



European Technical Assessment

ETA 22/0346 of 20/12/2022

General part

Technical Assessment Body issuing the ETA:

TECNALIA RESEARCH & INNOVATION

Trade name of the construction product

GRACCO SURFACES®

Product family to which the construction product belongs

Kits for external wall claddings made of agglomerated stone

Manufacturer

CERÁMICAS CUATRO PALOMAS, S.A
Ctra A5 km 22,800
E-28935 Móstoles, MADRID
www.gracco.es

Manufacturing plant

CERÁMICAS CUATRO PALOMAS, S.A
Ctra A5 km 22,800
E-28935 Móstoles, MADRID

This European Technical Assessment contains

24 pages including 2 annexes which form an integral part of this assessment.

This European Technical Assessment is issued in accordance with regulation (EU) No 305/2011, on the basis of

EAD 090020-00-0404 Kits for external wall claddings made of agglomerated stone.

This version replaces:

ETA 22/0346 of 04/10/2022

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

Communication of this European Technical Assessment, including transmission by electronic means, shall be in full (excepted the confidential Annex referred to above). However, partial reproduction may be made, with the written consent of the issuing Technical Assessment Body – Tecnalia Research & Innovation. Any partial reproduction has to be identified as such.



Table of contents

| | |
|---|----------|
| 1. Technical description of the product | 3 |
| 2 Specification of the intended use(s) in accordance with the applicable European Assessment Document (hereinafter EAD) | 4 |
| 2.1 Intended use | 4 |
| 2.2 Manufacturing | 4 |
| 2.3 Design and installation | 4 |
| 2.4 Packaging, transport and storage | 5 |
| 2.5 Use, maintenance and repair | 5 |
| 3 Performance of the product and references to the methods used for its assessment | 6 |
| 3.1 Reaction to fire | 8 |
| 3.2 Watertightness of joints (protection against driving rain) | 8 |
| 3.3 Drainability | 8 |
| 3.4 Wind load resistance | 8 |
| 3.5 Resistance to vertical load | 8 |
| 3.6 Impact resistance | 9 |
| 3.7 Mechanical resistance of cladding element. Bending strength..... | 10 |
| 3.8 Resistance of the grooved cladding element | 10 |
| 3.9 Resistance of cladding fixing..... | 10 |
| 3.10 Resistance of profiles | 10 |
| 3.11 Pull-through resistance of fixing from profile..... | 10 |
| 3.12 Pull-out resistance of fixing from profile | 10 |
| 3.13 Bracket resistance | 11 |
| 3.14 Dimensional stability by humidity of the cladding element | 11 |
| 3.15 Linear thermal expansion coefficient of the cladding element..... | 11 |
| 3.16 Freeze-thaw resistance of the cladding element. | 12 |
| 3.17 Thermal shock resistance of the cladding element..... | 12 |
| 3.18 Corrosion of metal components | 12 |
| 4 Assessment and verification of constancy of performance (hereinafter AVCP) system applied, with reference to its legal base | 13 |
| 5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD | 13 |
| ANNEX A: TECHNICAL DESCRIPTION | 14 |
| ANNEX B: CONSTRUCTION DETAILS | 22 |



SPECIFIC PARTS

1. Technical description of the product

The subject of this European Technical Assessment (ETA) is a kit for ventilated external wall claddings (façade system GRACCO SURFACES ®) consisting of external cladding elements, their associated fixing devices and the aluminium subframe. According to the EAD 090020-00-0404 “Kits for external wall claddings made of agglomerated stone” edition October 2016.

The GRACCO SURFACES® Facade System is supplied as a kit comprised of the agglomerated stone cladding panels. The other components of the ventilated façade system are not part of the kit, but are listed in table 1. Technical information on the components can be found in the annexes to this ETA.

| Components | | GRACCO SURFACES® | Technical description ANNEX A |
|----------------------------|--|---|-------------------------------|
| Cladding element | | Agglomerated stone panels with groove | A.1 |
| Cladding fixing | | Aluminium alloy continuous profiles | A.2 |
| Subframe components | Vertical profiles | Aluminium alloy profiles “T” | A.3 |
| | | Aluminium alloy continuous profiles “L” | |
| | Brackets | Aluminium alloy brackets | A.4 |
| | Fixings between brackets and vertical profiles | Stainless steel self-drilling screws ref. S-AD 01 SS 5,5xL | A.5 |
| | Fasteners between cladding element attachment and vertical profiles | Stainless steel self-drilling screws ref. S-MD 51 LS 5,5x25 | A.6 |

Table 1: Façade System GRACCO SURFACES ® kit components



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

2.1 Intended use

The façade system GRACCO SURFACES ® is a kit intended to be used for ventilated external wall cladding, which can be fixed to the external walls of new or existing buildings. The supporting walls are made of masonry (stone, ceramic or concrete) or concrete (cast in situ or with prefabricated panels).

The kit for ventilated external wall claddings is a non load-bearing construction system. It does not contribute to the stability of the wall on which it is installed, but it can contribute to its durability by providing enhanced protection from the effect of weathering. The kit is not intended to ensure the air tightness of the building structure.

The provisions made in this European Technical Assessment are based on an assumed working life of 25 years as minimum, provided that the cladding kits are subject to appropriate use and maintenance.

The indications given on the working life cannot be interpreted as a guarantee given by the producer or Assessment Body but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

2.2 Manufacturing

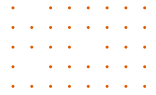
The European Technical Assessment is issued for the external wall cladding for ventilated façade on the basis of agreed data/information, deposited at Tecnalia Research & Innovation, which identifies the kit that has been assessed and judged.

Changes to the kit or production process, which could result in this deposited data/information being incorrect, shall be notified to Tecnalia Research & Innovation before the changes are introduced. Tecnalia Research & Innovation will decide whether or not such changes affect the ETA and consequently, the validity of the CE marking on the basis of the ETA; and if so, whether further assessment or alterations to the ETA shall be necessary.

2.3 Design and installation

The installation instructions including special installation techniques and provisions for the qualification of the personnel are given in the manufacturer's technical documentation.

Design, installation and execution of the façade system GRACCO SURFACES ® is to be in conformity with national documents. Such documents and the level of their implementation in Member States' legislation are different. Therefore, the assessment is done taking into account the general assumptions introduced in EAD 090020-00-0404 used as EAD, which summarizes how information introduced in the ETA and related documents is intended to be used in the construction process and gives advice to all parties interested when normative documents are missing.



2.4 Packaging, transport and storage

The information on packaging, transport and storage is given in the manufacturer's technical documentation. It is the responsibility of the manufacturer(s) to ensure that this information is effectively communicated to the concerned people.

2.5 Use, maintenance and repair

The maintenance of the façade system GRACCO SURFACES ® includes inspections on site, taking into account the following aspects:

- Regarding the panels: Appearance of any damage such as cracking or folding due to permanent and irreversible deformation.
- Regarding metallic components: Presence of corrosion or water accumulation.
- Necessary repairs should be done rapidly, using the same kit components and following the repair instructions given by ETA holder.

The information on use, maintenance and repair is given in the manufacturer's technical documentation. It is the responsibility of the manufacturer(s) to ensure that this information is effectively communicated to the concerned people.



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

The identification tests and the assessment for the intended use of this façade system GRACCO SURFACES ® according to the Basic Requirements (BWR) were carried out in compliance with EAD 090020-00-0404 “Kits for external wall claddings made of agglomerated stone”. The characteristics of the components shall correspond to the respective values laid down in the technical documentation of this ETA, checked by Tecnalía Research & Innovation.

| Basic Works Requirement | Essential characteristic | | ETA section | Performance |
|---|--|----------------|--------------|--------------------------------|
| BWR 2 Safety in case of fire | Reaction to fire | | 3.1 | A1 |
| BWR 3 Hygiene, health and the environment | Watertightness of joints (protection against driving rain) | | 3.2 | Not watertight (open joints) |
| | Drainability | | 3.3 | See § 3.3 y figures B.1 to B.9 |
| BWR 4 Safety and accessibility in use | Wind load resistance | | 3.4 | 3.600 Pa |
| | Resistance to vertical load | | 3.5 | 0,32 mm after 254 minutes |
| | Impact resistance | | 3.6 | See table 3 |
| | Bending strength of cladding element | | 3.7 | 9,3 MPa |
| | Resistance of grooved cladding element | Mean | 3.8 | 1.607 N |
| | | Characteristic | 3.8 | 1.334 N |
| | Cladding fixing resistance | | 3.9 | Not relevant |
| | Resistance of the profiles | | 3.10 | Not relevant |
| | Pull-through resistance of fixing from profile | | 3.11 | Not relevant |
| | Pull-out resistance of fixing from profile | | 3.12 | Not relevant |
| Bracket resistance | | 3.13 | Not relevant | |



| Basic Works Requirement | Essential characteristic | ETA section | Performance |
|-------------------------|--|-------------|----------------|
| | Dimensional stability by humidity of the cladding element | 3.14 | See table 6 |
| | Linear thermal expansion coefficient of the cladding element | 3.15 | ≤ 6,1 (µm/m°C) |
| | Freeze-thaw resistance of the cladding element | 3.16 | 1,1 |
| | Thermal shock resistance of the cladding element | 3.17 | 1,0 |
| | Corrosion of metal components | 3.18 | Not relevant |

Table 2: GRACCO SURFACES ® façade kit performance summary (see also the performance details in the relevant sections of the ETA).



3.1 Reaction to fire

Reaction to fire of GRACCO SURFACES ® kit is A1 according to Commission Delegated Regulation (EU) 2016/364 and EN 13501-1.

If an insulation layer placed in the ventilated air space is made of a non-combustible material (mineral wool) or if the layer behind the cladding elements is a mineral substrate like masonry or concrete (A1 or A2-s1, d0).

In other cases, not assessed.

Note: A European reference fire scenario has not been laid down for façades. In some Member States, the classification of external wall cladding kits according to EN 13501-1 might not be sufficient for the use in façades. An additional assessment of external wall cladding kits 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 cladding for ventilated façades are open, therefore GRACCO SURFACES ® kit is not watertight.

3.3 Drainability

On the basis of the construction details (see figures from B.1 to B.9), the installation criterion and the available knowledge and experience, 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 assessed according to § 2.2.4 and Annex D of EAD 090020-00-0404.

The performance of the kit exposed to wind pressure is more favourable than when exposed to wind suction. Therefore, the wind suction resistance has been tested in its most unfavourable arrangement: maximum width of the cladding element and maximum distance between vertical profiles and between horizontal profiles.

Maximum load, $Q = 3.600 \text{ Pa}$

3.5 Resistance to vertical load

Resistance to vertical load has been assessed according to § 2.2.5 and Annex E of EAD 090020-00-0404.

An additional load of 650 N is applied to a cladding panel, producing a stable displacement of 0,32 mm after 254 minutes with the load applied.

3.6 Impact resistance

Impact resistance has been assessed according to § 2.2.6 and Annex F of EAD 090020-00-0404.

| Cladding element | | | Cladding fixing and subframe | Impacts | Degree of exposure in use (*) |
|---|-------------|---------|-------------------------------|---|-------------------------------|
| Cladding element e= 20 mm | Length (mm) | ≤ 1.200 | The mechanically weakest case | - Hard body (0,5 kg) impacts of 1 J - Soft body (3 kg) impacts of 10 J | CATEGORY IV |
| | Width (mm) | ≤ 600 | | | |
| Cladding element e= 30 mm | Length (mm) | ≤ 2.000 | The mechanically weakest case | - Hard body (0,5 kg) impacts of 3 J - Soft body (3 kg) impacts of 10 J | CATEGORY III |
| | Width (mm) | ≤ 1.200 | | | |
| Perforated cladding element e= 30 mm | Length (mm) | ≤ 2.000 | The mechanically weakest case | - Hard body (0,5 kg) impacts of 3 J - Soft body (3 kg) impacts of 10 J | CATEGORY III |
| | Width (mm) | ≤ 1.200 | | | |
| <p>(*) Category I: This category means that the degree of exposure in use should be a zone at ground level readily accessible to the public and vulnerable to hard body impacts but not subjected to abnormally rough use.</p> <p>Category II: This category means that the degree of exposure in use should be a zone liable to impacts from thrown 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.</p> <p>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.</p> <p>Category IV: This category means that the degree of exposure in use should be a zone out of reach from ground level.</p> <p>Note: Performance not assessed for 20 mm thick cladding elements with length > 1200 mm and width > 600 mm.</p> | | | | | |

Table 3: Impact resistance.

3.7 Mechanical resistance of cladding element. Bending strength

Bending strength has been assessed according to §2.2.7

Initial bending strength values and after ageing (freeze-thaw cycles, see clause 3.16, and after thermal shock cycles, see clause 3.17) are listed in Table 4.

| Cladding element | Bending strength (MPa) | |
|----------------------------|------------------------|------------|
| | Mean value | Mean ratio |
| Without ageing | 9,3 | --- |
| After freeze-thaw cycles | 9,9 | 1,1 |
| After thermal shock cycles | 9,7 | 1,0 |

Table 4: Bending strength of the cladding element.

Note: Performance not assessed for 30 mm thick perforated cladding elements.

3.8 Resistance of the grooved cladding element.

Groove resistance has been assessed according to § 2.2.8 Annex G of EAD 090020-00-0404.

Mean and characteristics values are listed in Table 5.

| Cladding element | Ultimate resistance (N) | |
|------------------|-------------------------|-----------------|
| | $R_{m,u}$ | $R_{c,u}^{(*)}$ |
| | 1.607 | 1.334 |

(*) Characteristics values giving 75% confidence that the 95% of test results will be higher than this value.

Table 5: Resistance of the grooved cladding element.

3.9 Resistance of cladding fixing.

Not relevant.

3.10 Resistance of profiles

Not relevant.

3.11 Pull-through resistance of fixing from profile

Not relevant.

3.12 Pull-out resistance of fixing from profile

Not relevant.

3.13 Bracket resistance

Not relevant.

3.14 Dimensional stability by humidity of the cladding element

Dimensional stability by humidity of the cladding element has been assessed according to § 2.2.14 of EAD 090020-00-0404.

| Cladding element e= 20 mm | | | |
|---------------------------|----------|------------------------|------------|
| Characteristic | | Relative Humidity (RH) | Mean value |
| Moisture content (%) | | 30% | 3,18 |
| | | 65% | 3,21 |
| | | 85% | 3,34 |
| Length variation (mm/m) | Relative | from 65% to 85% | 0,02 |
| | | from 65% to 30% | -0,16 |
| | Total | from 30% to 85% | 0,18 |
| Cladding element e= 30 mm | | | |
| Characteristic | | Relative Humidity (RH) | Mean value |
| Moisture content (%) (%) | | 30% | 3,08 |
| | | 65% | 3,12 |
| | | 85% | 3,22 |
| Length variation (mm/m) | Relative | from 65% to 85% | 0,02 |
| | | from 65% to 30% | -0,09 |
| | Total | from 30% to 85% | 0,11 |

Table 6: Dimensional stability by humidity of the cladding element.

3.15 Linear thermal expansion coefficient of the cladding element.

Linear thermal expansion coefficient of the cladding element has been assessed according to §2.2.15 of EAD 090020-00-0404.

Mean value of linear thermal expansion coefficient is $\leq 6,1 \mu\text{m}/\text{m}^\circ\text{C}$.

| T ^a range | Linear thermal expansion coefficient – mean value ($\mu\text{m}/\text{m}^\circ\text{C}$) |
|----------------------|--|
| 30-50 °C | 6,1 |
| 50-80 °C | 5,3 |
| 80-100 °C | 4,4 |

Table 7: Linear thermal expansion coefficient of the cladding element.



3.16 Freeze-thaw resistance of the cladding element.

Freeze-thaw resistance of the cladding elements has been assessed according to § 2.2.16 of EAD 090020-00-0404.

Mean values of the bending strength resistance after freeze-thaw cycles are listed in table 4.

3.17 Thermal shock resistance of the cladding element.

Thermal shock resistance of the cladding element has been assessed according to § 2.2.17 of EAD 090020-00-0404.

Mean values of the bending strength resistance after thermal shock cycles are listed in table 4.

3.18 Corrosion of metal components

Not relevant.



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

According to the European Commission Decision 2003/640/EC, the AVCP System (see Delegated Regulation (EU) No 568/2014 amending Annex V to Regulation (EU) No 305/2011) given in the following table applies:

| Product | Intended use | Level or class | System |
|--------------------------------|--------------------------------------|----------------|--------|
| Kit for external wall cladding | Uses not subject to fire regulations | Any | 2+ |
| | Uses subject to fire regulations | A1 | 4 |

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 Assessment and Verification of Constancy of Performance (AVCP) system are laid down in the control plan deposited at Tecnalia Research & Innovation.

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

Issued in Azpeitia, on 20/12/2022



Miguel Mateos
 Innovation and Conformity Assessment Point
 Tecnalia Research & Innovation

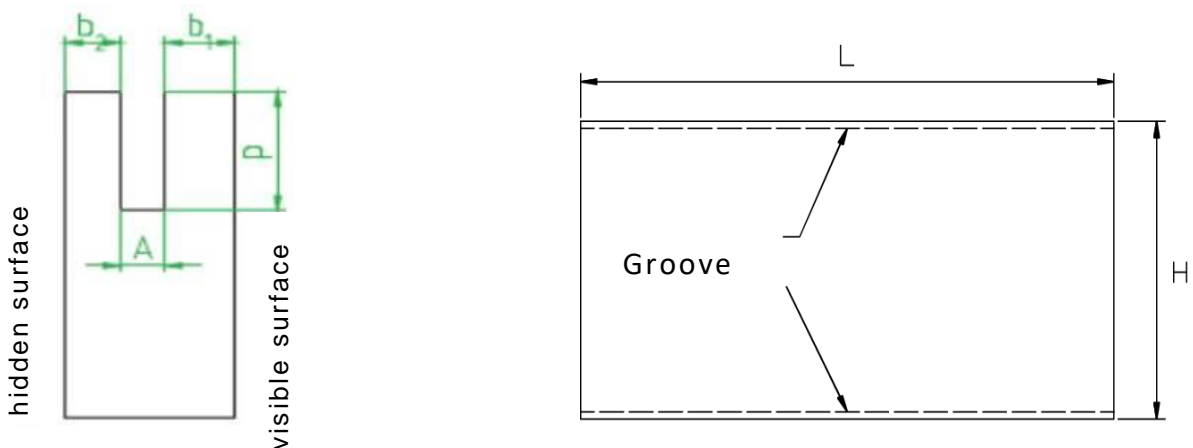


ANNEX A: TECHNICAL DESCRIPTION

A.1 Cladding elements: Agglomerated stone panels

| Characteristic | Value | | | Reference |
|--------------------------|---|-----------------------|-------------------------|-----------------|
| Trade name | GRACCO SURFACES ® | | | --- |
| Nominal length (mm) | 100 – 2.000 | | | --- |
| Nominal width (mm) | 100 – 1.200 | | | --- |
| Thickness (mm) | 20 - 30 | | | --- |
| Flatness tolerance | ≤ 0,3 | | | UNE-EN 15286 |
| Straight angles | L < 600 mm | ≥ 600 mm & ≤ 1.000 mm | > 1.000 mm & ≤ 3.500 mm | UNE-EN 15286 |
| | ± 0,9 | ± 1,2 | ± 3,0 | |
| Density | 2.301 kg/m ³ | | | UNE-EN 14617-1 |
| Bending strength | ≥ 9,3 MPa (See also section 3.7) | | | UNE-EN 14617-2 |
| Linear thermal expansion | ≤ 6,1 (µm/m°C) (See also section 3.14) | | | UNE-EN 14617-11 |
| Freeze-thaw resistance | 1,1 (See also section 3.15) | | | UNE-EN 14617-5 |
| Thermal shock resistance | 1,0 (See also section 3.16) | | | UNE-EN 14617-6 |
| Perforated cladding | Truncated conical perforations. External Ø=60 mm Internal Ø=50 mm | | | |

Table A.1. Cladding panel characteristics.



A: 3 mm
P: 12 mm
b1 = b2

Figure A1.1 GRACCO SURFACES ® cladding

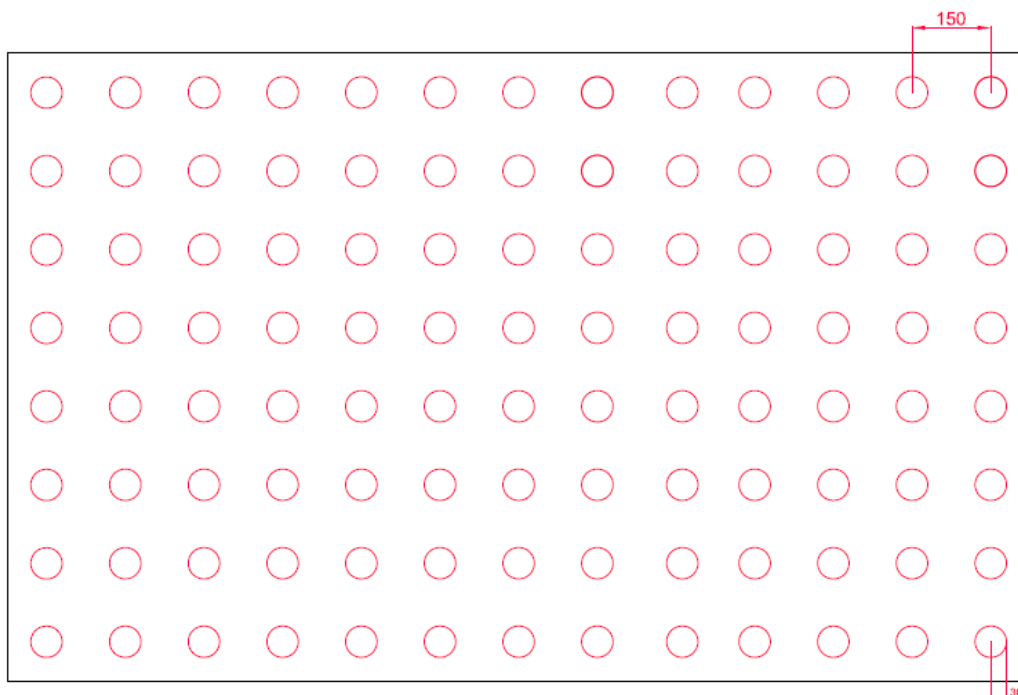


Figure A1.2 Perforated GRACCO SURFACES® cladding

A.2 Cladding fixings

Aluminium rail profiles

| Geometric characteristics | | | | | |
|--------------------------------------|-----------------|--------------------------|------------|------------|------------|
| Characteristics | | Value | | | |
| Trade name | | MFT-SPB 38 | MFT-SPM 38 | MFT-SPT 38 | MFT-SPJ 38 |
| Form | | Fig. A2.1 | Fig. A2.2 | Fig. A2.3 | Fig. A2.4 |
| Material | | Aluminium EN AW 6063 T66 | | | |
| Weight per linear metre (kg/m) | | 0,4 | 0,7 | 0,4 | 0,6 |
| Length as delivery (m) | | 6 | 6 | 6 | 6 |
| Cross section (mm ²) | | 153,2 | 275,2 | 126,6 | 224,4 |
| Moment of inertia (mm ⁴) | I _{xx} | 32.116 | 54.060 | 33.970 | 75.097 |
| | I _{yy} | 6.164 | 13.108 | 9.425 | 11.816 |
| Section modulus (mm ³) | W _{xx} | 1.377 | 2.303 | 1.200 | 2.047 |
| | W _{yy} | 391 | 627 | 523 | 643 |

Table A.2.1 Geometric characteristics of continuous aluminium alloy profiles.

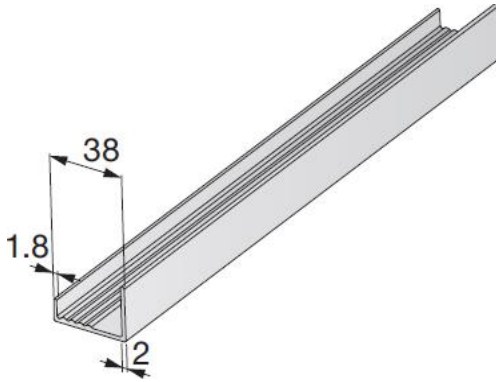
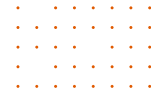


Figure A2.1 MFT-SPB 38 profile

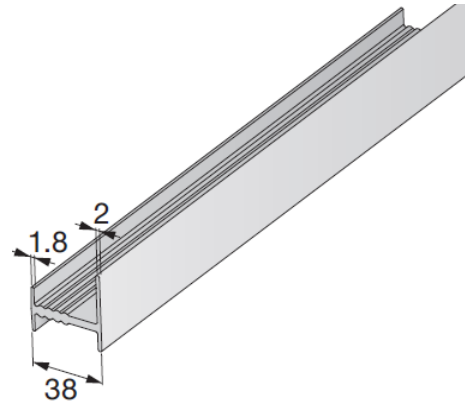


Figure A2.2 MFT-SPM 38 profile

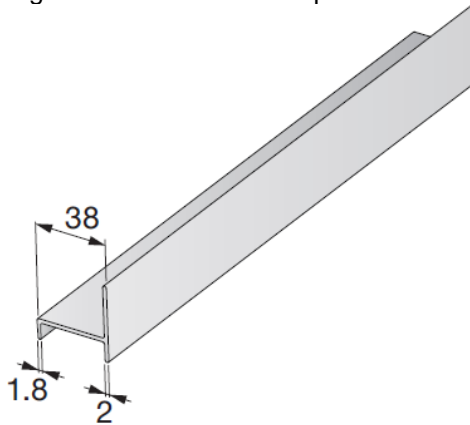


Figure A2.3 MFT-SPT 38 profile

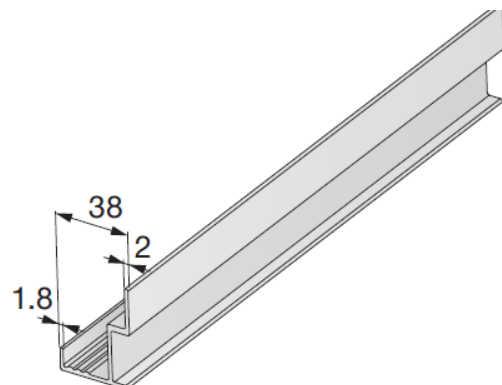


Figure A2.4 MFT-SPJ 38 profile

| Material properties | | |
|---|----------------------------|---------------------------------|
| Characteristic | Value | Reference |
| Type of material | AW 6063 T66 | UNE EN 1999-1-1 UNE EN 755-2 |
| Durability class | B | |
| Specific gravity | 2.700 (kg/m ³) | |
| Modulus of elasticity | 70.000 (MPa) | |
| Poisson coefficient | 0,30 | |
| Thermal expansion coefficient (T≤100°C) | 23,2 μm/m°C | |
| Elastic limit R _{p0,2} | ≥ 170 MPa | |
| Tensile strength R _m | ≥ 215 MPa | |

Table A.2.2 Material characteristics of continuous aluminium alloy profiles.



A.3 Subframe vertical profiles

| Material properties | | |
|---|----------------------------|---------------------------------|
| Characteristic | Value | Reference |
| Type of material | AW-6063T6 | UNE-EN 1999-1-1 UNE EN 755-2 |
| Durability class | B | |
| Specific gravity | 2.700 (kg/m ³) | |
| Modulus of elasticity | 70.000 (MPa) | |
| Poisson coefficient | 0,30 | |
| Thermal expansion coefficient (T≤100°C) | 23,2 μm/m°C | |
| Elongation 80 (%) | ≥ 8 | |
| Elongation 50 (%) | ≥ 6 | |
| Tensile strength | ≥130 (MPa) | |
| Geometric characteristics | | |
| Characteristic | Value | |
| | T60x100x1,8 | L60x40x1,8 |
| Trade name | MFT-T | MFT-L |
| Form | Figura A3.a | Figura A3.b |
| Weight per linear metre | 0,7 | 0,4 |
| Area | 258,5 | 157,8 |
| Standard length | 6 | 6 |
| I _{xx} | 81.425 | 72.397 |
| I _{yy} | 138.182 | 12.965 |
| W _{xx} | 1.680 | 1.741 |
| W _{yy} | 2764 | 601 |

Table A.3. Description of vertical profiles.

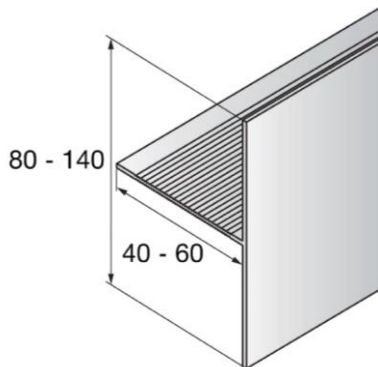


Figure A3.a MFT-T profile

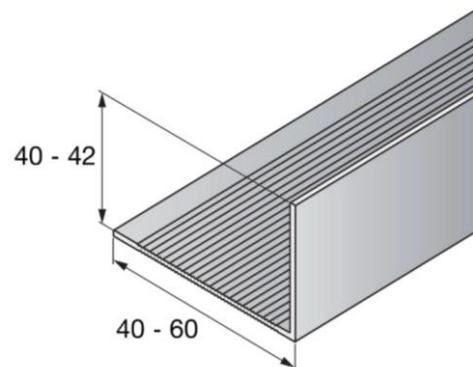


Figure A3.b MFT-SPJ 38 profile



A.4 Subframe brackets

| Material properties | | |
|---|-----------------------------------|----------------------------------|
| Characteristic | Value | Reference |
| Type of material | AW-6063T66 | UNE EN 1999-1-1 UNE EN 755-2 |
| Durability class | B | |
| Specific gravity | 2.700 (kg/m ³) | |
| Modulus of elasticity | 70.000 (MPa) | |
| Poisson coefficient | 0,30 | |
| Thermal expansion coefficient (T≤100°C) | 23,2 μm/m°C | |
| Elongation 80 (%) | ≥ 8 | |
| Elongation 50 (%) | ≥ 6 | |
| Tensile strength | ≥130 (MPa) | |
| Insulation material | Polypropylene | |
| Geometric properties | | |
| Characteristic | Value | |
| Trade name | MFT-MFIL | MFT-MFIM |
| Form | Figure A.4.a | Figure A.4.b |
| Dimensions (mm) ¹ | 166 x 68 x L 65 ≤ L ≤ 275 (mm) | 86 x 68 x L 65 ≤ L ≤ 275 (mm) |
| Vertical load | Fy (kN) | 1,84 – 15,97 |
| Horizontal load | Fx (kN) | 4,17 |
| | | 0,61 – 5,28 |
| | | 2,26 |

Table A.4. Description of brackets.

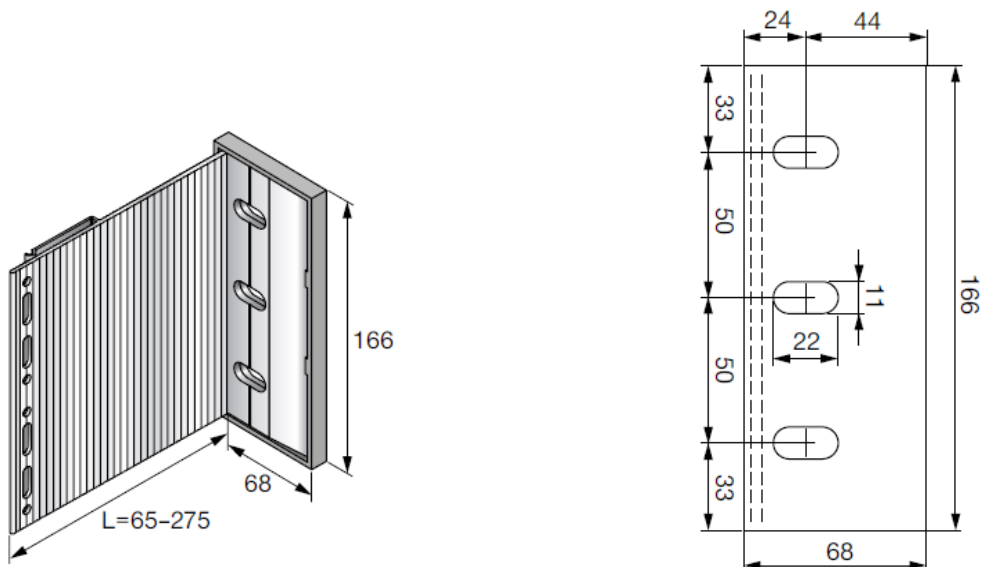


Figure A4.a MFT-MFIL bracket

¹ Dimensions (H x B x L) where H: height; B: width; L: span length.

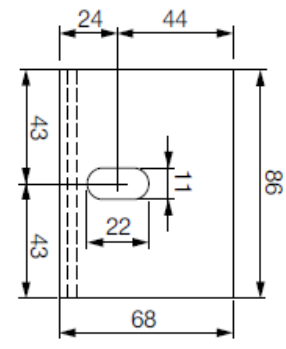
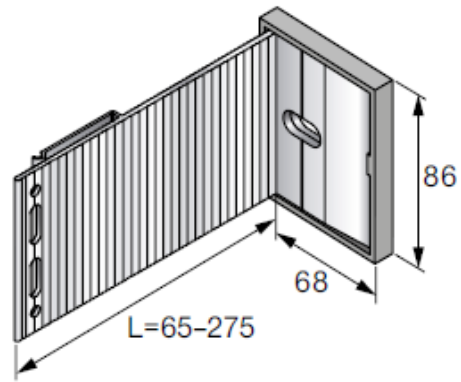
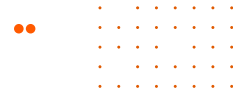


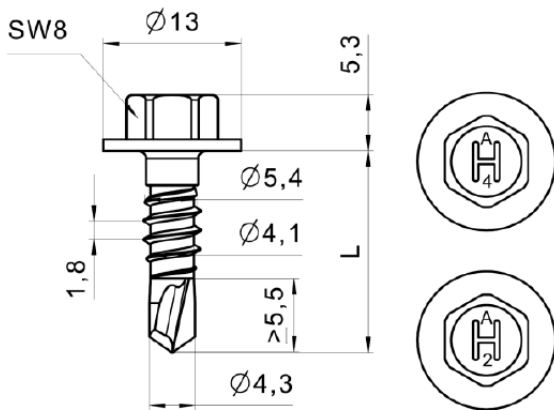
Figure A.4.b. MFT-MFIM bracket



A.5 Fixings between brackets and vertical profiles

| Characteristic | Value | Reference |
|----------------|---------------------|-----------|
| Trade name | S-AD 01 SS 5,5xL | --- |
| Form | Figure A.5.a | --- |
| Generic type | Self-drilling screw | --- |
| Diameter | Ø5,4 mm | --- |
| Screw head | Ø13mm | --- |
| Material | A2 Stainless steel | EN 3506 |

Table A.5. Description of fixings between brackets and vertical profiles.



Hilti S-AD 01 S 5,5xL * (Type H)
Hilti S-AD 01 SS 5,5xL ** (Type H)

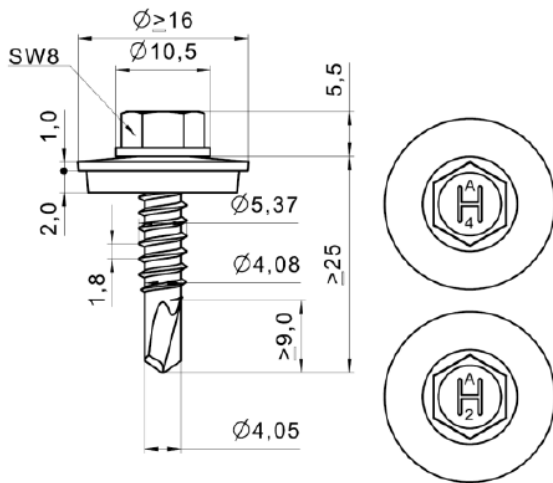
Figure A.5.a. Self-drilling screw S-AD 01 SS 5,5xL



A.6 Fixings between horizontal aluminium rail profiles and vertical profiles

| Characteristic | Value | Reference |
|----------------|---------------------|-----------|
| Trade name | S-MD 51 LSS 5,5 x L | --- |
| Form | Figure A.6.a | --- |
| Generic type | Self-drilling screw | --- |
| Diameter | Ø5,4 mm | --- |
| Screw head | Ø13mm | --- |
| Material | Stainless steel | EN 3506 |

Table A.5. Description of the fixings between the horizontal aluminium rail profiles and the vertical profiles.



Hilti S-MD 51 LS 5,5xL * (Type B2)
Hilti S-MD 51 LSS 5,5xL ** (Type B2)

Figure A.6.a. Self-drilling screw S-MD 51 LSS 5,5 x L



ANNEX B: CONSTRUCTION DETAILS

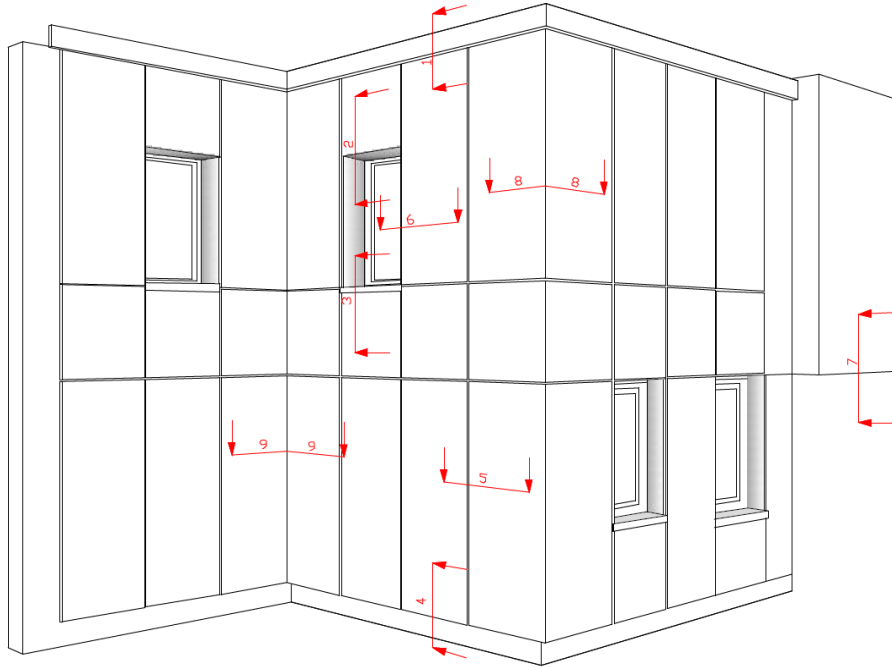


Figure B.1. Construction detail.

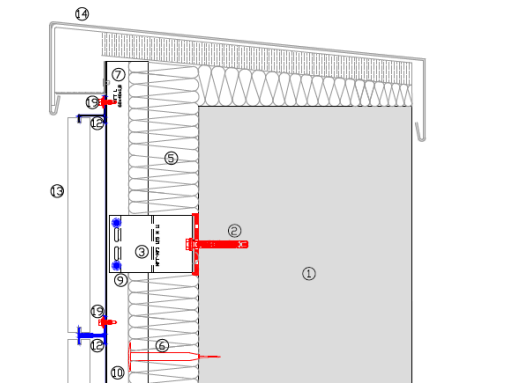


Figure B.2. Top detail (Roof edge)

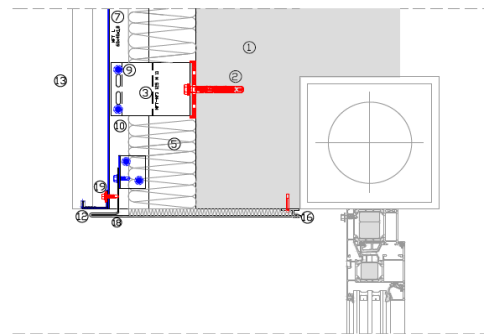


Figure B.2. Windows detail (Lintel)

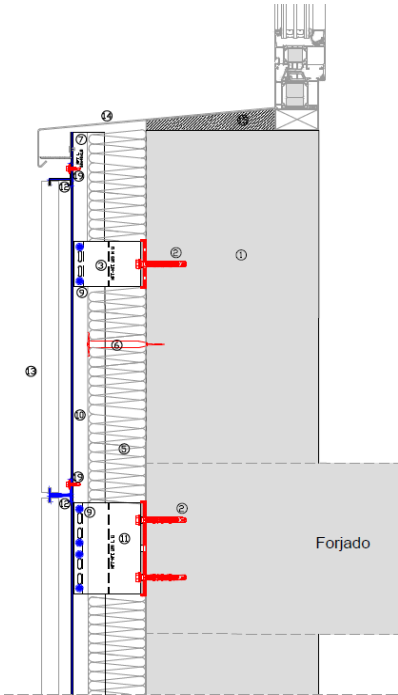


Figure B.3. Windows detail (Sill)

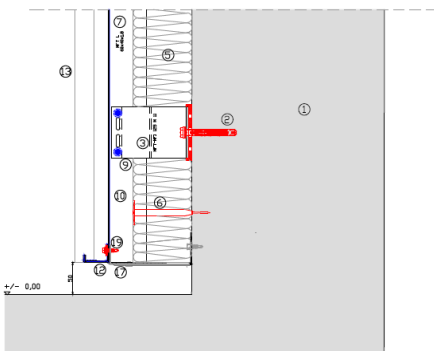


Figure B.4. bottom detail (Base edge)

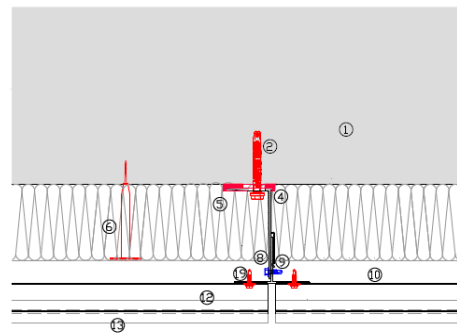


Figure B.5. Horizontal detail

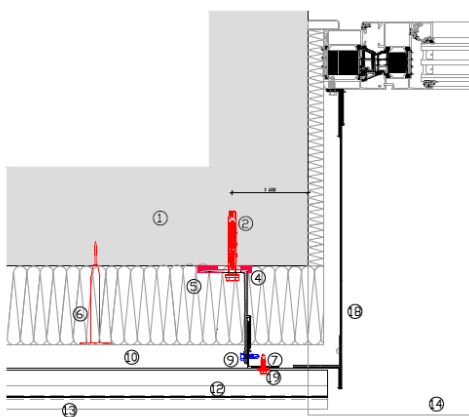


Figure B.6. Horizontal corner detail

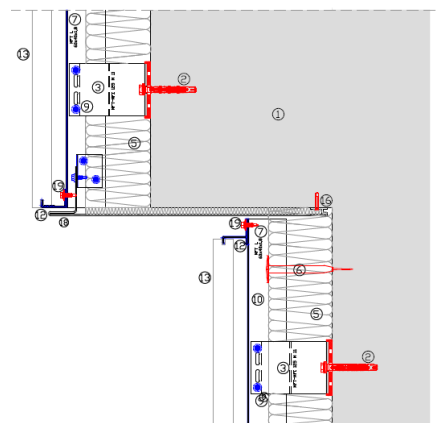


Figure B.7. Finishing detail (Flight)

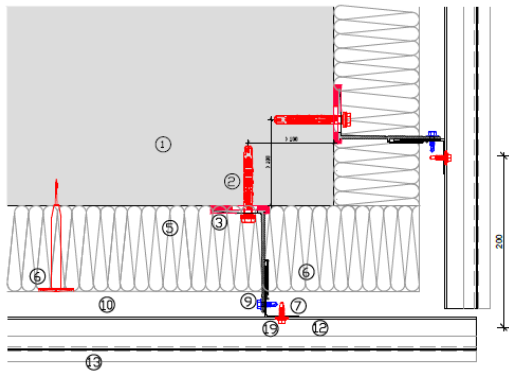


Figure B.8. Horizontal detail outside corner

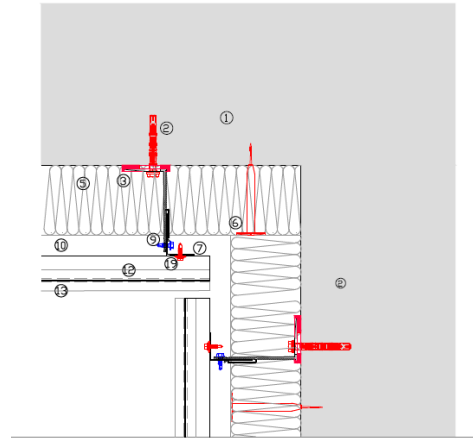
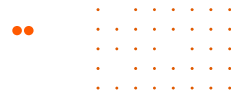


Figure B.9. Horizontal detail inside corner

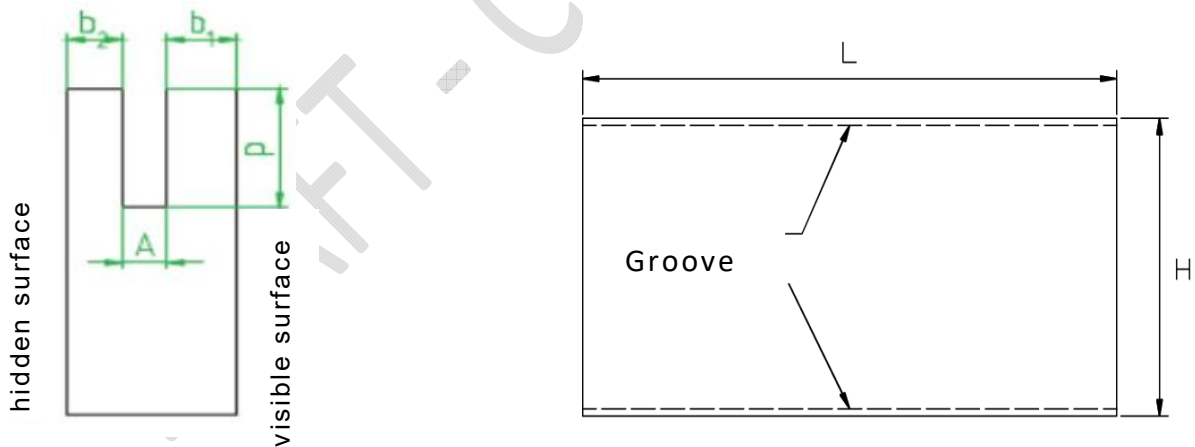


ANNEX A: TECHNICAL DESCRIPTION

A.1 Cladding elements: Agglomerated stone panels

| Characteristic | Value | | | Reference |
|--------------------------|---|-----------------------|-------------------------|-----------------|
| Trade name | GRACCO SURFACES ® | | | --- |
| Nominal length (mm) | 100 – 2.000 | | | --- |
| Nominal width (mm) | 100 – 1.200 | | | --- |
| Thickness (mm) | 20 - 30 | | | --- |
| Flatness tolerance | ≤ 0,3 | | | UNE-EN 15286 |
| Straight angles | L < 600 mm | ≥ 600 mm & ≤ 1.000 mm | > 1.000 mm & ≤ 3.500 mm | UNE-EN 15286 |
| | ± 0,9 | ± 1,2 | ± 3,0 | |
| Density | 2.301 kg/m ³ | | | UNE-EN 14617-1 |
| Bending strength | ≥ 9,3 MPa (See also section 3.7) | | | UNE-EN 14617-2 |
| Linear thermal expansion | ≤ 6,1 (µm/m°C) (See also section 3.14) | | | UNE-EN 14617-11 |
| Freeze-thaw resistance | 1,1 (See also section 3.15) | | | UNE-EN 14617-5 |
| Thermal shock resistance | 1,0 (See also section 3.16) | | | UNE-EN 14617-6 |
| Perforated cladding | Truncated conical perforations. External Ø=60 mm Internal Ø=50 mm | | | |

Table A.1. Cladding panel characteristics.



A: 3 mm
P: 12 mm
 $b_1 = b_2$

Figure A1.1 GRACCO SURFACES ® cladding