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www.eota.eu

INSTITUTO DE CIENCIAS DE LA CONSTRUCCIÓN EDUARDO TORROJA
C/ Serrano Galvache 4. 28033 Madrid (Spain)
Tel.: (34) 91 302 04 40. Fax: (34) 91 302 07 00
direccion.ietcc@csic.es www.ietcc.csic.es

European Technical Assessment

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General part

Technical Assessment Body issuing the ETA designated according to Art. 29 of Regulation (EU) 305/2011:	Instituto de Ciencias de la Construcción Eduardo Torroja (IETcc)
Trade name of the construction product:	**ALUCOIL® Suspended Cassettes** **ALUCOIL® Riveted Boards** (kits based on thin metallic composite panels larson® PE, larson® FR and larson® INOX FR)
Product family to which the construction product belongs:	Kits for external wall claddings
Manufacturer:	**ALUCOIL, S.A.** C/ Ircio, parcelas R72-R77. Pol. Ind. de Bayas 09200 MIRANDA DE EBRO (Burgos) Spain. website: www.alucoil.com
Manufacturing plants:	ALUCOIL, S.A. C/ Ircio, parcelas R72-R77. Pol. Ind. de Bayas 09200 MIRANDA DE EBRO (Burgos) Spain. info@alucoil.com ALUCOIL SYSTEMS, S.L. C/ Bardauri, parcela R65. Pol. Ind. de Bayas 09200 MIRANDA DE EBRO (Burgos) España. info@alucoilsystems.com
This European Technical Assessment contains:	25 pages including 4 annexes which form an integral part of the assessment. Annex C contains confidential information and is not included in the European Technical Assessment when that assessment is publicly available.
This European Technical Assessment is issued in accordance with regulation (EU) No 305/2011, on the basis of:	Guideline for European Technical Approval (ETAG) nº 034 ed. April 2012, Part 2 used as European Assessment Document (EAD)
This version replaces:	ETA 14 / 0100 issued on 21 / 03 / 2017

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

This European Technical Assessment may be withdrawn by the issuing Technical Assessment Body, in particular pursuant to information by the Commission according to Article 25 Paragraph 3 of Regulation (EU) No 305/2011.

Specific part

1. Technical description of the product (kits)

The assessed kits for external wall claddings, named as "ALUCOIL® Riveted Boards" and "ALUCOIL® Suspended Cassettes", consist main and respectively of riveted boards and suspended cassettes made of the following types of "larson®" thin metallic composite panels (TCMP): "larson® PE", "larson® FR" and "larson® INOX FR", which are produced by the ETA – holder (1). These claddings are mechanically fastened to a subframe, which is fixed to the external wall of new or existing buildings (retrofit). An insulation layer can be fixed on the external wall. According to the ETAG 034. Part 2, edition April 2012 (2), the kit ALUCOIL® Riveted Boards is considered to belong to family "A", while the kit ALUCOIL® Suspended Cassettes is considered to belong to family "G". The kits comprise other components as specified in Table 1, which are factory produced by the ETA – holder or by suppliers.

Table 1: Definition of the kit components

Components			Material	Sizes (mm) [Tolerances]
Subframe elements	Profiles used to fix the cladding elements		LC-2: Ω-shape section profile specific for ALUCOIL® Suspended Cassettes made of extruded alloyed aluminium EN AW 6063 T5, raw finished.	Length: 6000 Wing thickness: 2
			LCH-1: Ω-shape section profile, for both kits, made of extruded alloyed aluminium EN AW 6063 T5, raw finished.	
Cladding elements	Riveted boards, made of larson® composite panels Suspended cassettes with lateral simple folded flanges 44,5mm depth, top horizontal double folded flange and bottom horizontal simple folded flange		larson® PE: TMCP composed by two external alloyed aluminium sheets EN AW 5005 H22 and an internal core made of not recycled low density polyethylene (LDPE).	Length: 5000 [0,+4] Width: 1500, [0,+2] Thickness: 4 [0,+0,2]
			larson® FR: TMCP composed by two external alloyed aluminum sheets EN AW 5005 H22 and an internal core made of not recycled low density polyethylene (LDPE) and mineral compounds.	
			larson® INOX FR: TMCP composed by two sheets of alloyed stainless steel 1.4401 (front) and 1.4301 (rear) plus an internal core made of not recycled low density polyethylene (LDPE) and mineral compounds.	Length: 5000 [0,+4] Width: 1000, [0,+2] Thickness: 4 [0,+0,2]
Fixings	Elements used to fix cladding elements and subframe	Suspended cassettes	LC-3: Hanger made of alloyed aluminium EN AW 6063 T5 extruded and raw finished profile plus elastomeric protective piece, foreseen to be fixed to profiles with two screws ISO 15480 ST 4.8x19 mm.	--
			LCR-45: Hidden reinforcement for slots made of alloyed aluminium EN AW 3003 H16, fixed by four blind rivets ISO 15977 4.8 x12 AlA/St (d_k=9,5 mm)	Thickness: 3
			Blind rivet ISO 15977 4.8 x 12 AlA/St (d_k=9,5 mm): Open end blind rivet (also known as DIN 7337), with A2 stainless steel break pull mandrel diameter d= 4,8 mm and length 12 mm, and protruding aluminium head (optionally lacquered), diameter d_k=9,5 mm.	--
			Screw ISO 15480 ST 4.8 x 19 mm: Hexagon washer head drilling screw with tapping screw thread (also known as DIN 7504-K) of diameter 4.8 mm and 19 mm length, of stainless steel A2, class 50 according to ISO 3506-1, foreseen for fixing LC-3 and top flange of cassette to profiles.	--
		Riveted boards	LC-13: Piece made of folded sheet of alloyed aluminium EN AW 5754 H11, for connecting vertical and horizontal Ω-shape profiles LCH-1, fixed by four blind rivets ISO 15977 4.8 x 10 AlA/St, diameter d_k=9,5 mm.	Thickness: 2
			Blind rivet ISO 15977 5 x 12 Al /St (d_k=14 mm): Open end blind rivet (also known as DIN 7337), with A2 stainless steel break pull mandrel diameter d= 5 mm and length 12 mm, and protruding aluminium head (optionally lacquered), diameter d_k=14 mm.	--
	Brackets: Elements used as load transmission between the subframe and the substrate wall.		LC-1: Bracket L-shape section specific for ALUCOIL® Suspended Cassettes made of folded alloyed aluminium EN AW 1050A H24, of different depths, raw finished sheet with perforation for fastening elements.	Depth: 70,85,100,115,135,155 Height: 50 Thickness: 3
			LCH-2: Bracket U-shape section for both kits profile made of folded alloyed aluminium 1050A H24 of different depths, raw finished sheet with perforation for fastening elements.	Depth: 50,70,90,110,130,150 Height: 50 Thickness: 3
	Fixings for subframe elements	LCH-1 to LCH-2	Hexagon head screw ISO 4017 – M8x80 -8.8: Hexagon head screw (also known as DIN 931) class of thread A (metric 8 mm and 80 mm length) of galvanized steel 8.8 Washer ISO 7089 -8 200 HV: Flat washer (also known as DIN 125) class A of galvanized steel, nominal diameter 8 (int.) hardness 200 HV Hexagonal nut ISO 4032 M8-8: Hexagonal bolt (also known as DIN 934) type 1, of galvanized steel, thread 8 and quality class 8.8	--
		LC-1 to LC-2	Hammer head screw 8x17 UNE 17021: Two hammer head screws and thread diameter 8 mm, 17 mm length, of steel quality 4.8, protected by Deltatone Hexagon nut EN 1661 M8-4.8: Two hexagon nuts with flange (also known as ISO 4161 or DIN 6923) type A, of steel protected by Deltatone, thread 8 and quality class 4.8	--

(1) For further information see Annex A. Figures and Annex B. Complementary physical and mechanical data of components.
(2) Guideline for European Technical Approval of kit for external wall claddings nº 034. Part 2: Cladding kits comprising cladding components, associated fixings, subframe and possible insulation layer, edition April 2012.

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

2.1 Intended use

The kits ALUCOIL® Suspended Cassettes and ALUCOIL® Riveted Boards are intended to be used for ventilated external wall claddings which can be fixed to the external wall of new or existing buildings. The assessed kits are non-load-bearing construction systems, and therefore, they do not contribute to the stability of the wall on which is installed, neither to ensure the air tightness of the building structure but they 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 kits

The provisions made in this European Technical Assessment are based on an assumed working life of 25 years as minimum according to ETAG 034, 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 can not be interpreted as a guarantee given by the producer, 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.

2.3 Design of the kits in works

The design of the external wall cladding for ventilated façade using the kits should consider:

- The mechanical characteristic values of the components (e.g. panels, cladding fixings and subframe) in order to resist the actions applying on the specific work. National safety factors, if required, must be used.
- The substrate material to define the suitable anchorages.
- The possible movements of substrate and the position of the building expansion joints.
- The dilation of components of the kits and of the panels.
- The category of corrosivity of the atmosphere of the works [(3)].
- Because joints are not watertight, the first layer behind ventilated air space must be composed by materials with low water absorption.
- The construction of singular parts of façade (e.g. base, top, corners, windows, etc).
- If the entire building must comply with the specific building regulations, particularly concerning fires and wind load resistance, of the Member States in which the work has been built.

2.4. Installation of the kits in works

Installation should be carried out according to the ETA holder's specifications and using the specific components of the kits, manufactured by the ETA holder or by suppliers recognized by the ETA holder. Installation should be carried out by appropriately qualified 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 system or components the kits includes inspections on site, taking into account the following aspects:

- Regarding the panels: Appearance of any damage such as cracking, delamination o 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) (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.

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 the kits for ventilated external wall claddings according to the Basic Work Requirements (BWR) were carried out in compliance with the ETAG 034. The characteristics of the components shall correspond to the respective values laid down in the technical documentation of this ETA, checked by IETcc.

3.1 Mechanical resistance and stability (BWR 1)

The assessment of characteristics regarding to the mechanical resistance and stability of non-load bearing parts of the works are not included in this Basic Work Requirement but are treated under the Basic Work Requirement Safety in use (See section 3.4)

3.2 Safety in case of fire (BWR 2)

3.2.1 Reaction to fire of cladding kits

3.2.1.1 Classification of kit ALUCOIL® Riveted Boards, with cladding made of:

a)	Panels larson® PE:	Class* E
b)	Panels larson® FR:	Class** B-s1,d0
c)	Panels larson® INOX FR:	Class** B-s1,d0

3.2.1.2 Classification of kit ALUCOIL® Suspended Cassettes, with cladding made of:

a)	Panels larson® PE:	Class * E
b)	Panels larson® FR:	Class*** B-s1,d0
c)	Panels larson® INOX FR:	Class*** B-s1,d0

* Based on Tests and Classification Reports 16/13129-1954 part 1 and part 2-M1 (issued by Applus)
** Based on Tests and Classification Reports n. 16/12641-1471 part 1 and 2 (issued by Applus)
*** Based on Tests and Classification Reports n. 13/7185 3032 M1 part 1 and 2 (issued by Applus) which describe tests carried out and results obtained on cassettes made of panels according to European Standards EN ISO 11925-2 (4) and EN 13823 (5), and the corresponding class according to EN 13501-1 (6).

A European reference fire scenario has not been laid down for facades. In some Member States, the classification of the cladding kits according to Standard EN 13501-1 might not be sufficient for the use in façades. An additional assessment of the kits according to the national provision (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.

3.2.2 Reaction to fire on backside

3.2.2.1 Classification of kit ALUCOIL® Riveted Boards: (See section 3.2.1.1.)

3.2.2.2 Classification del kit ALUCOIL® Suspended Cassettes: (See section 3.2.1.2.)

3.2.3. Fire resistance

The fire resistance requirement is applicable to the wall itself (made of masonry, concrete) and not on the cladding kits. Kits alone do not meet any fire resistance requirements. The evaluation of “fire propagation to upper levels” is not part of the European classification and thus, cannot be evaluated, i.e. to be omitted.

(4) EN ISO 11925-2:2011 Reaction to fire tests - Ignitability of products subjected to direct impingement of flame -- Part 2: Single-flame source test.
(5) EN 13823:2012 Reaction to fire tests for building products - Building products excluding floorings exposed to the thermal attack by a single burning item.
(6) EN 13501-1:2007+A1.2010: Fire classification of construction products and building elements-Part 1: Classification using data from reaction to fire tests.

3.3 Hygiene, health and the environment (BWR 3)3.3.1 Watertightness of joints

3.3.1.1 Classification of kit ALUCOIL® Riveted Boards (from larson® PE, larson® FR, larson® INOX FR)
Purposeless. Kit is not watertight.

3.3.1.2 Classification of kit ALUCOIL® Suspended Cassettes (from larson® PE, larson® FR, larson® INOX FR)
Purposeless. Kit is not watertight.

3.3.2 Water permeability and water vapour permeability
Not relevant for external wall cladding kits with ventilated air space.

3.3.3 Drainability

On the basis of the standard construction details the installation criteria of the kits and the technical knowledge and experience, it may be said the water which penetrates through joints into the air space or the condensation water can be drained out from the cladding without accumulation or moisture damage into the substrate.

3.3.4 Release of dangerous substances

A declaration of conformity in this respect was made by the ETA holder. According to this declaration, components of kits supplied do not contain and/or release dangerous substances according to the European and national regulations, when and where in the Member States of destination. Indeed, according to § 5.3.2 of ETAG n. 034, it is stated that:

- Used wood: Not applicable as components of kits do not content and /nor release.
- Biocides: Not applicable as components of kits do not content and /nor release.
- Flame/Fire retardant: For larson ® PE: Not applicable as it does not content and /nor release. For larson ® FR and larson FR® INOX: A declaration signed by applicant has been received at IETcc stating the trade name(s) of the flame/fire retardant(s), the chemical name(s) of the active component(s) and the technical procedure of application.
- Polybromated diphenylether: Not applicable as components of kits do not content and /nor release.
- Formaldehyde: Not applicable as components of kits do not content and/nor release.
- Pentachlorophenol: Not applicable as components of kits do not content and/nor release.
- Man made mineral fibres: Not applicable as components of kits do not No content and no release.
- Ceramic fibres: Not applicable as components of kits do not content and /nor release.
- Cadmium: Not applicable as components of kits do not content and /nor release.

In addition to the specific clauses relating to dangerous substances contained in this ETA, there may be other requirements applicable to the ETICS falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the EU Construction Products Directive, these requirements need also to be complied with, when and where apply.

3.4 Safety in use (BWR 4)

3.4.1 Wind load resistance

3.4.1.1 Wind suction resistance

It has been determined by tests carried out according to ETAG n.034 part 1, § 5.4.1.1 on the following types of rigs, which compositions (7) and results are summarized in Tables 2 to 4.

(7) Characteristics of components are described in Annex A and B

Table 2: Summary of wind suction resistance results of kit ALUCOIL® Riveted Boards					
Rig type	**Test specimen**	**Test Results**			
	Composition	**Load (Pa) (8)**	**Type of failure (9)**	**Deflection (10)(mm)**	
				Permanent d_p	Instantaneous d_i
A.1.1	**Non continuous riveted boards (2 vert. sides)** - Cladding: LxH = 962 x 770 mm (larson® PE). - Perimeter rivets max. vertical distance: 370 mm - Perimeter rivets max. horizontal distance: 932 mm - Border rivets distance: 15 mm - Distance between LCH-1 profiles: 925 mm - Distance between LCH2-brackets: 938 mm	1800	Significant permanent deflection (≥ 3.00 mm)	3.25	36.83
		2200	None. End of test	4.94	44.15
	Non continuous riveted boards (2 vert. sides) - Cladding: LxH = 962 x 770 mm (larson® FR). - Perimeter rivets max. vertical distance: 370 mm - Perimeter rivets max. horizontal distance: 932 mm - Border rivets distance: 15 mm - Distance between LCH-1 profiles: 925 mm - Distance between LCH2-brackets: 938 mm	1600	Significant permanent deflection (≥ 3.00 mm)	3.01	30.44
		2200	None. End of test	4.82	43.87
A.1.2	**Non continuous riveted boards (2 vert. sides)** - Cladding: LxH=962 x 770 mm (larson® INOX FR). - Perimeter rivets max. vertical distance: 370 mm - Perimeter rivets max. horizontal distance: 932 mm - Border rivets distance: 15 mm - Distance between LCH-1 profiles: 925 mm - Distance between LCH2-brackets: 938 mm	1800	Significant permanent deflection (≥ 3.00 mm)	3.90	34.75
		2800	None. End of test	10.18	47.87
A.2.1	**Continuous riveted boards (vertical axe & 2 sides)** - Cladding: LxH=1950x772 mm (larson® PE). - Perimeter rivets max. vertical distance: 370 mm - Perimeter rivets max. horizontal distance: 985 mm - Border rivets distance: 15 mm - Distance between LCH-1 profiles: 925 mm - Distance between LCH2-brackets: 938 mm	1800	Significant permanent deflection (≥ 3.00 mm)	2.99	32.90
		2200	None. End of test	4.86	40.93
	Continuous riveted boards (vertical axe & 2 sides) - Cladding: LxH=1950x772 mm (larson® FR). - Perimeter rivets max. vertical distance: 370 mm - Perimeter rivets max. horizontal distance: 985 mm - Border rivets distance: 15 mm - Distance between LCH-1 profiles: 925 mm - Distance between LCH2-brackets: 938 mm	2000	Significant permanent deflection (≥ 3.00 mm)	3.45	32.80
		2200	None. End of test	4.86	40.93
A.2.2	**Continuous riveted boards (vertical axe and 2 sides)** - Cladding: LxH=1950x770 mm (larson® INOX FR). - Perimeter rivets max. vertical distance: 370 mm - Perimeter rivets max. horizontal distance: 985 mm - Border rivets distance: 15 mm - Distance between LCH-1 profiles: 925 mm - Distance between LCH2-brackets: 938 mm	1200	Significant permanent deflection (≥ 3.00 mm)	3.77	19.18
		3000	None. End of test	--	23.27
A.3.1	**Non continuous riveted boards (4 sides)** - Cladding: LxH=962 x 770 mm (larson® PE). - Perimeter rivets max. vertical distance: 370 mm - Perimeter rivets max. horizontal distance: 466 mm - Border rivets distance: 15 mm - Distance between LCH-1 profiles: 925 mm - Distance between LCH2-brackets: 938 mm	2600	Significant permanent deflection (≥ 3.00 mm)	3.58	19.31
		3200	None. End of test	--	51.28
	Non continuous riveted boards (4 sides) - Cladding: LxH=962 x 770 mm (larson® FR). - Perimeter rivets max. vertical distance: 370 mm - Perimeter rivets max. horizontal distance: 466 mm - Border rivets distance: 15 mm - Distance between LCH-1 profiles: 925 mm - Distance between LCH2-brackets: 938 mm	2400	Significant permanent deflection (≥ 3.00 mm)	3.29	18.27
		3200	None. End of test	--	50.63
A.3.2	**Non continuous riveted boards (4 sides)** - Cladding: LxH=962 x 772 mm (larson® INOX FR). - Perimeter rivets max. vertical distance: 370 mm - Perimeter rivets max. horizontal distance: 466 mm - Border rivets distance: 15 mm - Distance between LCH-1 profiles: 925 mm - Distance between LCH2-brackets: 938 mm	3400	Significant permanent deflection (≥ 3.00 mm). End of test	3.13	21.00
A.4.1	**Continuous riveted boards (vertical axe and 4 sides)** - Cladding: LxH=1950 x 772 mm (LARSON® PE). - Perimeter rivets max. vertical distance: 370 mm - Perimeter rivets max. horizontal distance: 494 mm - Border rivets distance: 15 mm - Distance between LCH-1 profiles: 925 mm - Distance between LCH2-brackets: 938 mm	2400	Significant permanent deflection (≥ 3.00 mm).	3.20	19.72
		3000	None. End of test	4.47	24.35
	Continuous riveted boards (vertical axe and 4 sides) - Cladding: LxH=1950 x 772 mm (larson® FR). - Perimeter rivets max. vertical distance: 370 mm - Perimeter rivets max. horizontal distance: 494 mm - Border rivets distance: 15 mm - Distance between LCH-1 profiles: 925 mm - Distance between LCH2-brackets: 938 mm	2000	Significant permanent deflection (≥ 3.00 mm).	3.23	17.26
		3000	None. End of test	5.99	25.94
A.4.2	**Continuous riveted boards (vertical axe and 4 sides)** - Cladding: LxH=1950 x 772 mm (larson® INOX FR). - Perimeter rivets max. vertical distance: 370 mm - Perimeter rivets max. horizontal distance: 494 mm - Border rivets distance: 15 mm - Distance between LCH-1 profiles: 925 mm - Distance between LCH2-brackets: 938 mm	2000	Significant permanent deflection (≥ 3.00 mm).	3.32	13.95
		3200	None. End of test	5.23	21.50

(8) Maximum admissible load should be calculated taken into account maximum other criteria (e.g. national regulations, ETA holder´s calculation program) if required.

(9) The following type of failures are considered according to ETAG 034: Breakage of any cladding element, failure of fixing, failure of detachment of the frame, and Significant permanent deflection (according to ETA-holder $d_p \geq 3$ mm)

(10) Deflection values (accumulated) have been measured in all cases at centre of front side of cladding elements.

Table 3: Summary of wind suction resistance results of ALUCOIL® Suspended Cassettes (with unreinforced slots)					
Rig type	**Test specimen composition**	**Test Results**			
		Load (Pa) [8]	**Type of failure [9]**	**Deflection (mm) [10]**	
				Permanent d_p	**Instantaneous d_i**
G.1.1	**Cassettes (LxH=962 x 1660 mm), (larson® PE)** - Upper flange: Double return. Lower flange: Simple return. - Lateral flange: Simple return, depth 44,5 mm, 4 slots - Slots: 15 mm width without LCR-45 - Distance between slots: 500 mm - Distance between LCH-1: 985 mm - Distance between LCH-2: 938 mm	1200	Significant permanent deflection (≥ 3.00 mm).	3.06	19.54
		1400	Permanent deformation and buckling of lower horizontal folder	--	--
	Cassettes (LxH=962 x 660 mm), (larson® PE) - Upper flange: Double return. Lower flange: Simple return. - Lateral flange: Simple return, depth 44,5 mm, 2 slots - Slots: 15 mm width without LCR-45 - Distance between slots: 500 mm - Distance between LCH-1: 985 mm - Distance between LCH-2: 938 mm	1200	None	1.53	11.23
		1400	None. End of test	--	--
G.1.2	**Cassettes (LxH=962 x 1660 mm), (larson® FR)** - Upper flange: Double return. Lower flange: Simple return. - Lateral flange: Simple return, depth 44,5 mm, 4 slots - Slots: 15 mm width without LCR-45 - Distance between slots: 500 mm - Distance between LCH-1: 985 mm - Distance between LCH-2: 938 mm	1600	Significant permanent deflection (≥ 3.00 mm).	3.65	35.36
		2000	Permanent deformation and local buckling of lower horizontal folder	--	--
	Cassettes (LxH=962 x 660 mm), (larson® FR) - Upper flange: Double return. Lower flange: Simple return. - Lateral flange: Simple return, depth 44,5 mm, 2 slots - Slots: 15 mm width without LCR-45 - Distance between slots: 500 mm - Distance between LCH-1: 985 mm - Distance between LCH-2: 938 mm	1800	None	1.60	16.37
		2000	None. End of test	--	--
G.1.3	**Cassettes (LxH=900x1660 mm), (larson® INOX FR)** - Upper flange: Double return. Lower flange: Simple return. - Lateral flange: Simple return, depth 44,5 mm, 4 slots - Slots: 15 mm width without LCR-45 - Distance between slots: 500 mm - Distance between LCH-1: 925 mm - Distance between LCH-2: 938 mm	2000	Significant permanent deflection (≥ 3.00 mm).	3.26	25.78
		2400	Permanent deformation and local buckling of lower horizontal folder	--	34.65
	Cassettes (LxH=900 x 660 mm), (larson® INOX FR) - Upper flange: Double return. Lower flange: Simple return. - Lateral flange: Simple return, depth 44,5 mm, 2 slots - Slots: 15 mm width without LCR-45 - Distance between slots: 500 mm - Distance between LCH-1: 925 mm - Distance between LCH-2: 938 mm	2200	None	1.96	13.60
		2400	None. End of test	--	14.92
G.2.1	**Cassettes (LxH=962x1160 mm), (larson® PE)** - Upper flange: Double return. Lower flange: Simple return. - Lateral flange: Simple return, depth 44,5 mm, 3 slots - Slots: 15 mm width without LCR-45 - Distance between slots: 500 mm - Distance between LCH-1: 985 mm - Distance between LCH-2: 938 mm	1800	Significant permanent deflection (≥ 3.00 mm).	4.55	26.14
		2200	Permanent deformation and buckling of lower horizontal folders	18.00	45.23
	Cassettes (LxH=962 x 1160 mm), (larson® FR) - Upper flange: Double return. Lower flange: Simple return. - Lateral flange: Simple return, depth 44,5 mm, 3 slots - Slots: 15 mm width without LCR-45 - Distance between slots: 500 mm - Distance between LCH-1: 985 mm - Distance between LCH-2: 938 mm	1600	Significant permanent deflection (≥ 3.00 mm).	3.31	29.19
		2200	Permanent deformation and buckling of lower horizontal folders	18.00	45.23
G.2.2	**Cassettes (LxH=900x1160 mm), (larson® INOX FR)** - Upper flange: Double return. Lower flange: Simple return. - Lateral flange: Simple return, depth 44,5 mm, 3 slots - Slots: 15 mm width without LCR-45 - Distance between slots: 500 mm - Distance between LCH-1: 925 mm - Distance between LCH-2: 938 mm	2200	None	2.88	22.39
		2400	Significant permanent deflection (≥ 3.00 mm) and local buckling of lower horizontal folders	5.57	34.98

Table 4: Summary of wind suction resistance results of ALUCOIL® Suspended Cassettes (with reinforced slots)					
Rig type	**Test specimen composition**	**Test Results**			
		Load (Pa) [8]	**Type of failure [9]**	**Deflection (mm) [10]**	
				Permanent d_p	**Permanent d_p**
G.3.1	**Cassettes (LxH=962 x 1660 mm), (larson® PE)** - Upper flange: Double return. Lower flange: Simple return. - Lateral flange: Simple return, depth 44,5 mm, 4 slots - Slots: 15 mm width with LCR-45 plate riveted on hidden side - Distance between slots: 500 mm - Distance between LCH-1: 985 mm - Distance between LCH-2: 938 mm	1400	Significant permanent deflection (≥ 3.00 mm)	2.99	30.45
		2200	Deformation and local buckling of lower horizontal folder	--	--
	Cassettes (LxH=962 x 660 mm), (larson® PE) - Upper flange: Double return. Lower flange: Simple return. - Lateral flange: Simple return, depth 44,5 mm, 2 slots - Slots: 15 mm width with LCR-45 plate riveted on hidden side - Distance between slots: 500 mm - Distance between LCH-1: 985 mm - Distance between LCH-2: 938 mm	2000	Significant permanent deflection (≥ 3.00 mm)	3.23	19.35
		2200	None. End of test	--	--
G.3.2	**Cassettes (LxH=962 x 1660 mm), (larson® FR)** - Upper flange: Double return. Lower flange: Simple return. - Lateral flange: Simple return, depth 44,5 mm, 4 slots - Slots: 15 mm width with LCR-45 plate riveted on hidden side - Distance between slots: 500 mm - Distance between LCH-1: 985 mm - Distance between LCH-2: 938 mm	1800	Significant permanent deflection (≥ 3.00 mm)	3.83	37.23
		2800	Deformation and local buckling of lower horizontal folder	--	--
	Cassettes (LxH=962 x 660 mm), (larson® FR) - Upper flange: Double return. Lower flange: Simple return. - Lateral flange: Simple return, depth 44,5 mm, 2 slots - Slots: 15 mm width with LCR-45 plate riveted on hidden side - Distance between slots: 500 mm - Distance between LCH-1: 985 mm - Distance between LCH-2: 938 mm	2600	Significant permanent deflection (≥ 3.00 mm)	4.19	24.56
		2800	None. End of test	--	--
G.3.3	**Cassettes (LxH=900x1660 mm), (larson® INOX FR)** - Upper flange: Double return. Lower flange: Simple return. - Lateral flange: Simple return, depth 44,5 mm, 4 slots - Slots: 15 mm width with LCR-45 plate riveted on hidden side - Distance between slots: 500 mm - Distance between LCH-1: 925 mm - Distance between LCH-2: 938 mm	2400	None	1.95	29.10
		2600	Deformation and local buckling of lower horizontal folder	--	45.99
	Cassettes (LxH=900 x 660 mm), (larson® INOX FR) - Upper flange: Double return. Lower flange: Simple return. - Lateral flange: Simple return, depth 44,5 mm, 2 slots - Slots: 15 mm with LCR-45 plate riveted on hidden side - Distance between slots: 500 mm - Distance between LCH-1: 925 mm - Distance between LCH-2: 938 mm	2400	None	1.12	12.73
		2600	None. End of test	--	--
G.4.1	**Cassettes (LxH=962x1160 mm), (larson® PE)** - Upper flange: Double return. Lower flange: Simple return. - Lateral flange: Simple return, depth 44,5 mm, 3 slots - Slots: 15 mm width with LCR-45 plate riveted on hidden side - Distance between slots: 500 mm - Distance between LCH-1: 985 mm - Distance between LCH-2: 938 mm)	1800	Significant permanent deflection (≥ 3.00 mm)	3.60	23.41
		2600	Permanent deflection and local buckling of lower horizontal folder	--	50.52
	Cassettes (LxH=962 x 1160 mm), (larson® FR) - Upper flange: Double return. Lower flange: Simple return. - Lateral flange: Simple return, depth 44,5 mm, 3 slots - Slots: 15 mm width with LCR-45 plate riveted on hidden side - Distance between slots: 500 mm - Distance between LCH-1: 985 mm - Distance between LCH-2: 938 mm	1600	Significant permanent deflection (≥ 3.00 mm)	5.31	23.85
		2600	Permanent deflection and local buckling of lower horizontal folder	--	50.31
G.4.2	**Cassettes (LxH=900x1160 mm), (larson® INOX FR)** - Upper flange: Double return. Lower flange: Simple return. - Lateral flange: Simple return, depth 44,5 mm, 3 slots - Slots: 15 mm width with LCR-45 plate riveted on hidden side - Distance between slots: 500 mm - Distance between LCH-1: 925 mm - Distance between LCH-2: 938 mm	2400	Significant permanent deflection (≥3.00 mm)	2.92	20.80
		2600	Permanent deflection and local buckling of lower horizontal folder	--	--

3.4.1.2 Wind pressure resistance

The behaviours of kits exposed to wind pressure is most favourable than when exposed wind suction. Therefore, according to paragraph § 5.4.1.2 of ETAG 034, wind pressure test has been avoided and wind pressure resistance of kits can be considered as equal to wind suction resistance.

3.4.2 Mechanical test

3.4.2.1 ALUCOIL® Riveted Boards

3.4.2.1.1 Pull-through resistance of cladding element

Pull-through resistance of cladding element has been tested according to ETAG 034 part 1 section 5.4.2.1.1. The tests have been carried out on the three different types of board samples, 4 mm panel thickness, with a fixing driven through the centre, corner and middle using three diameters of support (180, 250 and 350 mm). Tests results are indicated in Table 5.

Table 5: Pull-through resistance of cladding element

Type of board	Support Ø (mm)	Fixing position	Failure load (N)							Type of failure
			F_1	F_2	F_3	F_4	F_5	F_m	$F_{u,5}$	
larson® PE	180	Centre	1804.4	2430.2	2140.8	2229.4	2439.6	2208.9	1602.5	Rivet breakage
		Border	1172.7	1194.8	1093.0	1107.4	1054	1124.4	988.9	None. Board deformation
		Corner	314.6	283.0	272.7	289.8	293.1	290.6	254.5	None. Board deformation
	250	Centre	2306.8	2463.3	2511.9	2383.6	2470.5	2427.2	2236.7	None. Board deformation
		Border	1028.9	1016.4	1007.2	1013.6	1017.9	1016.8	998.4	None. Board deformation
		Corner	117.5	120.2	122.5	121.2	145.9	125.5	98.5	None. Board deformation
	350	Centre	2479.1	2620.4	2475.3	2664.9	2722.2	2592.4	2333.3	Rivet breakage
		Border	1158.9	1160.2	1190.2	1285.5	1205.6	1200.08	1079.51	None. Board deformation
		Corner	110.7	103.5	106.1	101.4	103.5	105.0	96.7	None. Board deformation
larson® FR	180	Centre	2871.3	2754.4	2693.1	2780.3	2848.4	2789.5	2621.6	Rivet breakage
		Border	1316.0	1184.4	1211.9	1236.5	1247.8	1239.3	1124.4	None. Board deformation
		Corner	373.2	424.6	321.9	348.7	431.6	380.0	269.2	None. Board deformation
	250	Centre	2773.8	2753.2	2881.5	3056.7	2663.6	2825.8	2474.9	Rivet breakage
		Border	1111.0	1083.2	1057.3	1069.2	928.2	1049.8	884.7	None. Board deformation
		Corner	176.0	132.1	133.9	148.7	151.4	148.4	107.3	None. Board deformation
	350	Centre	2988.0	2768.1	2951.0	2822.5	2796.5	2865.2	2636.9	Rivet breakage
		Border	1434.1	1452.4	1502.3	1401.2	927.1	1343.4	794.5	None. Board deformation
		Corner	157.5	143.1	161.3	140.5	147.0	149.9	128.7	None. Board deformation
larson® INOX FR	180	Centre	3032.7	3013.1	3108.2	3124.9	3175.3	3090.8	2934.5	None.Board deformation
		Border	1294.8	1271.2	1329.6	1364.2	1286.2	1309,2	1221.9	Rivet breakage
		Corner	667.0	523.3	522.4	511.8	631.5	571.2	402.3	None. Board deformation
	250	Centre	2632.2	3084.0	2834.1	2530.6	2951.7	2806.5	2278.6	Rivet breakage
		Border	1054.6	1069.8	1077.1	1086.5	1066.3	1070.9	1043.0	None. Board deformation
		Corner	165.4	195.6	169.5	186.1	167.0	176.7	145.5	Board deformation
	350	Centre	3066.7	3061.0	3149.2	2896.7	2987.5	3032.2	2811.0	None. Board deformation
		Border	1633.8	1279.8	1349.0	1342.2	1329.0	1386.8	1058.9	None. Board deformation
		Corner	132.4	175.8	154.9	322.5	160.5	189.2	11.9	None. Board deformation

3.4.2.1.2 Pull-through resistance under shear load

Pull-through resistance under shear load has been tested according to ETAG 034 part 1 section 5.4.2.1.2. The tests have been carried out on three types of specimens corresponding the three types of board evaluated. Tests results are indicated in Table 6.

Table 6: Pull-through resistance under shear load

Type of board	Fixing position	Failure load (N)						
		F_1	F_2	F_3	F_4	F_5	F_m	$F_{u,5}$
larson® PE	Border	2746.3	1884.3	2307.9	2931.3	2577.5	2489.5	1537.2
	Corner	2848.0	2696.3	2938.4	2869.5	2551.0	2780.6	2417.5
larson® FR	Border	2958.8	2940.1	2933.0	2944.6	2976.4	2950.6	2910.4
	Corner	2765.3	3012.7	2914.4	3142.4	3134.5	2993.9	2624.1
larson® INOX FR	Border	2857.6	2462.7	2270.5	2488.5	2426.6	2501.2	1996.8
	Corner	2659.5	1220.2	2429.1	2303.4	2602.5	2242.9	870.9

Note: F_n= individual value; F_m= mean value; $F_{u,5}$= characteristic value giving 75% confidence that 95% of the test results will be higher than this value

3.4.2.2 ALUCOIL® Suspended Cassettes

3.4.2.2.1 Resistance of slot

Mechanical fixing resistance of slots has been tested according to ETAG 034, section 5.4.2.7. Tests results are indicated in Table 7.

Table 7: Mechanical fixing resistance of slots

Type of board	Type of slot	Failure load (N)							
		F_1	F_2	F_3	F_4	F_5	F_6	F_m	$F_{u,5}$
larson® PE	Not reinforced	939	849	979	1009	979	957	952	831
	Reinforced	2011	2160	2013	2104	1992	1867	2025	1805
larson® FR	Not reinforced	1271	1214	1262	1196	1270	1157	1228	1126
	Reinforced	2101	1932	2075	1971	1942	2076	2016	1851
larson® INOX FR	Not reinforced	1401	1320	1603	1482	1661	1498	1494	1220
	Reinforced	2745	2396	2374	2161	2861	2572	2518	1954

3.4.3 Subframe

3.4.3.1 Aluminium profiles

According to paragraph 5.4.2.1 of ETAG 034 part II, following Table 8 summarizes main identification data, including those related to mechanical resistance in accordance to the Standard EN 755-2 [(11)].

Table 8: Mechanical data of aluminium profiles

Profile	Type	Alloy EN AW	Effective moment of area (cm^4)	E modulus (MPa)	Mechanical characteristics (minimum)				
					R_m (MPa)	$R_{p\,0,2}$ (MPa)	A (%)	A_{50mm} (%)	HBW
LC-2	Extruded Ω-shape Wing thickness =2 mm	6063 T5	16.30	70.000	175	130	8	6	60
LCH-1	Extruded Ω-shape Wing thickness = 2 mm	6063 T5	6.02	70.000	175	130	8	6	60

(11) EN 755-8: Aluminium and aluminium alloys - Extruded rod/bar, tube and profiles - Part 2: Mechanical properties

3.4.3.2 Fixings

For fixings connecting the subframe to the wall (anchors), the mechanical characteristics (resistance to tension and shear loads) shall be given from an ETA obtained according to the relevant ETAG. The mechanical characteristics (e.g. resistance to tension and shear loads) required of fixings between profiles/brackets are given in the following Table 9.

Table 9: Mechanical data of fixings

Fixed elements	Description	Geometry EN ISO 15480		Mechanical properties		
LC3 to LC-2 LC3 to LCH-1	Screw ISO 15480 ST 4,8x19 mm	Ø mm 4,8	L mm 19	Class 50 EN ISO *3506-1*	Characteristic tension load 4330 N	Characteristic shear load 2405 N
LCH-1 to LCH-2	Hexagon head screw ISO 4017 – M8x80 -8.8	8	80	8.8	23018 N	25575 N
	Washer ISO 7089 – 8 200 HV	6	--	8.8	--	--
	Hexagonal nut ISO 4032 M8 - 8	8	--	8.8	--	--
LC-1 to LC-2	Hammer head screw 8x17 UNE 17021	Ø mm 8	L mm 17	4.8	Characteristic tension load 11509 N	Characteristic shear load 6394 N
	Hexagon nut EN 1661 M8 – 4.8	8	--	4.8	--	--

3.4.3.3 Brackets

3.4.3.3.1 Resistance to horizontal load (tension)

Resistance of brackets and their fixings under tension and shear loads was determined by calculation (12) according to the specifications defined in the annex E of ETAG 034 part 2. The results are indicated in Tables 10 and 11.

Table 10: Resistance to horizontal load (tension) of brackets

Brackets (Depth of wing perpendicular to substrate)	Results		Remarks
	F_{1d} (daN) ΔL=1mm	F_s (daN) failure	
LC-1 (L-shape wing, thickness 3 mm depth:70 mm)	127	No breakage. Purposeless	Results extended to LC-1 brackets with respective depth wing of 85, 100, 115, and 135 mm
LC-1 (L-shape wing, thickness 3 mm depth:155 mm)	130	No breakage. Purposeless	--
LCH-2 (U-shape wing, thickness 3 mm depth:50 mm)	465	No breakage. Purposeless	Results extended to LCH-2 brackets with depth wing of 70, 90, 110, and 130 mm
LCH-2 (U-shape wing, thickness 3 mm depth: 150 mm)	455	No breakage. Purposeless	--

Table 11: Resistance to vertical load (shear) of bracket

Brackets (Depth of wing perpendicular to substrate)	Results				Remarks
	F_r (daN) ΔL=0,2%.L mm	F_{1d} (daN) ΔL=1mm	F_{1d} (daN) ΔL=3mm	F_s (daN) failure	
LC-1 (L-shape wing, thickness 3 mm; depth: 85 mm)	36	48	55	No breakage. Purposeless	Results extended to LC-1 brackets of depth wing ≤ 85 mm
LC-1 (L-shape wing, thickness 3 mm; depth: 115 mm)	25.5	32	37.5	No breakage. Purposeless	Results extended to LC-1 brackets of depth wing 85 < D ≤ 115 mm
LC-1 (L-shape wing, thickness 3 mm; depth: 155 mm)	19	22.5	26	No breakage. Purposeless	Results extended to LC-1 brackets of depth wing 115<D≤ 155 mm
LCH-2 (U-shape wing, thickness 3 mm; depth:70 mm)	160	215	230	No breakage. Purposeless	Results extended to LCH-2 brackets of depth wing <D≤ 70 mm
LCH-2 (U-shape wing, thickness 3 mm; depth 110 mm)	85	105	115	No breakage. Purposeless	Results extended to LC-1 brackets of depth wing 70 < D ≤ 110 m
LCH-2 (U-shape wing, thickness 3 mm; depth 150 mm)	56	69	74	No breakage. Purposeless	Results extended to LC-1 brackets of depth wing 110 < D ≤ 150 m

(12) Calculation carried out by FEM using COMSOL software (mesh # 3mm), including profiles and complementary elements.

3.4.4 Resistance to horizontal point loads

Both of the kit configurations (riveted boards and suspended cassettes) have acceptable resistance to horizontal point loads as no permanent deformation on any component was visually appreciated after tests.

3.4.5 Impact resistance

Impact resistances of the most unfavourable configurations were tested and classified according to the method indicated in section 5.4.4 of ETAG 034 part 1. Results and use categories obtained are described below in Table 12. In any case, cladding product presented sharp or cutting edges or surfaces able to cause injury to occupants or people nearby.

Table 12: Impact resistance

Impacts			**Riveted boards (riveted on two sides only)**			**Suspended cassettes with not reinforced slots**		
			larson® PE	larson® FR	larson® INOX FR	larson® PE	larson® FR	larson® INOX FR
hard body impact	**1J**	**0. 5 kg**	No deterioration (superficial damage without cracking)			No deterioration (superficial damage without cracking)		
	3J	**0.5 kg**						
	10J	**1.0 kg**						
soft body impact	**10J**	**3.0 kg**						
	60J	**3.0 kg**						
	300J	**50 kg**	No deterioration (significant permanent deflection without cracking)			No deterioration (significant permanent deflection without cracking)		
	400J	**50 kg**						
Use category			(I) A zone readily accessible at ground level to the public and vulnerable to hard body impacts but not subjected to abnormally rough 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.		

3.4.6 Resistance to seismic actions

This performance has been assessed according to French regulations by CSTB on four sides riveted boards and suspended cassettes made of larson® panels. Tests results obtained are summarized below in Table 13:

Table 13: Resistance to seismic actions

Type of board	**Riveted boards (four sides) fixed to substructure (LC-1 and LC-2)** Test report EEM 11 260035594/A		**Suspended cassettes with not reinforced slots fixed to substructure (LC-1 and LC-2)** Test report EEM 11 260035594/B	
larson® PE	Perpendicular load to substrate	Failure of one rivet at the beginning of cycles Failure of 4 brackets at the end of tests	Perpendicular load to substrate	Breakage of slot´s protection
	Parallel load to substrate	No deterioration No detachment of elements	Parallel load to substrate	No deterioration No detachment of elements
larson® FR	No Performance Determined (NPD)		No Performance Determined (NPD)	
larson® INOX FR				

3.4.7 Hygrothermal behaviour

This performance is considered as not relevant for ventilated cladding kit based on discontinuous cladding elements made of thin metallic composite panels.

3.5 Protection against noise (BWR 5)

No performance determined.

3.6 Energy economy and heat retention (BWR 6)

No performance determined.

3.7 Sustainable use of natural resources (BWR 7)

No performance determined

3.8 Aspects of durability and serviceability

According to § 5.7 of ETAG 034 part 1, the assessment of cladding elements (based on TMCP) was carried out according to EOTA TR 038, and complementary for other according to ETAG 034 part 2. The statement of characteristics are summarized below in the following Tables 14 to 19:

3.8.1 Decay of mechanical resistance after thermal ageing:

Table 14: Decay of delamination resistance by peeling test				
Type of board	**Panel thickness (mm)**	**Mean value of peeling resistance after ageing**		**Remarks**
		Front sheet	**Rear sheet**	
larson® PE	4	> 75% Initial value	> 75% Initial value	No cracks, or breakage
larson® FR	4	> 75% Initial value	> 75% Initial value	
larson® INOX FR	4	> 75% Initial value	> 75% Initial value	

3.8.1.1 Decay of mechanical resistance after exposure to water

a) Immersion in boiling water 6 h at 90º C

Table 15: Decay of delamination resistance by peeling test				
PANEL TYPE	**PANEL THICKNESS (mm)**	**Mean value of peeling resistance after ageing**		**Remarks**
		Front sheet	**Rear sheet**	
larson® PE	4	> 75% Initial value	> 75% Initial value	No cracks, or breakage
larson® FR	4	> 75% Initial value	> 75% Initial value	
larson® INOX FR	4	> 75% Initial value	> 75% Initial value	

b) Immersion in water 500 h at 20º C

Table 16:- Decay of delamination resistance by peeling test				
Type of board	**Panel thickness (mm)**	**Mean value of peeling resistance after ageing**		**Mean value of peeling resistance after ageing**
		Front sheet	**Front sheet**	
larson® PE	4	> 75% Initial value	> 75% Initial value	No cracks, or breakage
larson® FR	4	> 75% Initial value	> 75% Initial value	
larson® INOX FR	4	> 75% Initial value	> 75% Initial value	

3.8.2 Decay of mechanical resistance after exposure to frost

Table 17: Decay of delamination resistance by peeling test				
Type of board	**Panel thickness (mm)**	**Mean value of peeling resistance after ageing**		**Remarks**
		Front sheet	**Rear sheet**	
larson® PE	4	> 75% Initial value	> 75% Initial value	No cracks, or breakage
larson® FR	4	> 75% Initial value	> 75% Initial value	
larson® INOX FR	4	> 75% Initial value	> 75% Initial value	

3.8.3 Decay of mechanical resistance after exposure to heat

3.8.3.1 Long term exposure to heat (2.500 h. at hot dry air at 80º C)

Table 18: Decay of delamination resistance by peeling test				
Type of board	**Panel thickness (mm)**	**Mean value of peeling resistance after ageing**		**Remarks**
		Front sheet	**Rear sheet**	
larson® PE	4	> 75% Initial value	> 75% Initial value	No cracks, or breakage
larson® FR	4	> 75% Initial value	> 75% Initial value	
larson® INOX FR	4	> 75% Initial value	> 75% Initial value	

3.8.3.2 Short term exposure to heat (1 h. at hot dry air at 80º C)

Table 19: Decay of delamination resistance by peeling test			
Type of board	**Panel thickness (mm)**	**Mean value of decay of flexural stiffness (Increase of deflection at centre of van)**	**Remarks**
		Front sheet	
larson® PE	4	< 1.25 x Initial value	No cracks, breakage or delamination
larson® FR	4	< 1.25 x Initial value	
larson® INOX FR	4	< 1.25 x Initial value	

3.8.4 Fatigue

The resistance to fatigue of cladding components are described in the following Tables 20 and 21:

3.8.4.1 Resistance of routed and returned edge of cassette

Table 20: Decay of resistance to pull out pulsating loads				
Decay	**Type of board**	**Panel thickness (mm)**	**Load (N)**	**Remarks**
			Aged characteristic force F_{ck}	
TPB test Flexural pull out pulsating loads o	larson® PE	4	> 75% Initial value	No cracks, breakage or delamination
	larson® FR	4	> 75% Initial value	
	larson® INOX FR	4	> 75% Initial value	

3.8.4.2 Resistance of slot of cassette and its fixing device

Table 21: Decay of resistance to pull out pulsating loads				
Decay	**Type of board**	**Panel thickness (mm)**	**Load (N)**	**Remarks**
			Aged characteristic force F_{ck}	
Reinforced slot of vertical flange of cassette on screwed hunger	larson® PE	4	> 75% Initial value	No cracks, breakage or delamination
	larson® FR	4	> 75% Initial value	
	larson® INOX FR	4	> 75% Initial value	

3.8.5 Corrosion

The corrosion resistance of cladding components are described in the following Tables 22 to 24:

3.8.5.1 Corrosion resistance of cladding elements

Table 22: Corrosion resistance of cladding element made of stainless steel														
Component			**Type of ambient [13] and category of corrosion[14] (Table A.1 of EN 1993-1-4:2012)**											
Cladding material	**Material**		**Rural**			**Urban**			**Industrial**			**Marine**		
			Low	Med	High	Low	Med	High	Low	Med.	High	Low	Med.	High
larson® FR INOX 4mm	Front sheet	Stainless steel (Austenitic) (AISI 316) EN 1.4401	O	O	O	O	Y	Y	Y	Y	(Y)	Y	Y	(Y)
	Back sheet	Stainless steel (Austenitic) (AISI 304) EN 1.4301	Y	Y	Y	Y	Y	(Y)	(Y)	(Y)	(Y)	Y	(Y)	(Y)

(13) Key: Low: Minimum corrosion conditions for each type of ambient (e.g. where low moisture or temperature is given). / Medium: Typical conditions for this type of ambient. / High: Probable higher corrosion than typical for type of ambient, increased where high temperature or moisture or particularly aggressive air contaminant agents are given)
(14) Key: O: Potentially overestimated from corrosion resistance point of view / Y: Probably best election between resistance to corrosion and cost / (Y) May required adequate precautions

Table 23: Corrosion resistance of cladding element made of coil coated aluminium		
Component		Category according to EN 1396 [15]
Cladding material	Material	
larson® PE 4 mm	PVDF Bi-layered	Satisfactory**
larson® FR 4 mm	PVDF Tri-layered	

** Key: Equivalent to a corrosion resistance index 3 according to EN 1396: Aluminium and aluminium alloys. Coil coated sheet and strip for general applications. Specifications.

3.8.5.2 Corrosion resistance of subframe and cladding fixings elements

Table 24: Corrosion resistance of subframe components and cladding fixings made of aluminium profiles				
Profile	Type	Alloy EN AW	Protection	Corrosion resistance (Eurocode 9) [16]
LC-2	Extruded Ω-shape Wing thickness: 2 mm	6063 T5	Raw finished	Durability rating: B
LCH-1	Extruded Ω-shape Wing thickness: 2 mm	6063 T5	Raw finished	Durability rating: B
LC-1	Folded L-shape sheet Thickness: 3 mm	1050 H24	Raw finished	Durability rating: B
LCH-2	Folded L-shape sheet Thickness: 3 mm	1050 H24	Raw finished	Durability rating: B
Key: According to chapter 4 Durability of Eurocode 9, under normal atmospheric conditions (e.g. rural, moderate industrial or urban areas), aluminium alloys profiles as listed above can be used without the need for surface protection to avoid loss of bearing capacity. Please contact to ETA holder for further information in case of different atmospheric conditions				

3.8.5.3 Electrochemical compatibility between subframe components:

In severe environments, especially those with a high chloride content, attention must be paid to the risk of galvanic corrosion. Some form of insulation between aluminium and more noble metals (e.g. carbon steel, stainless steel, copper) is recommended.

3.9. Retention of bright and colour

No performance determined

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

4.1 System of assessment and verification of constancy of performances

According to the decision 2003/640/EC of the European Commission [17] 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:

Table 27: System AVCP applied			
Product(s)	Intended use(s)	Level(s) or class(es)	System(s)
Alucoil® Suspended cassettes Alucoil® Riveted boards	kit for external wall claddings	All / any	2+

(15) EN 1396:2007. Aluminium and aluminium alloys. Coil coated sheet and strip for general applications. Specifications
(16) (Eurocode 9): EN 1999-1-1:2007+A1:2009 Design of aluminium structures. General structural rules. Annex C. Table.C.1. and Table 3.1
(17) Published in the Official Journal of the European Union (OJEU) L226/21 of 10.09.2003 See www.new.eur-lex.europa.eu/oj/direct-access.html)

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

The ETA is issued for this kit on the basis of agreed data/information which identifies the product that has been assessed and judged. Detailed description and conditions of the manufacturing process of the kit, and all the relevant design and installation criteria of this kit are specified in the manufacturer's technical documentation deposited with the IETcc. The main aspects of this information are specified in the following sections. It is the manufacturer's responsibility to make sure that all those who use the kit are appropriately informed of specific conditions according to sections 1, 2, 4 and 5 including the annexes of this ETA.

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

c/ Serrano Galvache n. 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, 30th August 2017

Marta Castellote Armero
Director

Annex A: Figures

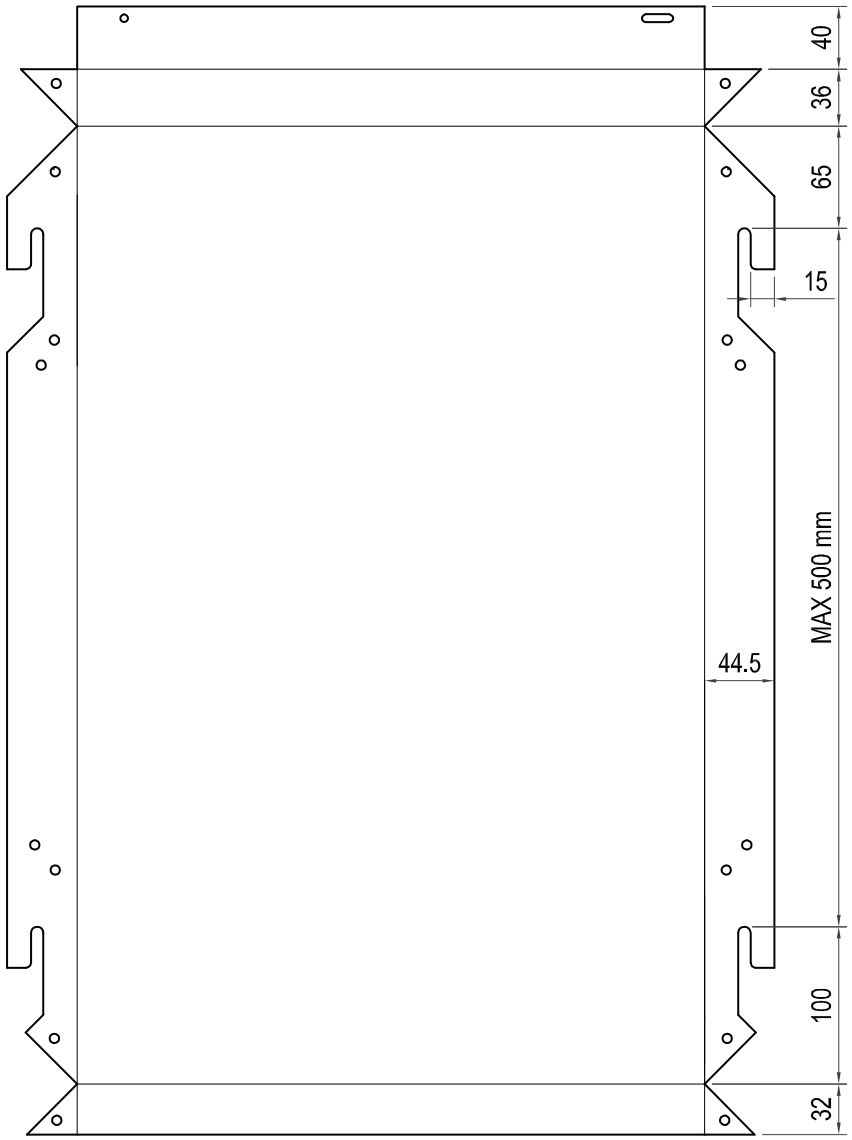


Fig. 0a. General View

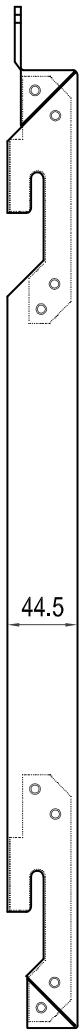


Fig. 0b. Lateral view

A0: Unfolded cassette dimensions
(Kit ALUCOIL® Suspended Cassettes)

Annex A (continuation):

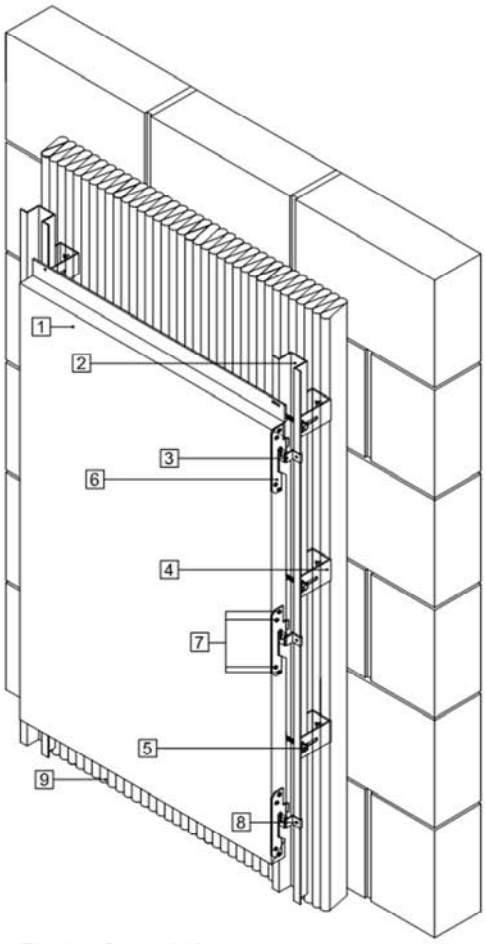


Fig. 1a. General View

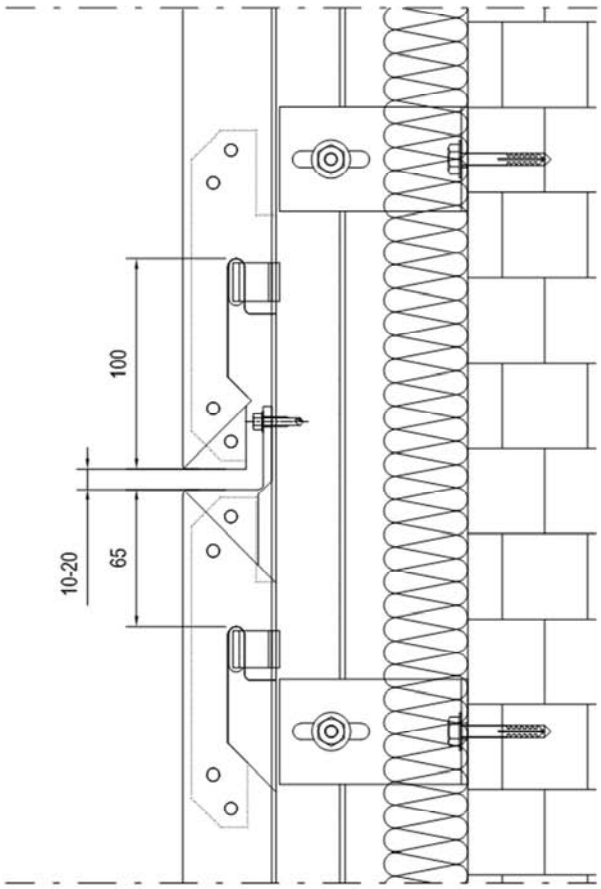
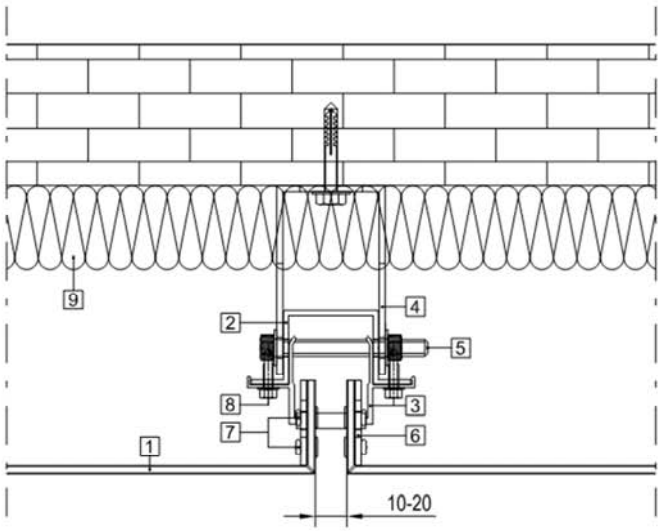


Fig. 1b. Vertical section

Fig. 1c. Horizontal section



Remarks (dimensions in mm)

1. **Iarson®Composite Panel**
2. LCH-1 Profile
3. Slot LC-3 with rubber
4. Bracket LCH-2
5. Bolt M8x80 8,8 (DIN 931) galvanized steel + hexagonal nuts and washers (DIN 934 and DIN 125)
6. a) Plates 36mm x 36mm x 3mm, made from aluminium sheets, used to shape the cassettes
   b) LCR-45 reinforcement (3mm thickness)
7. Blind rivet DIN 7337 4,8x12 K9,5 Alu/Stainless St
8. Self tapping screws ISO 15480 ST 4,8x19mm A2/50
9. Isolation

A1: Cladding kit based on suspended cassettes plus subframe composed of LCH-1 and LCH-2
(Kit ALUCOIL® Suspended Cassettes)

Annex A (continuation):

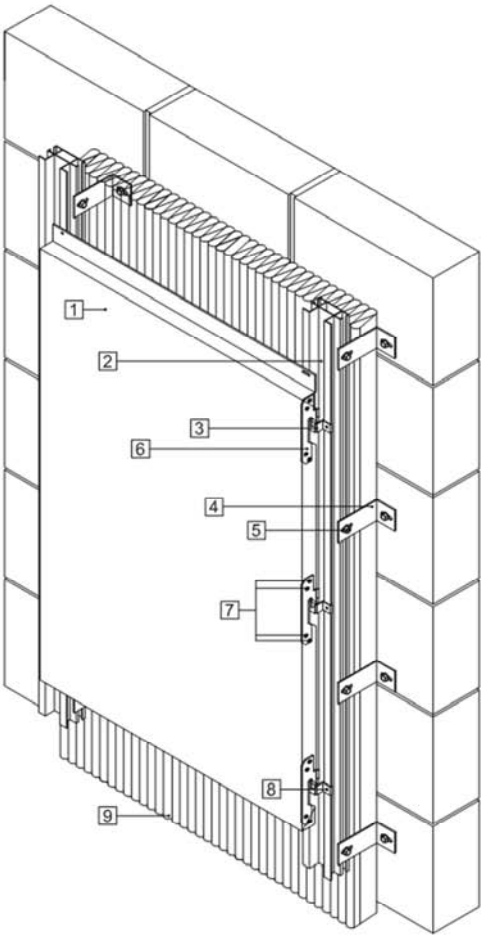


Fig. 2a. General View

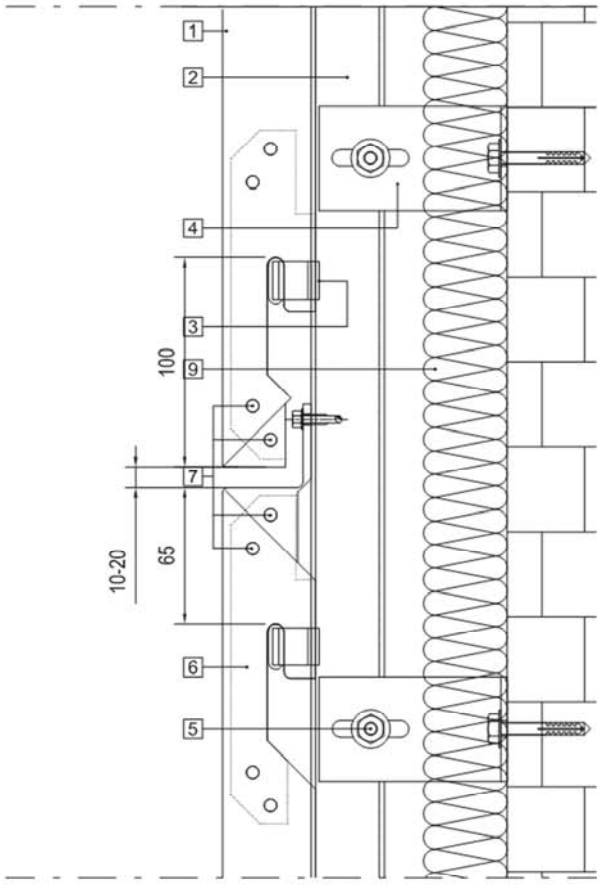
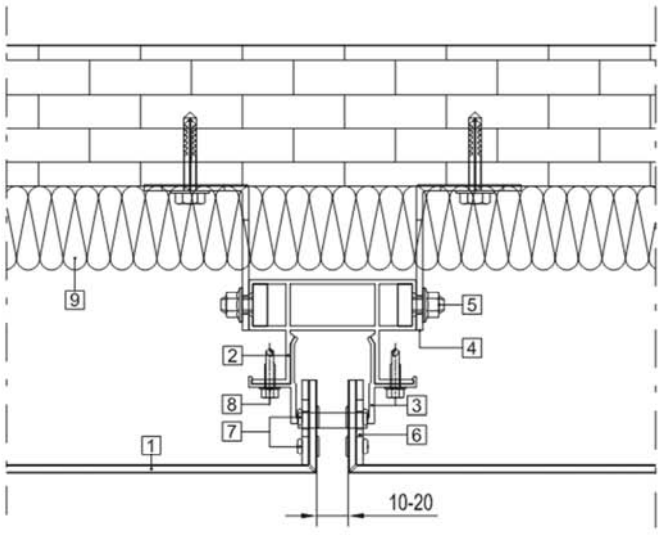


Fig. 2b. Vertical section

Fig. 2c. Horizontal section



Remarks (dimensions in mm)

1. **Iarson®Composite Panel**
2. LC-2 Profile
3. Slot LC-3 with rubber
4. Bracket LC-1
5. Hammer-head screw, plus hexagonal threaned nut
6. a) Plates 36mm x 36mm x 3mm, made from aluminium sheets , used to shape the cassettes
   b) LCR-45 reinforcement (3mm thickness)
7. Blind rivet DIN 7337 4,8x12 K9,5 Alu/Stainless St
8. Self tapping screws ISO 15480 ST 4,8x19mm A2/50
9. Isolation

A2: Cladding kit based on suspended cassettes plus subframe composed of profiles LC-1 and LC-2
(Kit ALUCOIL® Suspended Cassettes)

Annex A (continuation):

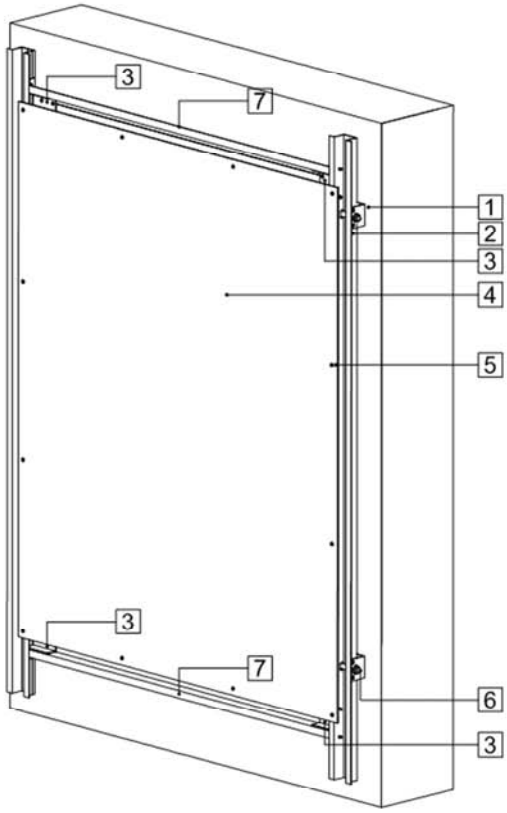


Fig. 3a. General View

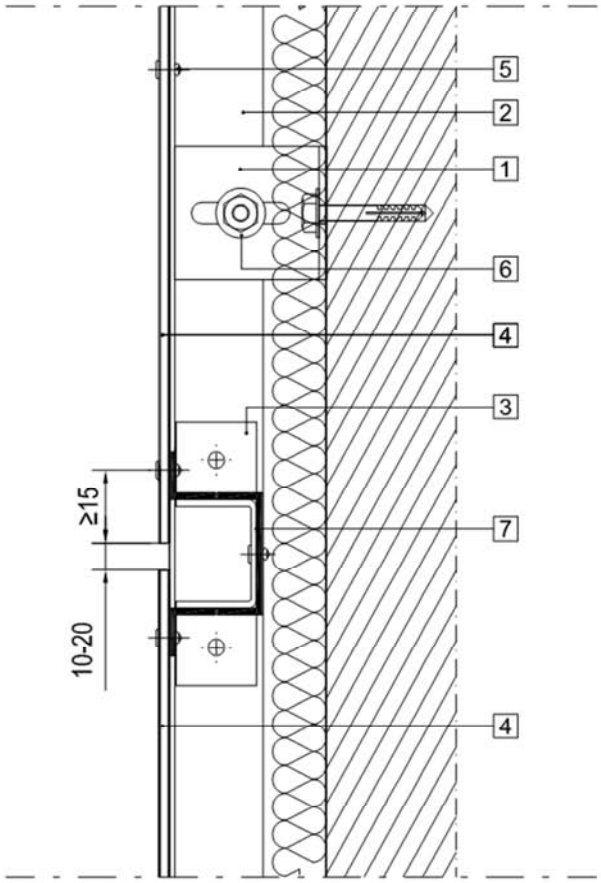
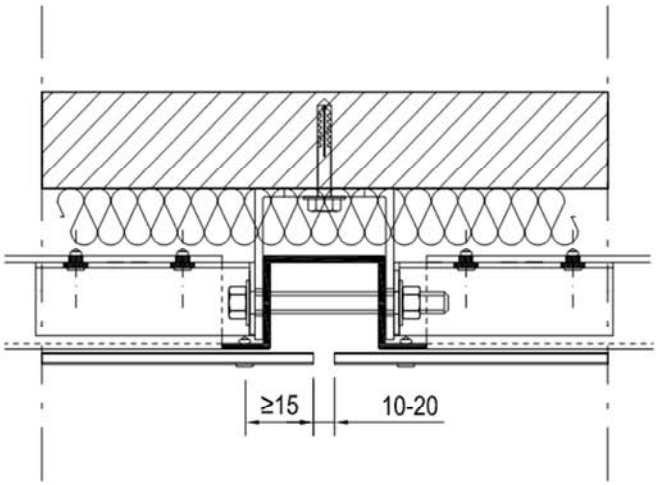


Fig. 3b. Vertical section

Fig. 3c. Horizontal section



Remarks (dimensions in mm)

1. Upper bracket (LCH-2)
2. Vertical profile (ref. LCH-1)
3. Piece for union of vertical and horizontal profiles (LC-13)
4. Riveted board made of **larson®**
5. Rivet (dilatation or fixed point)
6. Threaded bolt, washer and nut
7. Horizontal profile (ref. LCH-1)

A3: Cladding kit based on bidirectionally riveted boards plus subframe (profiles LCH-1 and brackets LCH-2)
(Kit ALUCOIL® Riveted Boards)

Annex A (continuation):

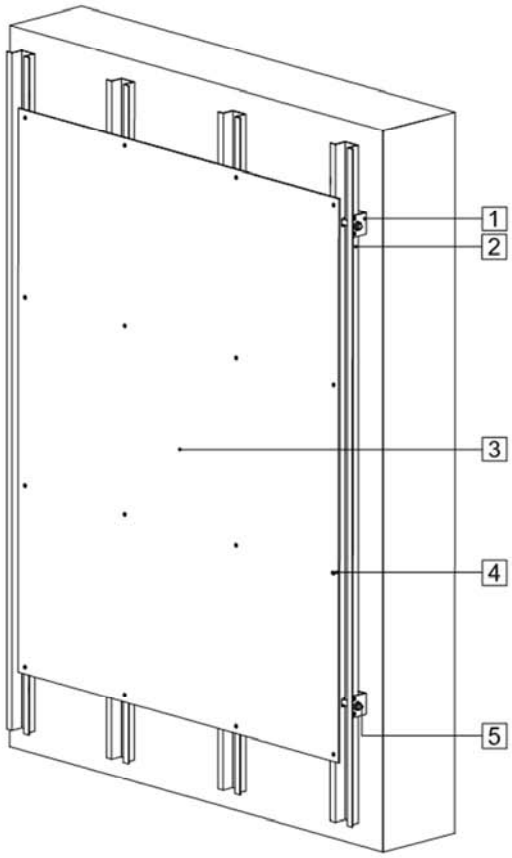


Fig. 4a. General View

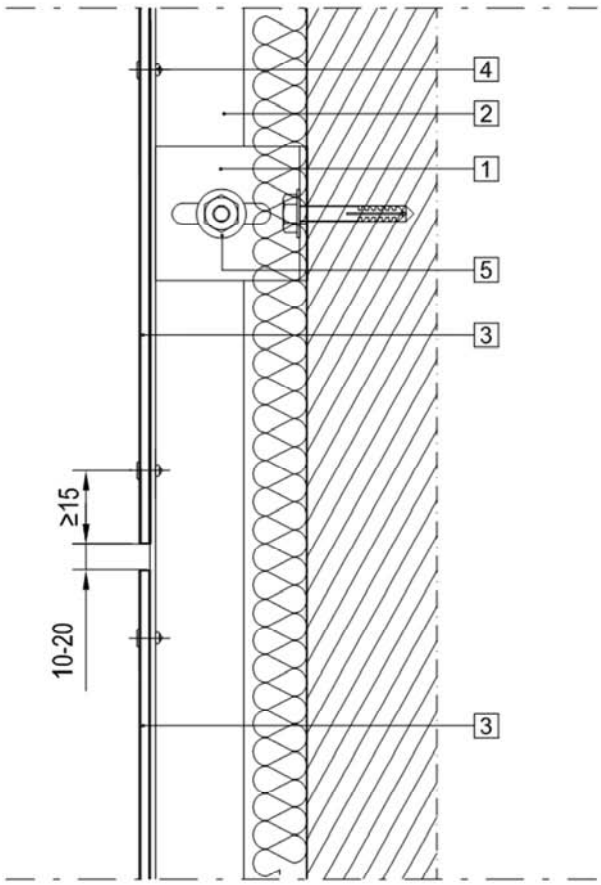
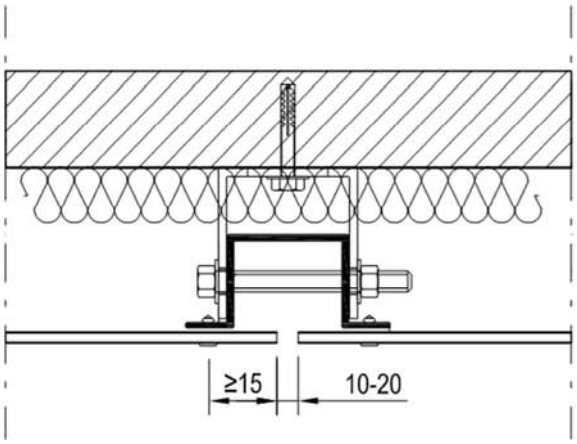


Fig. 4b. Vertical section

Fig. 4c. Horizontal section



Remarks (dimensions in mm)

1. Upper bracket (LCH-2)
2. Vertical profile (ref. LCH-1)
3. Riveted board made of **larson**®
4. Rivet (dilatation or fixed point)
5. Threaded bolt, washer and nut

A4: Cladding kit based on vertically riveted boards plus subframe (profiles LCH-1 and brackets LCH-2)
(Kit ALUCOIL® Riveted Boards)

Annex A (continuation):

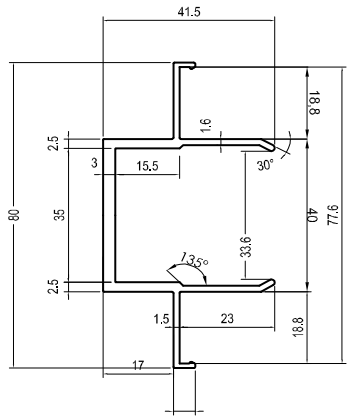


Fig. 5. Hanger LC-3
(horizontal section)

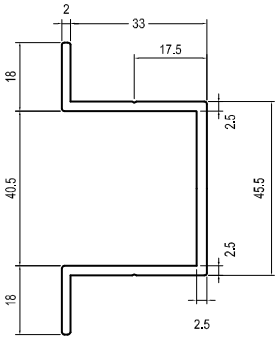


Fig. 6. Profile LCH-1
(horizontal section)

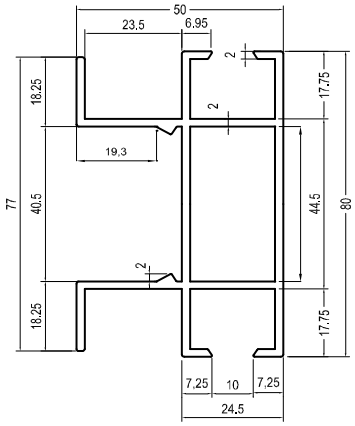


Fig. 7. Profile LC-2
(horizontal section)

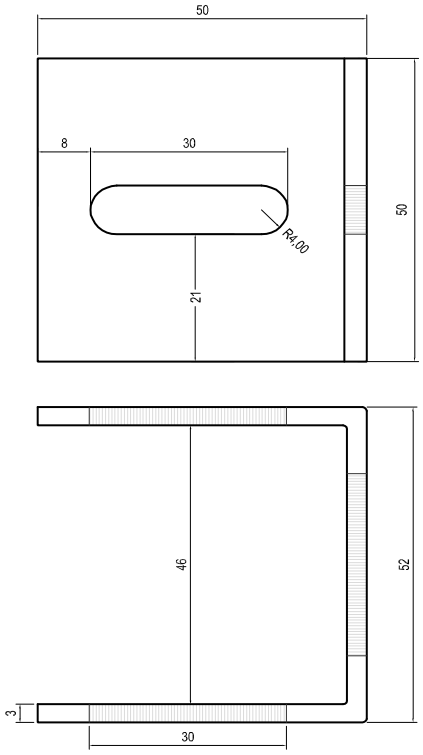


Fig. 8. Example of bracket LCH-2

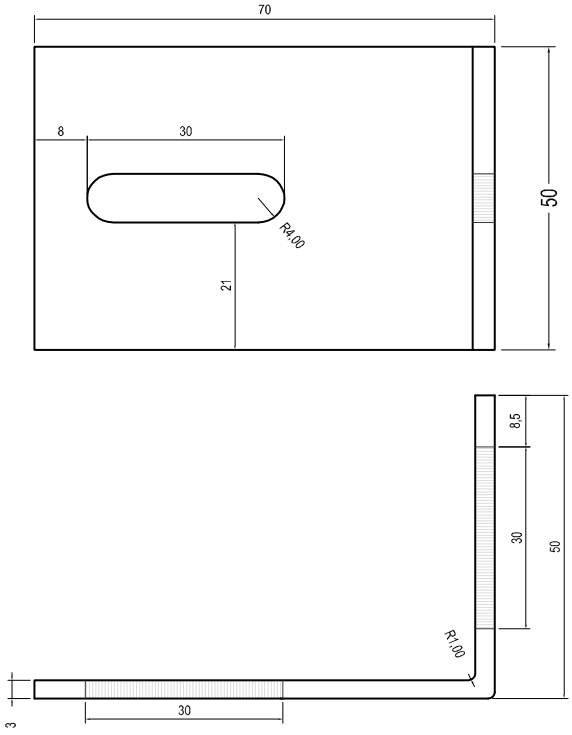


Fig. 9. Example of bracket LC-1

A5: Cladding fixings and subframe components of Kit ALUCOIL® Suspended Cassettes. Examples of brackets

Annex A (continuation):

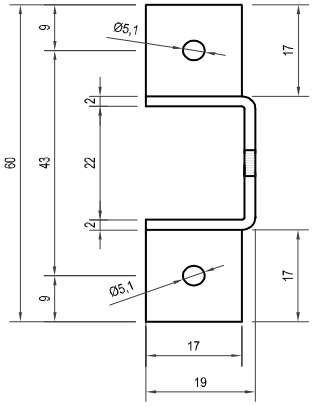


Fig. 10b. T-Piece (transversal section)

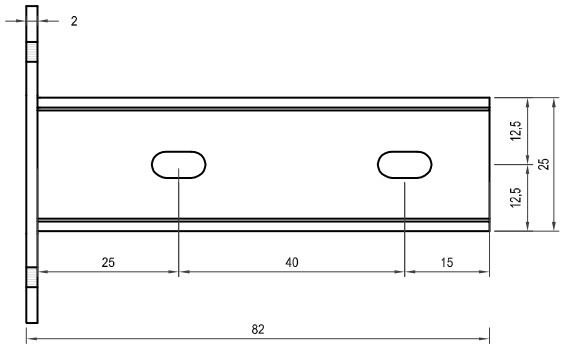
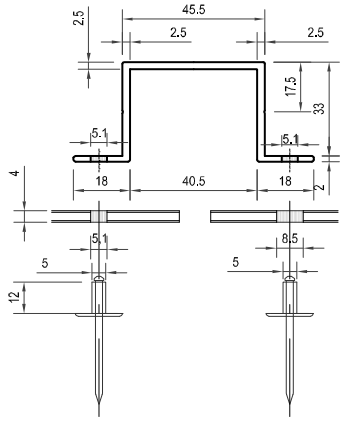


Fig. 10b. T-Piece (longitudinal section)



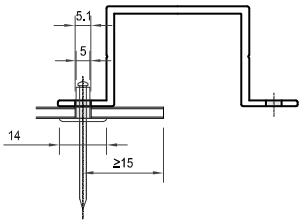


Fig. 11a. Type of fixing rivets (fixed point)

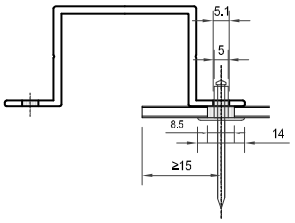


Fig. 11b. Type of fixing rivets (dilatation point)

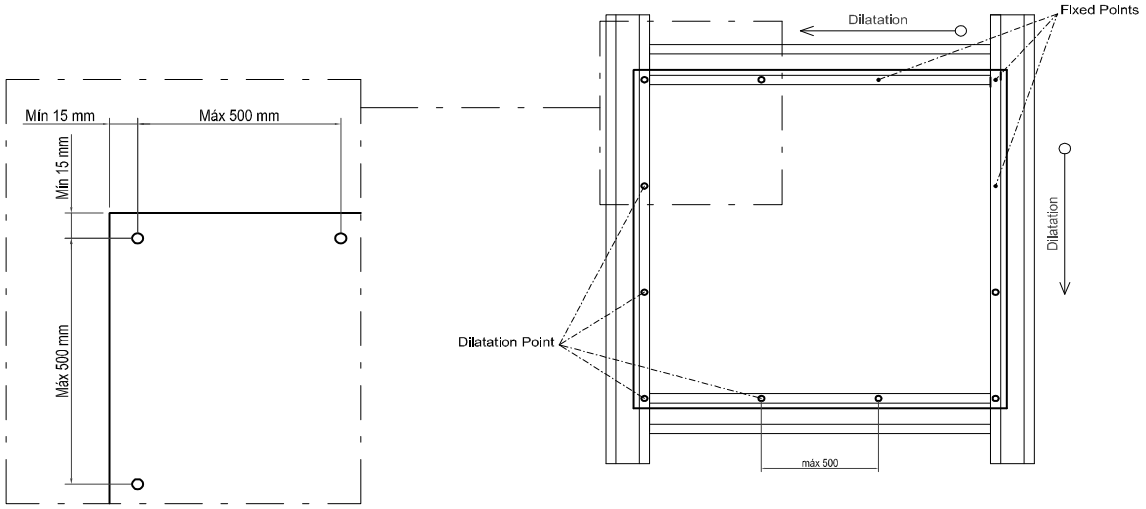


Fig. 12. Example - scheme for riveting

A6: Cladding fixings and subframe components of cladding kit based on riveted boards
(Kit ALUCOIL® Riveted Boards)

Annex B: Complementary physical and mechanical data of cladding kit elements

Table 28: Physical declared data of cladding components			
Panel	**Material**	**Characteristics**	**Value**
larson® PE 4mm	Removable protection film	Aspect: Thickness (µm):	White and blue 100
	Coating layer (PVDF)	Thickness bi-layer (µm) Thickness three-layer(µm) :	25 37
	External sheet of alloyed aluminium EN AW 5005 H22	Thickness (mm): Linear thermal expansion coefficient (K^{-1}):	0.5 23 x 10^{-6}
	Core of low density polyethylene	Aspect: Thickness (mm):	Black 3
	Rear sheet of alloyed aluminium EN AW 5005 H22	Thickness (mm): Linear thermal expansion coefficient (K^{-1}):	0.5 23 x 10^{-6}
	Coating layer (transparent)	Thickness (µm):	Confidential (Annex C)
larson® FR 4mm	Removable protection film	Aspect: Thickness (µm):	**White and blue** 100
	Coating layer (PVDF)	Thickness bi-layer (µm) Thickness three-layer(µm) :	25 37
	External sheet of alloyed aluminium EN AW 5005 H22	Thickness (mm): Linear thermal expansion coefficient (K^{-1}):	0.5 23 x 10^{-6}
	Core made of mineral compounds and low density polyethylene	Aspect: Thickness (mm):	Grey 3
	Rear sheet of alloyed aluminium EN AW 5005 H22	Thickness (mm): Linear thermal expansion coefficient (K^{-1}):	0.5 23 x 10^{-6}
	Coating layer (transparent)	Thickness (µm):	Confidential (Annex C)
larson® INOX FR 4mm	Removable protection film	Aspect: Thickness (mm):	Thickness 100 µm
	External sheet of stainless steel EN 1.4401	Thickness (mm): Linear thermal expansion coefficient (K^{-1}):	0.2 16 x 10^{-6}
	Core (LDPE+mineral)	Aspect: Thickness (mm):	Grey 3.6
	Rear sheet of stainless steel EN 1.4301	Thickness (mm): Linear thermal expansion coefficient (K^{-1}):	0,2 16.10^{-6}

Table 29: Mechanical declared data of cladding material			
Panel	**Material**	**Characteristic**	**Value**
LARSON® PE 4mm LARSON® FR 4mm	Alloyed aluminium sheet EN AW 5005 H22	E Modulus (MPa)	70.000
		Tensile strength R_m (MPa)	≥ 125
		Yield strength R_p 0,2 (MPa)	80
		Elongation A_{50} (%)	≥ 7
	Peeling resistance between sheet (external or rear) and core (N.mm/mm)		> 500 (test done in 25 mm)
	Flexural stiffness of Panel EI (kN*cm2/m) (equivalent test values)		PE 1846 / FR 2150
LARSON® INOX FR 4mm	External sheet Stainless steel EN1.4401	E Modulus (MPa)	200.000
		Tensile strength R_m (MPa)	520
		Yield strength R_p 0,2 (MPa)	220
		Elongation A_{50} (%)	≥ 40
	Rear sheet Stainless steel EN1.4301	E Modulus (MPa)	200.000
		Tensile strength R_m (MPa)	520
		Yield strength R_p 0,2 (MPa)	210
		Elongation A_{50} (%)	45
	Peeling resistance between sheet (external or rear) and core (N.mm/mm)		> 500 (test done in 25 mm)
	Flexural stiffness of Panel EI (kN*cm2/m) (equivalent test values)		3174

Table 30: Mechanical and physical data of brackets								
Brackets	**Type**	**Material**	**E modulus (MPa)**	**Mechanical characteristics**				
				R_m (MPa)	**$R_{p\ 0,2}$ (MPa)**	**A_{50mm} (%)**	**Coef. Thermal expansion (K^{-1})**	**HB**
LC-1 LCH-2	Folded sheet	Allied aluminium EN AW1050 A H24	70.000	150	140	> 100	23 x 10^{-6}	43

Annex C: Quality control of components of kits manufactured by suppliers or holder

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