at the right vertical edge of the central 1800 mm x 600 tile, in the middle of the vertical profile.

(17) Maximum displacement measured on the centre of the central 1200 mm x 600 mm tile.

(18) Maximum deformation measured on the centre of the lateral 600 mm x 600 mm tile.

Table 3.2.3: Wind suction test results GA20 FTS506 GR.

Test	Cladding element	Cladding fixing	Maximum load Q (Pa)	Deflection under maximum load (mm)	Deflection after 1 min recovery (mm)
Suction (1)	FAVEKER® GA20	Small rails	2800 (3)	15,07 (5)	3,21 (7)
Suction (2)			3200 (4)	10,54 (6)	1,35

(1) Test specimen 1: two tiles 1500 mm x 600 mm (length x width), two tiles 1500 mm x 400 mm, four tiles 450 mm x 600 mm and four tiles 450 mm x 400 mm, twelve intermediate small rails and eight start-end small rails of 150 mm length; four vertical profiles at distances 1500 mm and 450 mm; eight brackets 60 x 60 x 3 x 60 mm and four brackets 60 x 60 x 3 x 120 mm (span 750 mm) and subframe fixings (two screws for each small rail). Ancillary component: elastomeric filler.

(2) Test specimen 2: two tiles 1800 mm x 600 mm (length x width) with six fixing points, four tiles 1200 mm x 400 mm and four tiles 300 mm x 600 mm with four fixing points for each tile; eleven intermediate small rails and ten start-end small rails of 150 mm length; five vertical profiles at distances 900 mm and 300 mm; ten brackets 60 x 60 x 3 x 60 mm and five brackets 60 x 60 x 3 x 120 mm (span 750 mm) and subframe fixings (two screws for each small rail). Ancillary component: elastomeric filler.

(3) Groove breakage on the corners, at fixing points with small rails, of the central 1500 mm x 600 mm tile.

(4) Groove breakage at all the fixing points with small rails of the central 1800 mm x 600 mm tiles.

(5) Maximum displacement measured on the centre of the horizontal border of the central 1500 mm x 600 mm tile.

(6) Maximum displacement and deformation measured on the centre of the central 1800 mm x 600 mm tile.

(7) Maximum deformation measured on the centre of 1500 mm x 600 mm and 1500 mm x 400 mm tiles.

Table 3.2.4: Wind suction test results GAV FTS502A and GA16 FTS502A.

Test	Cladding element	Cladding fixing	Maximum load Q (Pa)	Deflection under maximum load (mm)	Deflection after 1 min recovery (mm)
Suction (1)	FAVEKER® GAV	C-shaped horizontal profiles	2800 (4)	13,91 (7)	5,12 mm
Suction (2)	FAVEKER® GA16		4000 (5)	25,24 (8)	5,79 (10)
Suction (3)			4000 (6)	14,57 (9)	2,32

(1) Tests specimen 1: ten tiles 600 mm x 400 mm (length x width) and twenty tiles 300 mm x 400 mm, four middle horizontal profiles, two start-end horizontal profiles (span between the horizontal profiles 400 mm), four vertical profiles at distances 1000 mm and 650 mm, twelve brackets 60x60x60x3 (span 750 mm), and subframe fixings.

(2) Test specimen 2: four tiles 1500 mm x 500 mm (length x width) and eight tiles 450 mm x 500 mm, three intermediate horizontal profiles and two start-end horizontal profiles (span between the horizontal profiles 500 mm), four vertical profiles at distances 1500 mm and 450 mm, eight brackets 60 x 60 x 3 x 60 mm and four brackets 60 x 60 x 3 x 120 mm (span 750 mm), and subframe fixings (two screws for each fixing point with vertical profile).

(3) Test specimen 3: four tiles 1800 mm x 500 mm (length x width) and eight tiles 300 mm x 500 mm, three intermediate horizontal profiles and two start-end horizontal profiles (span between the horizontal profiles 500 mm), five vertical profiles at distances 900 mm and 300 mm, ten brackets 60 x 60 x 3 x 60 mm and five brackets 60 x 60 x 3 x 120 mm (span 750 mm), and subframe fixings (two screws for each fixing point with vertical profile).

(4) Maximum load reached without kit failure (at test equipment limit).

(5) Lower grooves breakage at 3800 Pa at the fixing points with the vertical profiles of the central tiles. Test stopped at 4000 Pa.

(6) Lower grooves breakage at 4000 Pa at the fixing points with the vertical profiles of the central tiles.

(7) Maximum displacement and deformation measured on the centre of the central 300 mm x 400 mm tile.

(8) Maximum displacement measured on the centre of the horizontal border of the central 1500 mm x 500 mm tile.

(9) Maximum displacement and deformation measured on the centre of the 1800 mm x 500 mm tiles.

(10) Maximum deformation measured on the centre of the lower central 1500 mm x 500 mm tile.

Table 3.2.5: Wind suction test results GA20 FTS506.

Test	Cladding element	Cladding fixing	Maximum load Q (Pa)	Deflection under maximum load (mm)	Deflection after 1 min recovery (mm)
Suction (1)	FAVEKER® GA20	L-shaped horizontal profiles	3400 (2)	16,47 (3)	4,32

(1) Test specimen: two 1200 mm x 600 mm (length x width), two 600 mm x 400 mm and one 1200 mm x 400 mm tiles both at the top and bottom of the specimen, and two 600 mm x 600 mm both on the left and right centre sides; four vertical profiles at 750 mm and 800 mm distances; three intermediate L-shaped horizontal profiles at 600 mm and two start-end L-shaped horizontal profiles; four brackets of 60 x 60 x 3 x 120 mm and eight of 60 x 60 x 3 x 60 mm (750 mm span) and subframe fixings. Ancillary component: elastomeric filler.

(2) Pull-out of the screws on vertical profile and breakage of the inner and outer tongues of the central 1200 mm x 600 mm tiles at 3500 Pa.

(3) Maximum displacement and deformation measured on the centre of the horizontal border of the central 1200 mm x 600 mm tile.

3.5 Impact resistance

Impact resistance has been tested in the assembled systems given in table 3.3.

For other assembled systems or other cladding elements different than those given in the table 3.3, the impact resistance has not been assessed.

Table 3.3: Impact resistance.

FAVEKER® FV kit	Cladding element			Cladding fixings for cladding element	Impact resistance passed	Degree of exposure in use (*)
	Trade name	Length, L (mm)	Width, H (mm)			
GA16 FTS502A	FAVEKER® GA16	1200	250	FTS 502A (2 C-shaped horizontal profiles)	Hard body (0,5 kg) 3 impacts of 1 J Soft body (3,0 kg) 3 impacts of 10 J	Category IV
		≤ 1500	500			
GA16 FTS502B		≤ 1500	300	FTS 502B (4 clips 13 mm)	Hard body (0,5 kg) 3 impacts of 1 J Soft body (3,0 kg) 3 impacts of 10 J	Category IV
		800	≤ 500			
GA20 FTS502B and GA20 FTS502B+	FAVEKER® GA20	≤ 1500	600	FTS 502B (4 clips 15 mm) FTS 502B+ (4 clips GA20+ 16 mm)	Hard body (0,5 kg) 3 impacts of 1 J Soft body (3,0 kg) 3 impacts of 10 J	Category IV
GA20 FTS506		≤ 1500	≤ 600	FTS 506 (2 L-shaped horizontal profiles)	Hard body (0,5 kg) 3 impacts of 1 J Soft body (3,0 kg) 3 impacts of 10 J	Category IV
GA20 FTS506 GR		≤ 1500	300	FTS 506 GR (4 small rails)	Hard body (0,5 kg) 3 impacts of 1 J Soft body (3,0 kg) 3 impacts of 10 J	Category IV
		≥ 1200 & ≤ 1500	≤ 600			
GA20 FTS502B Vertical	FAVEKER® GA20 (**)	≤ 1800	≤ 600	FTS 502B (≥ 4 clips 15 mm)	Hard body (0,5 kg) 3 impacts of 1 J Soft body (3,0 kg) 3 impacts of 10 J	Category IV
GA30 FTS502B	FAVEKER® GA30	≥ 600	≤ 400	FTS 502B (≥ 4 clips 19 mm)	Hard body (0,5 kg) 3 impacts of 1 J Soft body (3,0 kg) 3 impacts of 10 J	Category IV
GAV FTS502A	FAVEKER® GAV	≥ 600	≤ 400	FTS 502A (2 C-shaped horizontal profiles)		

(*) Category I: This category means that the degree of exposure in use should be a zone readily accessible to the public at ground level and vulnerable to hard body impacts but not subjected to abnormally rough use.

Category II: This category means that the degree of exposure in use should be a zone liable to impacts from thrown or kicked objects, but in public locations where the height of the kit will limit the size of the impact; or at lower levels where access to the building is primarily to those with some incentive to exercise care.

Category III: This category means that the degree of exposure in use should be a zone not likely to be damaged by normal impacts caused by people or by thrown or kicked objects.

Category IV: This category means that the degree of exposure in use should be a zone out of reach from ground level.

(**) Cladding element placed in vertical configuration.

3.6 Bending strength of the cladding element

Bending strength of the cladding element has been tested according to EN 10545-4. The supports of the test specimens have been positioned parallel to the extrusion of the cladding element. Mean values of the breaking load, breaking strength and bending strength are given in table 3.4.

Bending strength after freeze-thaw cycles has been assessed according to clause 2.2.12.1 of EAD 090062-00-0404. No decrease in resistance has been observed.

Table 3.4: Bending strength of the cladding element.

Trade name	Load direction	Breaking load (N)		Breaking strength (N)		Bending strength (MPa)	
		F_m	F_c	F_m	F_c	F_m	F_c
FAVEKER® GA16 (*) (H ≤ 400 mm)	Suction	2225	2046	6007	5523	26,1	24,3
	Pressure	1044	999	3289	3146	14,5	13,8
FAVEKER® GA16 (*) (H > 400 mm)	Suction	1475	1262	6858	5870	29,7	24,0
	Pressure	700	612	3250	2841	15,7	13,8
FAVEKER® GA20 (*) (300 mm ≥ H ≤ 400 mm)	Suction	2407	1993	6499	5382	26,7	21,0
	Pressure	1476	1327	3986	3583	16,0	14,3
FAVEKER® GA20 (*) (400 mm < H ≤ 600 mm)	Suction	1459	1189	8461	6894	30,3	24,7
	Pressure	840	800	4034	3838	15,2	14,5
FAVEKER® GA30 (**)	Suction	3624	3334	18120	16670	32,6	30,0
	Pressure	2545	2204	12725	11021	22,9	19,8
FAVEKER® GAV (*)	Suction	728	695	1675	1599	24,4	23,0
	Pressure	515	462	1390	1248	19,7	17,8

(*) Test specimens' width = 100 mm.

(**) Test specimens' width = 50 mm.

Where: F_m = mean values; F_c = characteristic values giving 75% confidence that 95% of results will be higher than this value.

H = width of cladding element.

3.7 Resistance of grooved cladding elements

Mean and characteristic values of the grooved cladding elements are given in table 3.5.

Resistance of grooved cladding elements after freeze-thaw cycles has been assessed according to 2.2.12.2 of EAD 090062-00-0404. No decrease in resistance has been observed.

The worst cases have been tested.

Table 3.5: Resistance of grooved cladding elements**.**

Test specimen		Resistance (N)			
		In suction action		In pression action	
		F_m	F_c	F_m	F_c
FAVEKER® GA16 (H < 500 mm) (*)	Top groove	1155	854	870	806
	Lower groove	1631	1123		
FAVEKER® GA16 (H = 500 mm)	Top groove	1740	1165		
	Lower groove	2349	1381		

Table 3.5: Resistance of grooved cladding elements**.**

Test specimen		Resistance (N)			
		In suction action		In pression action	
		F_m	F_c	F_m	F_c
FAVEKER® GA20	Top or lower groove	1398	1151	1408	1078
	Lateral hollows	630	496	630	496
FAVEKER® GA30	Top groove	4107	3827	2129	1594
	Lower groove	3924	2762		
FAVEKER® GAV	Top groove	1708	1186	895	716
	Lower groove	1511	922		
	Intermediate groove	1644	938	(**)	(**)

(*) Tested cladding element which gives values to the other cladding elements.

(**) Test not relevant by geometry.

Where: F_m = mean values; F_c = characteristic values giving 75% confidence that 95% of results will be higher than this value.

H = width of cladding elements.

3.8 Resistance to vertical load of cladding fixing

The maximum deflection of the cladding fixings has been 0,09 mm after 1 hour. A vertical load with value 704 N has been applied. The worst case has been tested: tile with maximum weight (FAVEKER® GA30), clips 19 mm and distance between clips 1460 mm.

3.9 Pull-through resistance of fixings from profile

Pull-through resistance of fixings on cladding fixing horizontal profile has been tested. Mean and characteristic values of the pull-through resistance are given in table 3.6.

Table 3.6: Pull-through resistance of fixing from horizontal profile.

Test specimen	Failure load (N)		Failure mode
	F_m	F_c	
Intermediate profile: thickness 2,2 mm, AW-6063 aluminium alloy. Self-drilling screw: Ø4,8 mm, A2 stainless steel.	7133	6162	Screw came out
Start-end profile: thickness 2,2 mm, AW-6063 aluminium alloy. Self-drilling screw: Ø4,8 mm, A2 stainless steel.	7160	7092	Screw came out

Where: F_m = mean values; F_c = characteristic values giving 75% confidence that 95% of results will be higher than this value.

3.10 Resistance of metal clips

Resistance of metal clips has been tested. Mean and characteristic values are given in tables 3.7.

Worst cases have been tested.

Table 3.7.1: Resistance of metal clip. Clips FTS 502B and FTS 502B+.

Test specimen		Resistance (N) at 1 mm of permanent deflection		Ultimate resistance (N)		Failure
		F_m	F_c	F_m	F_c	
Horizontal load	Clip GA16 Simple 13 mm	678	509	746	697	Clip deflection
	Clip GA16 Double 13 mm	(*)		506	479	
	Clip GA20 Simple 15 mm (**)	303	237	497	452	
	Clip GA30 Simple 19 mm	(*)		517	467	
	Clip GA20+ Simple 16 mm (**)	956		826	1908	
Vertical load	Clip GA16 Simple 13 mm	288	280	351	332	
	Clip GA16 Double 13 mm	424	400	469	453	
	Clip GA20 Simple 15 mm (**)	307	271	533	474	
	Clip GA30 Simple 19 mm	91	80	108	95	
	Clip GA20+ Simple 16 mm	928	798	1613	1578	

(*) This value has not been measured because of the excessive clip deflection before reaching 1 mm of permanent deflection.

(**) Tested clips without assembling with the vertical profile. Higher resistance is expected for 1 mm of permanent deflection when assembled.

Where: F_m = mean values; F_c = characteristic values giving 75% confidence that 95% of results will be higher than this value.

Table 3.7.2: Resistance of metal clip. Small rails FTS 506 GR.

Test specimen		Resistance (N) at 1 mm of permanent deflection		Ultimate resistance (N)		Failure
		F_m	F_c	F_m	F_c	
Horizontal load	L Start-end small rail	1077	981	3375	3116	Small rail deflection
	L Intermediate small rail	935	612	3336	2999	
Vertical load	L Start-end small rail	1347	1080	2415	2167	
	L Intermediate small rail	852	602	1946	1562	

Where: F_m = mean values; F_c = characteristic values giving 75% confidence that 95% of results will be higher than this value.

3.11 Resistance of profiles

The following characteristics of the vertical profiles are given in Annex 1:

- Form and dimensions of the profiles sections.
- Inertia of the profiles sections.
- Minimum elastic limit of the profiles material.

3.12 Tension / Pull-out resistance of subframe fixings

Pull-out resistance of the subframe fixing on profile minimum thickness 1,8 mm has been tested. Mean and characteristics values are given in table 3.8.

Table 3.8: Pull out resistance.

Test specimen	Ultimate resistance (N)	
	F_m	F_c
Profile: Thickness 1,8 mm, AW-6063 aluminium alloy. Self-drilling screw: Ø4,8 mm, A2 stainless steel.	1938	929
Profile: Thickness 1,8 mm, AW-6063 aluminium alloy. Self-drilling screw: Ø5,5 mm, A2 stainless steel.	2155	1784

Where: F_m = mean values; F_c = characteristic values giving 75% confidence that 95% of results will be higher than this value.

3.13 Shear load resistance of subframe fixings

Shear load resistance of the subframe fixings on profile minimum thickness 1,8 mm has been tested. Mean and characteristics values are given in table 3.9.

Table 3.9: Shear load resistance.

Test specimen	Ultimate resistance (N)	
	F_m	F_c
Profile: Thickness 1,8 mm, AW-6063 aluminium alloy. Self-drilling screw: Ø4,8 mm, A2 stainless steel.	5234	4956
Profile: Thickness 1,8 mm, AW-6063 aluminium alloy. Self-drilling screw: Ø5,5 mm, A2 stainless steel. (*)		

(*) Shear strength not tested for this screw. Shear strength value taken from worse case tested screw.

Where: F_m = mean values; F_c = characteristic values giving 75% confidence that 95% of results will be higher than this value.

3.14 Bracket resistance (vertical and horizontal load)

Bracket resistance to horizontal load has been tested (see table 3.10). Bracket resistance to vertical load has been tested (see table 3.11).

Table 3.10: Bracket resistance to horizontal load.

Bracket L x B x t x H (mm)	Resistance (N) at 1 mm of permanent deflection		Ultimate resistance (N)	
	F_m	F_c	F_m	F_c
60 x 60 x 3 x 60 (*)	1380	472	3440	3050
80 x 60 x 3 x 60	1367	896	3417	3162
100 x 60 x 3 x 60				
120 x 60 x 3 x 60				
140 x 60 x 3 x 60 (*)				
160 x 60 x 3 x 60	2340	1480	4213	4016
180 x 60 x 3 x 60 (*)				
200 x 60 x 4 x 60	3838	2695	7343	6881
220 x 60 x 4 x 60 (*)				
60 x 60 x 3 x 120 (*)	1800	1371	5050	2683
80 x 60 x 3 x 120	2300	1766	4200	3810
100 x 60 x 3 x 120 (*)				

Table 3.10: Bracket resistance to horizontal load.

Bracket L x B x t x H (mm)	Resistance (N) at 1 mm of permanent deflection		Ultimate resistance (N)	
	F_m	F_c	F_m	F_c
120 x 60 x 3 x 120				
140 x 60 x 3 x 120 (*)	2767	2068	5233	4482
160 x 60 x 3 x 120	1440	1148	2382	2251
180 x 60 x 3 x 120 (*)				
200 x 60 x 4 x 120	1888	1074	3565	3385
220 x 60 x 4 x 120 (*)				
60 x 60 x 3 x 180 (*)	1933	1405	4967	4457
80 x 60 x 3 x 180	2100	1239	4233	3724
100 x 60 x 3 x 180 (*)				
120 x 60 x 3 x 180				
140 x 60 x 3 x 180 (*)	2367	1857	4467	4016
160 x 60 x 3 x 180	1723	1492	2980	2843
180 x 60 x 3 x 180 (*)				
200 x 60 x 4 x 180	2629	2042	4708	4222
220 x 60 x 4 x 180 (*)				

Where:

H = height; L = length; B = base; t = thickness

F_m = mean values; F_c = characteristic values giving 75% confidence that 95% of results will be higher than this value.

(*) Tested bracket which gives value to the other stronger brackets.

Table 3.11: Bracket resistance to vertical load.

Bracket L x B x t x H (mm)	Resistance (N) at 1 mm of displacement		Resistance (N) at 3 mm displacement		Resistance (N) at ΔL = 0,2%·L mm permanent deflection		Ultimate resistance (N)	
	F_m	F_c	F_m	F_c	F_m	F_c	F_m	F_c
60 x 60 x 3 x 60 (*)	933	739	2150	1813	1256	987	4138	3746
80 x 60 x 3 x 60	367	269	933	739	844	719	3188	3029
100 x 60 x 3 x 60(*)								
120 x 60 x 3 x 60	267	169	550	382	817	705	1839	1667
140 x 60 x 3 x 60 (*)								
160 x 60 x 3 x 60	(**)	(**)	(**)	(**)	(**)	(**)	(**)	(**)
180 x 60 x 3 x 60 (*)								
200 x 60 x 4x 60	(**)	(**)	(**)	(**)	(**)	(**)	(**)	(**)
220 x 60 x 4 x 60 (*)								
60 x 60 x 3 x 120 (*)	1500	1163	5900	5563	2457	1701	13557	12754
80 x 60 x 3 x 120	1033	519	2767	2572	1871	1359	9414	8708
100 x 60 x 3 x 120 (*)								
120 x 60 x 3 x 120	500	500	1567	1372	1529	1370	5229	4796

Table 3.11: Bracket resistance to vertical load.

Bracket L x B x t x H (mm)	Resistance (N) at 1 mm of displacement		Resistance (N) at 3 mm displacement		Resistance (N) at ΔL = 0,2%·L mm permanent deflection		Ultimate resistance (N)	
	F_m	F_c	F_m	F_c	F_m	F_c	F_m	F_c
140 x 60 x 3 x 120 (*)								
160 x 60 x 3 x 120	159	112	448	378	341	190	848	757
180 x 60 x 3 x 120 (*)								
200 x 60 x 4 x 120	220	180	575	517	524	266	1165	1096
220 x 60 x 4 x 120 (*)								
60 x 60 x 3 x 180 (*)	1567	788	6867	6478	4667	3965	17900	17008
80 x 60 x 3 x 180	900	563	3367	2978	3250	2574	10713	10142
100 x 60 x 3 x 180 (*)								
120 x 60 x 3 x 180	567	372	2333	1632	2033	1750	5511	5027
140 x 60 x 3 x 180 (*)								
160 x 60 x 3 x 180	453	365	1016	969	793	660	1714	1613
180 x 60 x 3 x 180 (*)								
200 x 60 x 4 x 180	507	357	1184	1085	912	722	1994	1836
220 x 60 x 4 x 180 (*)								

Where:

L = length; H = height; B = base; t = thickness

F_m = mean values; F_c = characteristic values giving 75% confidence that 95% of results will be higher than this value.

(*) Tested bracket which gives value to the other stronger brackets.

(**) Bracket not considered for this use.

3.15 Freeze-thaw resistance

Freeze-thaw resistance has been tested according to EN ISO 10545-12 with no defects.

FAVEKER® FV cladding elements are not sensitive to freeze-thaw.

3.16 Dimensional stability of the cladding elements

Moisture expansion and linear thermal expansion of the cladding elements has been tested according to EN ISO 10545-10 and EN ISO 10545-8 respectively.

The maximum moisture expansion of FAVEKER® tiles is 0,1 mm/m.

The maximum linear thermal expansion of FAVEKER® tiles is 6,0 µm/m·ºC.

3.17 Corrosion of metal components

The cladding fixing clips are made of stainless steel 1.4301 according to EN 10088 and the subframe fixings are made of A2 stainless steel according to EN ISO 3506-1. Therefore, these components may be used in dry internal conditions or exposure in permanent damp internal conditions and also in external atmospheric exposure with high category of corrosivity of the atmosphere (included industrial and marine environment, C4 as defined in ISO 9223), provided that no particular aggressive conditions exist. Such particular aggressive conditions are e.g. permanent or alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with extreme chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used).

The horizontal profiles, small rails and vertical profiles are made of aluminum alloy AW-6063 according to EN 573, EN 1999 and EN 755. The durability is class B and the minimum thickness is 1,8 mm. Therefore, these components may be used in the following external atmospheric exposure: rural environment, moderate industrial/urban environment, but excluding industrial marine environment. These components may be used in other external atmospheric conditions exposure if the components are protected as indicated in EN 1999-1-1.

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

According to the decision 2003/640/EC, as amended of the European Commission[1], the systems of AVCP (see EC delegated regulation (EU) No 568/2014 amending Annex V to Regulation (EU) 305/2011) given in the following table apply.

Table 4.1: Applicable AVPC system.

Product	Intended use	Level or class	System
Exterior wall claddings	External finishes of walls	Any	2+
	For uses subject to regulations on reaction to fire	A1 (*)	4
		B-s1,d0 (**)	3

(*) Class A1 according to Commission Decision 96/603/EC, as amended for FAVEKER® FV kit with horizontal profiles as cladding fixings which does not contain the EPDM joint.
(**) Class B,s1-d0 for FAVEKER® FV kit with clips as cladding fixings which contains the EPDM joint.

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

All the necessary technical details for the implementation of the AVCP system are laid down in the *Control Plan* deposited with the ITeC[2], with which the factory production control shall be in accordance.

Issued in Barcelona on 6 September 2022

by the Catalonia Institute of Construction Technology.

Ferran Bermejo Nualart

Technical Director, ITeC

[1] 2003/640/EC – Commission Decision of date 4 September 2003, published in the Official Journal of the European Union (OJEU) L226/21 of 10/09/2003.

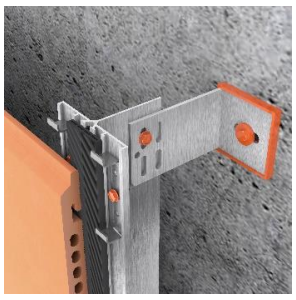
[2] The *Control Plan* is a confidential part of the ETA and is only handed over to the notified certification body involved in the assessment and verification of constancy of performance.

ANNEX 1: FAVEKER® FV kit

FAVEKER® FV kit for external wall claddings in ventilated façades are composed of:

- Cladding elements: four types of extruded ceramic tiles (see table A1.1) according to the harmonized standard EN 14411:
  - FAVEKER® GA16 (see figure A1.1.2),
  - FAVEKER® GA20 (see figure A1.1.3) which may be installed in horizontal or vertical configuration,
  - FAVEKER® GA30 (see figure A1.1.4),
  - FAVEKER® GAV (see figure A1.1.5).
- Cladding fixings: three types of cladding fixings according to family C given in EAD 090062-00-0404:
  - FTS 502B and FTS 502B+: stainless steel clips (see table A1.2.1 and figures A1.2.1),
  - FTS 502A and FTS 506: aluminium alloy horizontal profiles (see table A1.2.2 and figures A1.2.2),
  - FTS 506 GR: aluminium alloy small rails (see table A1.2.3 and figures A1.2.3).
- Subframe components:
  - Aluminium alloy vertical profiles (see table A1.3.1 and figures A1.3.1),
  - Aluminium alloy brackets (see table A1.3.2 and figures A1.3.2),
  - Subframe fixings (see table A1.3.3),
  - Ancillary components:
    - EPDM joint profiles (see table A1.3.4.1 and figures A1.3.4) only applicable in the case of clips as cladding fixings.
    - Elastomeric filler (see table A1.3.4.2) only applicable in the case of L-shaped horizontal profiles and small rails.

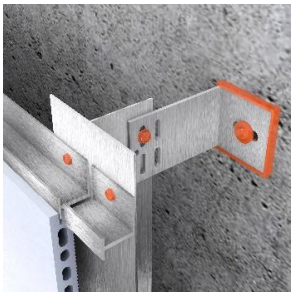
GA16 FTS502A



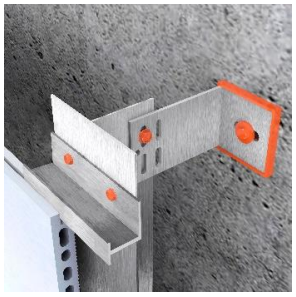
GA16 FTS502B

GA20 FTS502B & **GA20 FTS**502B+

GA20 FTS502B Vertical

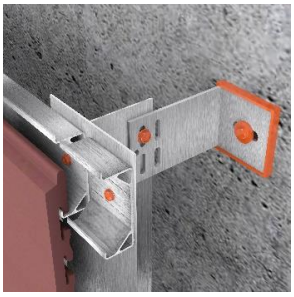


GA20 FTS506



GA20 FTS506 GR

GA30 FTS502B



GAV FTS502A

Figure A1.1.1: Assembled kits FAVEKER® FV.

A1.1 Cladding elements

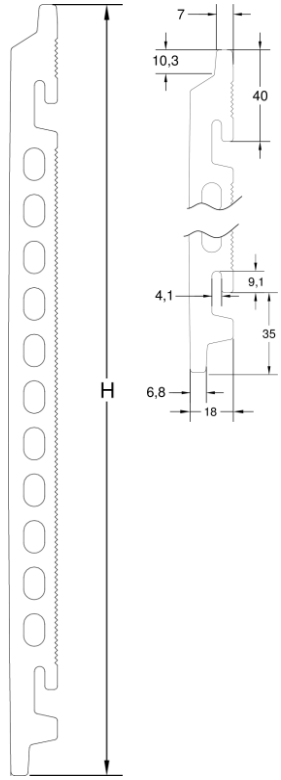


Figure A1.1.2: FAVEKER® GA16.

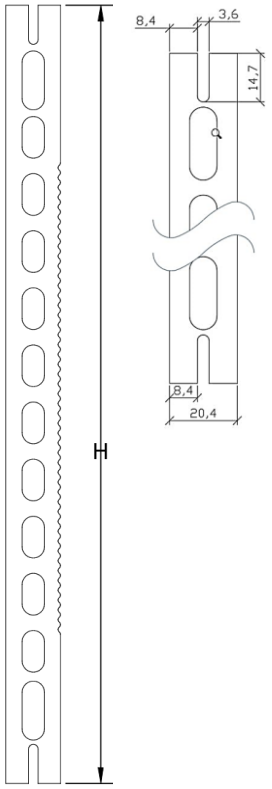


Figure A1.1.3: FAVEKER® GA20.

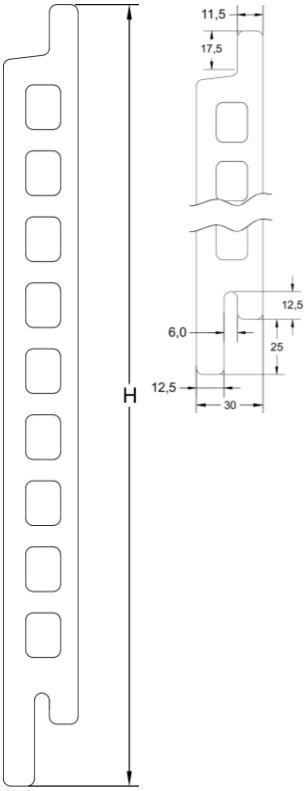


Figure A1.1.4: FAVEKER® GA30.

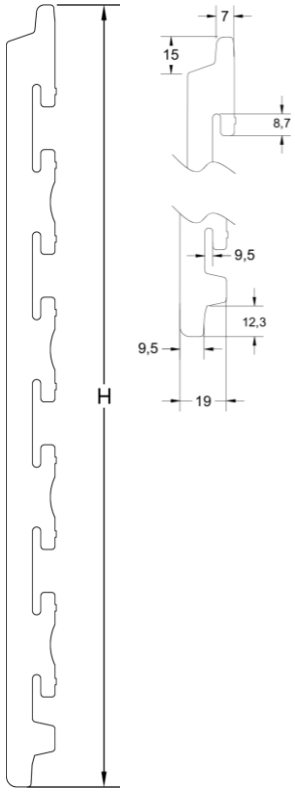


Figure A1.1.5: FAVEKER® GAV.

Table A1.1: FAVEKER® cladding elements.

Characteristic	Value				Reference
Trade name	**FAVEKER® GA16**	**FAVEKER® GA20**	**FAVEKER® GA30**	**FAVEKER® GAV**	---
Form: Tile / Grooves	Figure A1.1.2	Figure A1.1.3	Figure A1.1.4	Figure A1.1.5	---
(Format): Manufacturing length (mm)	(variable) ± 1 L_{max} ≤ (1800): 1792	(variable) ± 1 L_{max} ≤ (1800): 1792	(variable) ± 1 L_{max} ≤ (1800): 1792	(variable) ± 1 L_{max} ≤ (600): 592	EN ISO 10545-2
(Format): Manufacturing width (mm), H	(250): 255,0 ± 2 ≤ H ≤ (500): 505,0 ± 2	(300): 292,0 ± 2 ≤ H ≤ (600): 592,0 ± 2	(250): 265,0 ± 2 (300): 315,0 ± 2 (400): 415,0 ± 2	(300): 305,0 ± 2 (400): 405,0 ± 2	
Thickness (mm), L	18,0 ± 1,8	20,0 ± 2,0	30,0 ± 3,0	19,0 ± 1,9	
Rectangularity	± 1,0%	± 1,0%	± 1,0%	± 1,0%	
Straightness of sides	± 0,2%				
Central curvature Lateral curvature Warping	± 0,5%				
Surface appearance	> 95% undamaged tiles				
Water absorption (% weight)	Ev ≤ 0,5%	Ev ≤ 0,5%	Ev ≤ 0,5%	3% ≤ Ev ≤ 6%	EN ISO 10545-3

Table A1.1: FAVEKER® cladding elements.

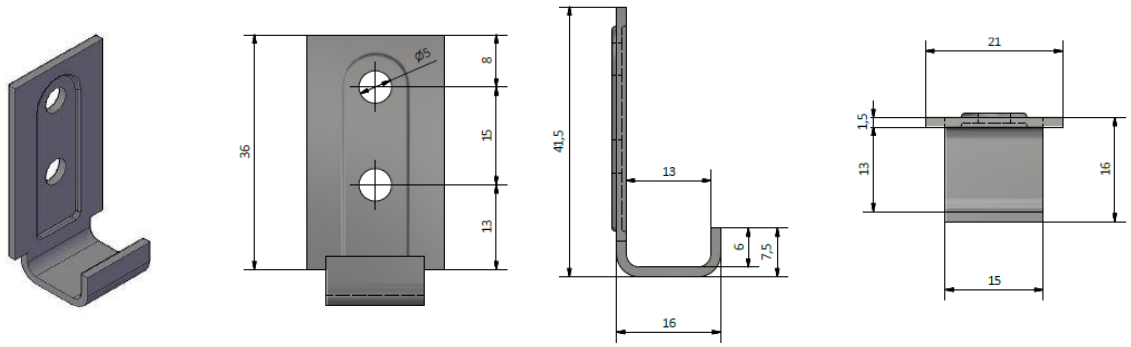
Characteristic	**Value**				**Reference**
Trade name	**FAVEKER® GA16**	**FAVEKER® GA20**	**FAVEKER® GA30**	**FAVEKER® GAV**	---
Form Tile / Grooves	Figure A1.1.2	Figure A1.1.3	Figure A1.1.4	Figure A1.1.5	---
Apparent relative density (kg/m^3)	2300 ± 200	2300 ± 200	2300 ± 200	2500 ± 200	
Bulk density (kg/m^3)	2300 ± 200	2300 ± 200	2300 ± 200	2200 ± 200	
Apparent porosity (%)	0,7 ± 0,3	0,7 ± 0,3	0,7 ± 0,3	1,0 ± 0,1	
Weight per unit (kg)	(variable) ± 10% m_{max} ≤ 28,9	(variable) ± 10% m_{max} ≤ 36,5	(variable) ± 10% m_{max} ≤ 34,4	(variable) ± 10% m_{max} ≤ 9	---
Weight per square metre (kg/m^2)	31,7 ± 10%	34,4 ± 10%	47,0 ± 10%	36,0 ± 10%	---
Mean breaking strength (N)	> 3200	> 3500	> 12000	> 1200	EN ISO 10545-4
Mean modulus of rupture (MPa)	> 14,5	> 14,5	> 20,0	> 17,0	
Resistance to deep abrasion for unglazed tiles (mm^3)	< 175	< 175	< 175	< 393	EN ISO 10545-6
Resistance to thermal shock	Pass	Pass	Pass	Pass	EN ISO 10545-9
Crazing resistance for glazed tiles	Pass	Pass	Pass	Pass	EN ISO 10545-11
Frost resistance	No defects	No defects	No defects	No defects	EN ISO 10545-12
Reaction to fire	A1	A1	A1	A1	Decision 96/603/EC with modifications

A1.2 Cladding fixings

A1.2.1 Clips: FTS 502B and FTS 502B+ fixing devices

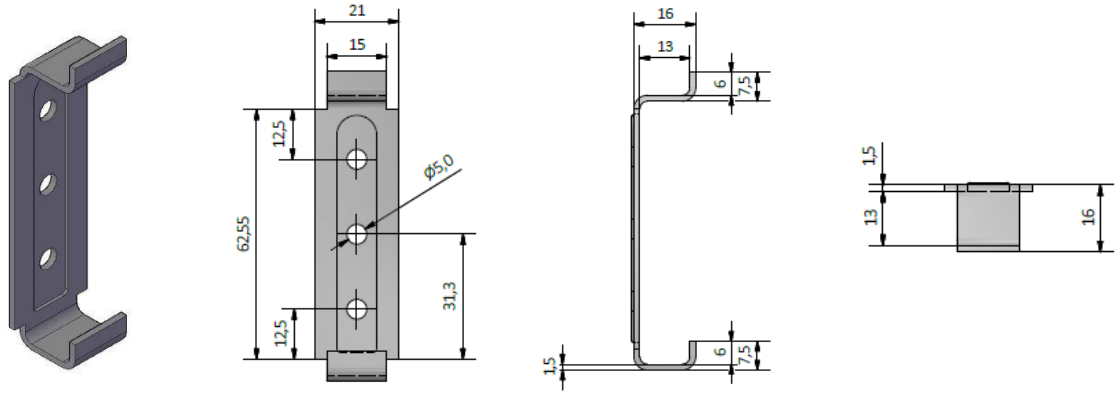
Table A1.2.1: FAVEKER® clips.

Characteristic	Value					Reference
Geometric properties						
Cladding fixing system	**FTS 502B**				**FTS 502B+**	
Type of clip	**Clip GA16 Simple 13 mm**	**Clip GA16 Double 13 mm**	**Clip GA20 Simple 15 mm**	**Clip GA30 Simple 19 mm**	**Clip GA20+ Simple 16 mm**	---
Form and dimensions	Figure A1.2.1.1	Figure A1.2.1.2	Figure A1.2.1.3	Figure A1.2.1.4	Figure A1.2.1.5	
Material properties						
Material	Stainless steel 1.4301 (X5CrNi18-10)					EN 10088-2
Resistance to corrosion	Pass					
Specific weight (kg/m^3)	7900					
Elastic limit (MPa)	≥ 230					
Tensile strength (MPa)	540 to 750					
Elongation (%)	≥ 45					
Modulus of elasticity at 20 ºC (kN/mm^2)	200					
Poisson coefficient	0,3					
Coefficient of thermal expansion between 50 °C and 100 ºC (µm/(m·ºC))	16,0					



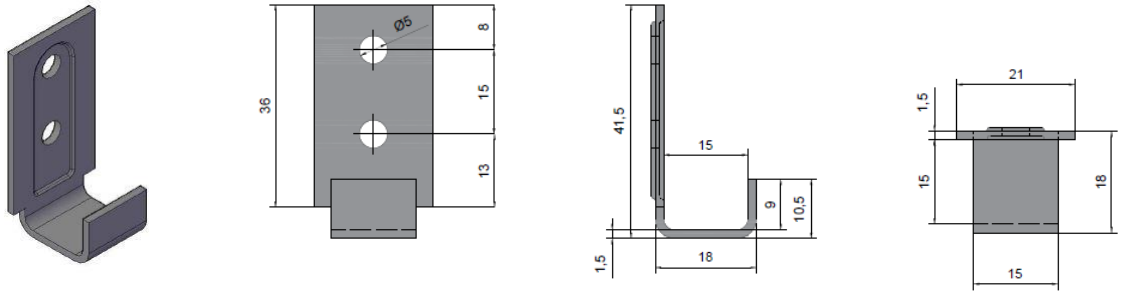
General view. Front view. Side view. Top view.

Figure A1.2.1.1: Clip GA16 Simple 13 mm.



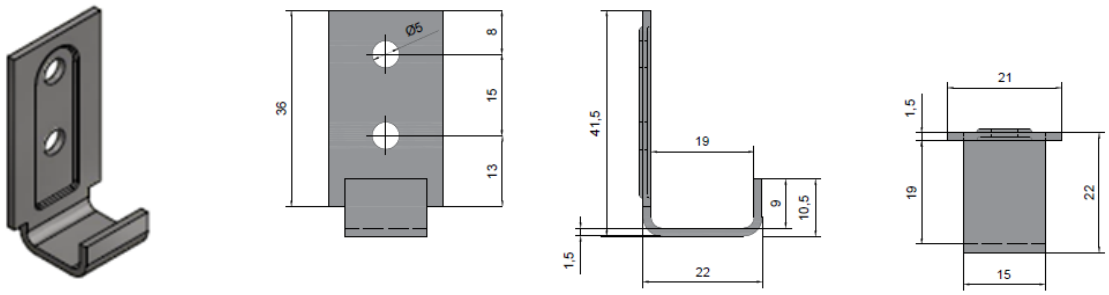
General view. Front view. Side view. Top view.

Figure A1.2.1.2: Clip GA16 Double 13 mm.



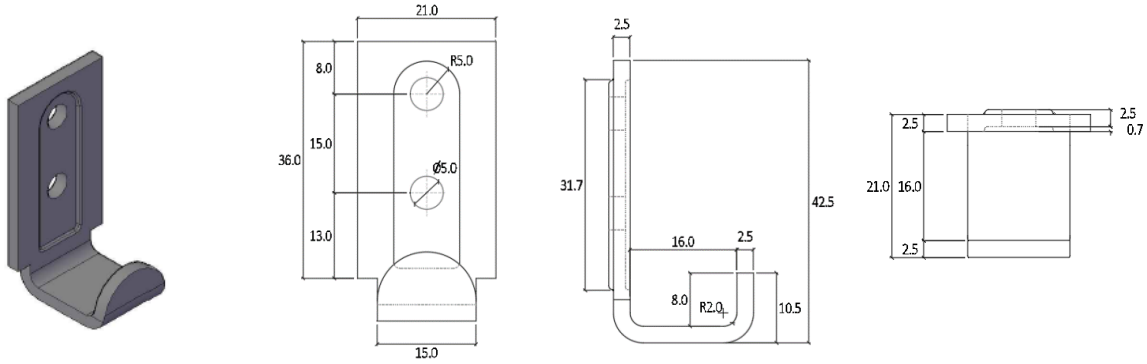
General view. Front view. Side view. Top view.

Figure A1.2.1.3: Clip GA20 Simple 15 mm.



General view. Front view. Side view. Top view.

Figure A1.2.1.4: Clip GA30 Simple 19 mm.



General view. Front view. Side view. Top view.

Figure A1.2.1.5: Clip GA20+ Simple 16 mm.

A1.2.2 Horizontal profiles: FTS 502A and FTS 506 fixing devices

Table A1.2.2: FAVEKER® horizontal profiles geometric and material properties.

Characteristic		Value				Reference
Geometric properties						
Cladding fixing system		**FTS 502A**		**FTS 506**		
Type of profile		**C Intermediate profile**	**C Start-end profile**	**L Intermediate profile**	**L Start-end profile**	
Form and dimensions		Figure A1.2.2.1	Figure A1.2.2.2	Figure A1.2.2.3	Figure A1.2.2.4	---
Weight per linear metre (kg/m)		0,78	0,42	0,55	0,51	
Standard length (m)		6,0				
Cross section (mm^2)		283,6	154,5	204	181	
Inertia of profile section	I_{xx} (cm^4)	19,20	2,80	2,18	1,74	
	I_{yy} (cm^4)	1,81	0,51	2,45	1,83	
Material properties						
Material		Aluminium alloy AW 6063				EN 1999-1-1 EN 755-2
Treatment		T66				
Durability class		B				
Specific weight (kg/m^3)		2700				
Elastic limit $R_{p0,2}$ (MPa)		200				
Elongation (%)		≥ 6				
Tensile strength R_m (MPa)		245				
Modulus of elasticity at 20 ºC (MPa)		70000				
Poisson coefficient		0,3				
Coefficient of thermal expansion between 50 °C and 100 ºC (µm/(m·ºC))		23,0				

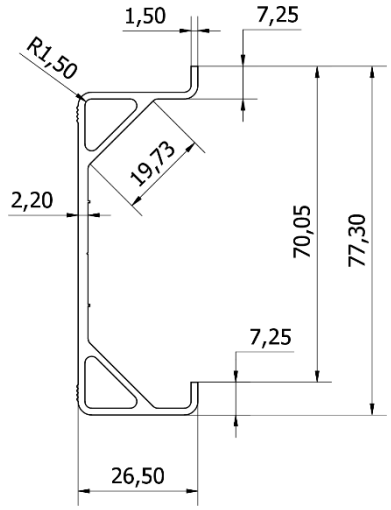


Figure A1.2.2.1: C Intermediate profile FTS 502A.

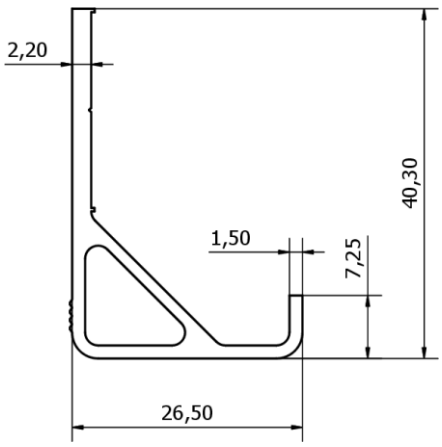


Figure A1.2.2.2: C Start-end profile FTS 502A.

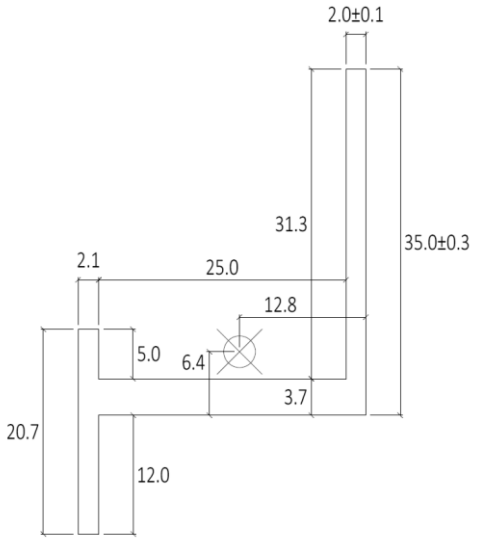


Figure A1.2.2.3: L Intermediate profile FTS 506.

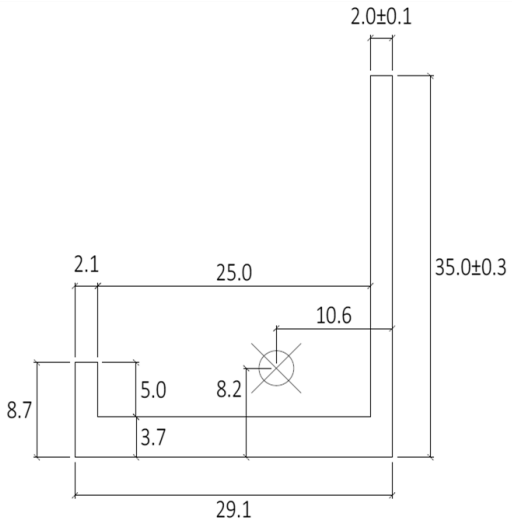


Figure A1.2.2.4: L Start-end profile FTS 506.

A1.2.3 Small rails: FTS 506 GR fixing device

Table A1.2.3: FAVEKER® small rails geometric and material properties.

Characteristic	Value		Reference
Geometric properties			
Cladding fixing system	**FTS 506 GR**		---
Type of profile	**L Intermediate small rail**	**L Start-end small rail**	
Form and dimensions	Figure A1.2.3.1	Figure A1.2.3.2	
Weight per linear metre (kg/m)	0,55	0,51	
Standard length (m)	0,15		
Cross section (mm^2)	204	181	
Material properties			
Material	Aluminium alloy AW 6063		EN 1999-1-1 EN 755-2
Treatment	T66		
Durability class	B		
Specific weight (kg/m^3)	2700		
Elastic limit $R_{p0,2}$ (MPa)	200		
Elongation (%)	≥ 6		
Tensile strength R_m (MPa)	245		
Modulus of elasticity at 20 ºC (MPa)	70000		
Poisson coefficient	0,3		
Coefficient of thermal expansion between 50 °C and 100 ºC (µm/(m·ºC))	23,0		

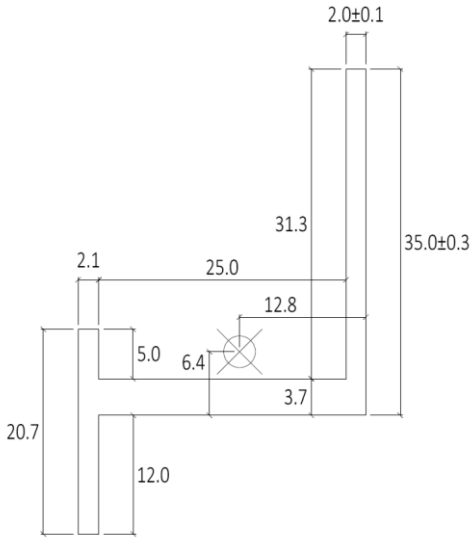


Figure A1.2.3.1: L Intermediate small rail FTS 506 GR.

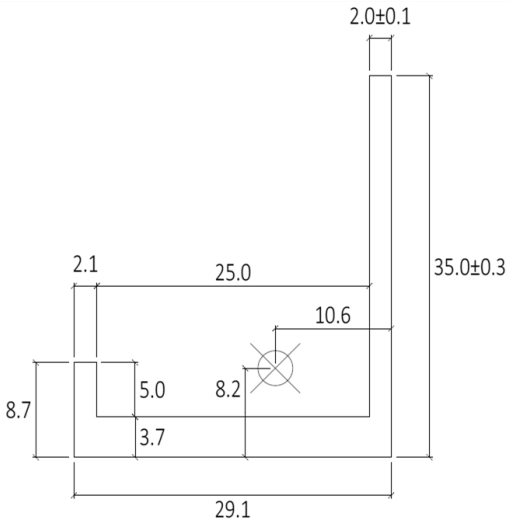


Figure A1.2.3.2: L Start-end small rail FTS 506 GR.

A1.3 Subframe

A1.3.1 Vertical profiles

Table A1.3.1: FAVEKER® vertical profiles geometric and material properties.

Geometric properties								
Cladding fixing system	**Type of profile**		**Form and dimensions (mm)**		**Weight per linear metre (kg/m)**	**Cross section (mm^2)**	**Inertia of profile section (cm^4)**	
							I_{xx}	**I_{yy}**
FTS 502A & FTS 506 & FTS 506 GR	**Tubular profile**	40 x 40 x 2,0	Figure A1.3.1.2	dy = 20,0	0,82	304	7,34	7,34
		60 x 40 x 2,0		dy = 30,0	1,04	384	19,31	10,22
		80 x 40 x 2,0		dy = 40,0	1,25	464	38,97	13,11
		100 x 40 x 2,0		dy = 50,0	1,47	544	67,91	16,00
	T profile	60 x 60 x 1,8	Figure A1.3.1.2	dy = 15,7	0,57	212	7,74	3,24
		80 x 60 x 1,8		dy = 13,5	0,67	248	8,41	7,68
		100 x 60 x 1,8		dy = 11,9	0,77	284	15,00	8,92
		100 x 60 x 2,0		dy = 12,0	0,85	316	16,67	9,86
	L profile	40 x 60 x 1,8	Figure A1.3.1.3	dy = 18,7	0,48	177	6,80	2,52
FTS 502B	**T grooved profile**	85 x 60 x 2,0	Figure A1.3.1.4	dy = 16,1	0,97	358	13,65	13,81
	L grooved profile	50 x 60 x 2,0	Figure A1.3.1.5	dy = 20,2	0,64	264	11,89	2,94
FTS 502B+	**T+ grooved profile**	50 x 60 x 2,8	Figure A1.3.1.6	dy = 22,3	0,95	353	16,62	3,70
	L+ grooved profile	112 x 60 x 2,8	Figure A1.3.1.7	dy = 16,5	1,48	547	20,03	39,73

Material properties		
Characteristic	**Value**	**Reference**
Material	EN AW-6063	EN 755 EN 1999-1
Treatment	T66	
Durability class	B	
Specific weight (kg/m^3)	2700	
Elastic limit (MPa)	200	

Table A1.3.1: FAVEKER® vertical profiles geometric and material properties.

Elongation (%)	6
Tensile strength (MPa)	245
Modulus of elasticity (MPa)	70000
Poisson coefficient	0,3
Coefficient of thermal expansion between 50 °C and 100 ºC (µm/(m·ºC))	23,0

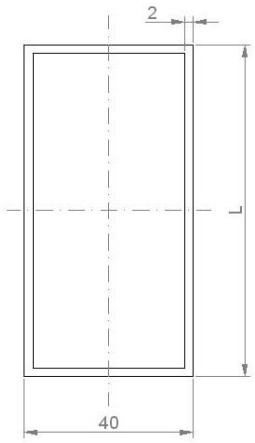


Figure A1.3.1.1: Tubular profile.

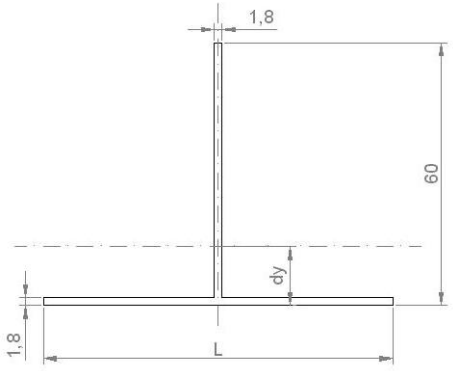


Figure A1.3.1.2: T profile.

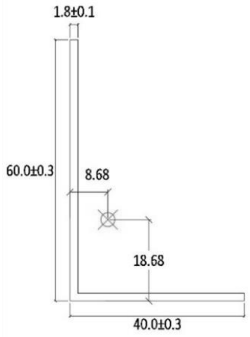


Figure A1.3.1.3: L profile

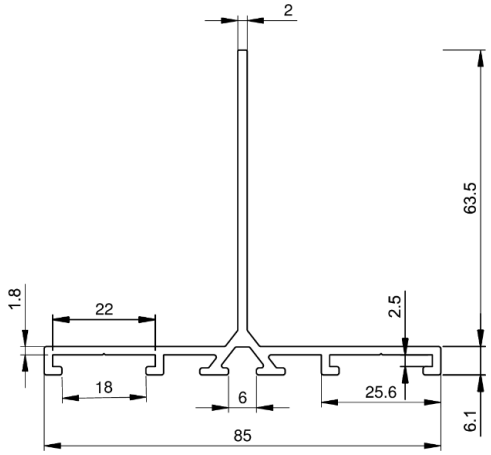


Figure A1.3.1.4: T grooved profile.

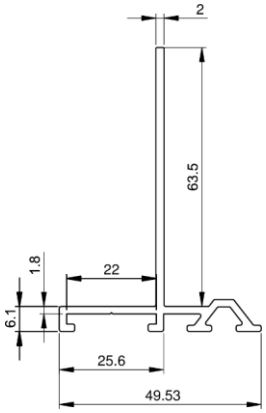


Figure A1.3.1.5: L grooved profile.

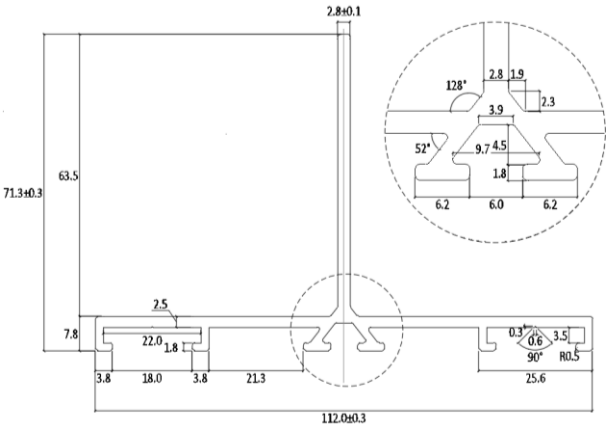


Figure A1.3.1.6: T+ grooved profile.

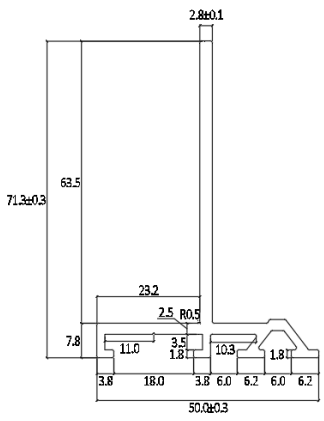


Figure A1.3.1.7: L+ grooved profile.

A1.3.2 Brackets

Table A1.3.2: FAVEKER® brackets geometric and material properties.

Geometric properties				
Type of bracket			**Form and dimensions**	**Mass per unit (kg)**
Height 60	L x 60 x 3,0 x 60	L = 60	Figure A1.3.2.1	0,051
		L = 80		0,060
		L = 100		0,070
		L = 120		0,080
		L = 140		0,090
		L = 160		0,100
		L = 180		0,109
	L x 60 x 4,0 x 60	L = 200		0,158
		L = 220		0,171
Height 120	L x 60 x 3,0 x 120	L = 60	Figure A1.3.2.2	0,099
		L = 80		0,119
		L = 100		0,138
		L = 120		0,158
		L = 140		0,177
		L = 160		0,197
		L = 180		0,216
	L x 60 x 4,0 x 120	L = 200		0,313
		L = 220		0,339
Height 180	L x 60 x 3,0 x 180	L = 60	Figure A1.3.2.3	0,154
		L = 80		0,183
		L = 100		0,212
		L = 120		0,241
		L = 140		0,270
		L = 160		0,300
		L = 180		0,328
	L x 60 x 4,0 x 180	L = 200		0,475
		L = 220		0,514

Material properties		
Characteristic	**Value**	**Reference**
Material	EN AW-6063	EN 755 EN 1999-1
Treatment	T5	
Durability class	B	
Specific weight (kg/m^3)	2700	
Elastic limit (MPa)	130	
Elongation (%)	6	
Tensile strength (MPa)	175	
Modulus of elasticity (MPa)	70000	
Poisson coefficient	0,3	
Coefficient of thermal expansion between 50 °C and 100 ºC (µm/(m·ºC))	23,0	

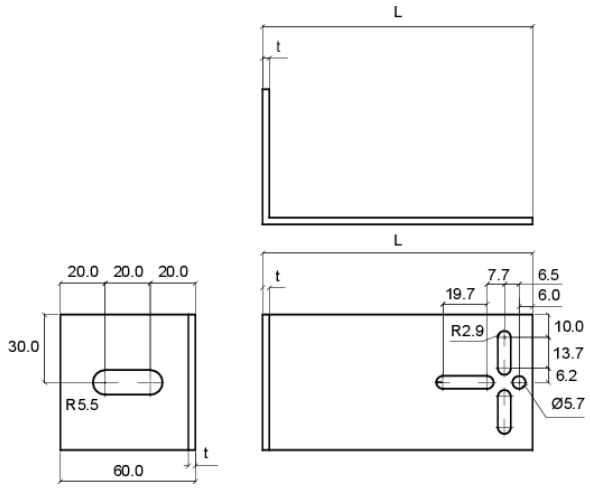


Figure A1.3.2.1: L x 60 x 3,0 x 60 bracket.

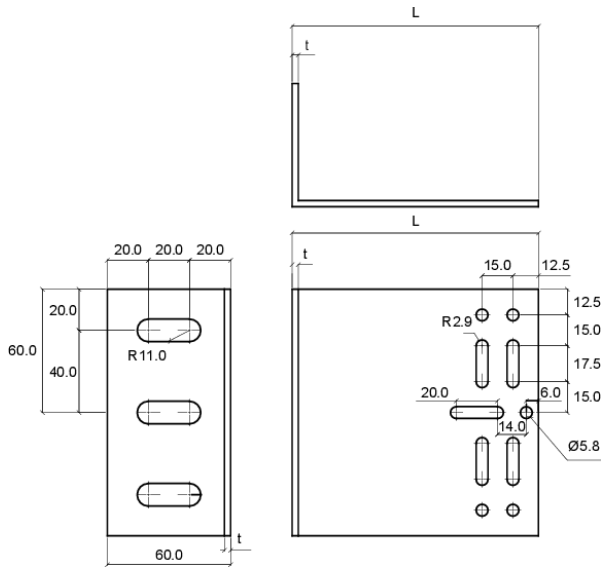


Figure A1.3.2.2: L x 60 x 3,0 x 120 bracket.

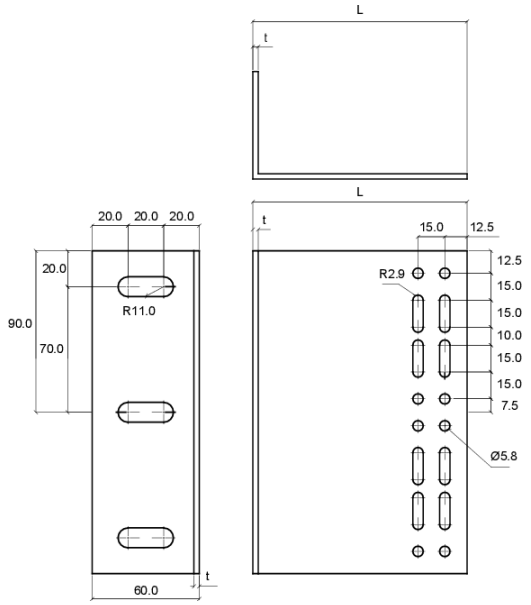


Figure A1.3.2.2: L x 60 x 3,0 x 180 bracket.

A1.3.3 Subframe fixings

Table A1.3.3: FAVEKER® FV subframe fixings.

Fixing elements	**Geometry**		**Material**		**Reference**
Position	**Type**	**Description**	**Type**	**Class**	---
Between the cladding fixing (clip, small rail or horizontal profile) and the vertical profiles	Self-drilling screws	ST 4,8 x L ST 5,5 x L	Stainless steel	A2-70	EN ISO 3506-4 EN ISO 15480 EN ISO 10666
Between the vertical profile and the brackets	Self-drilling screws	ST 5,5 x L			

A1.3.4 Ancillary components

Table A1.3.4.1: EPDM profiles.

Characteristic	**Value**		**Reference**
Cladding fixing system	**FTS 502B & FTS 502B+**		
Trade name	**T profile**	**L profile**	
Material	EPDM		
Form	Figure A1.3.4.1	Figure A1.3.4.2	---
Cross section (mm^2)	159,11	92,03	
Weight per linear metre (kg/m)	0,20	0,12	
Density (kg/m^3)	1,25 ± 0,05		ISO 2781
Hardness, 3 sec (ShA)	70 ± 5		ISO 7619-1
Tensile strength (MPa)	> 7		ISO 37
Elongation at break (%)	> 250 (*)		
(*) Due to ageing, elongation at break can reach a value of 150%.			

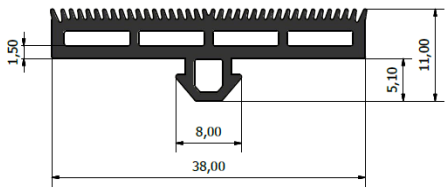


Figure A1.3.4.1: EPDM T profile.

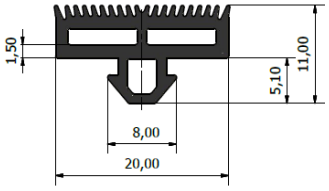


Figure A1.3.4.2: EPDM L profile.

Table A1.3.4.2: Elastomeric filler.

Typical Product Data	**Value**
Cladding fixing system	**FTS 506 & FTS 506 GR**
Chemical base	Elastomeric filler, based on hybrid polymer
Colour	White; grey; black; brown
Cure mechanism	Moisture-curing
Density at 20 ºC	1,48 kg/l approx.
Application ambient temperature	5 ºC to 40 ºC
Skin time at 23 ºC / 50% RH	10 min to 20 min
Cure time at 23 ºC / 50% RH	4 mm after 24 h
Hardness Shore A	50
Modulus at 100%	1,3 MPa

Table A1.3.4.2: Elastomeric filler.

Typical Product Data	Value
Modulus at break	3,8 MPa
Elongation at break	375 %
Service temperature	- 40 ºC to 90 ºC
Shelf-life storage between 5 ºC and 25 ºC	18 months
UV Resistance	Very good
Maximum length of bead piece	100 mm
Minimum distance between bead pieces	200 mm

ANNEX 2: Construction details

A2.1 FAVEKER® FV GA16 FTS502A system

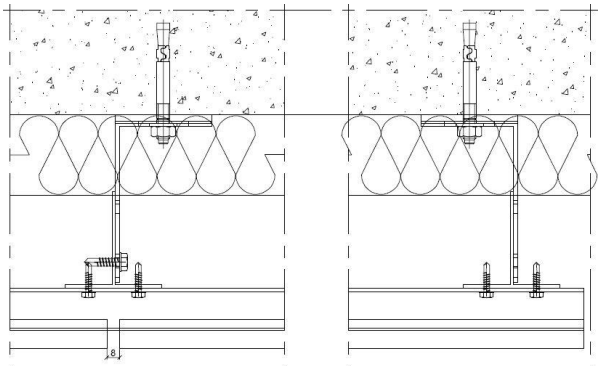


Figure A2.1.1: Horizontal section. FAVEKER® FV GA16 FTS502A system.

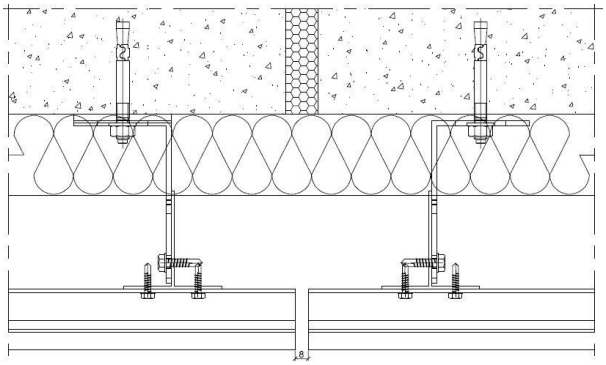


Figure A2.1.2: Horizontal section with expansion joint. FAVEKER® FV GA16 FTS502A system.

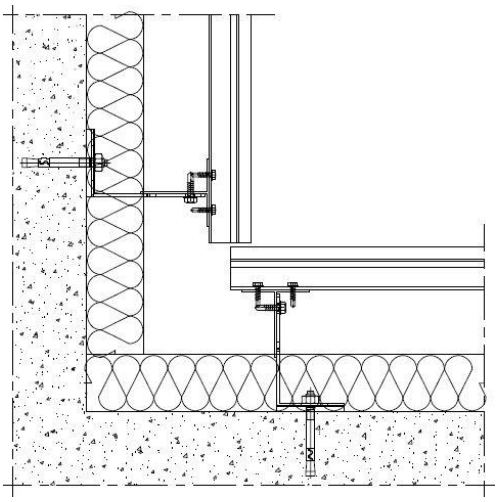


Figure A2.1.3: Internal corner. FAVEKER® FV GA16 FTS502A system.

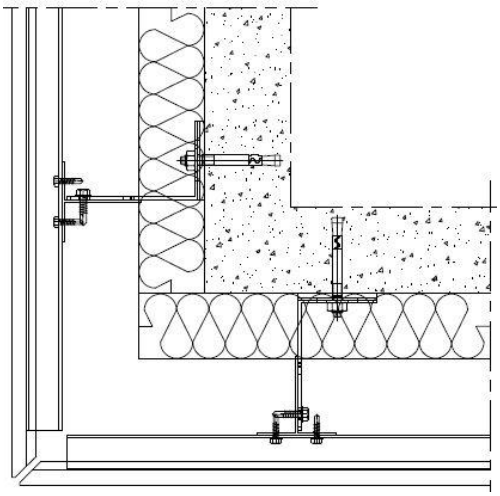


Figure A2.1.4: External corner with mitre joint. FAVEKER® FV GA16 FTS502A system.

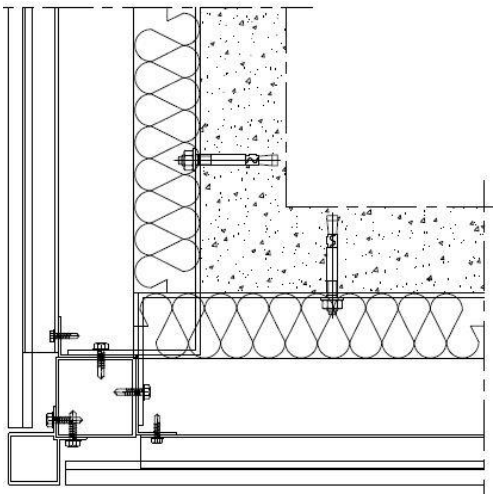


Figure A2.1.5: External corner with metal profile. FAVEKER® FV GA16 FTS502A system.

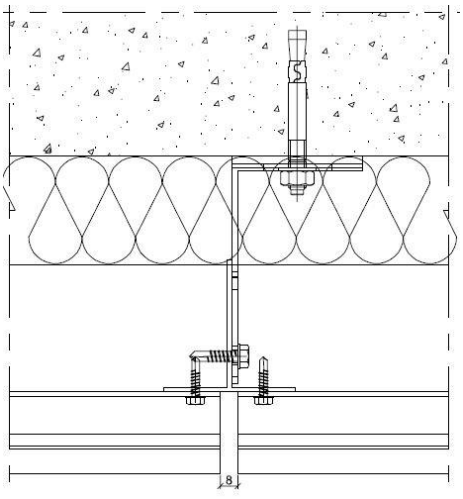


Figure A2.1.6: Horizontal profiles connection. FAVEKER® FV GA16 FTS502A system.

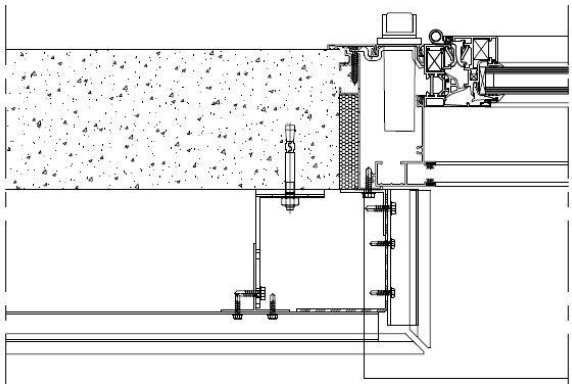


Figure A2.1.7: Jamb with ceramic piece. FAVEKER® FV GA16 FTS502A system.

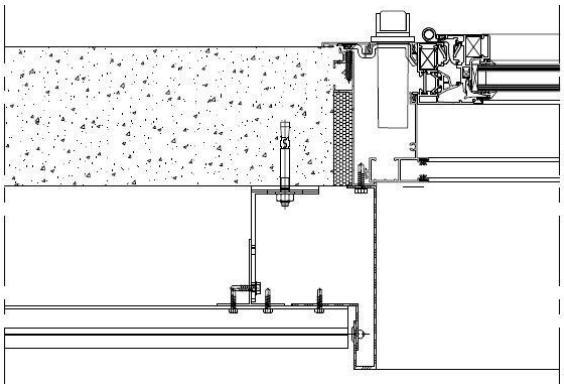


Figure A2.1.8: Jamb with metal piece. FAVEKER® FV GA16 FTS502A system.

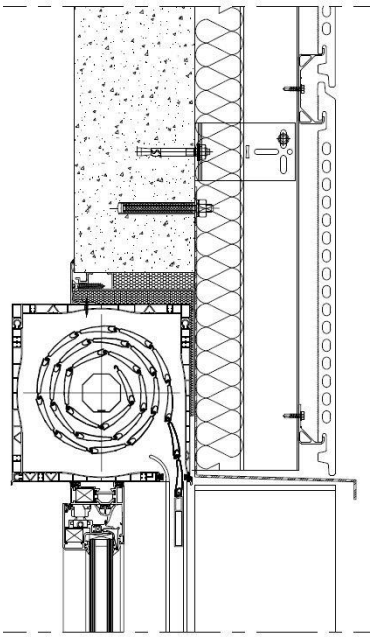


Figure A2.1.9: Lintel with blind and ceramic jamb. FAVEKER® FV GA16 FTS502A system.

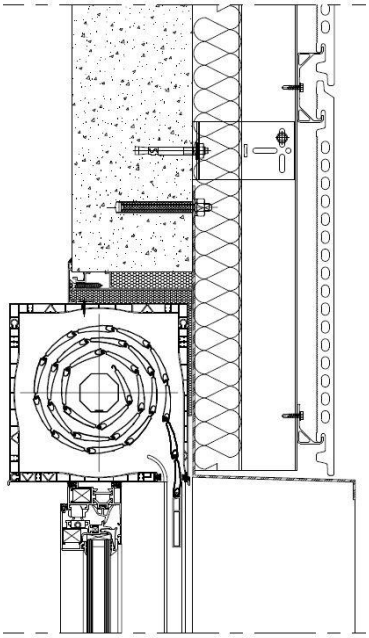


Figure A2.1.10: Lintel with blind and metal jamb. FAVEKER® FV GA16 FTS502A system.

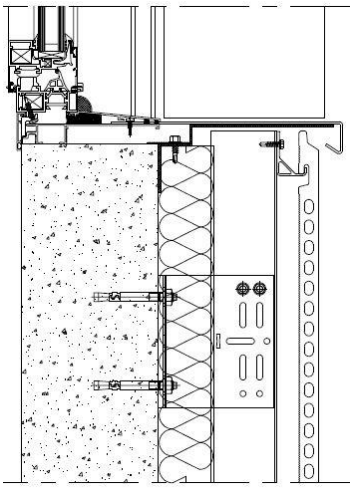


Figure A2.1.11: Sill with metal piece and ceramic jamb. FAVEKER® FV GA16 FTS502A system.

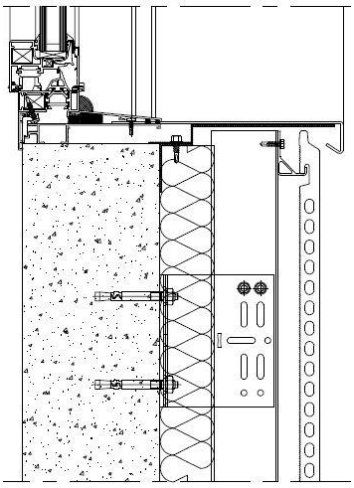


Figure A2.1.12: Sill with metal piece and metal jamb. FAVEKER® FV GA16 FTS502A system.

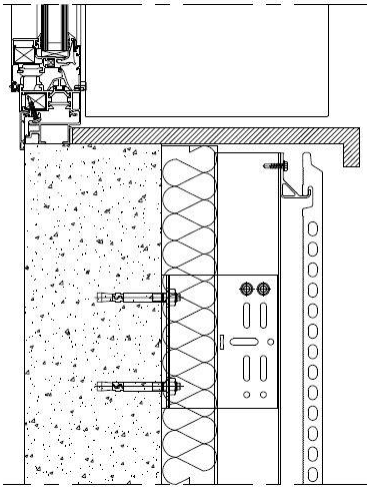


Figure A2.1.13: Sill with ceramic piece and ceramic jamb. FAVEKER® FV GA16 FTS502A system.

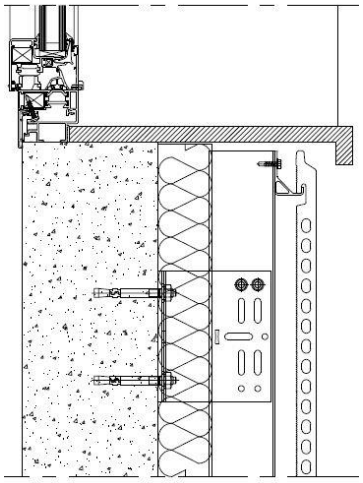


Figure A2.1.14: Sill with ceramic piece and metal jamb. FAVEKER® FV GA16 FTS502A system.

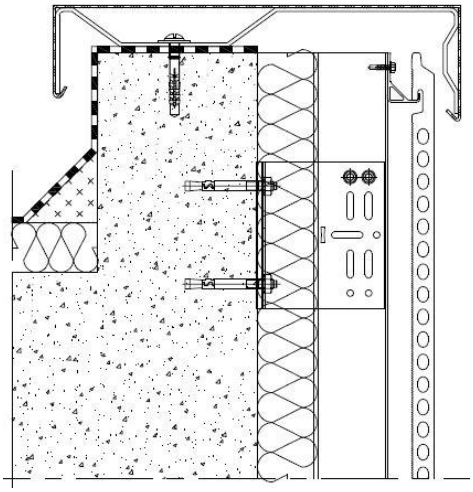


Figure A2.1.15: Roof edge with metal sheet (variant 1). FAVEKER® FV GA16 FTS502A system.

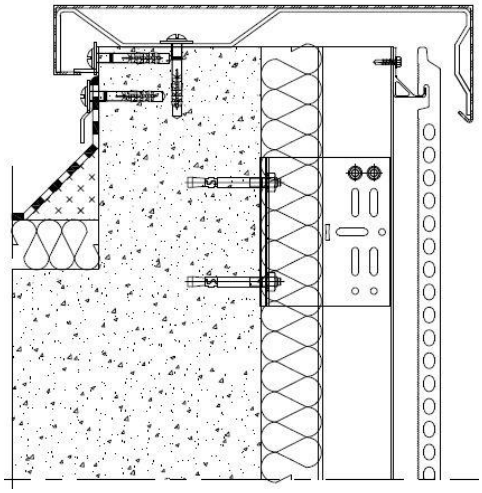


Figure A2.1.16: Roof edge with metal sheet (variant 2). FAVEKER® FV GA16 FTS502A system.

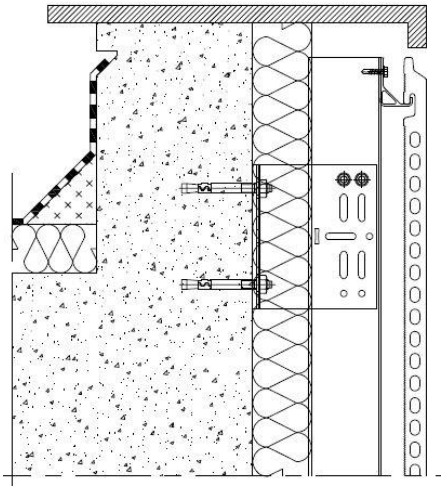


Figure A2.1.17: Roof edge with ceramic piece. FAVEKER® FV GA16 FTS502A system.

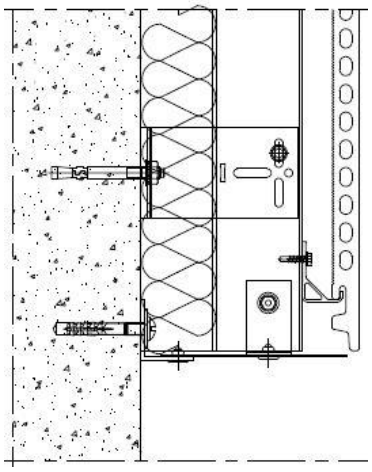


Figure A2.1.18: Base edge. FAVEKER® FV GA16 FTS502A system.

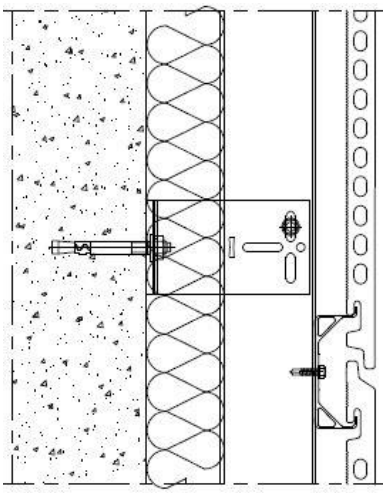


Figure A2.1.19: Retaining bracket. FAVEKER® FV GA16 FTS502A system.

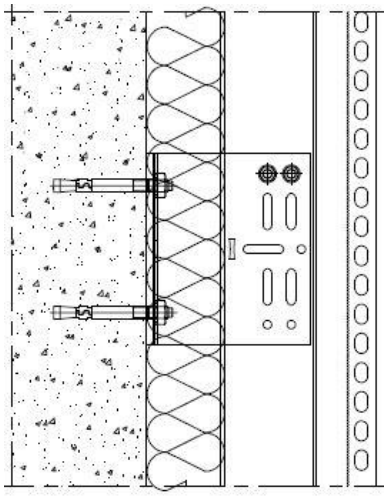


Figure A2.1.20: Sustaining bracket. FAVEKER® FV GA16 FTS502A system.

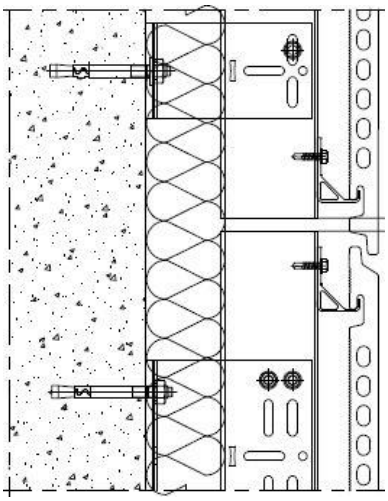


Figure A2.1.21: Vertical section. FAVEKER® FV GA16 FTS502A system.

A2.2 FAVEKER® FV GA16 FTS502B system

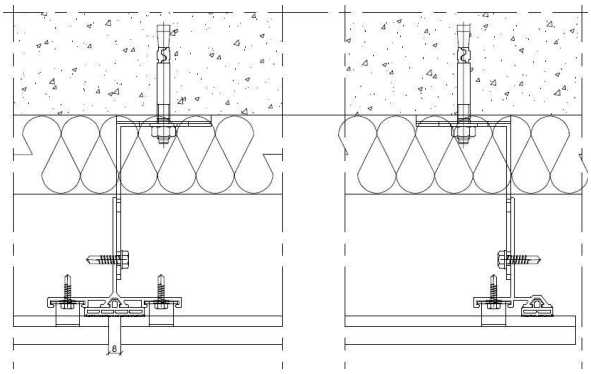


Figure A2.2.1: Horizontal section. FAVEKER® FV GA16 FTS502B system.

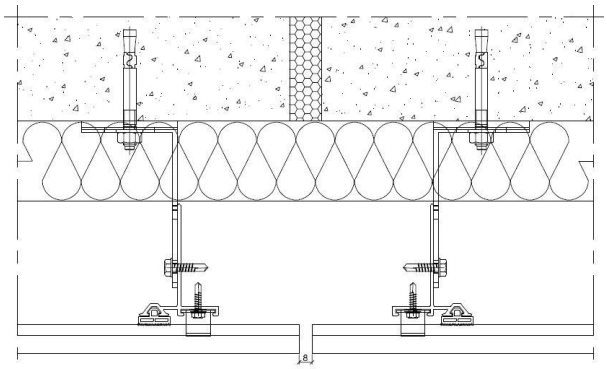


Figure A2.2.2: Horizontal section with expansion joint. FAVEKER® FV GA16 FTS502B system.

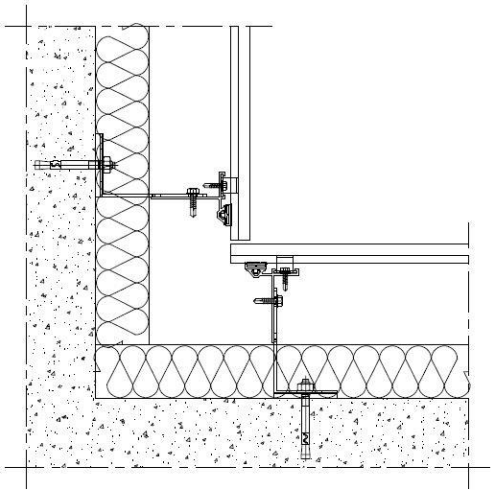


Figure A2.2.3: Internal corner. FAVEKER® FV GA16 FTS502B system.

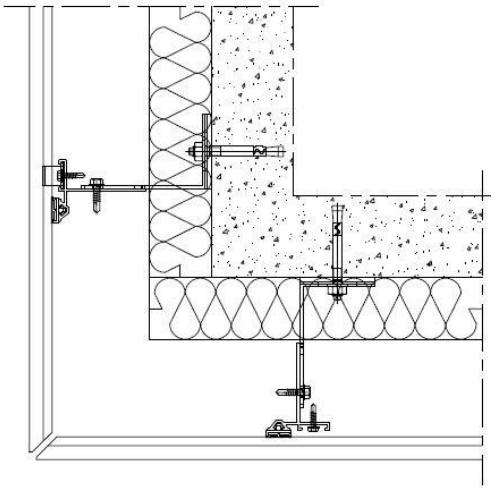


Figure A2.2.4: External corner with mitre joint. FAVEKER® FV GA16 FTS502B system.

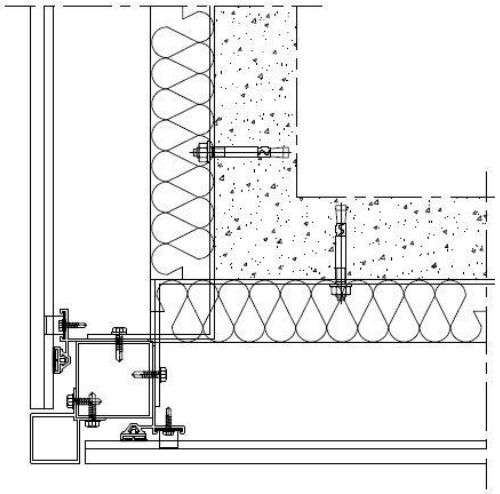


Figure A2.2.5: External corner with metal profile. FAVEKER® FV GA16 FTS502B system.

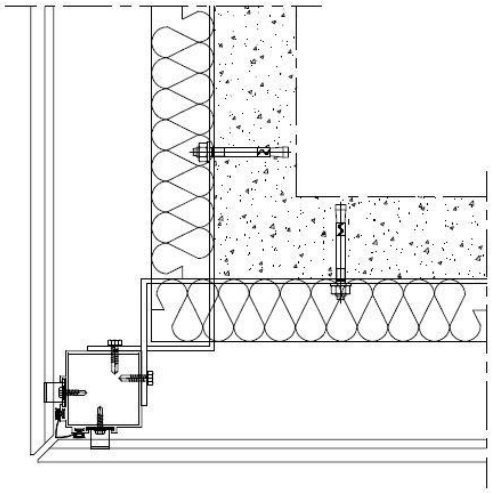


Figure A2.2.6: External corner with mitre joint and corner profile. FAVEKER® FV GA16 FTS502B system.

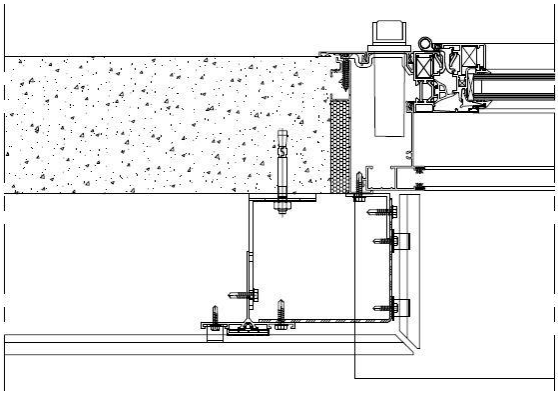


Figure A2.2.7: Jamb with ceramic piece. FAVEKER® FV GA16 FTS502B system.

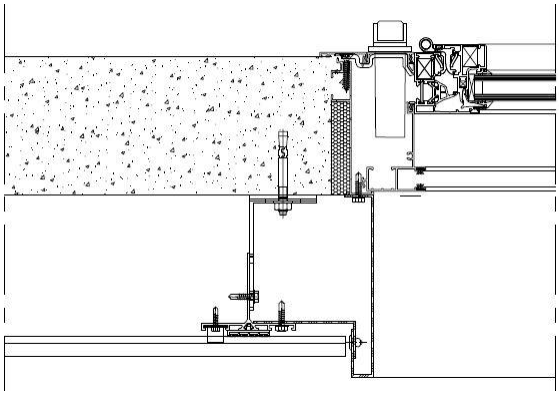


Figure A2.2.8: Jamb with metal piece. FAVEKER® FV GA16 FTS502B system.

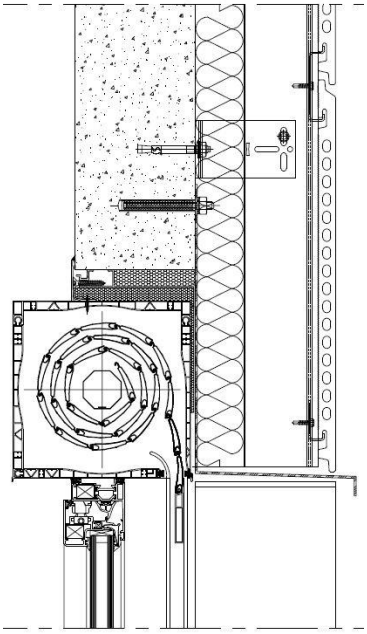


Figure A2.2.9: Lintel with blind and ceramic jamb. FAVEKER® FV GA16 FTS502B system.

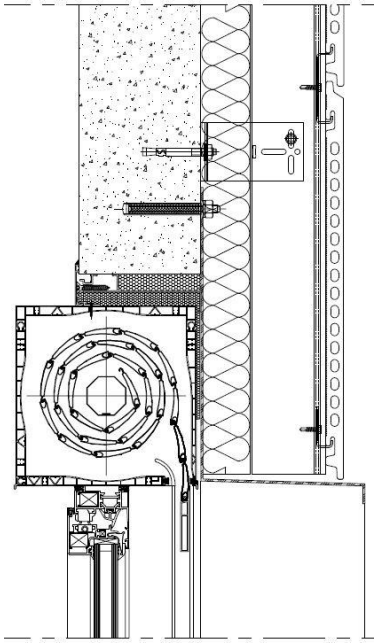


Figure A2.2.10: Lintel with blind and metal jamb. FAVEKER® FV GA16 FTS502B system.

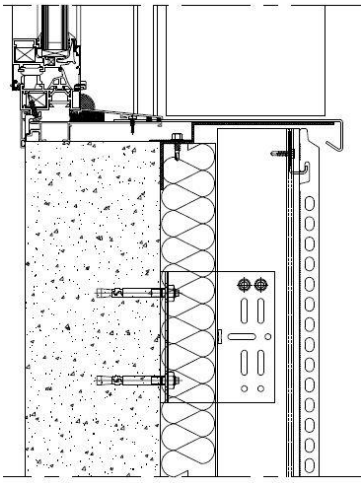


Figure A2.2.11: Sill with metal piece and ceramic jamb. FAVEKER® FV GA16 FTS502B system.

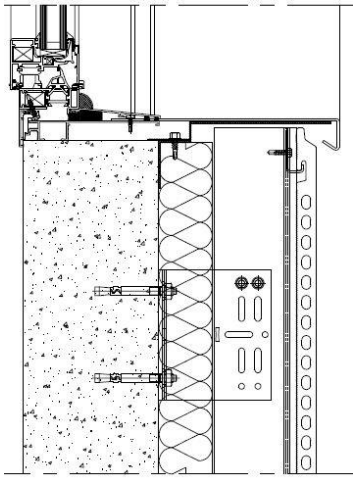


Figure A2.2.12: Sill with metal piece and metal jamb. FAVEKER® FV GA16 FTS502B system.

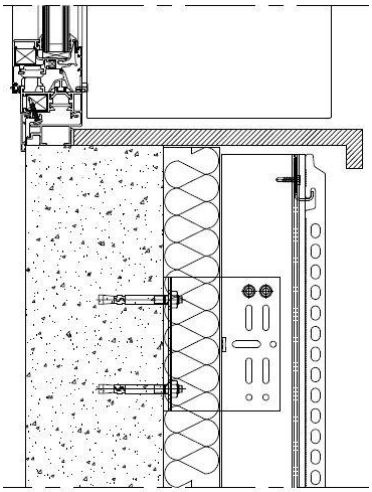


Figure A2.2.13: Sill with ceramic piece and ceramic jamb. FAVEKER® FV GA16 FTS502B system.

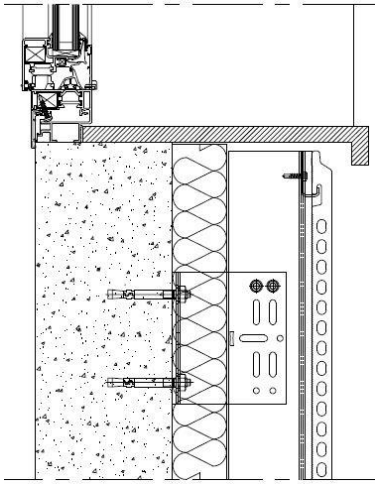


Figure A2.2.14: Sill with ceramic piece and metal jamb. FAVEKER® FV GA16 FTS502B system.

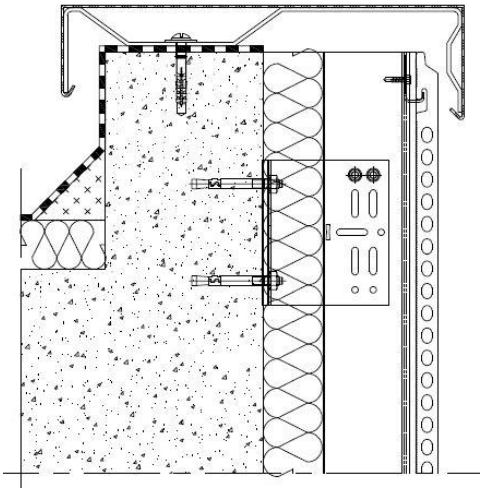


Figure A2.2.15: Roof edge with metal sheet (variant 1). FAVEKER® FV GA16 FTS502B system.

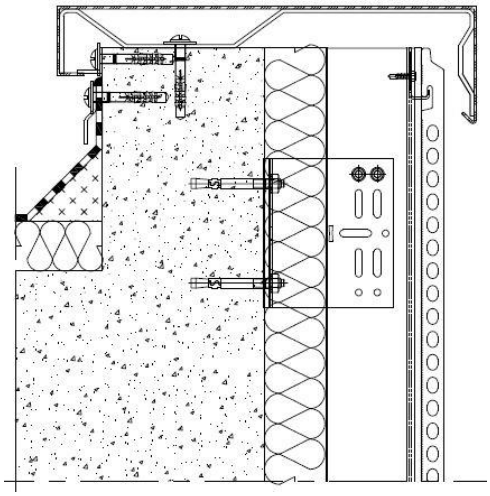


Figure A2.2.16: Roof edge with metal sheet (variant 2). FAVEKER® FV GA16 FTS502B system.

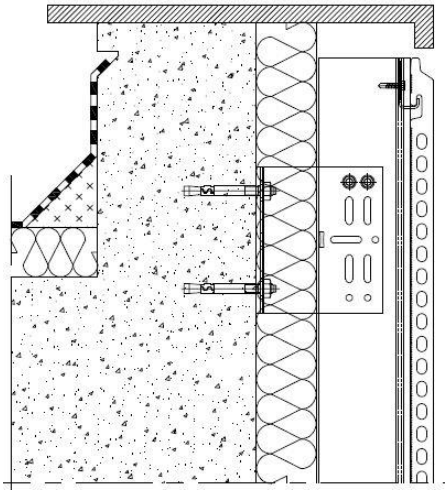


Figure A2.2.17: Roof edge with ceramic piece. FAVEKER® FV GA16 FTS502B system.

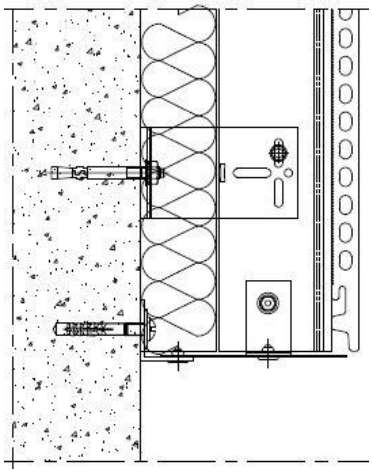


Figure A2.2.18: Base edge. FAVEKER® FV GA16 FTS502B system.

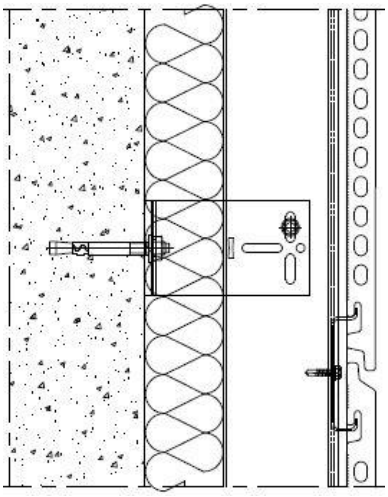


Figure A2.2.19: Retaining bracket. FAVEKER® FV GA16 FTS502B system.

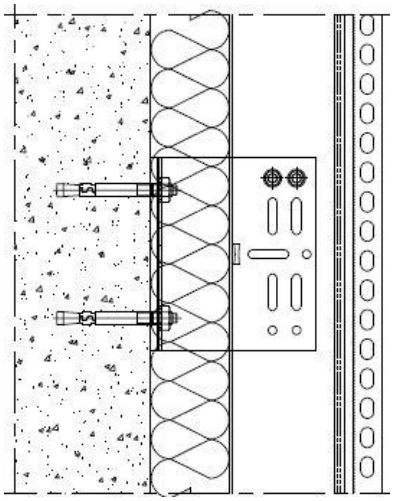


Figure A2.2.20: Sustaining bracket. FAVEKER® FV GA16 FTS502B system.

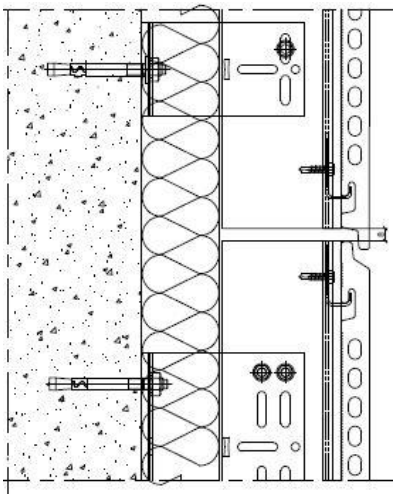


Figure A2.2.21: Vertical section. FAVEKER® FV GA16 FTS502B system.

A2.3 FAVEKER® FV GA20 FTS502B system

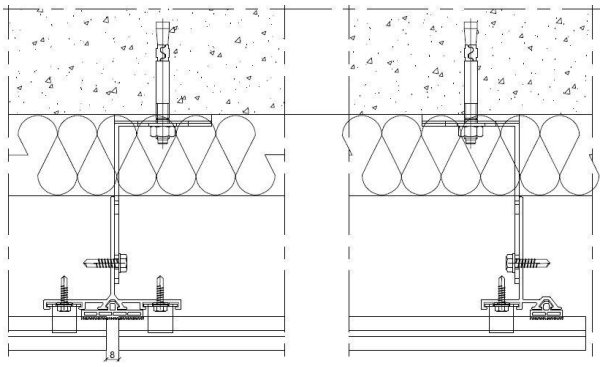


Figure A2.3.1: Horizontal section. FAVEKER® FV GA20 FTS502B system.

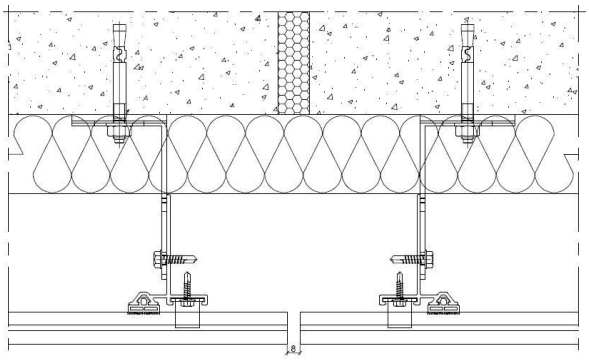


Figure A2.3.2: Horizontal section with expansion joint. FAVEKER® FV GA20 FTS502B system.

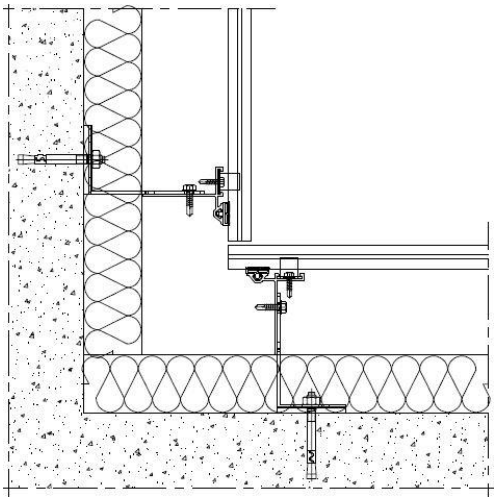


Figure A2.3.3: Internal corner. FAVEKER® FV GA20 FTS502B system.

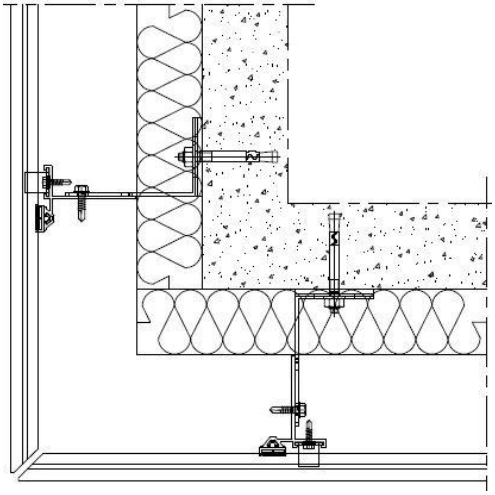


Figure A2.3.4: External corner with mitre joint FAVEKER® FV GA20 FTS502B system.

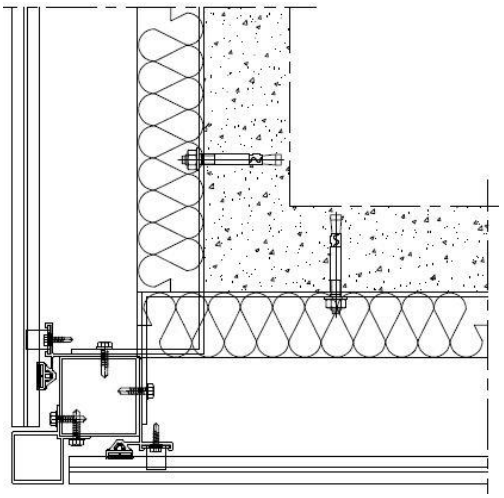


Figure A2.3.5: External corner with metal profile FAVEKER® FV GA20 FTS502B system.

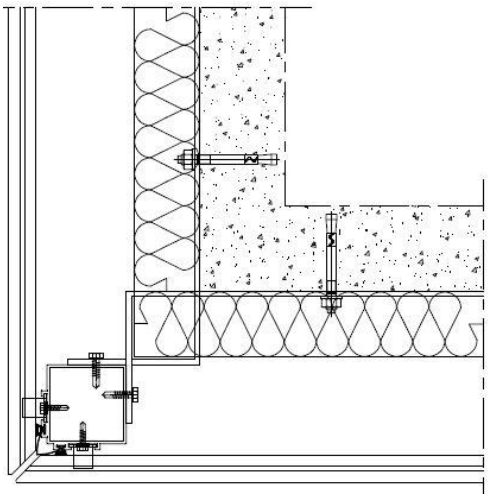


Figure A2.3.6: External corner with mitre joint and corner profile. FAVEKER® FV GA20 FTS502B system.

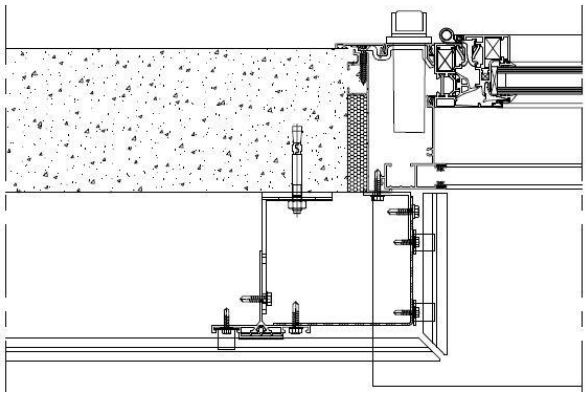


Figure A2.3.7: Jamb with ceramic piece. FAVEKER® FV GA20 FTS502B system.

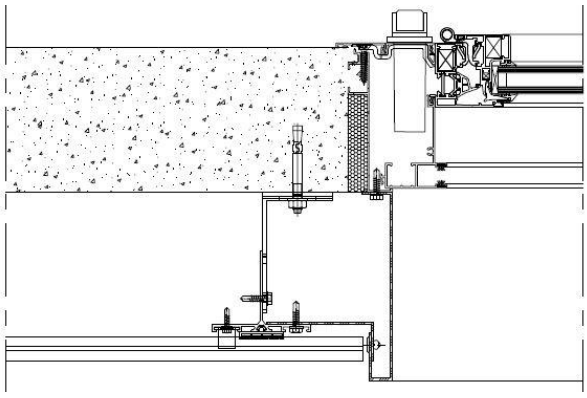


Figure A2.3.8: Jamb with metal piece. FAVEKER® FV GA20 FTS502B system.

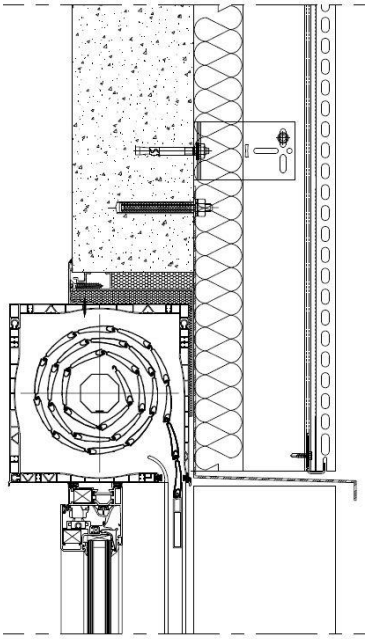


Figure A2.3.9: Lintel with blind and ceramic jamb. FAVEKER® FV GA20 FTS502B system.

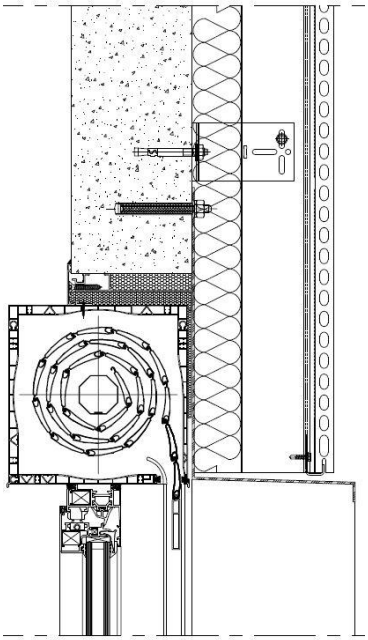


Figure A2.3.10: Lintel with blind and metal jamb. FAVEKER® FV GA20 FTS502B system.

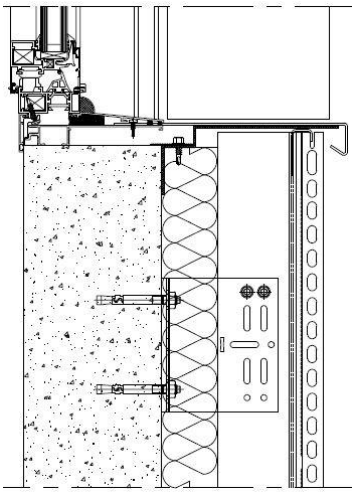


Figure A2.3.11: Sill with metal piece and ceramic jamb. FAVEKER® FV GA20 FTS502B system.

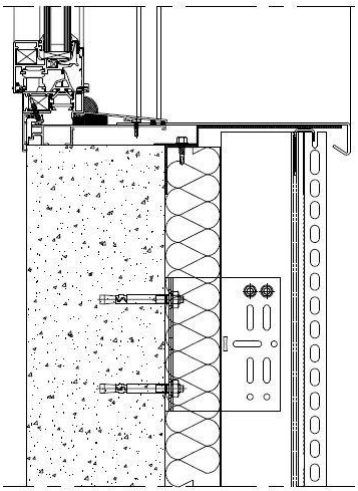


Figure A2.3.12: Sill with metal piece and metal jamb. FAVEKER® FV GA20 FTS502B system.

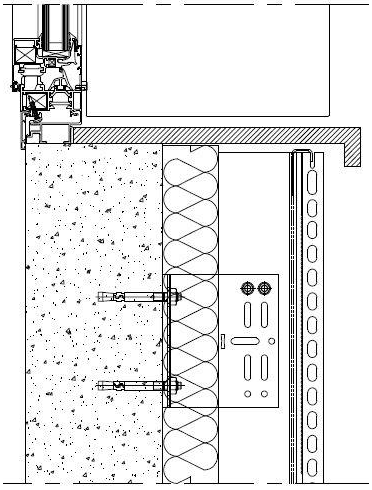


Figure A2.3.13: Sill with ceramic piece and ceramic jamb. FAVEKER® FV GA20 FTS502B system.

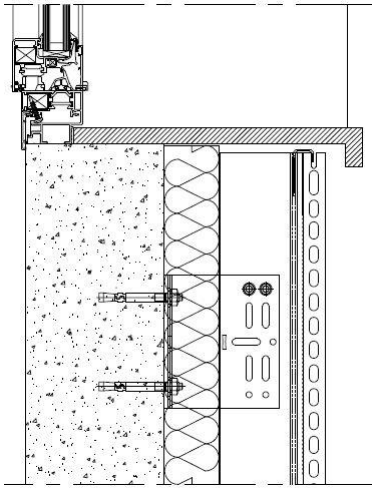


Figure A2.3.14: Sill with ceramic piece and metal jamb. FAVEKER® FV GA20 FTS502B system.

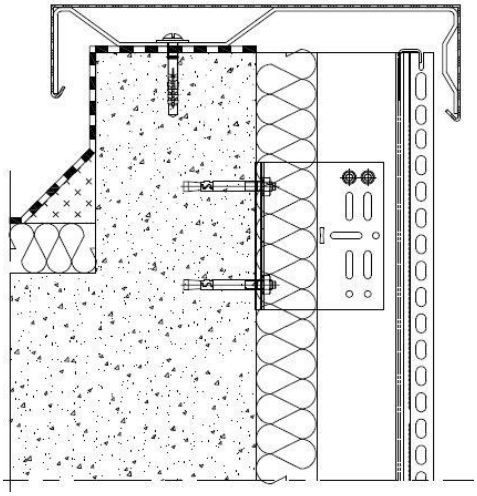


Figure A2.3.15: Roof edge with metal sheet (variant 1). FAVEKER® FV GA20 FTS502B system.

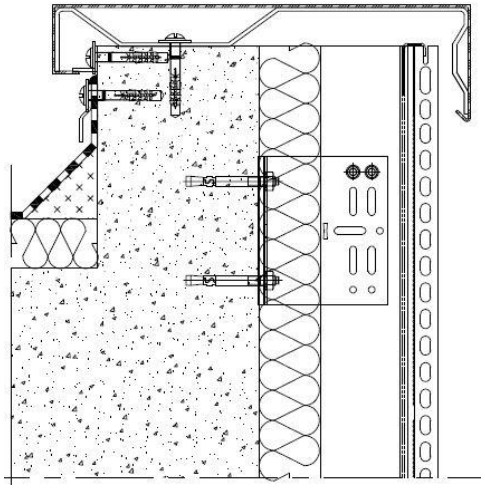


Figure A2.3.16: Roof edge with metal sheet (variant 2). FAVEKER® FV GA20 FTS502B system.

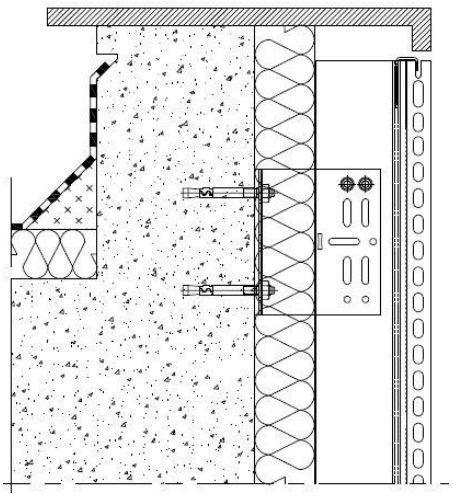


Figure A2.3.17: Roof edge with ceramic piece. FAVEKER® FV GA20 FTS502B system.

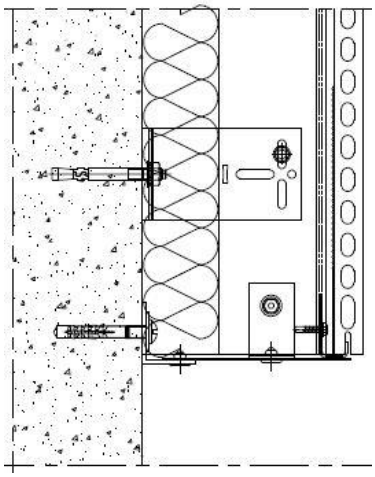


Figure A2.3.18: Base edge. FAVEKER® FV GA20 FTS502B system.

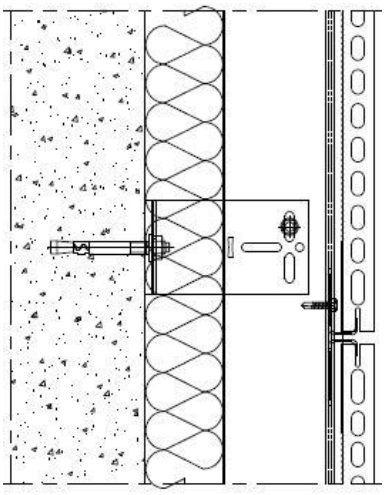


Figure A2.3.19: Retaining bracket. FAVEKER® FV GA20 FTS502B system.

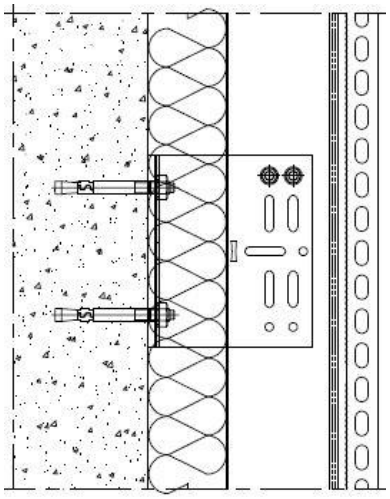


Figure A2.3.20: Sustaining bracket. FAVEKER® FV GA20 FTS502B system.

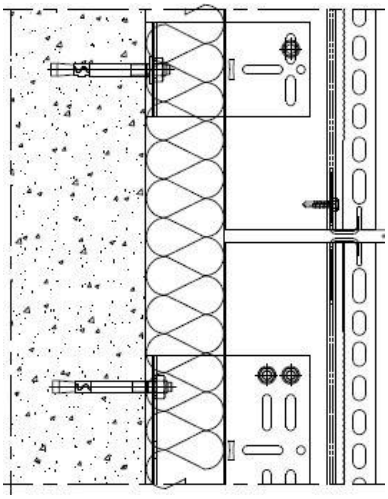


Figure A2.3.21: Vertical section. FAVEKER® FV GA20 FTS502B system.

A2.4 FAVEKER® FV GA20 FTS506 system

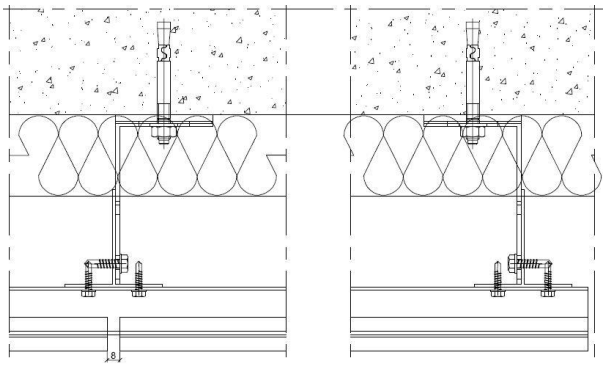


Figure A2.4.1: Horizontal section. FAVEKER® FV GA20 FTS506 system.

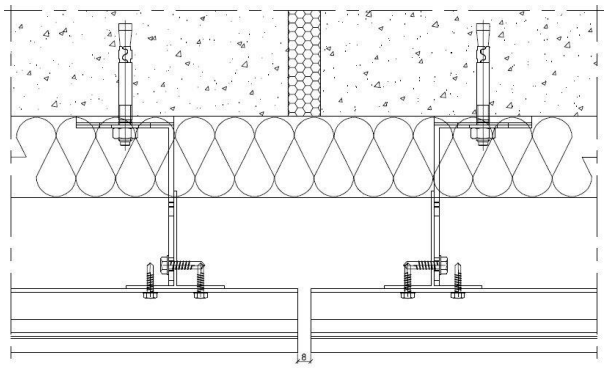


Figure A2.4.2: Horizontal section with expansion joint. FAVEKER® FV GA20 FTS506 system.

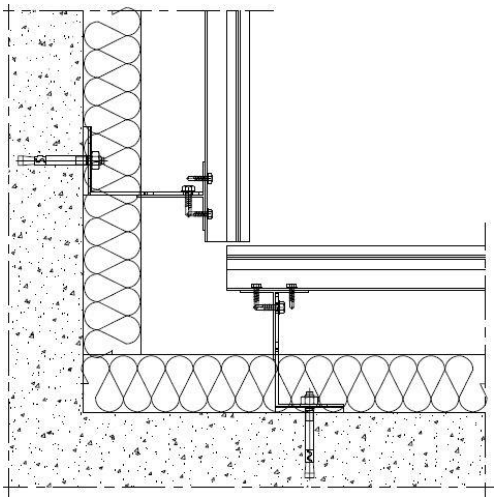


Figure A2.4.3: Internal corner. FAVEKER® FV GA20 FTS506 system.

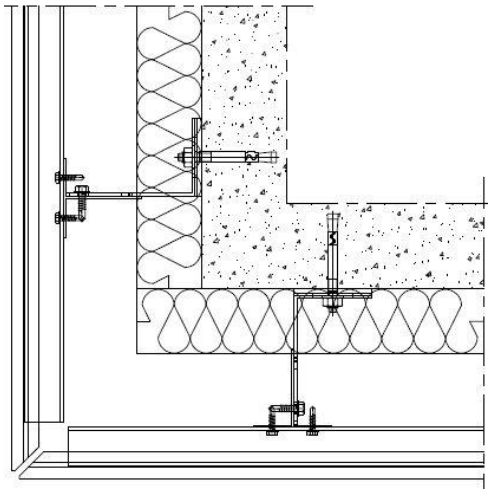


Figure A2.4.4: External corner with mitre joint. FAVEKER® FV GA20 FTS506 system.

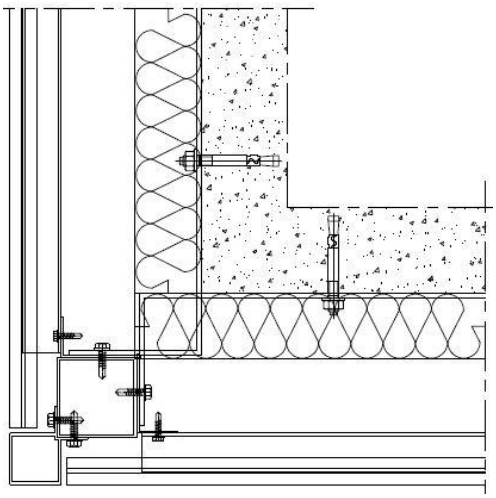


Figure A2.4.5: External corner with metal profile. FAVEKER® FV GA20 FTS506 system.

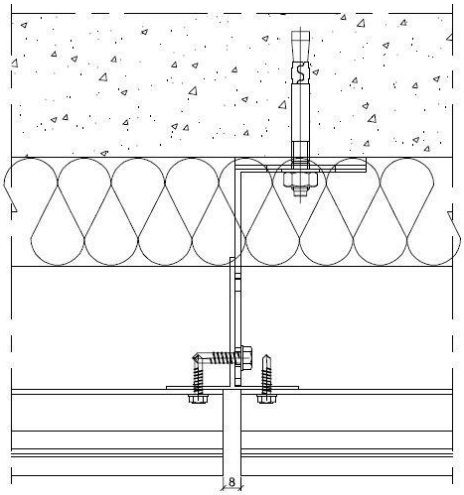


Figure A2.4.6: Horizontal profiles connection. FAVEKER® FV GA20 FTS506 system.

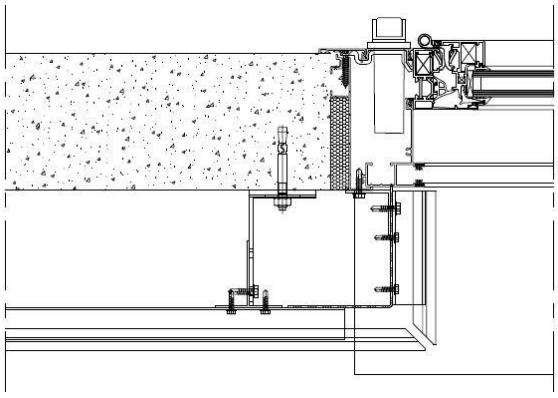


Figure A2.4.7: Jamb with ceramic piece. FAVEKER® FV GA20 FTS506 system.

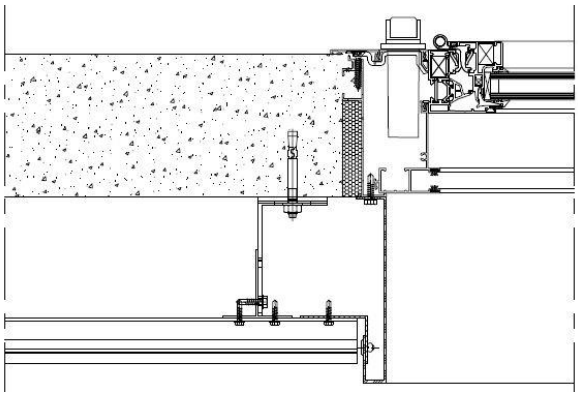


Figure A2.4.8: Jamb with metal piece. FAVEKER® FV GA20 FTS506 system.

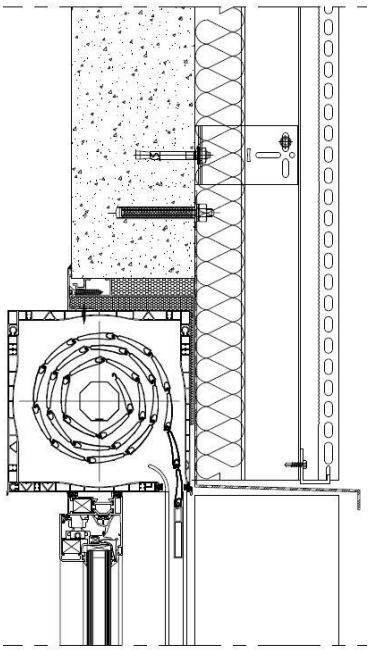


Figure A2.4.9: Lintel with blind and ceramic jamb. FAVEKER® FV GA20 FTS506 system.

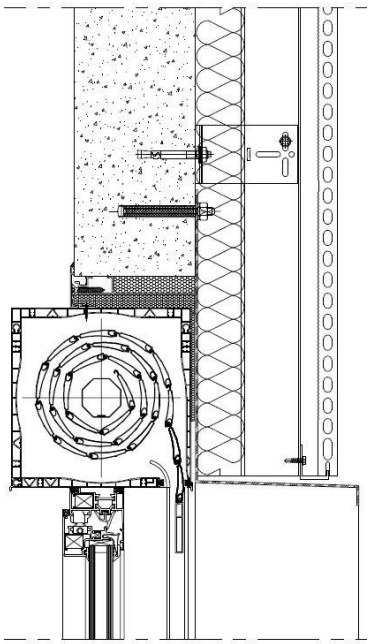


Figure A2.4.10: Lintel with blind and metal jamb. FAVEKER® FV GA20 FTS506 system.

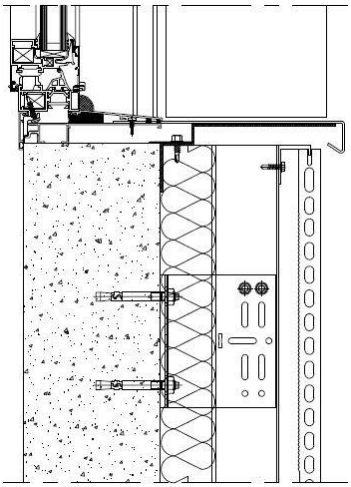


Figure A2.4.11: Sill with metal piece and ceramic jamb. FAVEKER® FV GA20 FTS506 system.

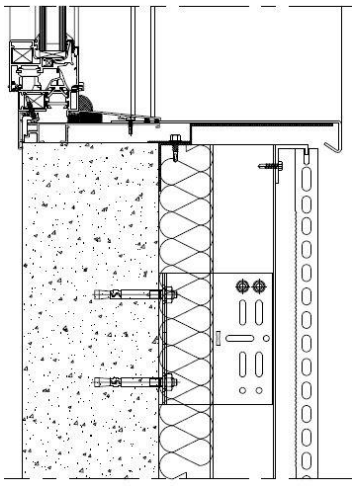


Figure A2.4.12: Sill with metal piece and metal jamb. FAVEKER® FV GA20 FTS506 system.

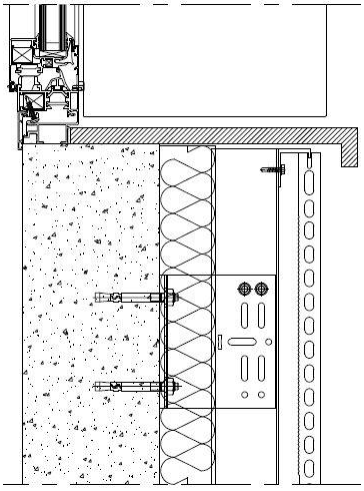


Figure A2.4.13: Sill with ceramic piece and ceramic jamb. FAVEKER® FV GA20 FTS506 system.

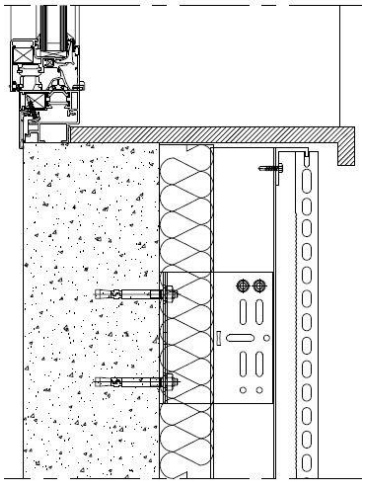


Figure A2.4.14: Sill with ceramic piece and metal jamb. FAVEKER® FV GA20 FTS506 system.

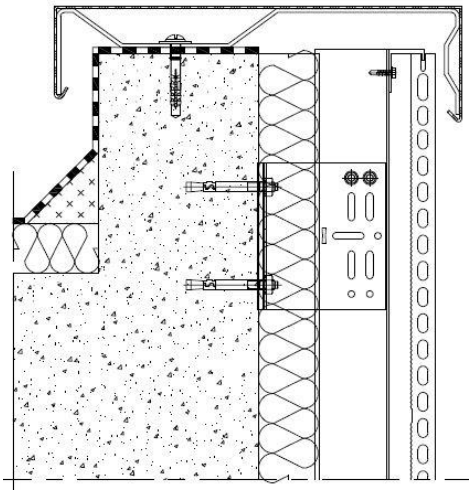


Figure A2.4.15: Roof edge with metal sheet (variant 1). FAVEKER® FV GA20 FTS506 system.

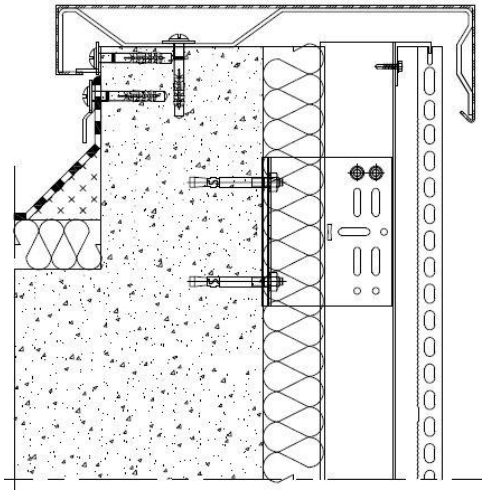


Figure A2.4.16: Roof edge with metal sheet (variant 2). FAVEKER® FV GA20 FTS506 system.

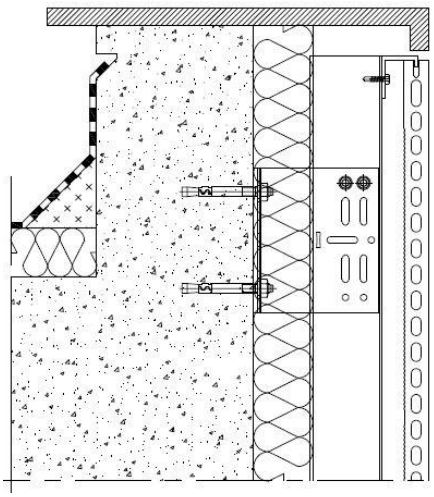


Figure A2.4.17: Roof edge with ceramic piece. FAVEKER® FV GA20 FTS506 system.

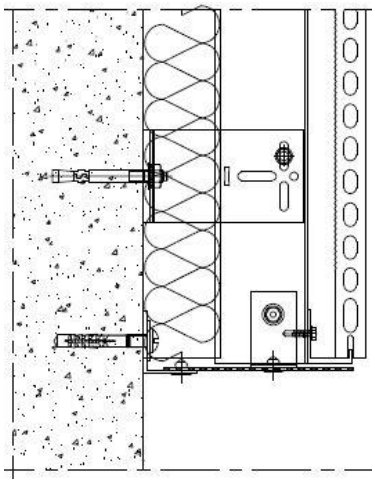


Figure A2.4.18: Base edge. FAVEKER® FV GA20 FTS506 system.

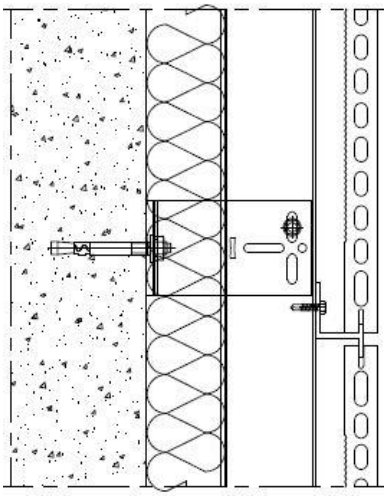


Figure A2.4.19: Retaining bracket. FAVEKER® FV GA20 FTS506 system.

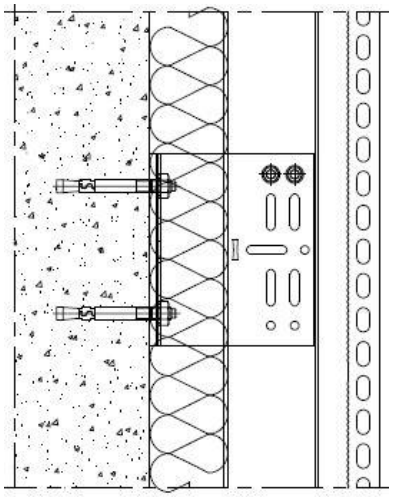


Figure A2.4.20: Sustaining bracket. FAVEKER® FV GA20 FTS506 system.

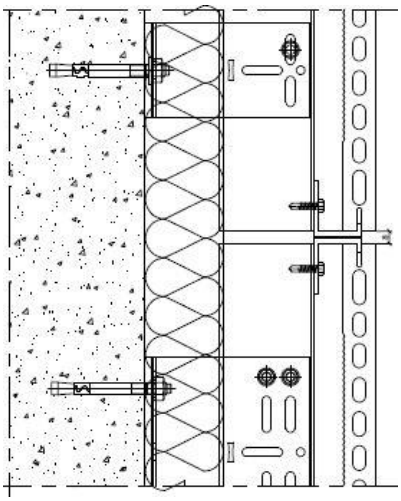


Figure A2.4.21: Vertical section. FAVEKER® FV GA20 FTS506 system.

ANNEX 3: Design, installation, maintenance and repair criteria

A3.1 Design

The design of the external wall claddings for ventilated façades using FAVEKER® FV kit should consider:

- It is assumed that the substrate wall meets the necessary requirements regarding the mechanical strength (resistance to static and dynamic loads) and the airtightness, as well as the relevant resistance regarding watertightness and water vapour.
- The verification of the designed system by means of calculation, taking into account the mechanical characteristic values of the kit components in order to resist the actions (dead loads, wind loads, etc.) applying on the specific works. National safety factors and other national provisions must be followed.
- For cladding elements with a length greater than 1500 mm an additional vertical profile placed at midspan of the cladding element should be considered. If the fixing devices are clips or small rails, six fixing points should be considered for each cladding element.
- The selection and verification of the anchors between the brackets and the external walls (substrate), taking into account the substrate material and the minimum resistance required (pull-out and shear resistance) according to the envisaged actions obtained from the mechanical calculation of the designed system.
- The accommodation of the designed system movements to the substrate or structural movements.
- The execution of singular parts of the façade; some examples of construction details are indicated in Annex 2.
- The corrosion protection of the designed system metallic components taking into account the category of corrosivity of the atmosphere of works (e.g. acc. ISO 9223) .
- The drainability of the ventilated air space between the cladding elements and the insulation layer or the external wall accordingly.
- An insulation layer is usually fixed on the external wall and should be defined in accordance with a harmonized standard or an European technical assessment and taking into account the clause 3.1 of this ETA.
- Because the joints are not watertight, the first layer behind ventilated air space (e.g. insulation layer) should be composed by materials with low water absorption.

A3.2 Installation

Installation of the external wall claddings for ventilated façades using FAVEKER® FV kit should be carried out:

- According to the specifications of the manufacturer and using the components specified in this ETA.
- In accordance with the design and drawings prepared for the specific works. The manufacturer should ensure that the information on these provisions is given to those concerned.
- By appropriately qualified staff and under the supervision of the technical responsible of the specific works.

A3.3 Maintenance and repair

Maintenance of the external wall claddings for ventilated façades using FAVEKER® FV kit includes inspections on site, taking into account the following aspects:

- Regarding the cladding elements: the appearance of any damage such as cracking, detachment, delamination, and mould presence due to permanent moisture or permanent irreversible deformation.

  Attention should be paid to the corners of the cladding elements as they may suffer small detachments.
- Regarding metallic components: the presence of corrosion or presence of water accumulation.

When necessary, any repair to localized damaged areas must be carried out with the same components and following the repair instructions given by the manufacturer.