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# European Technical Assessment

# ETA 20/1265 of 22/07/2021

English translation prepared by IETcc. Original version in Spanish language

## General Part

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|---|---|
| **Technical Assessment Body issuing the European Technical Assessment:** | Instituto de Ciencias de la Construcción Eduardo Torroja (IETcc) |
| **Trade name of the construction product** | TRESPA® METEON® and TRESPA® METEON® FR |
| **Product family to which the construction product belongs** | Kits for external wall claddings mechanically fixed |
| **Manufacturer** | TRESPA INTERNATIONAL B.V.<br>Wetering, 20. P.O. Box 110<br>6000 AC Weert - Nederland<br>website: www.trespa.info, www.trespa.com |
| **Manufacturing plant(s)** | TRESPA INTERNATIONAL B.V.<br>Wetering, 20. P.O. Box 110<br>6000 AC Weert - Nederland |
| **This European Technical Assessment contains** | 24 pages including 4 Annexes, which form an integral part of this assessment. Annex D contains confidential information and is not included in the ETA when is publicly available |
| **This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of** | EAD 090062-00-0404. Ed. July 2018.<br>Kits for external wall claddings mechanically fixed |

# SPECIFIC PART

## 1. Technical description of the product

The assessed kits for ventilated external wall claddings mechanically fixed are:

- TS150 – visible fixing with screws on timber subframe (family A);
- TS700 – visible fixing with rivets on aluminium subframe (family A);
- TS200 – invisible fixing with brackets on rails on aluminium subframe (family B);
- TS300 – invisible fixing with horizontal rail and profiled edges on aluminium subframe (family C);
- TS650 – invisible fixing with clips and profiled edges on wood subframe (family C);
- TS600 – invisible fixing with clips and profiled edges on aluminium subframe (family C).

Families referred above are described in table 1.1 of EAD 090062-00-0404: *Kit for external wall claddings mechanically fixed*, edition July 2018 (hereinafter EAD 090062-00-0404).
Kits components are defined in table 1; they are factory produced by the ETA holder or a supplier.

**TABLE 1 – DEFINITION OF THE KIT COMPONENTS**

| **Components** | | **Material** | | | **Sizes** [mm] | |
|---|---|---|---|---|---|---|
| Cladding element | HPL panels for exterior TRESPA® METEON® (STD) and TRESPA® METEON® Fire Retardant (FR)(1) produced by TRESPA INTERNATIONAL, B.V., respectly EDS(2) and EDF(3) quality and CE marking(4) according to Annex ZA of the EN 438-7:2005(5) | TS150 | High-pressure decorative laminates for exterior application | | 3050x1530 (t=6,8,10 and 13)<br>2550x1860 (t=6,8,10 and 13) | |
| | | TS700 | | | 3050x1530 (t=6,8,10 and 13)<br>or diagonal 3412 | |
| | | TS200 | | | Maximum length 3650<br>Maximum height 3050<br>(t=8,10 and 13) | |
| | | TS300 | | | Maximum length 3650<br>Maximum height 600 (t=8)<br>Maximum height 750 (t=10)<br>Maximum height 900 (t=13) | |
| | | TS600<br>TS650 | | | Maximum length 3650<br>Maximum height 200-350 (t=8) | |
| Cladding fixings (6) | Elements used to secure the cladding elements to the subframe(7) | TS150 | Timber subfr. | Stainless steel A2 self-drilling screw | TW-S-D12 Ø 4.8 | L=38 (pnl. th= 6-8-10) |
| | | | | | | L=44 (pnl. th= 13) |
| | | TS700 | Alum. subfr. | Aluminium AlMg5/ Stainless steel A2 rivet | AP 16 Ø 5 | L=16 (pnl. th= 6-8) |
| | | | | | | L=18 (pnl. th= 10) |
| | | | | | | L=21 (pnl. th= 13) |
| | | TS200 | Alum. subfr. | Stainless steel A2 self-drilling screws | EJOT PT-S-60 | L=9.5 (pnl. th= 8) |
| | | | | | | L=11.5 (pnl. th= 10) |
| | | | | | | L=14.5 (pnl. th= 13) |
| | | | | Extr. alum. AW 6060 T5 TS 200 Hanging bracket | 70 x 30 x 50 (th=5) | |
| | | | | Extr. alum. AW 6060 T5 or 6063 T66 TS 200 Horiz. rail | 60 x 31.5 (th=2-3) | |
| | | | | Stainless steel A2 adjustment screw | TH13 Ø 8 L=25 | |
| | | | | Stainless steel A2 self-drilling screws (for fix point) | PERFIX 3 TH8 Ø 5.5 L=25 | |
| | | TS300 | Alum. subfr. | Extr. alum. AW 6060 T6 TS 302 Intermed./crown rail | 37.8 x 45.3 (th=2) | |
| | | | | Extr. alum. AW 6060 T6 TS 301 base rail | 37.5 x 50 (th=2) | |
| | | TS650/ TS600 | Timber/ Alum. subfr. | Anti-corrosion cold-forming hardened steel clamp | 30 x 25 (th= 0.8) | |
| | | TS650 | Timber subfr. | Fix point - Stainless steel A2 self-drilling screw | TW-S-D12 Ø 4.8 L=36 | |
| | | TS600 | Alum. subfr | Fix point - Aluminium AlMg5/ Stainless steel A2 rivet | AP 16 Ø 5 L=18 | |

(1) Standards manufacturing formats, dimensional features, physical – mechanical and weather resistance properties in Annex A.
(2) Panels for exterior use, severe conditions, standard.
(3) Panels for exterior use, severe conditions, fire-retardant.
(4) EDS panels – Declaration of performance 002-4 (OCTOBER 2020); EDF panels – Declaration of performance 001-4 (OCTOBER 2020); Certificate of constancy of performance 0958-CPR-1001-1.
(5) EN 438-7:2005 "High-pressure decorative laminates (HPL) - Sheets based on thermosetting resins (Usually called Laminates) - Part 7: Compact laminate and HPL composite panels for internal and external wall and ceiling finishes."
(6) Not manufactured by TRESPA INTERNATIONAL, B.V.
(7) Geometric and mechanical features in Annex B and figures 2, 5, 8, 12 and 16.

| | | | | | | |
|---|---|---|---|---|---|---|
| Subframe [8] | Vertical elements [9] used to fasten on the cladding elements by cladding fixings | TS150 TS650 | Timber subfr. | Wood[10] batten | Between 2 panels | 34[11]/75[12] x 95 |
| | | | | | Intermediate support | 34[13]/75[14] x 45 |
| | | TS700 TS200 TS300 TS600 | Alum. subfr. | Extruded Aluminium AW 6060 T5[15] profile | Between 2 panels | "T" 52 x 110 (t= 2) |
| | | | | | Intermediate support | "L" 50 x 42 (t= 2) |
| | Metallic elements (wall brackets)[16] used as load transmission between the kit for external wall claddings and the substrate wall | TS150 TS650 [17] | Timber subfr. | Bended Galvanized steel S220GD – Z450 brackets | 100 x 50 x 60 (t= 2.5)<br>140 x 50 x 60 (t= 2.5)<br>180 x 50 x 60 (t= 2.5) | |
| | | TS700 TS200 TS300 TS600 | Alum. subfr | Extr. alum. AW 6060 T5 or 6063 T66 Supporting bracket | 150 x 40 x 40 (t= 3)<br>150 x 40 x 80 (t= 3)<br>150 x 40 x 120 (t=3) | |
| | | | | Extr. alum AW 6060 T5 or 6063 T66 Retention bracket | 80 x 40 x 40 (t= 3)<br>80 x 40 x 80 (t= 3)<br>80 x 40 x 120 (t= 3) | |
| Subframe fixings [8] | Screws between brackets and vertical elements and horizontal profiles and vertical element[18] | TS150 TS650 | Timber subfr | Hot galvanized hardened steel self-drilling screw | HEX 13 SH Ø 7 L=50 | |
| | | TS700 TS200 TS300 TS600 | Alum. subfr | Stainless steel A2 self-drilling screw | PERFIX 3 TH8 Ø 5.5 L=25 | |
| | Screws between clamps and vertical elements[19] | TS650/ TS600 | Timber/ Alum. subfr. | Stainless steel A2 self-drilling screw | SW3-S-D11/R Ø 4.8 L=38 | |
| Ancillary components [8] | Tape used to form the joints | TS150 TS650 | Timber subfr. | Ethylene propylene diene monomer (*EPDM*) | W=60-100 | |
| Auxiliary components [8] | Anchorage to substrate[20] | - | | | - | |

When referring to TRESPA® METEON® in this document it should be understood that both, Standard (STD) and Fire Retardant (FR) grade are meant.

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

### 2.1 Intended use

TRESPA® METEON® kits are intended to be used for ventilated external wall claddings which can be fixed to the external wall of new or existing buildings.
The substrate walls are made of masonry (bricks or blocks), concrete (cast on site or as prefabricated panels), wood based panels (particle boards) and timber or metal frame. Insulation material is defined in accordance with an EN standard or an ETA and is not manufactured by TRESPA INTERNATIONAL, B.V.
Kit for ventilated external wall claddings is non-load-bearing construction system. It does not contribute to the stability of the wall on which it is installed, neither to ensure the air tightness of the building structure but it can contribute to durability of the works by providing enhanced protection from the effect of weathering.

### 2.2 Relevant general conditions for the use of the kit

The provisions made in this European Technical Assessment, according to the EAD, are based on an assumed working life of 25 years as minimum, provided that the conditions lay down for the installation, packaging, transport and storage as well as appropriate use, maintenance and repair are met.
The indications given on the working life cannot be interpreted as a guarantee given by the manufacturer, but are to be regarded only as a means for choosing the right product in relation to the expected economically reasonable working life of the works[21].

### 2.3 Design of kit

The design of the external wall cladding system for ventilated façade using TRESPA® METEON® kits should take into account:

(8) Not manufactured by TRESPA INTERNATIONAL, B.V.
(9) Geometric and mechanical features in Annex B and figure 22.
(10) Technical specifications in Annex B.
(11) Installation with horizontal wood battens.
(12) Installation with bended galvanized steel brackets.
(13) Installation with horizontal wood battens.
(14) Installation with bended galvanized steel brackets.
(15) Physical and mechanical properties in Annex B.
(16) Geometric and mechanical features in Annex B and figures 20 and 21.
(17) In TS150 and TS650, vertical batten can be fixed to substrate also using horizontal wood battens, with a section of L x 45 mm (L depends on the insulation thickness).
(18) Geometric and mechanical features in Annex B.
(19) Geometric and mechanical features in Annex B and figure 17.
(20) See Annex C.
(21) In addition, TRESPA INTERNATIONAL B.V. declares that, according to EPD-TRE-20180143-IBB1-EN issued 04-04-2019, the reference service life for TRESPA® METEON® panels is set in 50 years, provided that they are subject to appropriate installation, use and maintenance under normal conditions.

- The substrate material to define the suitable anchorages, assuming that the substrate meets the mechanical requirements (resistance to static and dynamic actions) and ensures airtightness, watertightness and water vapour permeability.
- The mechanical characteristic values of the kit components (e.g. cladding elements, cladding fixings and subframe) and the cladding or external wall elements in order to resist the actions (dead loads, wind loads, etc.) applying on the specific work. National safety factor must be used.
- The possible movements of the substrate and the position of the building expansion joints.
- The dilatation of the kit components and of the panels.
- The category of corrosivity of the atmosphere of the works [(22)].
- Because joints are not watertight, materials with low water absorption must be used as first layer behind ventilated air space.
- Insulation layer, usually fixed on the external wall should be defined in accordance with a harmonized standard or a European technical assessment.
- The construction of façade specific parts (e.g. base, top, corners, windows etc.)
- If the entire building must comply with the specific building regulations, particularly concerning fire and wind-load resistances, of the Member State where the work is to be built.

## 2.4 Installation of kit in works

Installation has to be carried out according to the ETA holder's specifications and using the specific kit components, manufactured by the ETA holder or by suppliers recognized by the ETA holder.
Installation should be carried out by professional, trained staff and under the supervision of the technical responsible of the site.

## 2.5 Use, maintenance and repair of the works

Maintenance of the assembled systems or kit components includes inspections on site, taking into account the following aspects:

- Regarding the cladding elements appearance of any damage such as cracking or detachment 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.

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

The assessment of TRESPA® METEON® kits according to the Basic Work Requirements (BWR) was carried out in compliance with the EAD 090062-00-0404. The characteristics of the components shall correspond to the respective values laid down in the technical documentation of this ETA, checked by IETcc.

In table 2 a summary of TRESPA® METEON® kits performance.

**TABLE 2 – SUMMARY OF TRESPA® METEON® KITS PERFORMANCE**

| Basic Works Requirement | Nº | Essential characteristic | ETA section | Performance |
|---|---|---|---|---|
| BWR 2 Safety in case of fire | 1 | Reaction to fire | 3.1 | EDS D-s2, d0 |
| | | | | EDF B-s1, d0 (t ≥ 8 mm) |
| | | | | EDF B-s2, d0 (t = 6 mm) |
| | 2 | Façade fire performance | -- | Not assessed |
| | 3 | Propensity to undergo continuous smouldering | -- | Not assessed |
| BWR 3 Hygiene, health and the environment | 4 | Watertightness of joints (protection against driving rain) | 3.2 | Not watertight (open joints) |
| | 5 | Water absorption | -- | Not relevant (use in ventilated façades) |
| | 6 | Water vapour permeability | -- | Not relevant (use in ventilated façades) |
| | 7 | Drainability | 3.3 | See § 3.3 and figures 23 to 27. |
| | 8 | Content and/or release of dangerous substances | -- | Not assessed |

(22) E.g. see table 1 of Standard EN ISO 12944-2: 1998. Paints and varnishes. Corrosion protection of steel structures by protective paint systems. Part 2: Classification of environments.

| | | | | | | |
|---|---|---|---|---|---|---|
| BWR 4<br>Safety and accessibility in use | 9 | Wind load resistance | | 3.4 | TS150 | 3000 Pa |
| | | | | | TS700 | 3200 Pa |
| | | | | | TS200 | 2600 Pa |
| | | | | | TS300 | 4000 Pa |
| | | | | | TS600/650 | Not assessed |
| | 10 | Resistance to horizontal point loads | | -- | Not assessed | |
| | 11 | Impact resistance | | 3.5 | TS150 | Category I |
| | | | | | TS700 | Category I |
| | | | | | TS200 | Category I |
| | | | | | TS300 | Category I |
| | | | | | TS600/650 | Category I |
| | 12 | Mechanical resistance of cladding elements | Bending strength of cladding element | 3.6 | See table 5 | |
| | 13 | | Resistance of grooved cladding element | 3.7 | TS300<br>TS600/650 | See table 6 |
| | 15 | Mechanical resistance of connection between the cladding element and the cladding fixing | Pull-through resistance | 3.8 | TS150 | See table 7 |
| | | | | | TS700 | See table 8 |
| | 16 | | Pull-through resistance under shear loads | 3.9 | TS150 | See table 9 |
| | | | | | TS700 | See table 10 |
| | 17 | | Axial tension resistance | 3.10 | TS200 | See table 11 |
| | 18 | | Shear load resistance | 3.11 | TS200 | See table 12 |
| | 19 | | Combined tension and shear load resistance | 3.12 | TS200 | See table 13 |
| | 21 | Mechanical resistance of cladding fixing | Resistance to vertical load | -- | TS300<br>TS600/650 | Not assessed |
| | 22 | | Pull-through resistance of fixings from profile | 3.13 | TS300 | See table 14 |
| | 23 | | Resistance of metal clip | -- | | Not assessed |
| | 24 | Resistance of profile | | 3.14 | See § 3.14 | |
| | 25 | Subframe fixings | Tension/pull out resistance | -- | Not assessed | |
| | 26 | | Shear load resistance | -- | Not assessed | |
| | 27 | Brackets resistance (horizontal and vertical) | | 3.15 | See tables 15 and 16 | |
| BWR 5<br>Protection against noise | 28 | Airborne sound insulation | | -- | Not assessed | |
| BWR 6<br>Energy economy and heat retention | 29 | Thermal resistance | | -- | Thermal insulation is not a kit component | |
| Durability | 30 | Hygrothermal behaviour | | 3.16 | TS200 | None of the defects specified in EAD were observed |
| | 31 | Behaviour after pulsating load | | 3.17 | TS200 | See table 17 |
| | 32 | Freeze-thaw resistance of cladding element | | 3.18 | TS200 | See table 18 |
| | 33 | Behaviour after immersion in water of cladding element | | -- | TRESPA® METEON® cladding kits are not sensitive to water penetration | |
| | 34 | Dimensional stability | | 3.19 | See § 3.19 | |
| | 35 | Chemical and biological resistance of the cladding elements | | -- | Not assessed | |
| | 36 | UV radiation resistance of the cladding elements | | 3.20 | See § 3.20 | |
| | 37 | Corrosion of metal components | | 3.21 | See § 3.21 | |

## 3.1 Reaction to fire – BWR 2

The Euro class of TRESPA® METEON® panels according to standard EN 13501-1: 2007 + A1:2010(23) is:

EDS D-s2, d0
EDF B-s1, d0 (thickness≥ 8 mm)
EDF B-s2, d0 (thickness= 6 mm)

This classification is valid for the TRESPA® METEON® STD and FR. Mentioned products are high pressure compact laminates available in thicknesses from 6 mm to 13 mm. The products are produced and tested in accordance with EN 438-7:2005. The reaction to fire declaration is valid as long as the

(23) EN 13501-1:2007 + A1:2010 Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests

insulation layer placed in the ventilated air space is made of a non-combustible material (e.g. mineral wool) or there is no insulation in the cavity and the substrate are wood based substrates or are substrates of Euro classes A1 and A2-s1,d0.

In other cases, the class of reaction to fire is NPA (No performance assessed).

A European reference fire scenario has not been laid down for facades. In some Member States, the classification of external wall cladding kits according to Standard EN 13501-1 might not be sufficient for the use in facades. An additional assessment of the system according to the national provision (e.g. based on 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) – BWR 3

Joints between the cladding elements in the external wall claddings for ventilated façades are open, therefore TRESPA® METEON® kits are not watertight(24).

## 3.3 Drainability – BWR 3

On the basis of the construction details (see figures 23 to 27), 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 kit without accumulation of water, moisture damage or leakage into the substrate.

## 3.4 Wind load resistance – BWR 4

Wind load resistance has been tested according to § 2.2.9 and the method specified in Annex E of EAD. The kit behaviour exposed to wind pressure is most favourable than when exposed to wind suction. Therefore, wind pressure tests have been avoided and wind pressure resistance of kit can be considered as equal to wind suction resistance.
The worst case has been tested: minimum thickness admitted for the kit, maximum span between cladding fixings and subframe components.

Test results for the tested specimen are indicated in table 3.

**TABLE 3 – WIND SUCTION RESISTANCE TEST RESULTS**

| TEST SPECIMEN | | MAXIMUM LOAD Q (Pa) | TYPE OF FAILURE | DISPLACEMENT UNDER MAXIMUM LOAD (mm) |
|---|---|---|---|---|
| TRESPA® METEON® | TS150 – 6mm | 3000(25) | Breakage of the cladding element | 7.32 |
| | TS700 – 6mm | 3200(26) | No failure | 11.86 |
| | TS200 – 8mm | 2600(27) | Breakage of the cladding element | 11.11 |
| | TS300 – 8mm | 4000(28) | No failure | 14.36 |

## 3.5 Impact resistance – BWR 4

Impact resistance has been assessed according to § 2.2.11 and the method specified in Annex G of EAD.

According with the test results the use category (29) of kits is indicated in table 4.

(24) Even if the joint are open the ventilated façade does not decrease the protection against rain, because the ventilation gap functions as a compensation room, which ensures that, in a worst-case scenario, driving rain is drained over the back of the cladding, protecting the thermal insulation from wetness. So any moisture that might enter the ventilated space between insulating material and cladding can easily be removed.
(25) Achieving the 3200 Pa, cladding element broke.
(26) The test had to be stopped at 3200 Pa because the equipment did not achieve stabilization. No failure occurs.
(27) Achieving the 2800 Pa, cladding element broke.
(28) Maximum load allowed by the test equipment. No failure occurs.
(29) The definition of use categories is given in table G.2, annex G of EAD. These categories correspond to the degrees of exposure in use.

Table G.2 – Impact use categories

| Category | Use |
|---|---|
| I | A zone readily accessible at ground level to the public and vulnerable to hard body impacts but not subjected to abnormally rough use (e.g.: façade bases in buildings sited in public locations, such as squares, schoolyards or parks. Cleaning gondolas may be used on the façade). |
| II | 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 (e.g.: Façade bases in buildings not sited in public locations – e.g. squares, schoolyards, parks. – or upper façade levels in buildings sited in public locations that occasionally can be hit by a thrown object – e.g. ball, stone, etc.- Cleaning gondola may be used on the façade). |
| III | A zone not likely to be damaged by normal impacts caused by people or by thrown or kicked objects (e.g.: Upper façade levels in buildings – not including base – not sited in public locations, that occasionally can be hit by a thrown object – e.g. ball, stone, etc.- Cleaning gondola may be used on the façade). |
| IV | A zone out of reach from ground level (e.g. High façade levels that cannot be hit by a thrown object. Cleaning gondola may be used on the façade). |

| TABLE 4: USE CATEGORY OF KITS | | |
|---|---|---|
| **FIXING SYSTEM** | | **USE CATEGORY** |
| TRESPA® METEON® | TS150 | Category I |
| | TS700 | Category I |
| | TS200 | Category I |
| | TS300 | Category I |
| | TS600/650 | Category I |

## 3.6 Bending strength of cladding element – BWR 4

Bending strength of the cladding element has been tested according to EN ISO 178: 2019.

Mean and characteristic values of test are indicated in table 5.

| TABLE 5 – BENDING STRENGHT OF CLADDING ELEMENT MEAN AND CHARACTERISTIC VALUES | | | | |
|---|---|---|---|---|
| **PANEL THICKNESS (mm)** | **FAILURE LOAD (MPa)** | | **FLEXURAL MODULUS (MPa)** | |
| | **Mean value** | **Characteristic value** | **Mean value** | **Characteristic value** |
| 6 - STD | 163 | 140 | 10422 | 9799 |
| 13 - STD | 144 | 136 | 10220 | 9901 |
| 6 - FR | 171 | 153 | 10508 | 9697 |
| 13 - FR | 177 | 154 | 11707 | 10205 |

TRESPA® METEON® panels satisfy the requirements defined in table 3 § 5.4.1 of EN 438-6: 2016(30).

## 3.7 Resistance of grooved cladding element – BWR 4

Resistance of grooved cladding element for TRESPA® METEON® - TS300 / TS650 kits (Family C) has been assessed according to § 2.2.12.2 and the method specified in Annex N of EAD.

Mean and characteristic values of test are indicated in table 6.

| TABLE 6: RESISTANCE OF GROOVED CLADDING ELEMENT TEST RESULT | | | |
|---|---|---|---|
| **PANEL THICKNESS (mm)** | **FAILURE LOAD (N)** | | **FAILURE MODE** |
| | **$F_m$** | **$F_{u,5}$** | |
| 8 (mechanically weakest case) | 1030 | 528.21 | Cladding element |

## 3.8 Pull-through resistance – BWR 4

Pull-through resistance for TRESPA® METEON® - TS150 / TS700 kits (Family A) has been assessed according to § 2.2.12.4 and the method specified in section I.1.1 of Annex I of EAD.

TS150 kit – Mean and characteristic values are indicated in table 7.

| TABLE 7 - PULL-THROUGH RESISTANCE OF TS150 (SCREW) | | | | | |
|---|---|---|---|---|---|
| **PANEL THICKNESS (mm)** | **SUPPORT Ø (mm)** | **FIXING POSITION** | **FAILURE LOAD (N)** | | **FAILURE MODE** |
| | | | **$F_m$** | **$F_{u,5}$** | |
| 6 | 180 | Centre | 1431 | 632 | Cladding element |
| | | Lateral | 785 | 384 | |
| | | Corner | 293 | 120 | |
| | 270 | Centre | 1490 | 1123 | |
| | | Lateral | 657 | 310 | |
| | | Corner | 299 | 195 | |
| | 350 | Centre | 1299 | 1091 | |
| | | Lateral | 620 | 415 | |
| | | Corner | 243 | 171 | |
| 8 | 180 | Centre | 2517 | 873 | Cladding element |
| | | Lateral | 1548 | 1294 | |
| | | Corner | 537 | 334 | |
| | 270 | Centre | 2741 | 2160 | |
| | | Lateral | 1573 | 1195 | |
| | | Corner | 584 | 351 | |
| | 350 | Centre | 2515 | 1736 | |
| | | Lateral | 1234 | 910 | |
| | | Corner | 346 | 199 | |
| 10 | 180 | Centre | 5280 | 3770 | Cladding element |
| | | Lateral | 3026 | 2251 | |
| | | Corner | 592 | 346 | |
| | 270 | Centre | 3825 | 2153 | |
| | | Lateral | 2412 | 1148 | |
| | | Corner | 611 | 456 | |
| | 350 | Centre | 3913 | 2571 | |
| | | Lateral | 2123 | 1836 | |
| | | Corner | 543 | 391 | |

(30) EN 438-6: 2016 “High-pressure decorative laminates (HPL) - Sheets based on thermosetting resins (Usually called Laminates) - Part 6: Classification and specifications for Exterior-grade compact laminates of thickness 2 mm and greater”.

TS700 kit – Mean and characteristic values are indicated in table 8.

| TABLE 8- PULL-THROUGH RESISTANCE OF TS700 (RIVET) | | | | | |
|---|---|---|---|---|---|
| PANEL THICKNESS (mm) | SUPPORT Ø (mm) | FIXING POSITION | FAILURE LOAD (N) | | FAILURE MODE |
| | | | $F_m$ | $F_{u,5}$ | |
| 6 | 180 | Centre | 2018 | 1781 | Cladding element |
| | | Lateral | 1094 | 524 | |
| | | Corner | 636 | 475 | |
| | 270 | Centre | 1443 | 682 | |
| | | Lateral | 1029 | 861 | |
| | | Corner | 361 | 299 | |
| | 350 | Centre | 1568 | 1161 | |
| | | Lateral | 833 | 631 | |
| | | Corner | 297 | 218 | |
| 8 | 180 | Centre | 3022 | 2561 | Cladding element |
| | | Lateral | 2214 | 1461 | |
| | | Corner | 848 | 349 | |
| | 270 | Centre | 2857 | 2286 | Rivet |
| | | Lateral | 1573 | 1233 | Cladding element |
| | | Corner | 507 | 303 | |
| | 350 | Centre | 2678 | 2346 | Rivet/Cl. element |
| | | Lateral | 1169 | 759 | Cladding element |
| | | Corner | 390 | 271 | |
| 10 | 180 | Centre | 3024 | 2710 | Rivet |
| | | Lateral | 2843 | 2166 | |
| | | Corner | 969 | 604 | Rivet/Cl. element |
| | 270 | Centre | 2901 | 1552 | Rivet |
| | | Lateral | 2461 | 1842 | Rivet/Cl. element |
| | | Corner | 791 | 608 | Rivet |
| | 350 | Centre | 2892 | 2024 | Rivet |
| | | Lateral | 2195 | 1438 | Cladding element |
| | | Corner | 623 | 517 | Rivet |

## 3.9 Pull-through resistance under shear loads – BWR 4

Pull-through resistance under shear loads for TRESPA® METEON® - TS150 / TS700 kits (Family A) has been assessed according to § 2.2.12.5 and the method specified in section I.2 of Annex I of EAD.

TS150 kit – Mean and characteristic values of test are indicated in table 9.

| TABLE 9 - PULL-THROUGH RESISTANCE UNDER SHEAR LOADS OF TS150 (SCREW) | | | |
|---|---|---|---|
| PANEL THICKNESS (mm) | FAILURE LOAD (N) | | FAILURE MODE |
| | $F_m$ | $F_{u,5}$ | |
| 6 | 3758 | 2995 | Tear in batten |
| 8 | 4104 | 3331 | Tear in batten |
| 10 | 4132 | 2823 | Tear in batten |

TS700 kit – Mean and characteristic values of test are indicated in table 10.

| TABLE 10 - PULL-THROUGH RESISTANCE UNDER SHEAR LOADS OF TS700 (RIVET) | | | |
|---|---|---|---|
| PANEL THICKNESS (mm) | FAILURE LOAD (N) | | FAILURE MODE |
| | $F_m$ | $F_{u,5}$ | |
| 6 | 2718 | 2585 | Rivet |
| 8 | 2584 | 2505 | Rivet |
| 10 | 2638 | 2464 | Rivet |

## 3.10 Axial tension resistance – BWR 4

Axial tension resistance for TRESPA® METEON® - TS200 kit (Family B) has been assessed according to § 2.2.12.6 and the method specified in section I.3 of Annex I of EAD.

TS200 kit – Mean and characteristic values of test are indicated in table 11.

| TABLE 11 – AXIAL TENSION RESISTANCE OF TS200 | | | | | |
|---|---|---|---|---|---|
| PANEL THICKNESS (mm) | SUPPORT Ø (mm) | FIXING POSITION | FAILURE LOAD (N) | | FAILURE MODE |
| | | | $F_m$ | $F_{u,5}$ | |
| 8 (mechanically weakest case) | 270 | Centre | 1870 | 1217 | Cladding element |
| | 350 | Centre | 1428 | 1037 | |

## 3.11 Shear load resistance – BWR 4

Shear load resistance for TRESPA® METEON® - TS200 kit (Family B) has been assessed according to § 2.2.12.7 and the method specified in section I.4 of Annex I of EAD.

TS200 kit – Mean and characteristic values of test are indicated in table 12.

| TABLE 12 - SHEAR LOAD RESISTANCE OF TS200 | | | |
|---|---|---|---|
| PANEL THICKNESS (mm) | FAILURE LOAD (N) | | FAILURE MODE |
| | $F_m$ | $F_{u,5}$ | |
| 8 (mechanically weakest case) | 6984 | 5037 | Cladding element |

## 3.12 Combined tension and shear load resistance – BWR 4

Combined tension and shear load resistance for TRESPA® METEON® - TS200 kit (Family B) has been assessed according to § 2.2.12.8 and the method specified in section I.5 of Annex I of EAD.

TS200 kit – Mean and characteristic values of test are indicated in table 13.

| TABLE 13 – COMBINED TENSION AND SHEAR LOAD RESISTANCE OF TS200 | | | | | | |
|---|---|---|---|---|---|---|
| PANEL THICKNESS (mm) | ANGLE | SUPPORT Ø (mm) | FIXING POSITION | FAILURE LOAD (N) | | FAILURE MODE |
| | | | | $F_m$ | $F_{u,5}$ | |
| 8 (mechanically weakest case) | 30º | 350 | Centre | 1160 | 933 | Cladding element |

## 3.13 Pull-through resistance of fixing from profile – BWR 4

Pull-through resistance of fixing from profile for TRESPA® METEON® - TS300 kit (Family C) has been assessed according to § 2.2.12.11 and the method specified in section J.2 of Annex J of EAD.

TS300 kit – Mean and characteristic values of test are indicated in table 14.

| TABLE 14 –PULL-THROUGH RESISTANCE OF FIXING FROM PROFILE OF TS300 | | | |
|---|---|---|---|
| TEST SPECIMEN | FAILURE LOAD (N) | | MODE OF FAILURE |
| | $F_m$ | $F_{u,5}$ | |
| HORIZONTAL RAIL | 8711 | 8068 | Breakage of fixings and profile deformation |

## 3.14 Resistance of profiles – BWR 4

Resistance of kit profiles has been assessed according to section 2.2.10 of EAD.
The following characteristics of the profiles and the subframe profiles are given in the relevant tables of Annex B:

- Form and dimensions of the profile section.
- Inertia of the profile section.

## 3.15 Brackets resistance (vertical and horizontal) – BWR 4

Brackets load bearing capacity and deformation under loading (vertical and horizontal load) have been assessed according to § 2.2.12.16 and the method specified in Annex L.

Mean and characteristic values of brackets resistance to vertical load test are indicated in table 15.

| TABLE 15: RESISTANCE TO VERTICAL LOAD OF BRACKETS | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| BRACKETS DIMENSIONS | | | $F_r$ (N) ΔL=0.2% de L Residual distortion | | $F_{1d}$(N) ΔL=1mm Displacement | | $F_{3d}$(N) ΔL=3mm Displacement | | $F_s$(N) ΔL=5 mm Displacement Significant permanent distortion (2 mm) | |
| | | | Mean value | Char. value | Mean value | Char. value | Mean value | Char. value | Mean value | Char. value |
| GALVANIZED STEEL | | 60 x 50 x 100 | 353.6 | 235.4 | 790.1 | 655.8 | 1831.8 | 1472.4 | 2556.5 | 2154.6 |
| | | 60 x 50 x 140 | 306.1 | 145.6 | 383.9 | 281.0 | 912.1 | 728.4 | 1205.4 | 1109.0 |
| | | 60 x 50 x 180 | 200.3 | 106.4 | 199.1 | 192.9 | 485.3 | 387.0 | 666.2 | 582.2 |
| ALUMINIUM | SUPPORTING B. | 150 x 40 x 40 | 3245.4 | 2609.7 | 6042.3 | 4511.3 | 9084.2 | 7324.4 | 9860.6 | 8716.6 |
| | | 150 x 40 x 80 | 3113.1 | 2562.8 | 4072.9 | 3833.6 | 5923.3 | 4964.8 | 6906.8 | 5408.0 |
| | | 150 x 40 x 120 | 2739.8 | 1265.1 | 2636.3 | 1153.3 | 5041.7 | 4270.1 | 6200.6 | 5403.9 |

Mean and characteristic values of brackets resistance to horizontal load test are indicated in table 16.

| TABLE 16: RESISTANCE TO HORIZONTAL LOAD OF BRACKETS | | | | | | |
|---|---|---|---|---|---|---|
| BRACKETS DIMENSIONS | | | $F_m$(N) ΔL=1mm Residual distortion | | $F_t$(N) ΔL=5 mm Displacement Significant permanent distortion (≥3 mm) | |
| | | | Mean value | Char. value | Mean value | Char. value |
| GALVANIZED STEEL | | 60 x 50 x 100 | 2630.00 | 2010.25 | 3957.80 | 3608.25 |
| | | 60 x 50 x 140 | 2080.00 | 1765.23 | 3839.80 | 3602.86 |
| | | 60 x 50 x 180 | 2352.00 | 1807.96 | 3310.40 | 2839.89 |
| ALUMINIUM | RETENTION B. | 80 x 40 x 40 | 2190.00 | 1474.69 | 3100.52 | 2421.94 |
| | | 80 x 40 x 80 | 1910.00 | 1494.83 | 4003.44 | 2007.47 |
| | | 80 x 40 x 120 | 2384.00 | 2210.73 | 3198.40 | 2922.45 |
| | SUPPORTING B. | 150 x 40 x 40 | 2630.00 | 2247.14 | 3764.80 | 3407.80 |
| | | 150 x 40 x 80 | 3640.00 | 2790.27 | 4848.60 | 4123.41 |
| | | 150 x 40 x 120 | 3990.00 | 3574.83 | 5098.80 | 4611.66 |

## 3.16 Hygrothermal behaviour – Durability

The hygrothermal behaviour for TRESPA® METEON® - TS200 kit (Family B) has been tested according to § 2.2.15.1 and the method specified in section M.1 of Annex M of EAD.

During the test cycles, none of the following defects occurs:

- deterioration such as cracking or delamination of the cladding element that allows water penetration to the insulation
- detachment of the cladding element
- Irreversible deformation

This system is therefore assessed as resistant to hygrothermal cycles.

The joint in TRESPA® METEON® kits are not watertight so the insulation layer should be composed by materials with low water absorption (such as insulation products made of MW according to EN 13162).

## 3.17 Behaviour after pulsating load – Durability

Behaviour after pulsating load for TRESPA® METEON® - TS200 kit (Family B) has been assessed according to § 2.2.15.2 and the method specified in section M.2 of Annex M of EAD.

TS200 kit – Mean and characteristic values of test are indicated in table 17.

| TABLE 17 – AXIAL TENSION RESISTANCE OF TS200 AFTER PULSATING LOAD | | | | | |
|---|---|---|---|---|---|
| PANEL THICKNESS | SUPPORT Ø (mm) | FIXING POSITION | FAILURE LOAD (N) | | FAILURE MODE |
| | | | $F_m$ | $F_{u,5}$ | |
| 8 (mechanically weakest case) | 350 | Centre | 1647 | 1163 | Cladding element |

## 3.18 Freeze-thaw resistance – Durability

Freeze-thaw resistance for TRESPA® METEON® - TS200 kit (Family B) has been assessed according to § 2.2.15.3.

After completion of the freeze-thaw cycles, according to EN 494:2012+A1, mechanical tests was carried out.

TS200 kit – Mean and characteristic values of test are indicated in table 18.

| TABLE 18 – AXIAL TENSION RESISTANCE OF TS200 AFTER FREEZE-THAW CYCLES | | | | | |
|---|---|---|---|---|---|
| PANEL THICKNESS (mm) | SUPPORT Ø (mm) | FIXING POSITION | FAILURE LOAD (N) | | FAILURE MODE |
| | | | $F_m$ | $F_{u,5}$ | |
| 8 (mechanically weakest case) | 350 | Centre | 1634 | 1287 | Cladding element |

### 3.19 Dimensional stability – Durability

Dimensional stability at elevated temperature of the panel has been determined according to EN 438-2: 2005[31] (section 17).

TRESPA® METEON® panels satisfy the requirements defined in table 3 § 5.4.1 of EN 438-6:2016, besides the cumulative dimensional change of TRESPA® METEON® panels is set at ≤ 0.25 % (length + transversal direction).

### 3.20 UV radiation resistance of the cladding elements – Durability

UV radiation resistance has been tested according to EN 438-2:2016+A1 (section 28) on all references of TRESPA® METEON® panels.
The samples tested do not show any visible change after accelerating ageing from UV radiation test.

### 3.21 Corrosion of metal components

Fixings and subframe components are made of:

- Aluminium alloy AW-6060 according to EN 573, EN 755 and EN 1999-1-1 and their minimum thickness is 2mm.

The durability class is B according to EN 1999-1-1:2007/A1:2009[32] (Table 3.1a and Table.C.1 in Annex C). 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.

- A2 (AISI 304) stainless steel according to EN ISO 3506-1.

The category of corrosivity is C4 (High) according to EN 1993-1-4:2006[33] (Table A.1 in Annex A) and EN ISO 9223: 2012[34] (Table C.1 in Annex C). Therefore, these components may be used in indoor environments with high frequency of condensation and high pollution from production process (e.g. industrial processing plants, swimming pools) and in outdoor environments, temperate zone, with high pollution (e.g. polluted urban areas, industrial areas, coastal areas without spray of salt water) or, subtropical and tropical zone, with medium pollution.

- Galvanized steel S220GD with Z450 treatment according to EN 10346[35].

The category of corrosivity is C3 (Medium) and the durability class is H (High) according to EN ISO 14713-1: 2019[36] (Table 2). Therefore, these components may be used in outdoor environments, temperate zone, atmospheric environment with medium pollution or some effect of chloride, e.g. urban areas, coastal areas with low deposition of chlorides, subtropical and tropical zones with atmosphere with low pollution.

## 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 of the European Commission [37] the system of assessment and verification of constancy of performances (see Annex V to Regulation (EU) Nº 305/2011) given in the following table applies:

| Product(s) | Intended use(s) | Level(s) or class(es) | System(s) |
|---|---|---|---|
| Kits for external wall claddings mechanically fixed TRESPA® METEON® FR | Ventilated external wall claddings | - | 1 |
| Kits for external wall claddings mechanically fixed TRESPA® METEON® | Ventilated external wall claddings | | 2+ |

(31) EN 438-2:`"High-pressure decorative laminates (HPL) - Sheets based on thermosetting resins (usually called Laminates) - Part 2: Determination of properties"
(32) EN 1999-1-1:2007+A1:2009 "Eurocode 9. Design of aluminium structures - Part 1-1: General structural rules".
(33) EN 1993-1-4:2006 "Eurocode 3 Design of steel structures - Part 1-4: General rules - Supplementary rules for stainless steels".
(34) EN ISO 9223:2012 "Corrosion of metals and alloys - Corrosivity of atmospheres - Classification, determination and estimation".
(35) EN 10346: 2015 "Continuously hot-dip coated steel flat products for cold forming - Technical delivery conditions".
(36) EN ISO 14713-1: 2017 "Zinc coatings - Guidelines and recommendations for the protection against corrosion of iron and steel in structures - Part 1: General principles of design and corrosion resistance".
(37) 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

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

Technical details necessary for the implementation of the AVCP system are laid down in the quality plan deposited at the Instituto de Ciencias de la Construcción Eduardo Torroja.

Instituto de Ciencias de la Construcción Eduardo Torroja
**CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS**

c/ Serrano Galvache nº 4. 28033 Madrid.
Tel: (34) 91 302 04 40 Fax. (34) 91 302 07 00
www.ietcc.csic.es

On behalf of the Instituto de Ciencias de la Construcción Eduardo Torroja
Madrid, 22nd July 2021

Firmado por CASTILLO TALAVERA ANGEL - DNI 52507605P
Fecha: 17/09/2021 16:01:53 CEST

Director
IETcc – CSIC

**Note**: The details shown in figures on this page and on the following pages are approximate and must be defined for each project depending on the site of the building.
These details concern the kit for ventilated external wall claddings and may not be used as justification for compliance with the National requirements.

# TS150 – VISIBLE FIXING WITH SCREWS ON TIMBER SUBFRAME (FAMILY A)

FIGURE 1: GENERAL CONFIGURATION

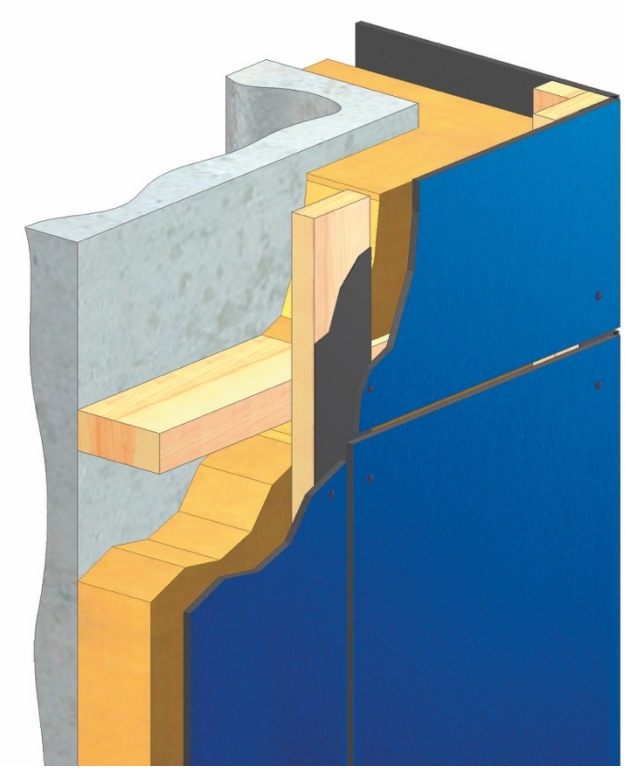
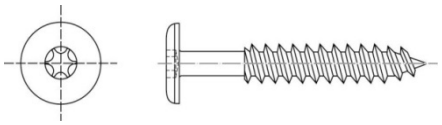
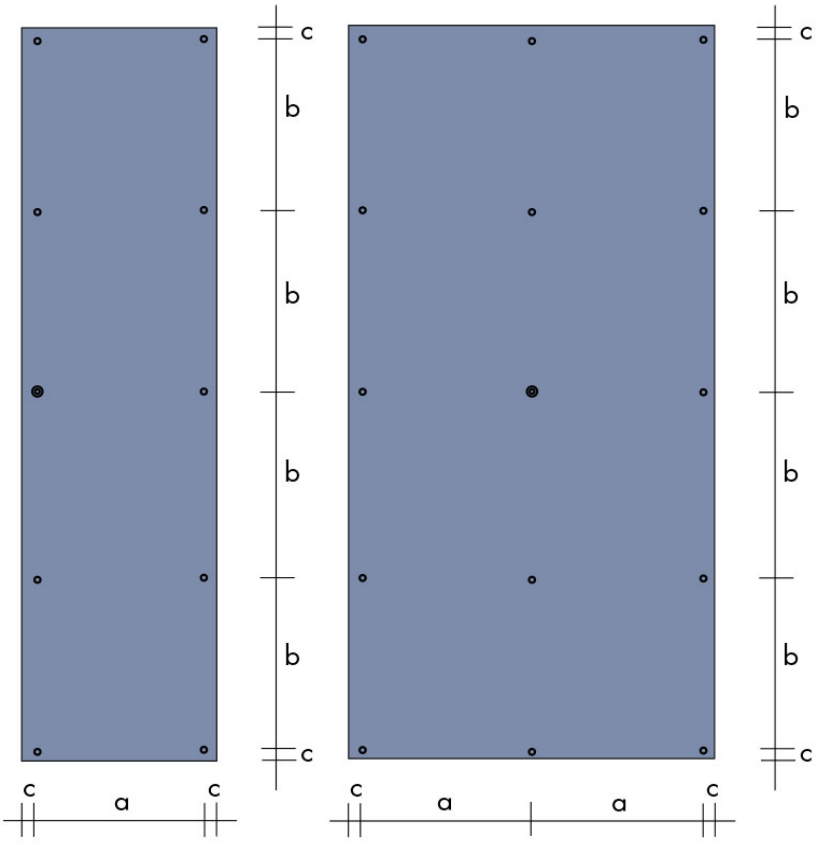


FIGURE 2: VISIBLE FIXING – SCREW



| | |
|---|---|
| TW-S-D12 Ø 4.8 (SFS) | L=38 (panel th= 6-8-10) |
| | L=44 (panel th= 13) |

FIGURE 3: FIXING DISTANCE and FIXINGS HOLES DIMENSIONS



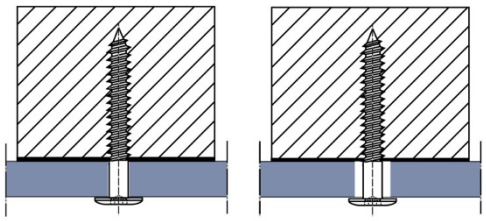

a = horizontal fixing distance
b = vertical fixing distance
c = edge clearance (Min. 20 mm, Max. 10 x panel th.)
◎ = fixed point in panel centre
○ = sliding point

| RECOMENDED MAXIMUM FIXING DISTANCE | | | | |
|---|---|---|---|---|
| Panel thickness (mm) | 6 | 8 | 10 | 13 |
| 2 fixings in one direction (mm) | 450 | 600 | 750 | 950 |
| 3 or more fixings in one direction (mm) | 550 | 750 | 900 | 1200 |

Fixing distances must be calculated in accordance with applicable local standards and regulations and should be verified by a structural engineer.
For Specular finish panels (thickness 10 and 13 mm) fixing distance should to be reduced (check www.trespa.info for specifics).

FIXED POINT
hole Ø 5 mm

SLIDING POINT
hole Ø 8 mm



# TS700 – VISIBLE FIXING WITH RIVETS ON ALUMINIUM SUBFRAME (FAMILY A)

FIGURE 4: GENERAL CONFIGURATION

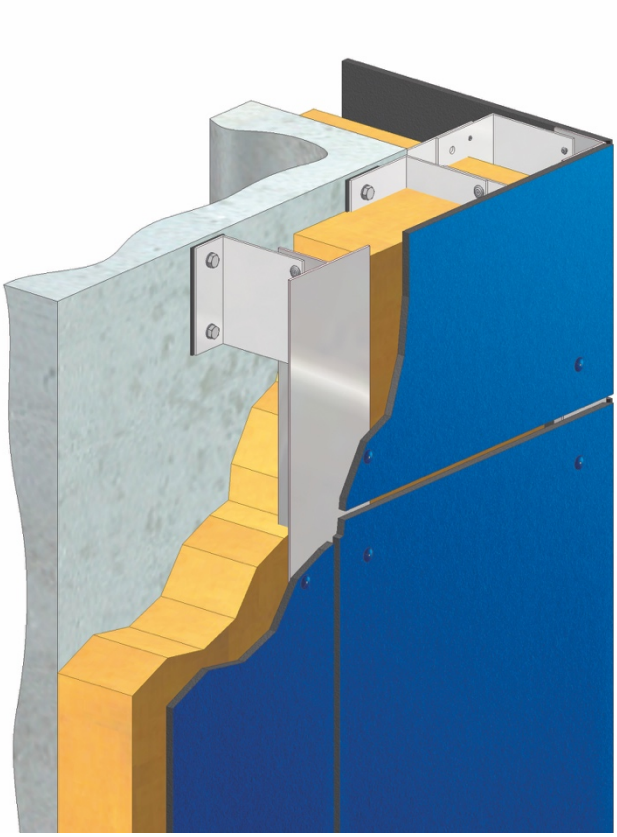
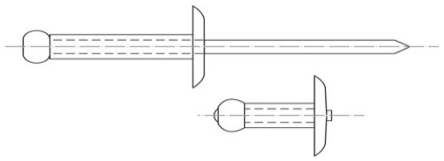
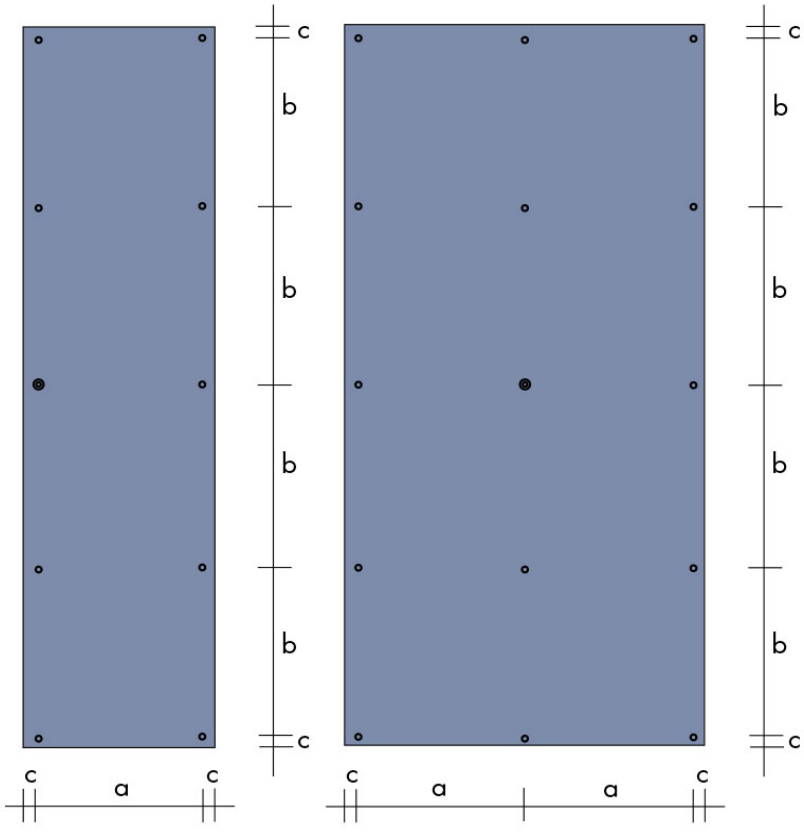


FIGURE 5: VISIBLE FIXING – RIVETS



| | |
|---|---|
| AP 16 Ø 5 (SFS) | L=16 (panel th= 6-8) |
| | L=18 (panel th= 10) |
| | L=21 (panel th= 13) |

FIGURE 6: FIXING DISTANCE and FIXINGS HOLES DIMENSIONS




a = horizontal fixing distance

b = vertical fixing distance

c = edge clearance (Min. 20 mm, Max. 10 x panel th.)

◎ = fixed point in panel centre

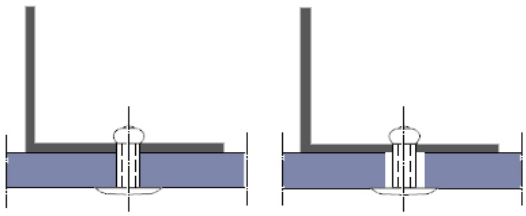
○ = sliding point

| RECOMENDED MAXIMUM FIXING DISTANCE | | | | |
|---|---|---|---|---|
| Panel thickness (mm) | 6 | 8 | 10 | 13 |
| 2 fixings in one direction (mm) | 450 | 600 | 750 | 950 |
| 3 or more fixings in one direction (mm) | 550 | 750 | 900 | 1200 |

Fixing distances must be calculated in accordance with applicable local standards and regulations and should be verified by a structural engineer.
Based on surface finish of Specular panels, fixing distances should be reduced (check www.trespa.info for specifics).

FIXED POINT
hole Ø 5.1 mm

SLIDING POINT
Hole Ø 10 mm



# TS200 – INVISIBLE FIXING WITH SCREWS – HANGING BRACKET – HORIZONTAL RAIL ON ALUMINIUM SUBFRAME (FAMILY B)

FIGURE 7: GENERAL CONFIGURATION

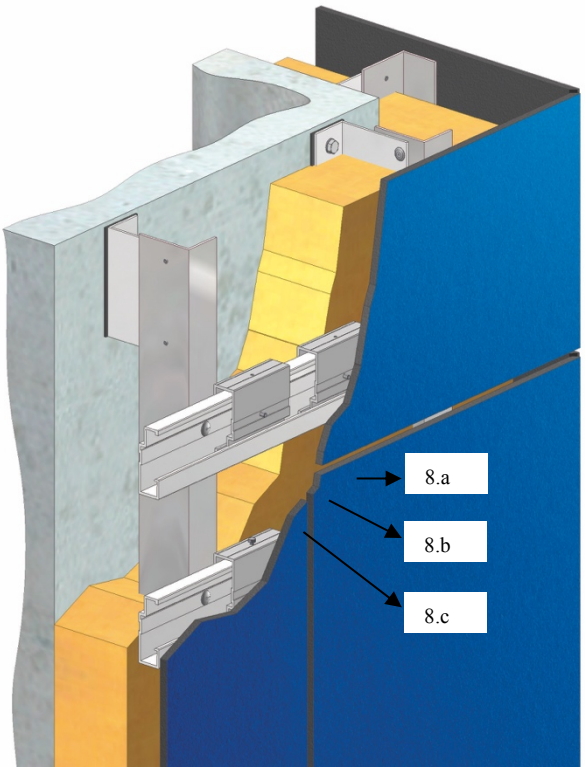
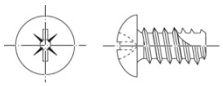


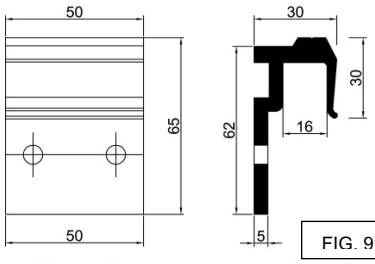

FIGURE 8: INVISIBLE FIXING

8.a: SELF-DRILLING SCREW

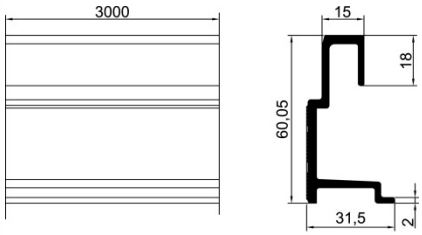


| | |
|---|---|
| EJOT PT-S-60 | L=9.5 (pnl. th= 8) |
| | L=11.5 (pnl. th= 10) |
| | L=14.5 (pnl. th= 13) |

8.b: HANGING BRACKET




8.c: HORIZONTAL RAIL



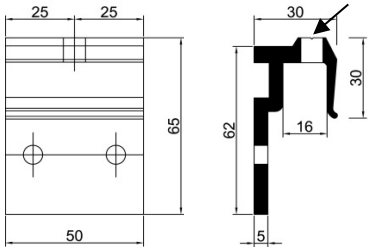




FIG. 9

FIGURE 9: SCREWS

9.a: for FIXED POINT

9.b: for ADJUSTING POINT

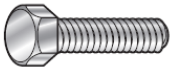
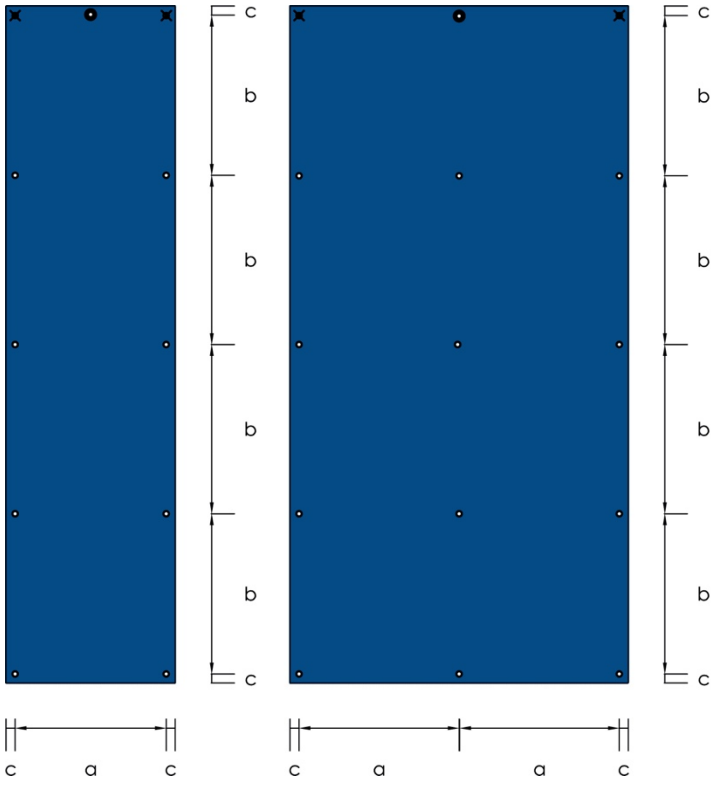


FIGURE 10: FIXING DISTANCE




Fixing and edge clearances

a = Horizontal fixing distance

b = Vertical fixing distance

c = Edge clearance
(Min. 65 mm, Max. 10 x panel th. counted from the center of the first fixing)

⊙ = Fixed point

x = Adjusting point

o = Sliding point:
Lower brackets fixed higher at such a level as to facilitate downward panel movement (2.5 mm/m¹)

| MAXIMUM FIXING DISTANCE | | | |
|---|---|---|---|
| Panel thickness (mm) | 8 | 10 | 13 |
| 2 fixings in one direction (mm) | 600 | 750 | 950 |
| 3 or more fixings in one direction (mm) | 750 | 900 | 1200 |

Fixing distances must be calculated in accordance with applicable local standards and regulations and should be verified by a structural engineer.
The maximum permitted fixing distances shown have been designed with a maximum wind-load of 600N/m² and a maximum deflection of L/200.
Based on surface finish of Specular panels, fixing distances should be reduced (check www.trespa.info for specifics).

# TS300 – INVISIBLE FIXING WITH HORIZONTAL RAIL ON ALUMINIUM SUBFRAME (FAMILY C)

FIGURE 11: GENERAL CONFIGURATION

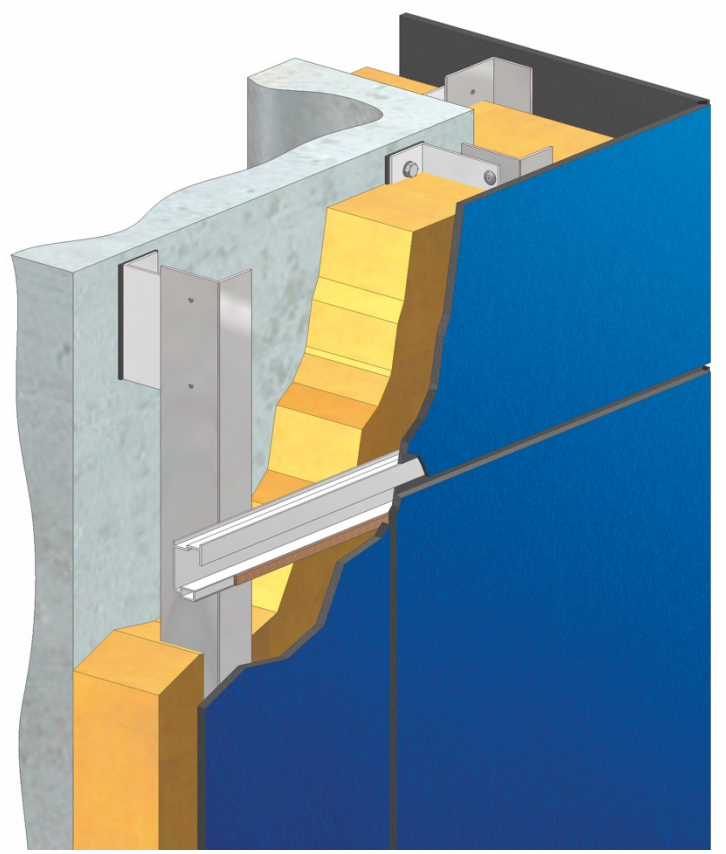
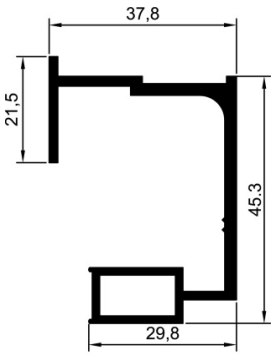


FIGURE 12: INVISIBLE FIXING - HORIZONTAL RAIL

12.a: INTERMEDIATE/CROWN RAIL (TS 302)




12.b: BASE RAIL (TS 301)

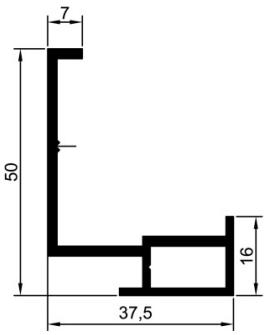
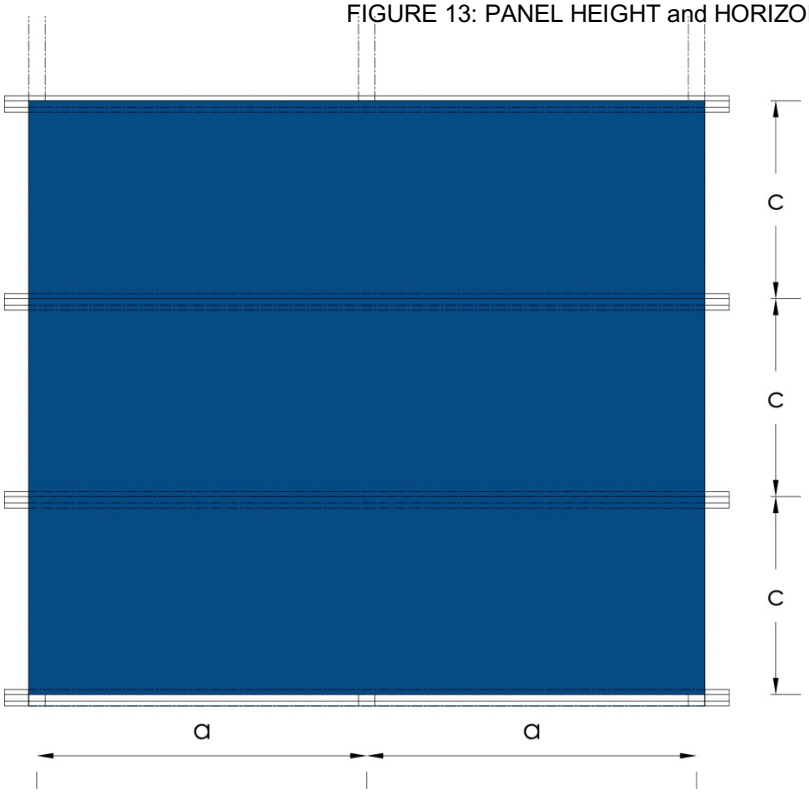


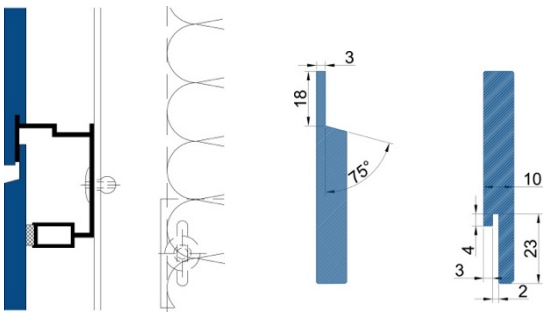

FIGURE 13: PANEL HEIGHT and HORIZONTAL RAIL DISTANCE




| RECOMENDED MAXIMUM PANEL HEIGHT | | | |
|---|---|---|---|
| Panel thickness (mm) | 8 | 10 | 13 |
| Panel height (mm) | 600 | 750 | 900 |

Fixing distances must be calculated in accordance with applicable local standards and regulations and should be verified by a structural engineer.
The maximum permitted fixing distances shown have been designed with a maximum wind-load of 600N/m$^2$ and a maximum deflection of L/200.
Based on surface finish of Specular panels, fixing distances should be reduced (check www.trespa.info for specifics).

FIGURE 14: JOINT AND PANEL SHAPE DETAILS



# TS650/600 – INVISIBLE FIXING WITH CLIPS ON WOOD/ALUMINIUM SUBFRAME (FAMILY C)

FIGURE 15: GENERAL CONFIGURATION

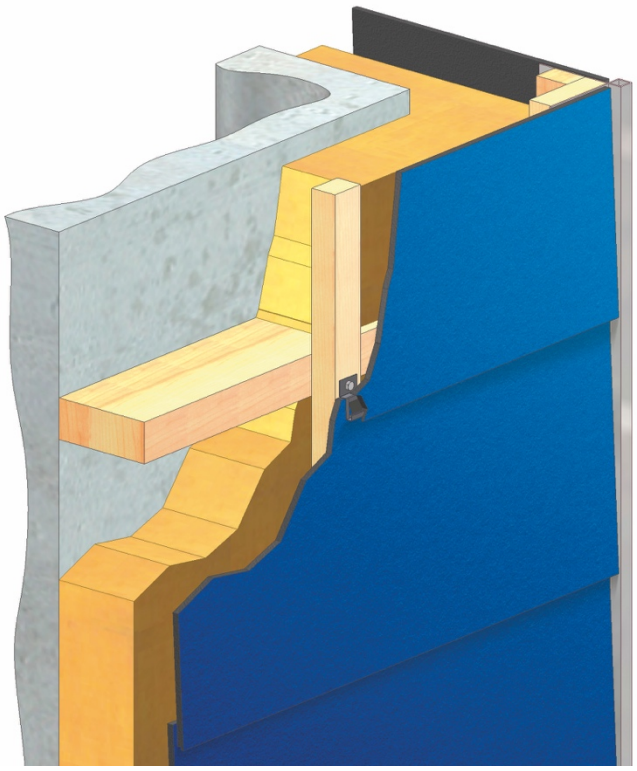


FIGURA 16: INVISIBLE FIXING - CLAMP

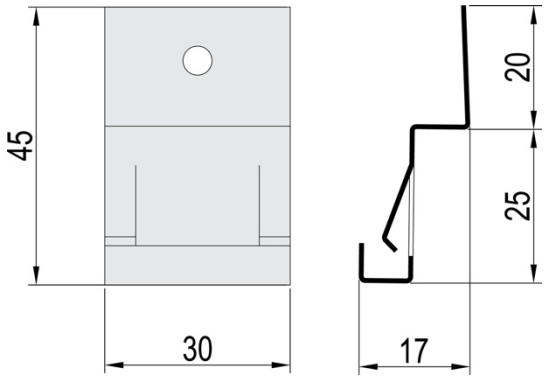



FIGURA 17: SCREWS - CLAMPS AND VERTICAL ELEMENTS

17.a: SW3-S-D11/R Ø 4.8 L=38
(SFS)

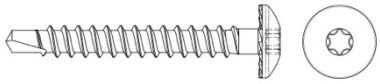
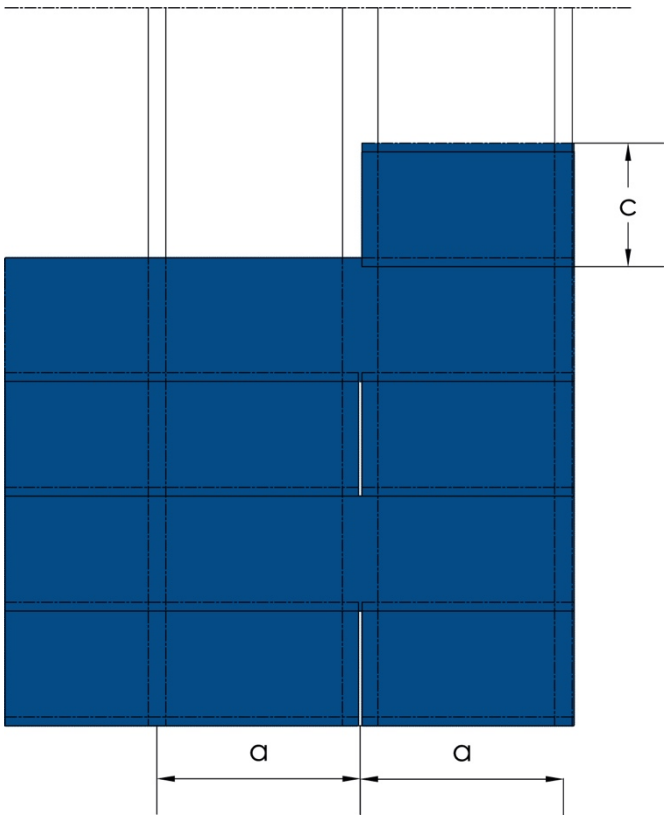


FIGURE 18: PANEL HEIGHT and FIXINGS DISTANCE




| RECOMENDED MAXIMUM PANEL HEIGHT AND FIXING DISTANCE | |
|---|---|
| Panel thickness (mm) | 8 |
| Panel height (mm) | 200-350 |
| fixings in horizontal direction (mm) | 600 |

Fixing distances must be calculated in accordance with applicable local standards and regulations and should be verified by a structural engineer.

FIGURE 19.a: FIX POINT – OVERLAP DETAIL

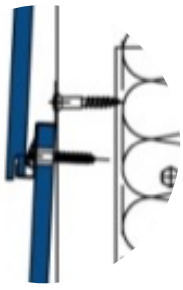
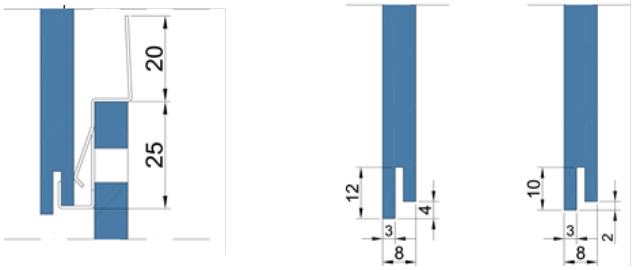


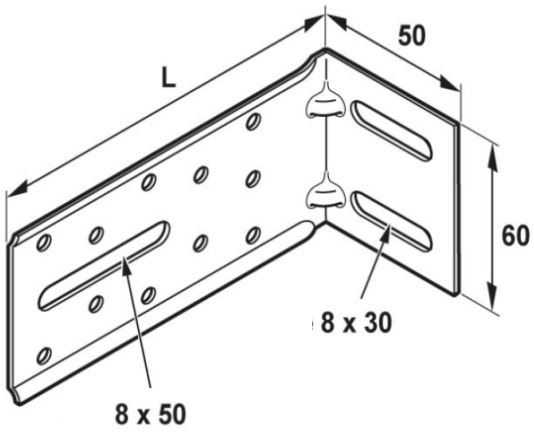
FIGURE 19.b: OVERLAP AND SHAPE PANEL DETAILS



## TIMBER SUBFRAME COMPONENTS

FIGURE 20: BENDED GALVANIZED STEEL BRACKET (L depends on the insulation thickness).

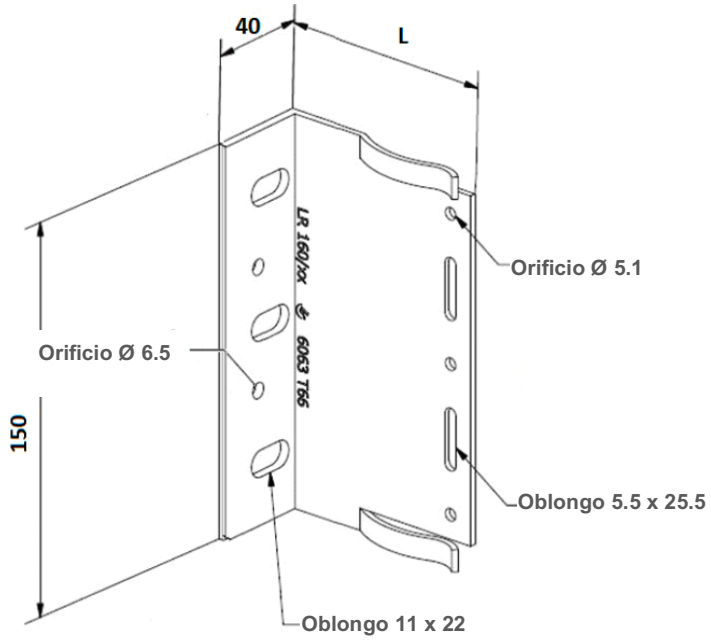
Vertical wood batten can be fixed to substrate also using horizontal wood battens, with a section of L x 450mm.




## ALUMINIUM SUBFRAME COMPONENTS

FIGURE 21: BRACKETS

SUPPORTING




RETENTION

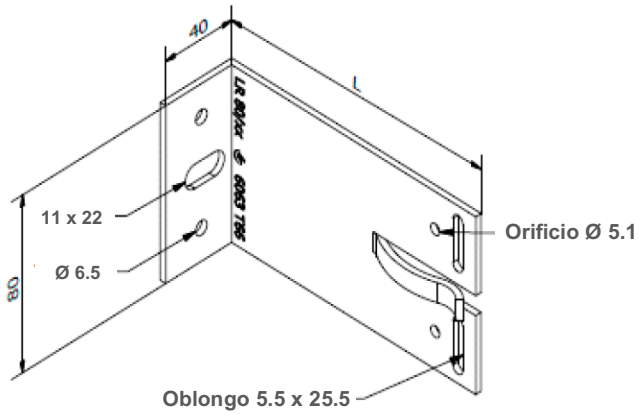
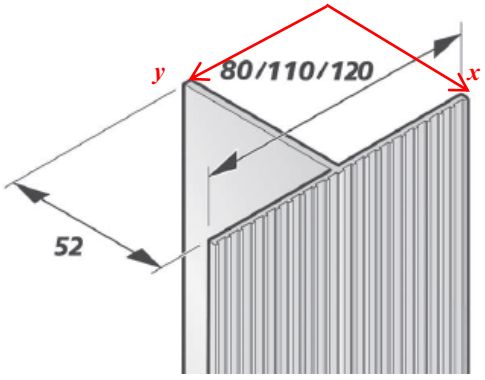



FIGURE 22: VERTICAL PROFILES



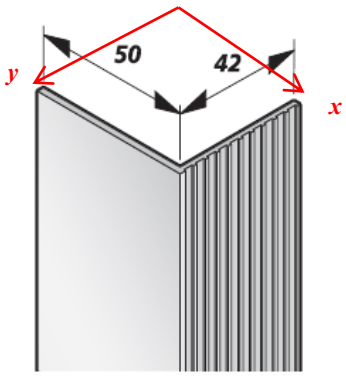



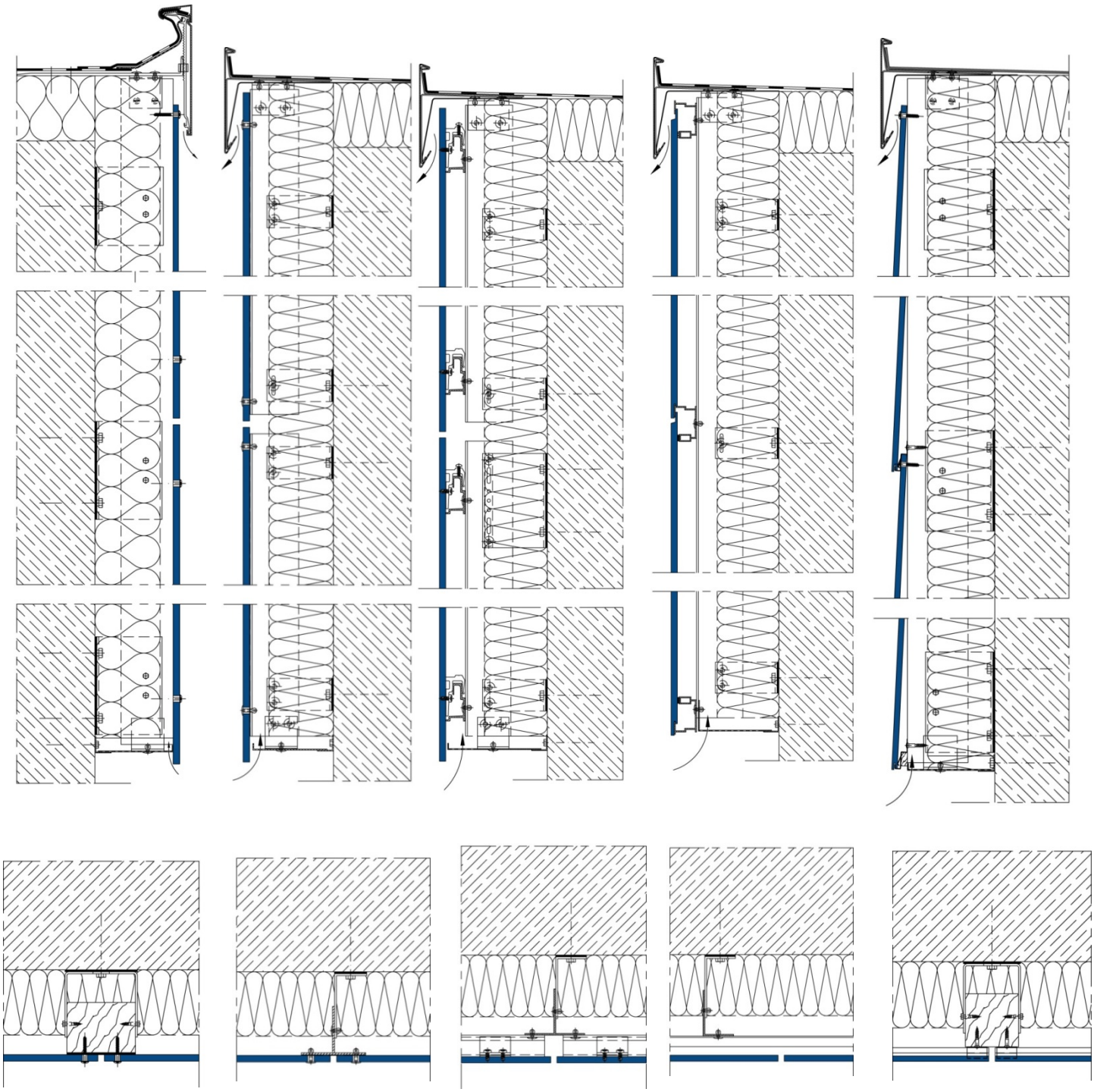
FIGURE 23: TS150

FIGURE 24: TS700

FIGURE 25: TS200

FIGURE 26: TS300

FIGURE 27: TS650/600



JOINTS RECOMENDATIONS

The horizontal and vertical panel connections may either be open or closed and for each of these combinations special joint solutions exist. For more details please visit www.trespa.info/meteon. In all cases, tolerances with respect to the panel, assembly and building itself play an important role in the joint details. Therefore the following guidelines apply:

- Take into account a cumulative dimensional change of 2.5 mm per meter in the length and in the width.
- Allow for at least 5 mm space around every single panel.
- Ensure a minimum joint width of 10 mm between two panels.
- Fit joints larger than 10 mm with grilles, insect mesh, etc. in accordance with applicable building standards and regulations to prevent insects and vermin getting in behind the façade cladding.
- Ensure joints allow for sufficient ventilation and drainage to prevent damage by retained moisture.

## Annex A: Cladding element specifications

| STANDARD DIMENSIONS | | | | | | |
|---|---|---|---|---|---|---|
| **Manufacturing formats** | **Length x Height** (mm x mm) | **Length x Height Tollerance** (mm) | **Thickness** (mm) | **Thickness Tollerance** (mm) | **Diagonal** (mm) | **Diagonal Tollerance** (mm) |
| FF<br>SF<br>IF<br>ZF | 3650 x 1860<br>2550 x 1860<br>3050 x 1530<br>4270 x 2130 | ± 5 | 6 | ± 0,4 | 4097 | ± 17 |
| | | | 8 | ± 0,5 | 3156 | ± 13 |
| | | | 10 | | 3412 | ± 12 |
| | | | 13 | ± 0,6 | 4772 | ± 20 |

| GEOMETRY | | | |
|---|---|---|---|
| **Thickness** | **Flatness** | **Straightness of edges** | **Weight** |
| Nominal (mm) | Tollerance (mm/m) | Deviation (mm/m) | Nominal(kg/m$^2$) |
| 6 | ≤ 2,0 | ≤ 1,0 | 8,1 |
| 8 | ≤ 2,0 | ≤ 1,0 | 10,8 |
| 10 | ≤ 2,0 | ≤ 1,0 | 13,5 |
| 13 | ≤ 2,0 | ≤ 1,0 | 17,5 |

## Physical, mechanical and weather resistance properties

| PHYSICAL AND MECHANICAL PROPERTIES | | | | |
|---|---|---|---|---|
| **Property** | **Attribute** | **Value** | **Unit** | **Test** |
| Density | Density | ≥ 1.35 | g/cm$^3$ | EN ISO 1183-1[(38)] |
| Elastic modulus | Stress | ≥ 9000 | MPa | EN ISO 178[(39)] |
| Flexural strength | Stress | ≥ 120 | MPa | EN ISO 178 |
| Tensile strength | Stress | ≥ 70 | MPa | EN ISO 527-2[(40)] |
| Resistance to humidity | Mass increase | ≤ 3 | % | EN 438-2[(41)]-15 |
| | Appearance | ≥ 4 | 1 to 5 | |
| Dimensional stability at high temp. | Cumulative dimensional change | ≤ 0.25 | % | EN 438-2-17 |
| Impact resistance | Mean failure height | ≥ 1800 | mm | EN 438-2-21 |
| | Indentation Ø | ≤ 10 | mm | |
| Resistance to fixings | 6 mm | ≥ 2000 | N | EN 438-7 |
| | 8 mm | ≥ 3000 | N | |
| | 10 mm | ≥ 4000 | N | |
| | 13 mm | ≥ 4000 | N | |
| Formaldehyde emission | | E1 Class | - | EN 438-7 |

| WEATHER RESISTANCE PROPERTIES | | | | |
|---|---|---|---|---|
| **Property** | **Attribute** | **Value** | **Unit** | **Test** |
| Resistance to climatic shock | Appearance | ≥ 5 | 1 to 5 | EN 438-2 - 19 |
| | Flexural strength index (Ds) | ≥ 0.80 | | |
| | Flexural modulus index (Dm) | ≥ 0.80 | | |
| Colour stability | 3000h Xenon 1200V | 4 - 5 | Grey scale | EN 438-2 – 29 [(42)] |
| Resistance to $SO_2$ | | 4 - 5 | Grey scale | DIN 50018 |
| Reaction to fire | EDS | D-s2, d0 | Euroclass | EN 13501-1[(43)] |
| | EDF (t = 6 mm) | B-s2, d0 | | |
| | EDF (t ≥ 8 mm) | B-s1, d0 | | |

(38) EN ISO 1183-1:2019 “Plastics - Methods for determining the density of non-cellular plastics - Part 1: Immersion method, liquid pyknometer method and titration method”.
(39) EN ISO 178:2010 “Plastics - Determination of flexural properties”.
(40) EN ISO 527-2: 2012 “Plastics. Determination of tensile properties. Part 2: test conditions for moulding and extrusion plastics”.
(41) EN 438-2:2016+A1:2018 “High-pressure decorative laminates (HPL) - Sheets based on thermosetting resins (usually called Laminates) - Part 2: Determination of properties”.
(42) In addition, Trespa uses also FLORIDA cycles to evaluate Colour Stability of the panels, obtaining the same results.
(43) EN 13501-1:2007+A1:2009 “Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests”.

## Annex B: Cladding fixings and Subframe specifications

### Cladding Fixings

### TS150 – visible fixing – Screws on timber subframe

| | |
|---|---|
| **Designation** | TW-S-D12 Ø 4.8 (SFS) |
| **Diameter** (mm) | 4.8 |
| **Length** (mm) | L=38 (pnl. th= 6-8-10) |
| | L=44 (pnl. th= 13) |
| **Material** | Stainless steel A2 (1.4567) |
| **Standard** | EN ISO 3506-4:2009(44) |
| **Tensile breaking load** (N) | 7000 |
| **Shear breaking load** (N) | 5400 |
| **Pull-out (embedment on wood 26mm)** (N) | 3023 |

### TS700 – visible fixing – Rivets on aluminium subframe

| | | |
|---|---|---|
| **Designation** | | AP16 Ø 5 (SFS) |
| **Diameter** (mm) | | 5.0 |
| **Length** (mm) | | L=16 (pnl. th= 6-8) |
| | | L=18 (pnl. th= 10) |
| | | L=21 (pnl. th= 13) |
| **Material** | **Sleeve** | Aluminium AlMg5 |
| | **Mandrel** | Stainless steel A2 (1.4541) |
| **Tensile breaking load** (N) | | 3950 |
| **Shear breaking load** (N) | | 2250 |

### TS200 – invisible fixing – Screws, Hanging bracket, Horizontal rail on aluminium subframe

#### Screws to panel

| | |
|---|---|
| **Designation** | EJOT PT-S-60 |
| **Diameter** (mm) | 6 |
| **Length** (mm) | L=9.5 (pnl. th= 8) |
| | L=11.5 (pnl. th= 10) |
| | L=14.5 (pnl. th= 13) |
| **Material** | Stainless steel A2 (1.4567) o A4 (1.4401) |
| **Standard** | EN ISO 3506-4:2009 |
| **Blind drill diameter on panel** (mm) | 4.9 ± 0.1 |
| **Blind drill depth on panel** (mm) | D=5.5 (pnl. th= 8) |
| | D=7.5 (pnl. th= 10) |
| | D=10.5 (pnl. th= 13) |
| **Average Tensile load** (N) | 1030 (pnl. th= 8) |
| | 3710 (pnl. th= 10) |
| **Average Shear load** (N) | 2680 (pnl. th= 8) |
| | 4210 (pnl. th= 10) |

| | |
|---|---|
| **Designation** | TS 200 Hanging bracket |
| **Thickness** (mm) | 5 |
| **General dimension** (mm) | 70 x 30 |
| **Length** (mm) | 50 |
| **Material** | AW 6060 T5 |
| $I_x$ ($cm^4$) | 17.23 |
| $I_y$ ($cm^4$) | 4.58 |

#### Horizontal rails

| | |
|---|---|
| **Designation** | TS 200 Horizontal rail |
| **Thickness** (mm) | 2-3 |
| **General dimension** (mm) | 60 x 31.5 |
| **Length** (mm) | Max. 3000 |
| **Material** | AW 6063 T66 |
| $I_x$ ($cm^4$) | 13.37 |
| $I_y$ ($cm^4$) | 2.13 |

(44) EN ISO 3506-4: 2009 Mechanical properties of corrosion-resistant stainless steel fasteners - Part 4: Tapping screws (ISO 3506-4:2009)

### Screws fixed points

| | |
|---|---|
| **Designation** | PERFIX 3 TH8 INA2 |
| **Diameter** (mm) | 5.5 |
| **Length** (mm) | 25 |
| **Material** | Stainless steel A2 (1.4301) |
| **Standard** | EN ISO 3506-4:2009 |

### Screws adjustment points

| | |
|---|---|
| **Designation** | TH13 INA2 |
| **Diameter** (mm) | 8 |
| **Length** (mm) | 25 |
| **Material** | Stainless steel A2 (1.4567) |
| **Standard** | EN ISO 3506-4:2009 |

### TS300 – invisible fixing – Horizontal rail on aluminium subframe

| | | |
|---|---|---|
| **Designation** | TS 302 | TS 301 |
| **Thickness** (mm) | 2 | |
| **General dimension** (mm) | 37.8 x 45.3 | 37.5 x 50 |
| **Length** (mm) | Max. 3600 | |
| **Material** | AW 6060 T6 | |

### TS650/600 – invisible fixing – Clips on wood/aluminium subframe

| | |
|---|---|
| **Designation** | TS 600/650 Clamp |
| **Thickness** (mm) | 0.8 |
| **General dimension** (mm) | 30 x 45 |
| **Hole diameter** (mm) | 5.5 |
| **Material** | Anti-corrosion cold-forming hardened steel (1.4401) |
| **Standard** | EN 10088-2:2008 (45) |

### Screws between clip and vertical elements

| | |
|---|---|
| **Vertical elements** | Aluminium/Timber subframe |
| **Designation** | SW3-S-D11/R (SFS) |
| **Diameter** (mm) | 4.8 |
| **Length** (mm) | 38 |
| **Material** | Stainless steel A2 (1.4567) |
| **Standard** | EN ISO 3506-4:2009 |
| **Tensile breaking load** (N) | 6479 |
| **Shear breaking load** (N) | 5190 |

(45) EN 10088-2:2008 Stainless steels - Part 2: Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for general purposes

## Subframe materials

### Wood requirements

| | |
|---|---|
| Resistance class | ≥ C 18[46] |
| Durability | Class 2[47] |
| Processing | Autoclave level 5 [48] |
| Damp control | ≤ 18% |

### Galvanized steel physical and mechanical properties

| | |
|---|---|
| Type of steel | S220GD |
| Treatment | Z450 |
| PHYSICAL PROPERTIES | |
| Density | 7850 g/cm$^3$ |
| Coefficient of linear thermal expansion | 1,2 x 10$^{-5}$ ºC$^{-1}$ |
| Poisson coefficient | 0.3 |
| MECHANICAL PROPERTIES | |
| Tensile strength ($R_m$) | 300 MPa |
| Elastic limit ($R_{eH}$) | 220 MPa |
| Elongation ($A_{80mm}$) | 20 mm |
| According to EN 10025-5: 2019[49] and EN 10346:2015[50] | |

### Aluminium Physical and mechanical properties

| | | |
|---|---|---|
| Symbolic designation | EN AW-Al MgSi | EN AW-Al Mg0,7Si |
| Numeric designation | EN AW 6060 | EN AW 6063 |
| Treatment | T5-T6 | T66 |
| PHYSICAL PROPERTIES | | |
| Specific weight (g/cm$^3$) | 2,70 | |
| Coefficient of linear thermal expansion (K$^{-1}$ - 20/100 ºC) | 23,4·10$^{-6}$ | |
| Elastic modulus (MPa) | 69500 | |
| Poisson coefficient | 0,33 | |
| MECHANICAL PROPERTIES | | |
| Tensile strength - $R_m$ (N/mm$^2$) | 160-190 | 245 |
| Elastic limit - $R_{p0,2}$ (N/mm$^2$) | 120-150 | 200 |
| Elongation – A (%) | 8 | 8 |
| Elongation - $A_{50mm}$ (%) | 6 | 6 |
| Brinell hardness (HB) | 60-70 | 80 |
| According to EN 755-2:2016[51] and EN 12020-1:2008[52] | | |

## Subframe components

### Vertical elements Geometrical and mechanical features

### Wooden batten (timber subframe)

| **Reference** | **TWO PANELS FIXING (at location of joint)** | **ONE PANELS FIXING (intermediate support)** |
|---|---|---|
| **Minimum width** (mm) | 95 | 34[53]/75[54] |
| **Thickness** (mm) | 75 | 34/75 |

### Aluminium profiles (aluminium subframe)

| **Reference** | | Dimensions (mm) | Thickness (mm) | Section (mm$^2$) | $x_c$ (mm) | $I_{xc}$ (cm$^4$) | $y_c$ (mm) | $I_{yc}$ (cm$^4$) |
|---|---|---|---|---|---|---|---|---|
| Aluminium strip (L) Al 6060 T5 |  | L 50 x 42 | 2 | 180 | 35.6 | 46.46 | 31.7 | 30.30 |
| Aluminium strip (T) Al 6060 T5 |  | T 52 x 110 | 2 | 320 | 42.9 | 6.74 | 55 | 22.19 |

(46) EN 338:2016 Structural timber - Strength classes
(47) EN 335:2013 Durability of wood and wood-based products - Use classes: definitions, application to solid wood and wood-based products.
The wood battens are protected in the joint between sidings with an EPDM elastomeric belt of a thickness exceeding 10/20 mm the width of the battens. Furthermore, it is necessary verify that the battens are protected from damp in other points as the start of them.
(48) EN 599-1:2010 Durability of wood and wood-based products - Efficacy of preventive wood preservatives as determined by biological tests - Part 1: Specification according to use class.
(49) EN 10025-5:2019 Hot rolled products of structural steels - Part 5: Technical delivery conditions for structural steels with improved atmospheric corrosion resistance.
(50) EN 10346:2015. Continuously hot-dip coated steel flat products for cold forming - Technical delivery conditions.
(51) EN 755-2: 2016 Aluminium and aluminium alloys. Extruded rod/bar, tube and profiles. Part 2: Mechanical properties.
(52) EN 12020-1: 2008 Aluminium and aluminium alloys. Extruded precision profiles in alloys EN AW-6060 and EN AW-6063. Part 1: technical conditions for inspection and delivery.
(53) Using horizontal wood battens to fixe vertical batten to substrate.
(54) Using bended galvanized steel brackets to fixe vertical batten to substrate.

**Brackets Geometrical and mechanical features**

| BRACKETS | | Material | Dimensions (mm) | Thickness (mm) |
|---|---|---|---|---|
| ISOLCO 3000P M8 Y M10 (ETANCO) | | Galvanized Steel S220GD – Z450 | 60 x 50 x 100/140/180 | 2.5 |
| ISOLALU (ETANCO) | LR80 | Extruded Aluminium EN AW 6063 T66 or EN AW 6060 T5 | 80 x 40 x 40/80/120 | 3.0 |
| | LR150 | | 150 x 40 x 40/80/120 | |

**Screws between vertical elements and brackets**

| **Vertical elements** | Timber subframe | Aluminium subframe |
|---|---|---|
| **Designation** | TIREFOND A VISSER TH13/SHERARDISE | PERFIX 3 TH8 INA2 |
| **Diameter** (mm) | 7 | 5.5 |
| **Length** (mm) | 50 | 25 |
| **Material** | Hot dip galvanized hardened steel | Stainless steel A2 (1.4301) |
| **Standard** | EN ISO 17668:2016(55) | EN ISO 15480:2000 |
| **Pull-out** | 5980 N (450kg/m$^3$ fir wood –anchorage 50 mm) | 4250 N (Aluminium 3 mm) |

## Annex C: Auxiliary components

### Anchorage to substrate

The fixings between the subframe and the substrate are not part of the kit. Therefore have not been assessed. Even so, it is important to define type, position and number of the anchorages according to the substrate material and the resistance required due to the envisaged actions. When it is possible, CE marking according to the EAD 330232-00-0601, 330499-00-0601, 330747-00-0601, 330076-00-0604, etc. is recommended.

## Annex D: Confidential information

### Quality control of components of kits manufactured by suppliers or ETA holder.

This information is confidential and it is not included in the European Technical Assessment when that assessment is publicly available.

(55) EN ISO 17668:2016 Zinc diffusion coatings on ferrous products - Sherardizing - Specification (ISO 17668:2016)