larson®
by Alucoil®

Technical Information

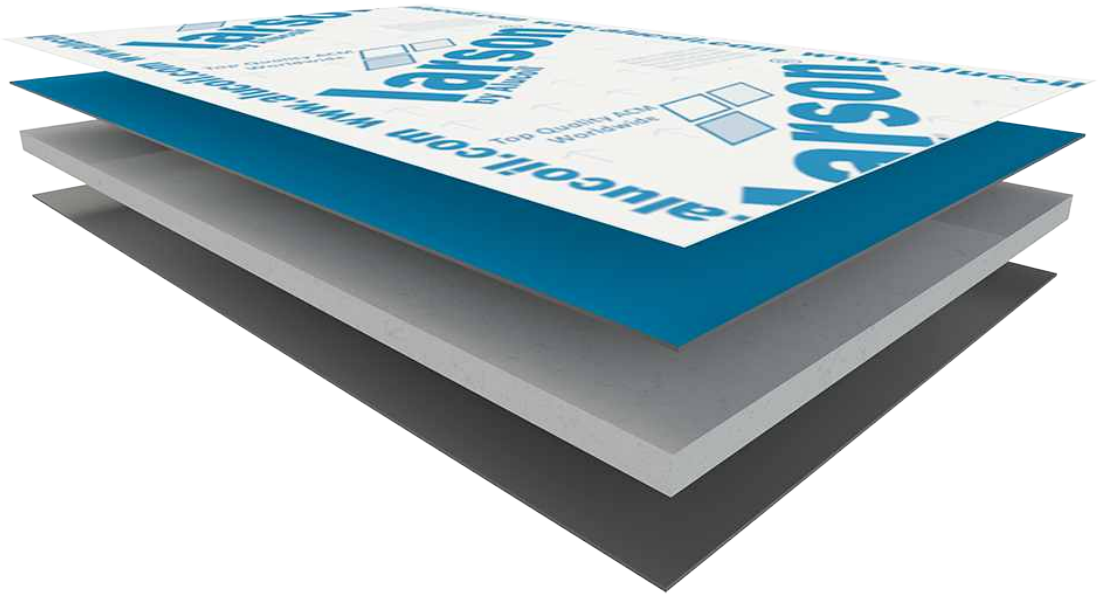
Aluminium Composite Panel for Architectural Wall Cladding
Top Quality ACM - Worldwide

Alucoil®
Grupo Alibérico

larson®
by Alucoil®

Aluminium Composite Panel for Architectural Wall Claddings

Top Quality ACM - Worldwide



Alucoil®
Grupo Alibérico

Polígono Industrial de Bayas - C/Ircio. Parcelas R72-77
09200 Miranda de Ebro, Burgos. SPAIN
Tlf: +34 947 333 320 Fax: +34 947 324 913
info@alucoil.com

www.alucoil.com

Summary

larson®
by Alucoil®
Top Quality ACM - Worldwide

1. Product description

1.1 larson®
1.2 larson® wood
1.3 larson® metals
1.4 larson® Illusions

1.1 larson®

larson® FR aluminium composite panel formed by two aluminium sheets, 5005 alloy, bonded by a mineral fire retardant (FR) core. Thanks to internal developments of our R&D department in Miranda de Ebro, Spain, **Alucoil®** has matured a core that delays panel combustion which allows this material to achieve B-s1, d0 classification, according to EN 13501-1 standard.

larson® PE composite panel, formed, as well, by two aluminium sheets 5005 alloy but bonded by a thermoplastic resin core (polyethylene PE). This product is meant to be used only in low buildings, canopies, signalization and corporate identity. (**Alucoil®** does not recommend the use of this product in high rise building, limited by specific standards in each country).

larson® A2 is the new aluminium composite panel developed by the **Alucoil**´s R&D department for the architectural façade execution. This panel has been developed to be used in those countries whose regulations prevent from the use of other kind of composite panel which does not have A2-s1, d0 classification available. **Alucoil®** has achieved A2-s1, d0 classification according EN 13501-1.

larson®, doubles that of the industry standard parameters for any ACM product. It can be easily machined, transformed, drilled, perforated or curved. Its strength by design does not however limit its breadth of design capabilities. For this reason, it has the widest range of coated finishes in the market from the highest quality in liquid PVdF 70% Kynar 500 2 layers with **COASTAL PRIMER** 31µ or 3 layers 37µ.

1.2 larson® wood

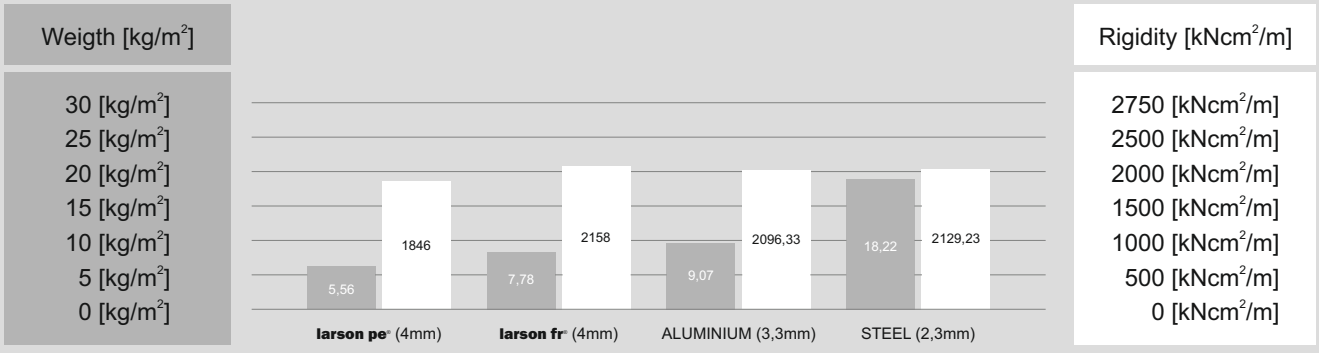
larson® aluminium composite panel with wood finishes from several colour schemes in either HQP High Quality Polyester or PVdF with COASTAL PRIMER paint systems, both suitable for outdoor use with outstanding UV performance. They transmit the warmth of real timber with the advantages of our composite panels, enabling outstanding fabrication capabilities for folding, bending, perforating, and curving without losing its technical characteristics.

1.3 larson® metals

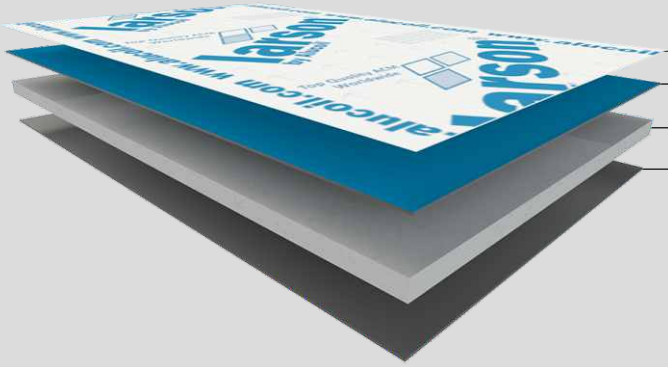
Composite panels that transmit natural metals' true beauty. The offering includes stainless steel, copper, brass, and zinc. The lack of solvents makes these composite products the ideal ecological solution- providing a sensation of liveliness and distinctiveness that comes with nature's finest elements combined with the light weight composite panels.

1.4 larson® Illusions

larson® Illusions is the composite panel range like **HOLO, ALUNATURAL, MIRROR, ANODIZED LOOK, TEXTURED** y **DESIGN** and other amazing finishes.



Aluminium Composite Panels for Architectural Wall Cladding



(1) Three possibilities

a) Mineral FR core
larson® FR Fire Class Architectural B-s1, d0 according EN 13501-1)

b) Mineral A2 Core
larson® A2 Fire Class Architectural A2-s1, d0 according EN 13501-1)
(To be used in those countries whose regulations prevent from the use of other kind of composite panel which does not have A2-s1, d0 classification available).

c) Polyethylene PE core
(Product for exclusive use in low buildings, canopies, signalization and corporate identity)

	Aluminium **5005 H42-43-44**	Aluminium **5005 H22**	Stainless Steel **316 AISI**	Stainless Steel **304 AISI**	Copper **SFCu**	Brass **CuZn30**	Zinc **ZnCuTi** (Zn 99,995)
larson® External Face	✓						
larson® Internal Face		✓					
larson® metals stainless steel External Face			✓				
larson® metals stainless steel Internal Face				✓			
larson® metals Copper External Face					✓		
larson® metals Copper Internal Face					✓		
larson® metals Brass External Face						✓	
larson® metals Brass Internal Face						✓	
larson® metals Zinc External Face							✓
larson® metals Zinc Internal Face							✓
larson® wood External Face	✓						
larson® wood Internal Face		✓					
larson® Illusions External Face	✓						
larson® Illusions Internal Face		✓					

2. Dimensional characteristics of larson® composite panels

2.1 Metal thickness
2.2 Panel thickness
2.3 Panel weight
2.4 Minimum and maximum length
2.5 Standard width

2.1 Metal thickness "e_1 / e_2 " (mm)

Depending on the type of composite panel, the metal can be aluminium, stainless steel, brass, zinc or copper. It is measured in millimeters (mm) and determined by:
a) Thickness of the outer sheet metal (e_1)
b) Thickness of the inner sheet metal (e_2)

2.2 Panel thickness

The thickness of the composite panel is measured in millimeters (mm) and it is the sum of the thickness of the outer metal sheet (e_1) + core thickness (FR, A2 or PE) + the thickness of 1 the inner sheet metal (e_2).

2.3 Panel weight (Kg/m^2)

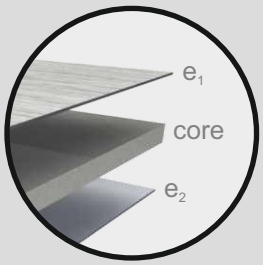
The weight changes depending on the panel thickness, type of metal and metal thickness, and the type of core, from 3,8 kg/m^2 (3mm aluminium composite panel thickness with PE core) to 14,37 kg/m^2 (6mm copper composite panel with FR core).

2.4 Minimum and maximum length "L" (mm)

Alucoil® can fabricate a minimum length of 2000mm due to the characteristics of its production line. Shorter lengths may be obtained after cutting panels. The maximum length produced is 8000mm because of **Alucoil**'s CNC machine dimensions.

2.5 Standard width "H" (mm)

Aluminium standard widths are 1000mm/1250mm/1500mm/2000mm.
There is a semi-standard width at 1800mm and it is also possible to produce on request any width between 900mm and 2000mm. For **larson® metals** the possibilities are usually reduced to a single width only.



	Panel thickness (mm)			e_1 (mm)	e_2 (mm)	3mm weight (kg/m^2) PE	3mm weight (kg/m^2) FR	4mm weight (kg/m^2) PE	4mm weight (kg/m^2) FR	6mm weight (kg/m^2) PE	6mm weight (kg/m^2) FR
larson®	3	4	6	0,5	0,5	4,66	6,14	5,56	7,78	7,36	11,06
larson® Illusions	3	4	6	0,5	0,5	4,66	6,14	5,56	7,78	7,36	11,06
larson® wood	3	4	6	0,5	0,5	4,66	6,14	5,56	7,78	7,36	11,06
larson® metals S.Steel 2D		4		0,23	0,23				9,62		
larson® metals S.Steel Wf30		4		0,23	0,23				9,62		
larson® metals Copper	3	4	6	0,3	0,3	7,68	9,45	8,58	11,09	10,38	14,37
larson® metals Brass	3	4	6	0,5	0,5	7,42	9,2	11,36	13,58	10,12	14,12
larson® metals Zinc		4		0,5	0,5			10,06			

3. Mechanical properties of larson® composite panels

3.1 Rigidity "EI" (Kncm^2) ***(Mechanical properties of composite panels)***
3.2 Moment of inertia "I" (mm^4) ***(Mechanical properties of composite panels)***
3.3 Rigidity "EI" (Kncm^2) ***(Mechanical properties of the metal)***
3.4 Elasticity limit "$Rp_{0,2}$" (N/mm^2) ***(Mechanical properties of the metal)***
3.5 Ultimate tensile strength "Rm" (N/mm^2) ***(Mechanical properties of the metal)***
3.6 Elongation "A" (%) ***(Mechanical properties of the metal)***

3.1 Moment of inertia "I" (mm^4)
Section property that quantifies its amount of mass (area) in relation to its gravity center. Stress and deflection obtained under a certain load applied to a panel are directly influenced by its moment of inertia (the greater the inertia, the less stress and deflection under the same load).

3.2 Modulus of elasticity "E" (N/mm^2)
Also known as Young Modulus, it is a typical constant of elastic materials that relates the force applied to the deflection or displacement obtained. The higher the modulus of elasticity the lower deflection for a given load.

3.3 Rigidity "EI" (KNcm^2)
Rigidity is calculated multiplying the moment of inertia by elastic modulus, under given load and support configurations. The higher the rigidity, the lower deflection obtained.

3.4 Elasticity limit "$Rp_{0,2}$" (N/mm^2)
Maximum stress an elastic material can stand so it can recover from obtained deflection up to 99.8% once the applied force is removed. The higher the limit, the more difficult to cause permanent deformation of the panel.

3.5 Ultimate tensile strength "R_m" (N/mm^2)
Material breakage stress. Once the yield strength is exceeded, the material continues deforming without breaking, but undergoes plastic deformation (non-recoverable deformation). The material breaks when it reaches its ultimate tensile strength.

3.6 Elongation "A" (%)
Length increase of an element (expressed in percentage) since it exceeds the elasticity limit until the breakage appears.

	Mechanical properties of **larson®** (thickness = 4mm)		Mechanical properties of the metal			
	EI (kNcm^2/m) *DIN 53293*	I (mm^4/m) *DIN 53293*	E (N/mm^2) *UNE EN ISO 527-1/2*	$R_{p0,2}$ (N/mm^2) *UNE EN ISO 527-1/2*	R_m (N/mm^2) *UNE EN ISO 527-1/2*	A (%) *UNE EN ISO 527-1/2*
larson® PE **larson® wood (PE)** **larson® Illusions (PE)**	1846	2637	70000	$80<R_{p0,2}<120$	$125<R_m<140$	>7%
larson® (FR) **larson® wood (FR)** **larson® Illusions (FR)**	2150	3070				
larson® metals S. Steel **(FR)**	2891(*)	1446(*)	200000	$250<R_{p0,2}<650$	$650<R_m<700$	$20<A<50$
larson® metals Copper **(PE)**	2130	1613	132000	$R_{p0,2}>140$	$R_m>240$	>8%
larson® metals Copper **(FR)**	2662	2017				
larson® metals Brass **(PE)**	3218(*)	2637(*)	110000	$R_{p0,2}<186$	$R_m<290$	>36%
larson® metals Brass **(FR)**	3748(*)	3070(*)				
larson® metals Zinc **(PE)**	2165	2405	90000	$R_{p0,2}>110$	$R_m>150$	>40%

* Estimated values while lab results arrive.

4. larson® products R&D

4.1 COASTAL PRIMER
4.2 FastClean by Alucoil®

4.1 COASTAL PRIMER. It is a special primer treatment for aggressive environments with a total thickness of 31µ applied in combination with a PVdF Kynar 500 70%. All together it is applied over a 5005 H-42-43-44 marine aluminium alloy which lengthens the lifespan of the panel.

It protects specially the edges and folding points, the most delicate in marine environments. It can give the panel a warranty exceeding 10 years in projects located on the seaside, avoiding blistering or paint delamination in marine environments without having to use a 3 layer PVdF.

4.2 **FastClean by Alucoil®** is a PVdF 3 coat paint using a special 12-15µ thick FEVE clear coat (Fluoroethylene / Vinyl Ether) with special additives which provide "easy to clean" properties. It can be used with any PVdF standard color of **larson®** panels.
Fastclean is the solution for every architect and project which needs to protect a building against graffiti and pollutants such as dust and dirt build-up.

5. Characteristics of the colours and finishes range of larson® composite panels

5.1 PVdF 70% Kynar 500 COASTAL PRIMER
5.2 HQ Polyester

5.1 Liquid paint PVdF 70% Kynar 500 COASTAL:

a) Two layers: Primer coat 10µ thickness and 21µ of colour coat (70% Kynar 500 with **COASTAL PRIMER**). Total 31µ.

b) Three layers: Primer coat 5µ, 22µ PvdF coat (70% Kynar 500) and 10µ of clear coat, for a total 37µ.

24 standard colours in PVdF 70% Kynar 500.
12 metallic finishes in PVdF 70% Kynar 500.
8 types of wood finishes in paint HQP.
(From 600 m^2 any RAL colour chart).

5.2 HQ Polyester
Liquid coating consisting on a primer layer of 5µ and a layer of high durability polyester resin making a total of 25µ.

7. Machining of composite panel

7.1 Cutting
7.2 Routing
7.3 Curving
7.4 Bending
7.5 larson® thermal expansion

The advanced manufacturing process of **larson®** composite panels brings out an extremely tight adhesion between the different layers and coats. Every tests carried out on our products have at least doubled the recommended parameters according to several standards. Thanks to the perfect bond between the different layers of **larson®** composite panels, they have an immense capacity to allow multiple types of machining and manipulation . All works detailed below shall be carried out at temperatures over 10ºC:

7.1 Cutting
Cutting can be performed in:
►Vertical saws (straight cuts)
►CNC machines (straight and curved cuts)
►Guillotine (straight cuts) (**larson® metals** stainless steel)

7.2 Routing
Routing can be performed in:
►Portable routing machines
►Vertical manual routing with feeler
►CNC machines

Architectural Advanced Materials

larson® A2/FR/PE - larson® Illusions (A2/FR/PE) - larson® wood (A2/FR/PE)
larson metals® Stainless Steel **(A2/FR) - larson metals®** Copper **(A2/FR/PE) - larson® metals** Brass **(A2/FR/PE)**
larson® metals Zinc **(FR/PE)**

ROUTING DISC (VERTICAL)

Disc D.244x14mm
Material: High Speed Steel (HSS)
Standard V_c: 5000rpm / f_n: 16m/min

CUTTING DISC (VERTICAL SAW)

Disc D.300x3.2mm
Material: Steel
Standard V_c: 5000rpm / f_n: 16m/min

	Routing CNC	Shape cutting CNC	Straight cutting CNC
larson® PE **larson® wood (PE)** **larson® Illusions (PE)** **larson® metals** Copper **(PE)** **larson® metals** Brass **(PE)** **larson® metals** Zinc **(PE)**	CERIN TOOL "V" α= 45º - D.12mm - Hard Metal Max V_c: 18000rpm / f_n: 50m/min Standard V_c: 12000rpm / f_n: 25m/min Min V_c: 10000rpm / f_n: 7m/min	CERIN TOOL D.6mm - Hard Metal Standard V_c: 17000rpm Standard f_n: 12m/min	Disc D120x20 (13-12) Z4 High Speed Steel (HSS) Standard V_c: 5000rpm Standard f_n: 20m/min
larson® A2/FR **larson® wood (A2/FR)** **larson® Illusions (A2/FR)** **larson® metals** Copper **(A2/FR)** **larson® metals** Brass **(A2/FR)**	CERIN TOOL "V" α= 45º - D.12mm - Hard Metal Max V_c: 12000rpm / f_n: 50m/min Standard V_c: 12000rpm / f_n: 25m/min Min V_c: 8000rpm / f_n: 7m/min	CERIN TOOL D.6mm - Hard Metal Standard V_c: 12000rpm Standard f_n: 8m/min	Disc D120x20 (13-12) Z4 High Speed Steel (HSS) Standard V_c: 5000rpm Standard f_n: 20m/min
larson® metals S.Steel **(A2/FR)**	CERIN TOOL "V" α= 45º - D.12mm - Hard Metal+TIALM Standard: V_c: 2200rpm / f_n: 8m/min	IZAR TOOL D.5mm Hard Metal+TIALM Standard V_c: 4000rpm Standard f_n: 6m/min	Shears - Guillotine

Indicative data, depending on the machine and kind of tool used.

7.3 Curving

GENERAL SPECIFICATIONS

Alucoil® should make a preliminary evaluation to verify every curving solution desired by the clients in order to assure its accurate execution.

larson® composite panel can be curved easily in curving machines of three or four rolls, ensuring that they are clean to avoid damaging the material.

a) Curving of larson® composite panels of 3 or 4mm thickness.

Manufacturing dimensions:
►Curving maximum width: 4m (Length of the curving machine).
►Minimum radius: 150mm.

b) Curving of larson metals® stainless steel composite panels

Manufacturing dimensions:
►Curving maximum width: 4m (Length of the curving machine).
►Minimum radius: 1000mm.

c) Curving of 4mm thickness larson® cassette with folded edges.

Manufacturing dimensions:
►Minimum bending width: 150mm
(the same as the caps width). Distance between the caps will be the same as the thickness of the panel, so that separation is where the edges will move during the curving process.
►Curving maximum width: 4m. (The limit of the pyramid roller).
►Maximum cassette route and return folds: 20mm

NOTES FOR CURVING CASSETTES WITH EDGES:
● It is not recommended to curve cassettes with edges greater than 20mm as they could become twisted.

● To carry out the curving process, it is required to place a 2mm thick aluminium sheet between the panel and cap areas in order to avoid marking the teflon caps. If this sheet is not used, cap marks will appear on the panel surface

● If the desired radius is greater than 1000mm, curving can be performed flat, bending the edges afterwards. For this reason the initial curving radius should be smaller than the intended one, reaching the desired radius during the forming of the cassette. With this type of curving practice, the edge of the cassette will not remain completely flat some minor, subtle ripples will be visible on those edges.

● **larson metals®** stainless steel can be curved in cassette form with edges of 40mm in the folding sense.

● Due to 3mm composite panels low rigidity, it won't be possible to curve them on cassette form due to edge distorsion during the process.

RADIUS (mm)	TOLERANCE (%)
150<R<1000	±7
1000<R<2000	±3.5
R>2000	±2

7.4 Bending

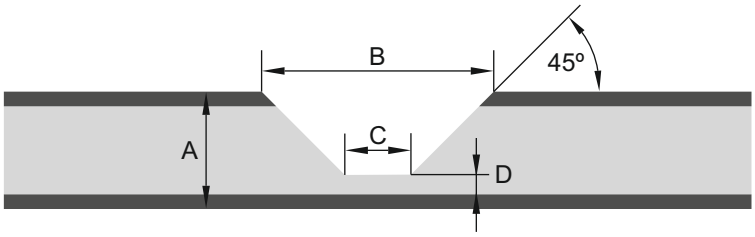
Panel area in contact with the tool and also the area leaning on the mold should be protected to prevent damages.

TYPES OF ROUTING

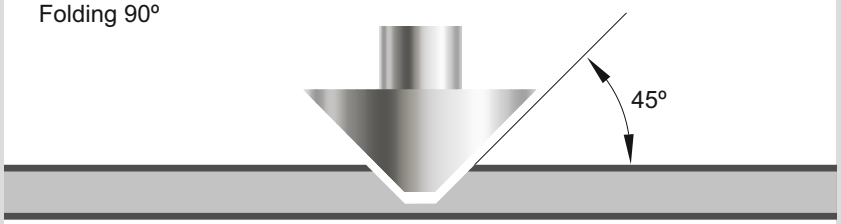
► Bending to ⩽ 90º, with tools which cutting angle reaches a perfect fold at 90 º.
► Bending between 90º<180º, with tools which cutting angle allows a perfect fold at the customer's requested angles.
►To get the desired length, folding should accommodate half the width of the bottom of the routed channel which will be translated to the route and return folded edges.

A(mm)	=	4	5	6
B(mm)	=	~9.3	~11.3	~13.3
C(mm)	=	~2,7	~2,7	~2,7
D(mm)	=	0,2	0,2	0,2

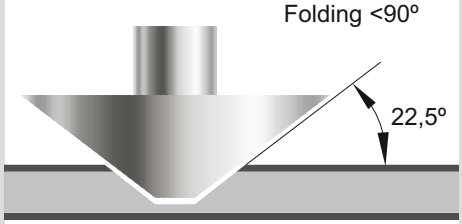
Folding 90º

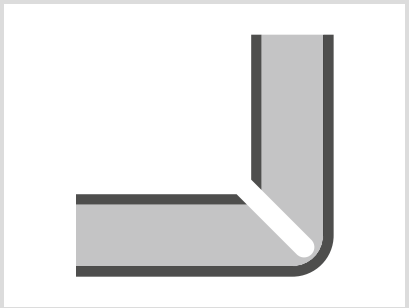


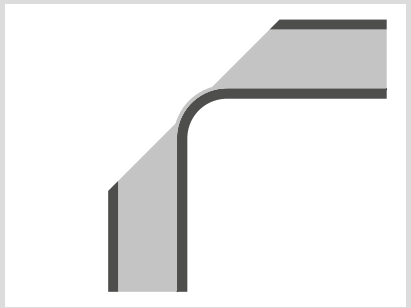
Folding 90º

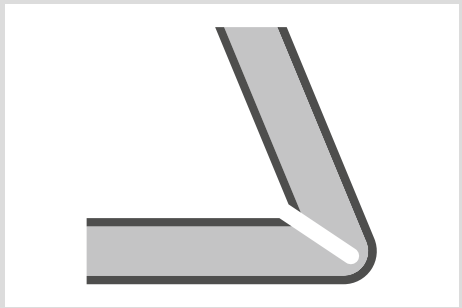


Folding <90º









7.5 Lineal thermal expansion of larson® composite panel

Due to thermal influences, the magnitude of contraction or expansion has to be calculated to the size that the joint expansion areas require. This is defined by: $\Delta L = \alpha \times \Delta T \times L$
Where “α” is the coefficient of expansion of the composite panel and the aluminium: 2,4 x 10-5C-1, being “ΔT" temperature variation and "L" length or height of the cassette/panel.

8. larson® perforated

The ability to perforate and provide bond warranties for **larson®** metal composite panels is a reality that opens up design possibilities unimaginable until now, with a plethora of perforation combinations at your disposal.

Only **Alucoil®** can guarantee the bond integrity for perforated applications. **larson®** ACM panels can achieve this due to its exceptional technical and performance characteristics:

► High quality 5005 series aluminium alloy
► Corrosion-Resistant Pretreatment
► Exceptional bond strength, reaching double the industry standard parameters
► 10 years exterior warranty (warranty required prior analysis of project specifics by **Alucoil®** in advance and is limited to panels manufactured at **Alucoil®** in Miranda de Ebro, Spain.
► Perforated Wall Cladding - Double sided coated panels

Whether by CNC or Punch Press processes, **Alucoil®** offers the possibility to use round, square, triangular, star, and many other shapes in different perforation sizes and patterns.

As well as its use for wall cladding, the use of perforated composite panels for internal applications is a clear commitment to modern design.

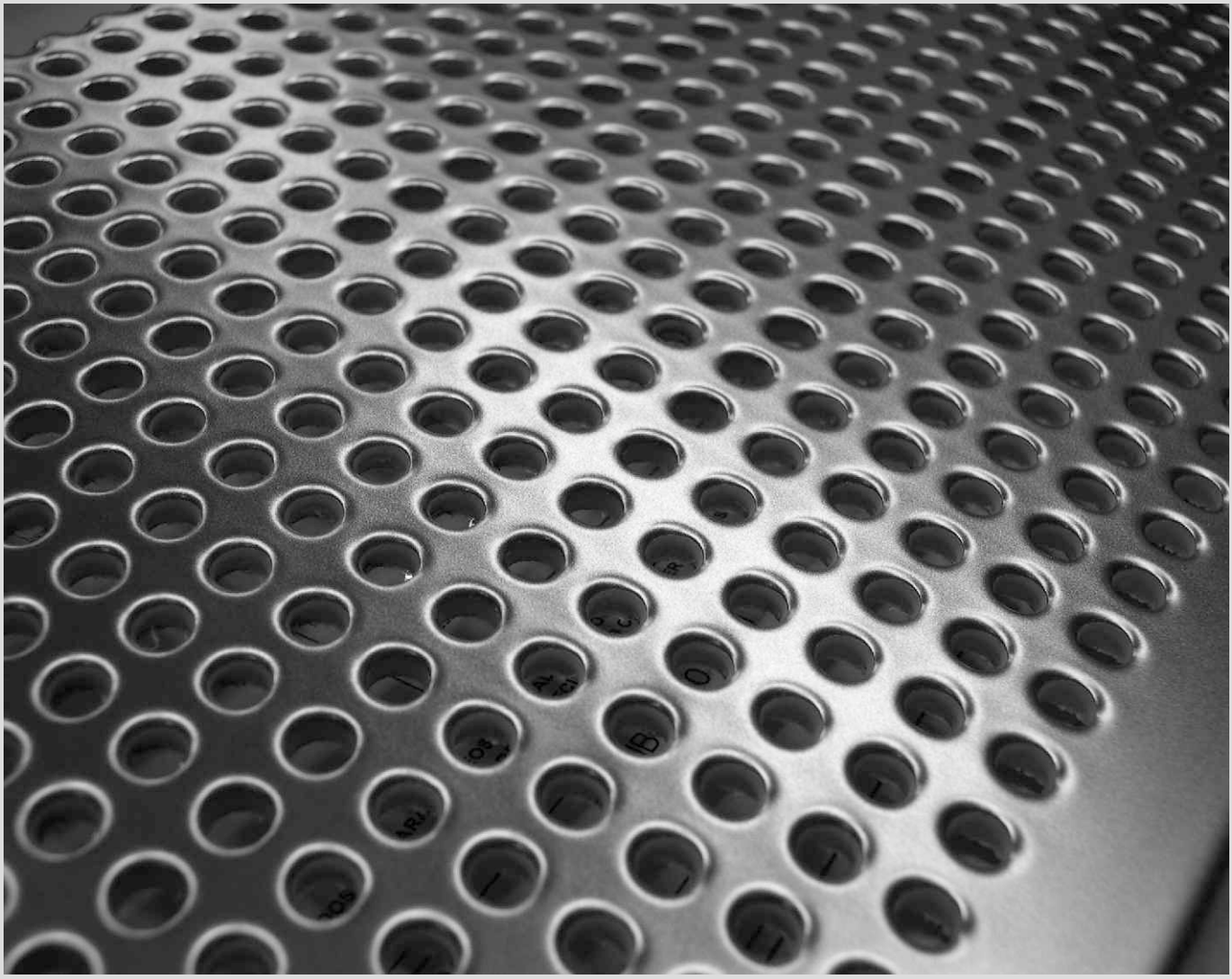
Based on below abbreviations to designate perforation configurations, **Alucoil®** offers a wide range of perforation patterns which provides each type of facade an exclusive design:

“R”: Round (diameter of perforations).
“U”: Parallel perforations (distance between axes).
“T”: Perforations in a staggered formation (distance between axes).
“C”: Square (side of square).
“LC”: Rectangle (width x length).
“LR”: Slotted holes (width x length).

Non-perforated perimeter areas will be indicated by the type of perforation and tool used for each case. To combine different diameters within the same panel, or special dimensions and perforations, please consult.

► Main possibilities of punching of ACP

	Length<6000mm - Width<1500mm							
Round quincunx	R4T8,8	R5T9	R6T16	R7T17,5	R8T19	R10T14	R15T20	R20T27
Rounded parallel	R4U8,8	R5U13	R6U16	R6U25	R7U17,5	R8U19	R10U24	R20U46,8
Parallel square	C4U12	C8U21	C10U26	C20U40	C30U48	C30U60	C40U80	C70U140
Diagonal square	CD10M15				CD10U21			
Square side in parallel	LC4X20U26							



IMPORTANT

►Every **larson**® fabrication job must be done with the protective plastic film in place to avoid damages on coated surfaces. Temperatures should stay above 10ºC. The plastic film must remain until all processing and fabrication have been completed.

►Routing must be done on the rear side of the panel, opposite to the plastic film surface.

►Hammer and Stucco embossed finishes have special mechanizing / fabrication instructions due to their rough texture. It is necessary to maintain 1mm of total material in the router groove, including the 0.5mm of aluminium sheet, so that the router bit does not damage the exterior surface. CNC router bits must be screwed in place to the spindle.

►To install panels or cassettes with metallic colors, ALWAYS take into account the direction of the arrows of the protective plastic film.

9. Wind velocity and velocity pressure

Basis for calculation

The wind velocity and the velocity pressure are composed of a mean and a fluctuating component. The mean wind velocity V_m should be determined from the basic wind velocity V_b wich depends on the wind climate and the height variation of the wind determined from the terrain roughness and orography.
The fluctuating component of the wind is represented by the turbulence intensity.

Basic values

The basic wind velocity shall be calculated from expression $V_b = C_{dir} \cdot C_{season} \cdot V_{b,0,}$

V_b is the basic wind velocity
$V_{b,0}$ is the fundamental value of the basic wind velocity
C_{dir} is the directional factor
C_{season} is the season factor

Mean wind - variation with height -

The mean wind velocity $V_m(z)$ at a height z above the terrain depends on the terrains roughness and orography and on the basic wind velocity, V_b.

$$V_m(z) = C_r(z) \cdot C_0(z) \cdot V_b$$

$C_r(z)$ is the roughness factor
$C_0(z)$ is the orography factor, taken as 1,0 unless otherwise specified.

Terrain roughness

The roughness factor, $C_r(z)$, accounts for the variability of the mean wind velocity at the site of the structure due to:
1.- The height above ground level.
2.- The ground roughness of the terrain upwind of the structure in the wind direction considered.

$C_r(z) = k_r \cdot ln\,(z/z_0)$ for $z_{min} \le z \le z_{max}$
$C_r(z) = C_r(z_{min})$ for $z \le z_{min}$

z_0 is the roughness length
k_r is the terrain factor depending on the roughness length z_0 calculated using $k_r = 0{,}19\,(z_0 / z_{0,II})^{0,07}$

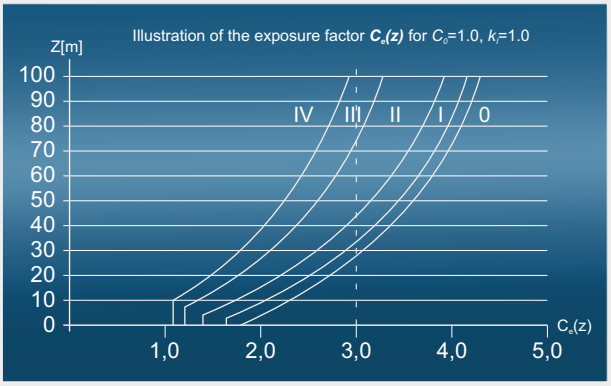
$z_{0,II}$ = 0,05m (terrain category II, table 1)
z_{min} is the minimum height defined in table 1
z_{max} is to be taken as 200m

Terrain category		z_0 m	z_{min} m
0	Sea or coastal area exposed to the open sea.	0,003	1
I	Lakes or flat and horizontal area with negligible vegetation and without obstacles.	0,01	1
II	Area with low vegetation such as grass and isolated obstacless (tress, buildings) with separations of at least 20 obstacle heights.	0,05	2
III	Area with regular cover of vegetation or buildings or with isolated obstacles with separations of maximum 20 obstacle heights (such as villages, suburban terrain, permanent forest).	0,3	5
IV	Area in wich at least 15% of the surface is covered with buildings and their average height exceeds 15m.	1,0	10

Table1

Peak velocity pressure

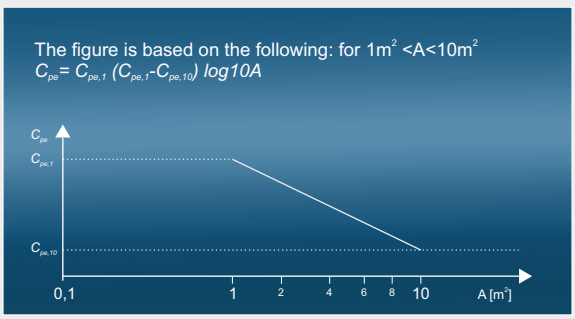
$q_p(z) = C_e(z) \,.\, qb$



Wind pressure on surfaces $W_e = q_p(z_e) \,.\, C_{pe}$

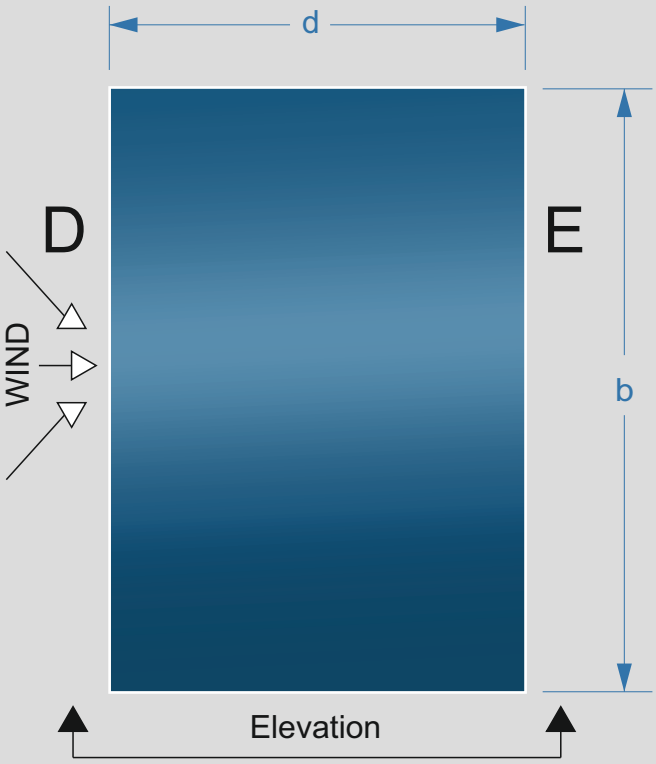
Z_e is the reference height for the external pressure
C_{pe} is the pressure cosfficient for the external pressure

Pressure coefficients for buildings



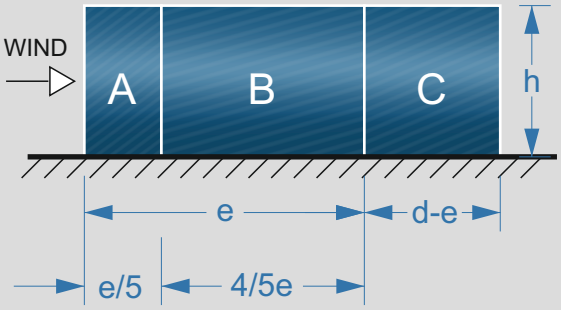
External pressure coefficients for vertical walls

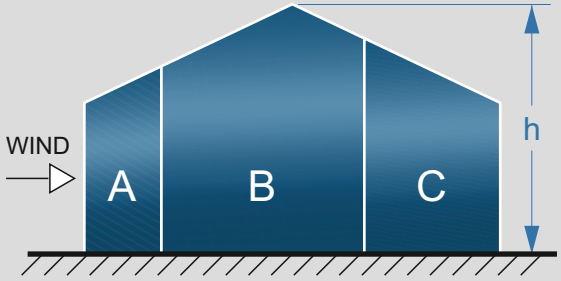
Zone	A		B		C		D		E	
hld	$C_{pe,10}$	$C_{pe,1}$	$C_{pe,10}$	$C_{pe,1}$	$C_{pe,10}$	$C_{pe,1}$	$C_{pe,10}$	$C_{pe,1}$	$C_{pe,10}$	$C_{pe,1}$
5	-1,2	-1,4	-0,8	-1,1	-0,5		+0,8	+1,0	-0,7	
1	-1,2	-1,4	-0,8	-1,1	-0,5		+0,8	+1,0	-0,5	
≤0,25	-1,2	-1,4	-0,8	-1,1	-0,5		+0,7	+1,0	-0,3	



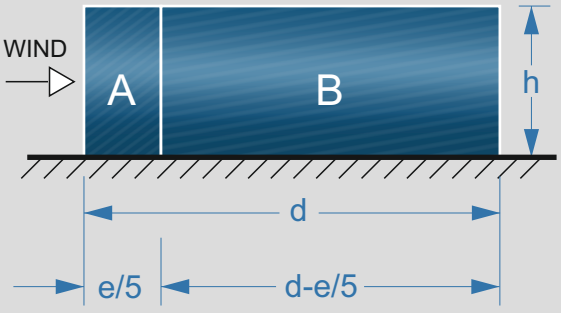
e=b or 2h (minimum value)
b= Wind transverse dimension

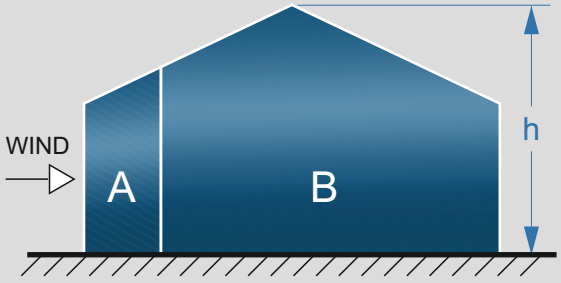
Elevation to e<d



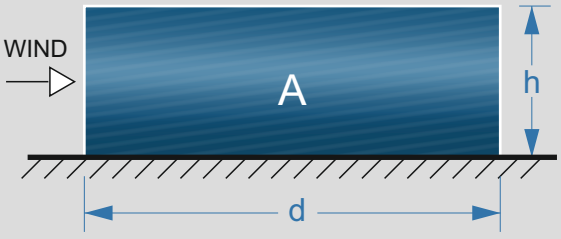


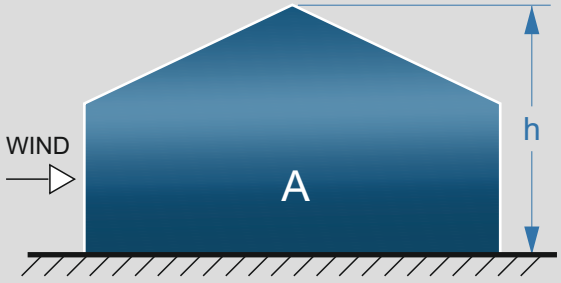
Elevation to e≥d





Elevation to e≥5d





10. Composite panel behavior under wind loads

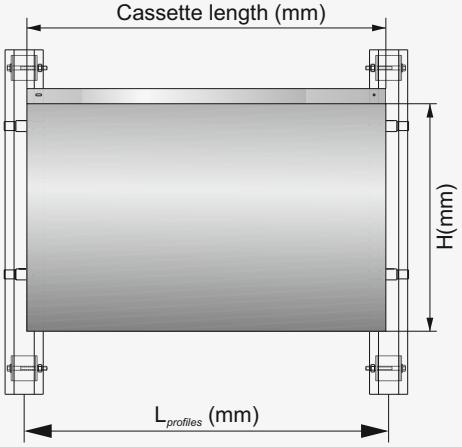
Alucoil® installation systems and panels have achieved several European certificates, such as DIT (Spain), ETA (Europe), AVIS TECHNIQUE (France), DIBt (Germany) or BBA (UK), Intertek North America and CODEMARK Australia/NZ. To obtain all of them several tests have been carried out in order to know panels and cassettes behavior under different wind loads. These tests are performed simulating the entire installation system so that the results show the real deflection of our panel/cassette as well as the appearance of plastic deformation, if it existant, once the load has been removed.

To make panel and cassette calculations it is better to also define the substructure, it would be necessary to consider Service Limit State (for deflections), Ultimate Limit State (for stresses) and the following points:

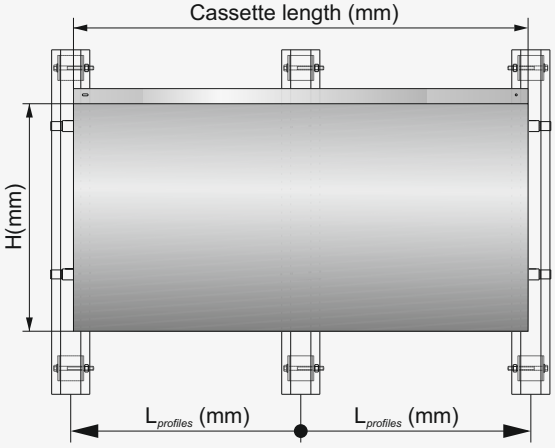
a) Aluminium composite panel **larson® PE** 4mm thickness
b) Maximum deflection in the middle of the cassette attending to project specifications.
c) Maximum stress of composite panel = 80MPa on the sheets
d) Maximum deflection of vertical profile L/200mm or 15mm, where "L" is the distance between brackets.
e) Wind load would be factorized by 1,5

► Distance between vertical profiles "$L_{profiles}$"

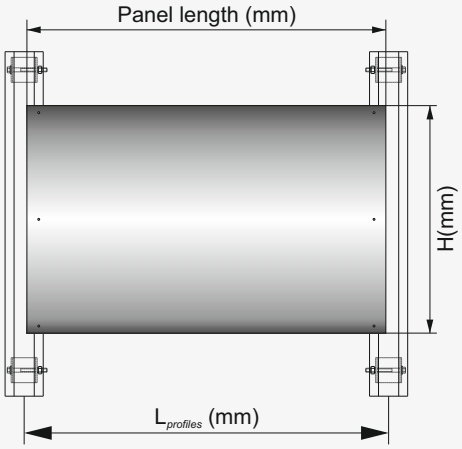
CASSETTE SYSTEMS



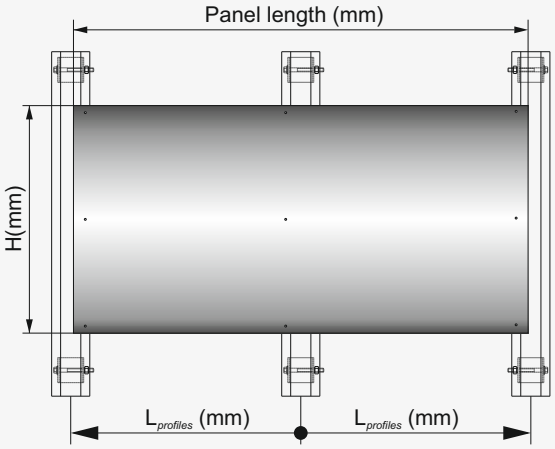
CASSETTE SYSTEMS



RIVETED SYSTEMS



RIVETED SYSTEMS



Cassette length “L” with 2, 3, 4, 5 and 6 vertical profiles - Height “H” 1500mm

NUMBER OF VERTICAL PROFILES

Load	2	3	4	5	6
200N/m²	1700mm	3550mm	5800mm	7733mm	8000mm
600N/m²	1100mm	2350mm	3850mm	5133mm	6417mm
1000N/m²	850mm	1950mm	3150mm	4200mm	5250mm
1400N/m²	750mm	1700mm	2750mm	3667mm	4583mm
1800N/m²	700mm	1550mm	2500mm	3333mm	4167mm
2200N/m²	650mm	1450mm	2300mm	3067mm	3833mm
2600N/m²	600mm	1350mm	2150mm	2867mm	3583mm
3000N/m²	550mm	1300mm	2050mm	2733mm	3417mm

Horizontal modulation
Cassette length “L”
40mm cassette system with LCR-40

Mandatory

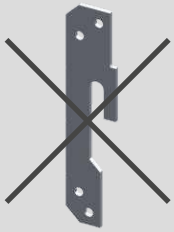
Cassette length “L” with 2, 3, 4, 5 and 6 vertical profiles - Height “H” 1500mm

NUMBER OF VERTICAL PROFILES

Load	2	3	4	5	6
200N/m²	1750mm	3550mm	5850mm	7800mm	8000mm
600N/m²	1100mm	2350mm	3850mm	5133mm	6417mm
1000N/m²	850mm	1950mm	3200mm	4267mm	5333mm
1400N/m²	750mm	1700mm	2800mm	3733mm	4667mm
1800N/m²	700mm	1550mm	2500mm	3333mm	4167mm
2200N/m²	650mm	1450mm	2300mm	3067mm	3833mm
2600N/m²	600mm	1350mm	2150mm	2867mm	3583mm
3000N/m²	550mm	1300mm	2050mm	2733mm	3417mm

Horizontal modulation
Cassette length “L”
44,5mm cassette system without LCR-44,5

Non mandatory



Panel length “L” with 2, 3, 4, 5 and 6 vertical profiles - Height “H” 1500mm

NUMBER OF VERTICAL PROFILES

Load	2	3	4	5	6
200N/m²	2700mm	4300mm	5800mm	7750mm	8000mm
600N/m²	1450mm	2300mm	3100mm	4150mm	5200mm
1000N/m²	1050mm	1700mm	2300mm	3050mm	3800mm
1400N/m²	850mm	1350mm	1800mm	2400mm	3000mm
1800N/m²	700mm	1100mm	1500mm	2000mm	2500mm
2200N/m²	650mm	1050mm	1400mm	1850mm	2300mm
2600N/m²	550mm	900mm	1200mm	1600mm	2000mm
3000N/m²	500mm	800mm	1100mm	1450mm	1800mm

Horizontal modulation
Panel length “L”
Riveted system with vertical and horizontal profiles

Mandatory

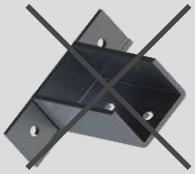
Panel length “L” with 2, 3, 4, 5 and 6 vertical profiles - Height “H” 1500mm

NUMBER OF VERTICAL PROFILES

Load	2	3	4	5	6
200N/m²	2100mm	4700mm	6950mm	8000mm	8000mm
600N/m²	1350mm	2900mm	4450mm	5933mm	7417mm
1000N/m²	1100mm	2100mm	3300mm	4400mm	5500mm
1400N/m²	950mm	1700mm	2650mm	3533mm	4417mm
1800N/m²	900mm	1450mm	2250mm	3000mm	3750mm
2200N/m²	800mm	1250mm	1950mm	2600mm	3250mm
2600N/m²	750mm	1100mm	1750mm	2333mm	2917mm
3000N/m²	700mm	1000mm	1600mm	2133mm	2667mm

Horizontal modulation
Panel length “L”
Riveted system only with vertical profiles

Non mandatory



11. Cassettes from composite panels

11.1 Standard cassette Type I
11.2 Standard cassette Type II
11.3 Cassette shaped
11.4 Edge cassettes development
11.5 Intermediate vertical stiffeners (PCI)
11.6 Intermediate horizontal stiffeners (LC-RH)

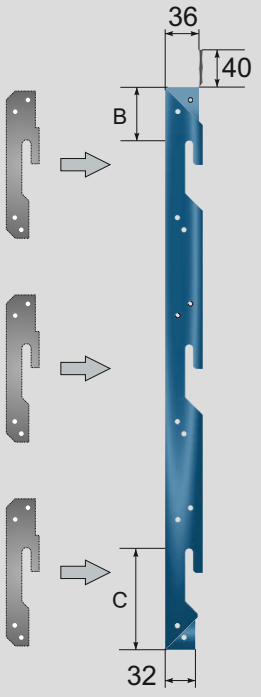
11.1 Type I standard cassette is the cassette formed from **larson**® composite panel with the following characteristics:

MANDATORY INSTALLATION PIECE LCR-40
Upper edge of 40mm and 36mm
Lower edge of 32mm
A=Lateral edge of 40mm
B=Upper slot separation=57mm
C=Lower slot separation=108mm
D=Width hang= 10.5mm

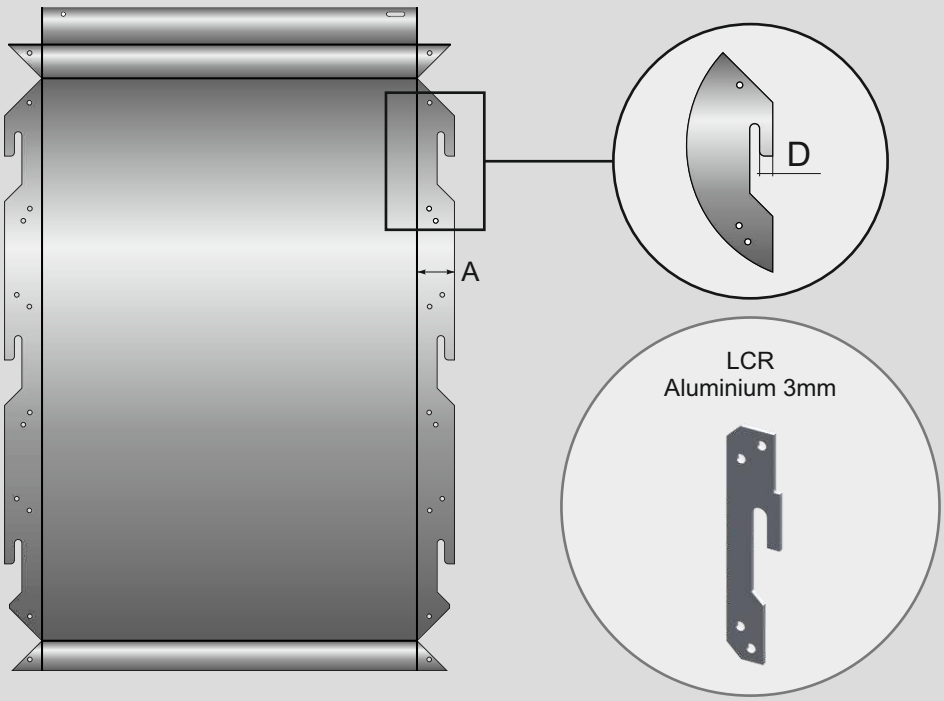
11.2 Type II standard cassette, is the cassette formed from **larson**® composite panel with the following characteristics:

OPTIONAL INSTALLATION PIECE LCR-45
Upper edged of 40mm y 36mm
Lower edged of 32mm
A=Lateral edged of 44,5mm
B=Upper slot separation=65mm
C=Lower slot separation=100mm

Edged view
Folded cassette



"Internal face" unfolded cassette



11.3 Folded cassette

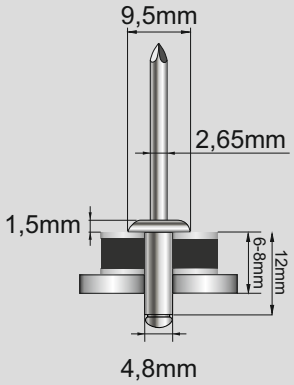
Standard **larson**® cassette is formed using rivets to join the folded edges with LCR pieces or with aluminium plates.

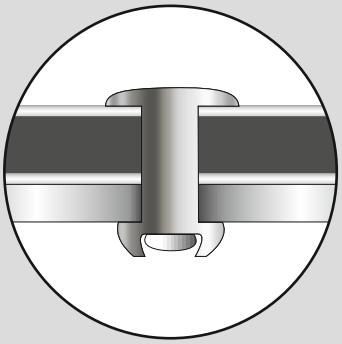
According to different panel certifications, these rivets should be open ended blind rivets ISO 15977 - Ø4.8 x 12 AIA/St (d_k=9.5mm) (DIN 7337).

With an A2 stainless steel break pull mandrel, diameter 4,8mm and length 12mm, and protruding aluminium head.

STANDARD BLIND RIVET
EN ISO 15977

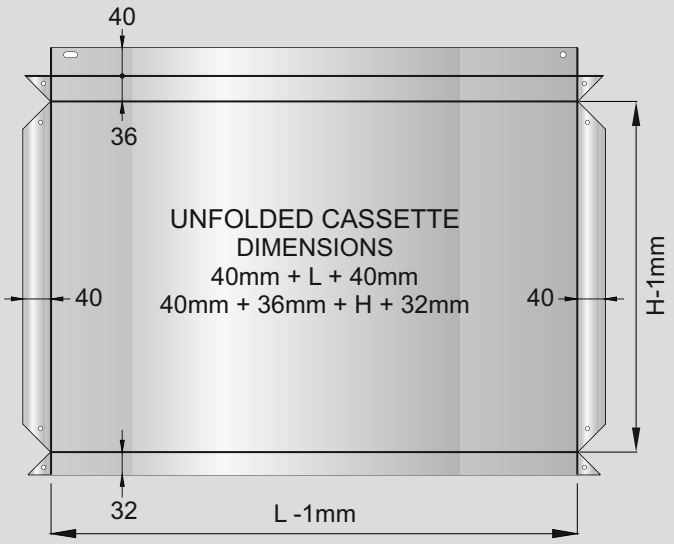
Dome head
Body: Aluminium (Al Mg 3,5 EN AW 5154)
Mandrel: Stainless steel (DIN EN 10016-2)

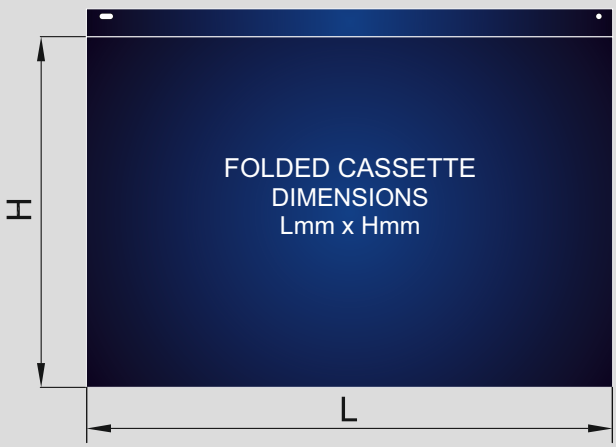




11.4 Dimensions of the cassette before bending and folding

The standard **larson**® cassette is formed by bending and folding its edges. These edges are folded in the middle of a previous routing groove made on the panel with different angles as seen before. The most important thing to take into account is knowing the real dimension of the cassettes before folding its edges.





11.5 Vertical intermediate stiffeners (PCI)

The PCI is usually made of pieces from Composite Panel. Using this piece it is possible to connect panels with intermediate modulation profiles, when it is necessary, by calculation.

1. STIFFENER FOLDING
The folding of the stiffener is made by a milling on the lacquered skin. The stiffener then will be folded so that the coated skin will remain inside, thus allowing gluing the stiffener NO coated face.

2. PREPARATION OF AREAS
Remove dust and dirt using mechanical processes and under no circumstances using solvents. This cleaning consist of a more or less deep sanding, depending on the existing dirt, both PCI face in contact with the panel, and the contact area thereof with PCI. Then you must vacuum the dust, or blow it with compressed air. For cleaning and degreasing later, the degreasing cleaner **Sika® Cleaner- 205** will be used on both elements.

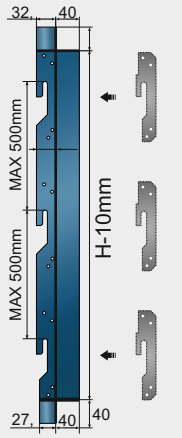
3. AREAS PRIMING
Once clean, Sika® Primer will be applied on both areas to strengthen the adhesion of the glue. Depending on whether the tray is **larson®** or **larson metals®** stainless steel, will be used **Sika® Primer 210T** or **Sika® Primer 204** respectively.

4. DOUBLE-SIDED TAPE
Once applied the primer on the area and having elapsed the primer timeout (30 '), proceed to place the **SikaTack® Panel 3**, double-sided tape which will support the PCI while the adhesive polymerizes, plus ensuring the minimum thickness of glue on the stiffener.
Specifically, it must be located glued to the opposite edge that is folded.

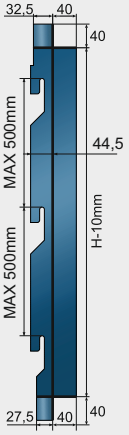
5. ADHESIVE APPLICATION
The application of the **SikaTack® Panel** adhesive will always on the PCI, applying a strip along the opposite edge to the one we stuck the double-sided tape.

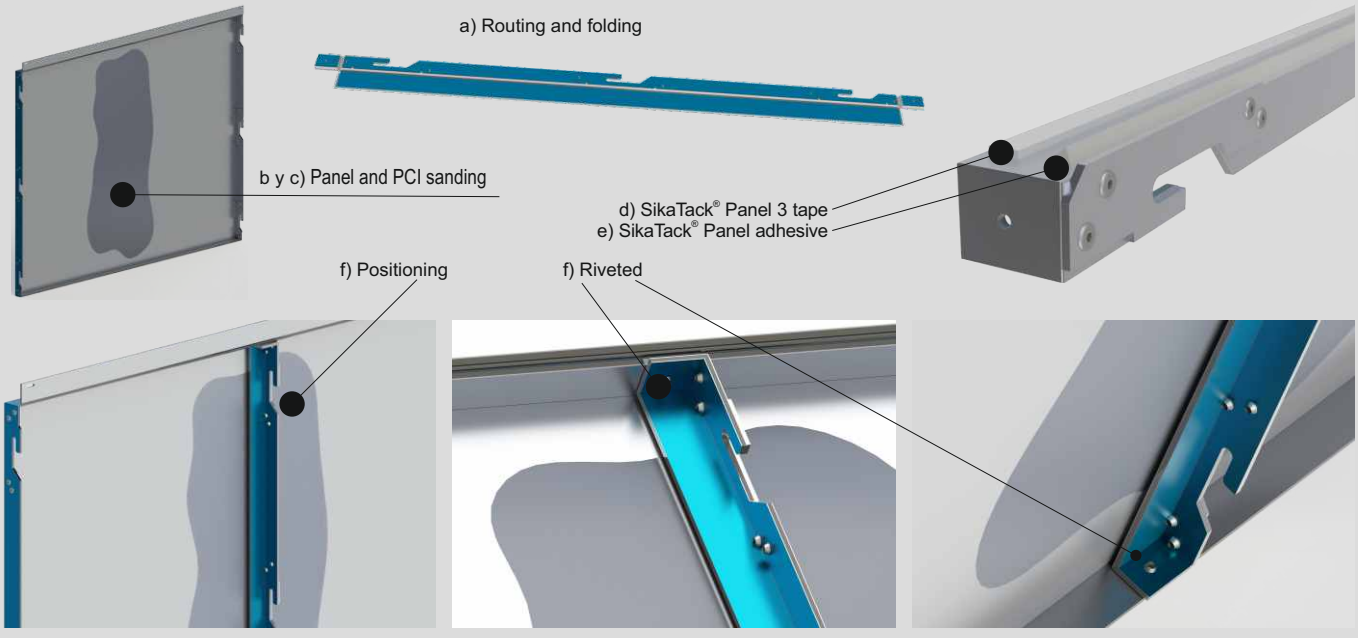
6. STIFFENER PLACEMENT
The stiffener is positioned so that the leading edge with mechanized hangers stays perpendicular to the panel, and aligned with the theoretical axis of that stiffener.
Later their horizontal foldings will be riveted to upper and lower panel edges.

PCI cassette 40mm



PCI cassette 44,5mm





11.6 Horizontal intermediate stiffeners (LC-RH)

They are used in vertical modulations when the wind load requires more substructure, and there is no aim or it is not possible to install itermediate profiles. It is an extruded aluminium profile which incorporates a screw holder to make easier the mechanical fixation to the edges of the panel. Calculations are required to determine the exact number of stiffeners needed, just as with vertical stiffeners.

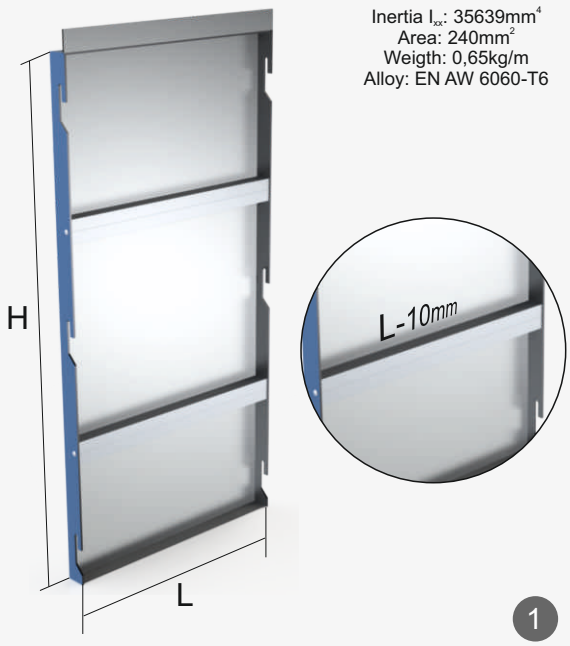
Horizontal Stiffener features

► Machining limited to a simple cut
► Glued system SikaTack® Panel
► Screwed
► It works better than those formed with composite panel
► Lightweight
► Easily assembled

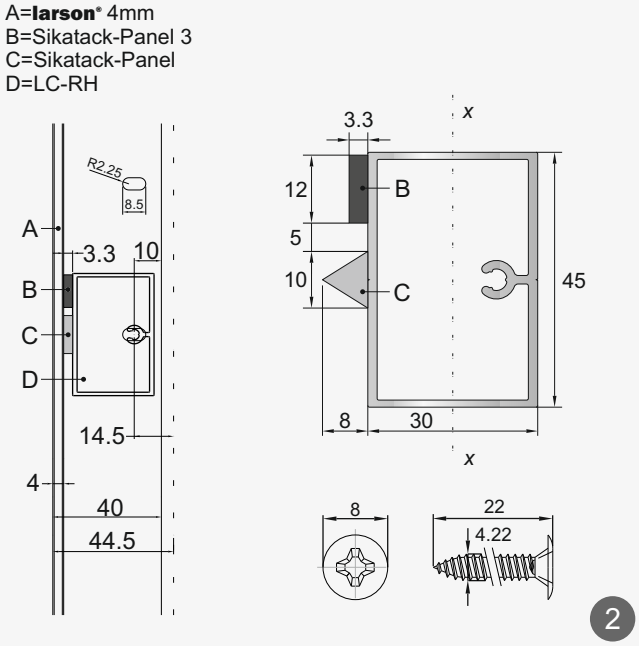
Glued system SikaTack® Panel

►Sand the stiffener gently with a more or less deep sanding by the side where it will be sticked to the panel.
►Clean both surfaces (stiffener/panel) with **Sika® Cleaner 205**.
►Apply primer **SikaTack Panel Primer** on both the stiffener and panel where they will come into contact.
►If the cassette is **Iarson®**, **Sika® Primer 210** must be used and if the cassette is made from **Iarson metals®** stainless steel **Sika® Primer 204** must be used.
►Place **SikaTack® Panel 3** tape at one end of the face to stick to the cassette the stiffener.
►Extend the triangular cord of **SikaTack® Panel** aided by the notch in the inside face in the center of LC-RH.
►Place the stiffeners helped by the mark on its external face.
►Drying will be 100% effective after 24 hours

ATTACHMENT SCREWS
Screw fasteners used to attach stiffeners with the vertical edges should be: A2 stainless steel screws with thread sheet metal and extra flat head.
Dimensions Ø4,2x22mm (ex.: screw INDEX CP-A2).



1



2

larson®
by Alucoil
Top Quality ACM - Worldwide

LCH-1 system - CASSETTES 40mm

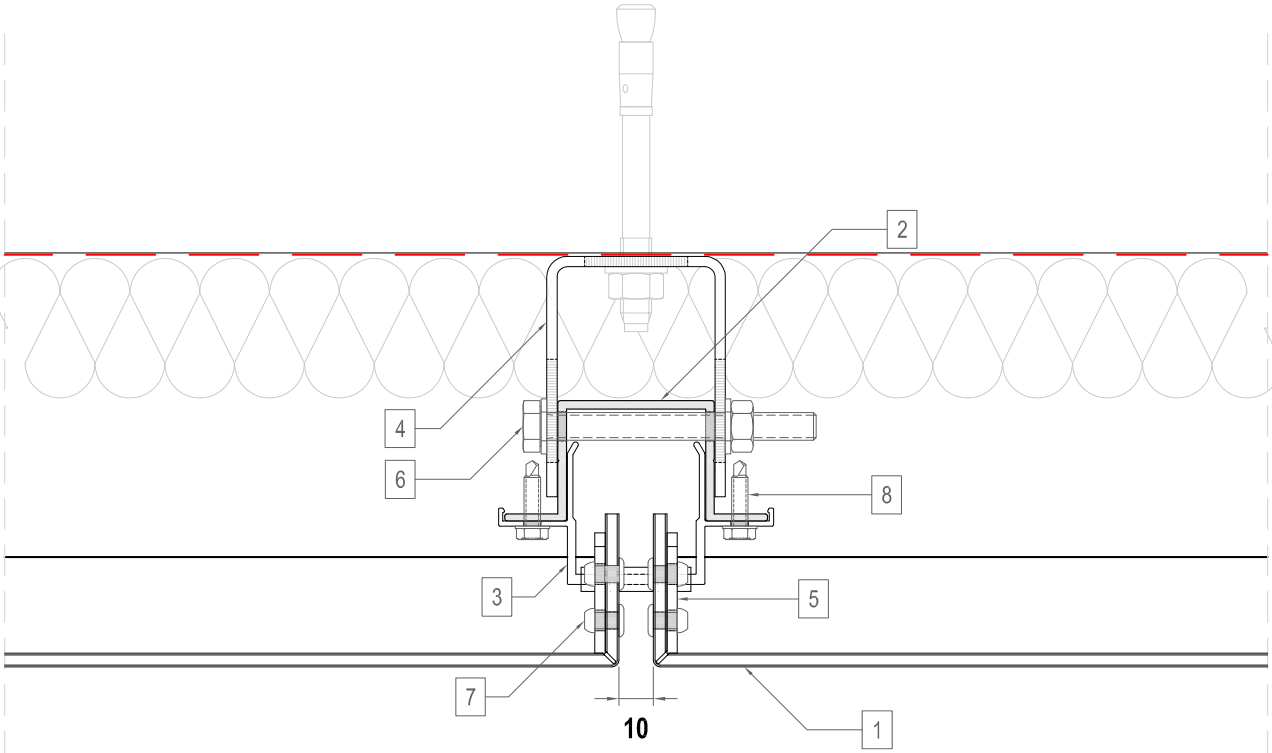
LCH-2

LC-3

LCR-40

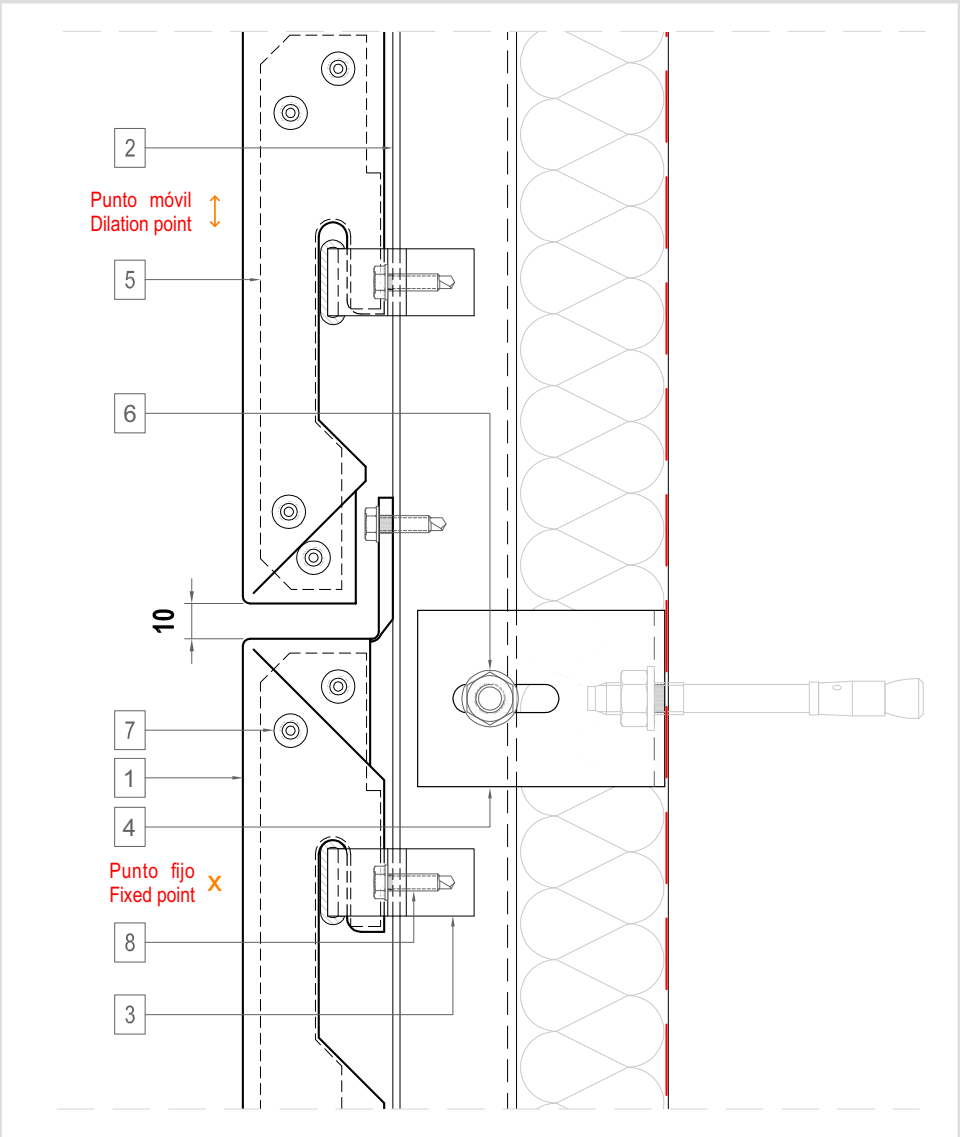
1. **larson®** composite panel
2. LCH-1 profile
3. LC-3 hanging piece with rubber
4. LCH-2 bracket
5. LCR-40 reinforcement piece
6. Hex head screw ISO 4017-M8x80 **(DIN 933)**
   Washer ISO 7089-8 200HV **(DIN 125)**
   Hex nut ISO 4032-M8-8 **(DIN 934)**
7. Blind rivet ISO 15977-Ø4,8x12 AlA/St (d_k=9,5mm) **(DIN 7337)**
8. Screw ISO 15480 St Ø4,8x19 **(DIN 7504-K)**

LCH-1



TOP Quality ACM

Aluminium Composite Panels for Architectural Wall Cladding

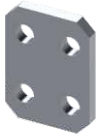


larson®
by Alucoil
Top Quality ACM - Worldwide

LCH-1 system - CASSETTES 44,5mm

LCH-2

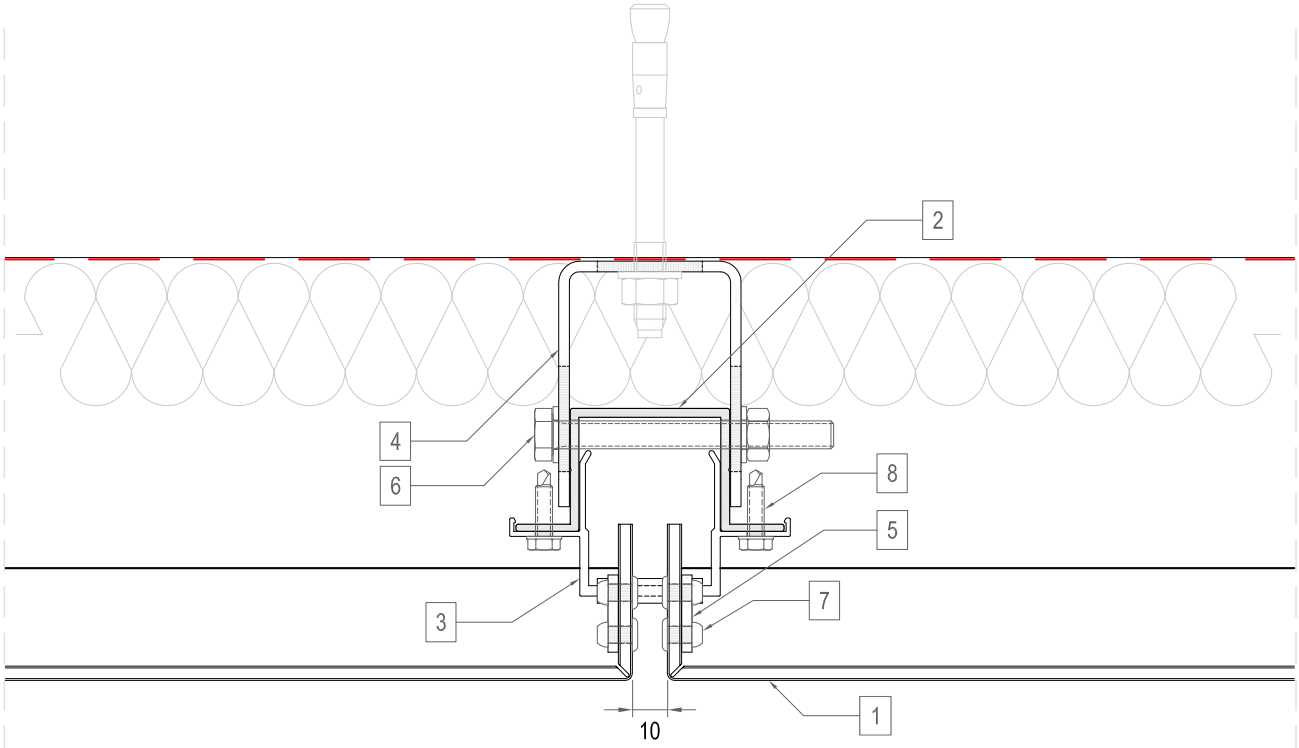
LC-3



Aluminium piece

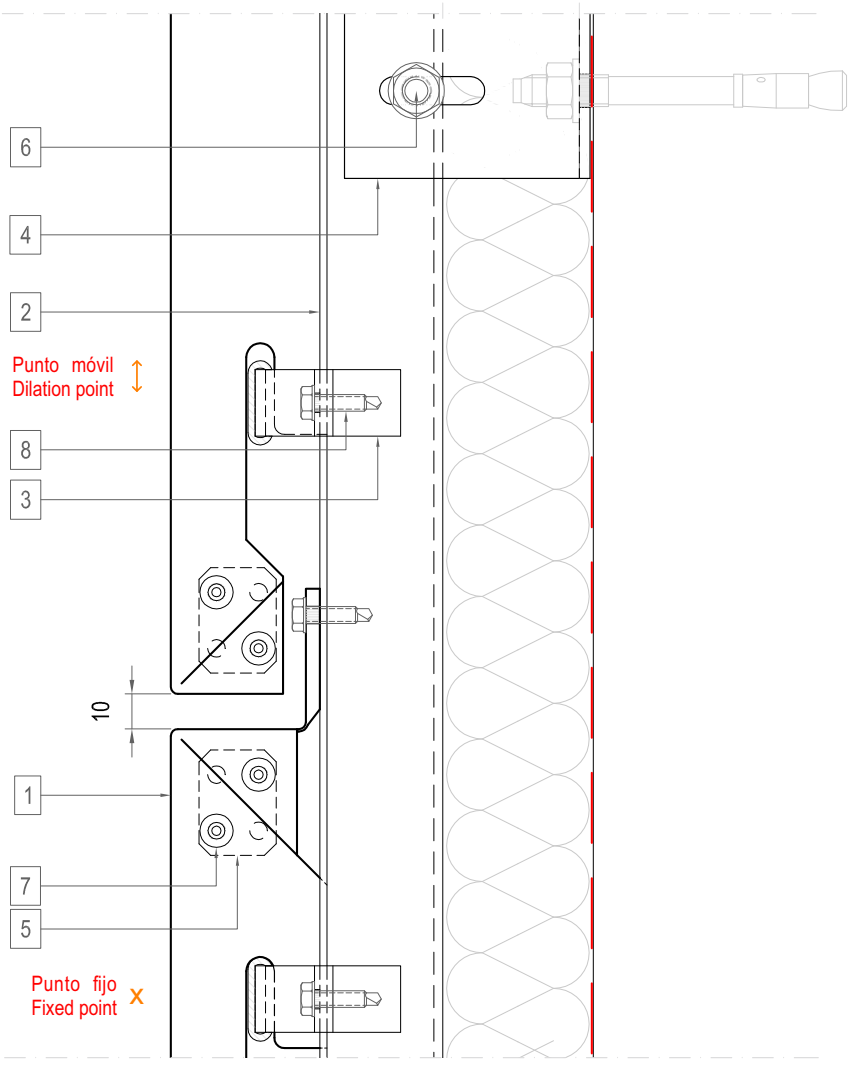
LCH-1

1. **larson®** composite panel
2. LCH-1 profile
3. LC-3 hanging piece with rubber
4. LCH-2 bracket
5. Aluminium plate 3mm
6. Hex head screw ISO 4017-M8x80 **(DIN 933)**
   Washer ISO 7089-8 200HV **(DIN 125)**
   Hex nut ISO 4032-M8-8 **(DIN 934)**
7. Blind rivet ISO 15977-Ø4,8x12 AlA/St (d_k=9,5mm) **(DIN 7337)**
8. Screw ISO 15480 St Ø4,8x19 **(DIN 7504-K)**



TOP Quality ACM

Aluminium Composite Panels for Architectural Wall Cladding



larson®
by Alucoil
Top Quality ACM - Worldwide

LC-2 system - CASSETTES 44,5mm

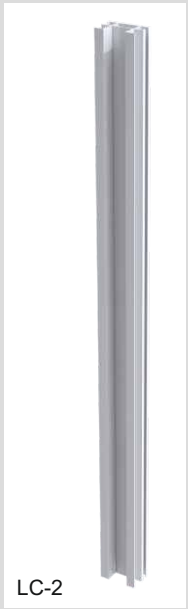

LC-1

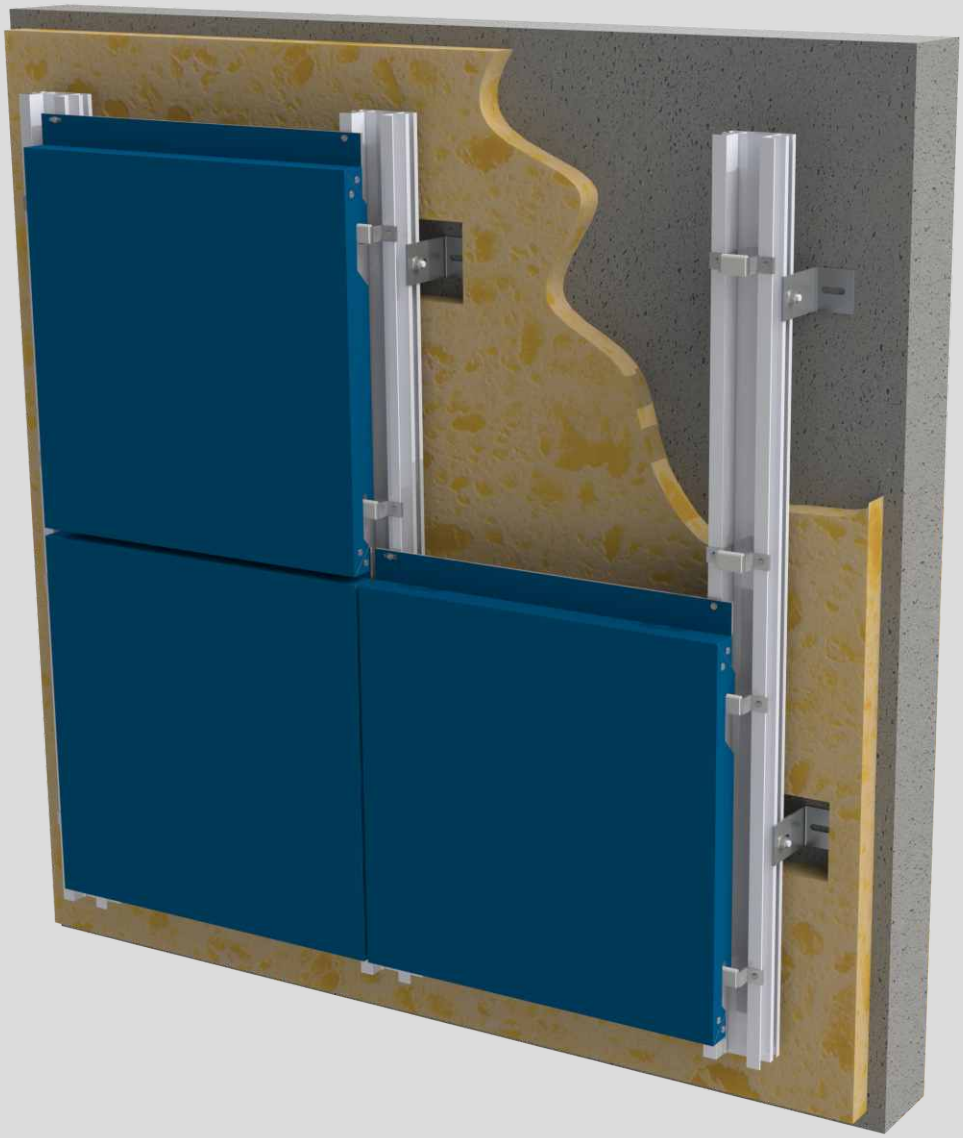

LC-3


Aluminio piece


LC-8

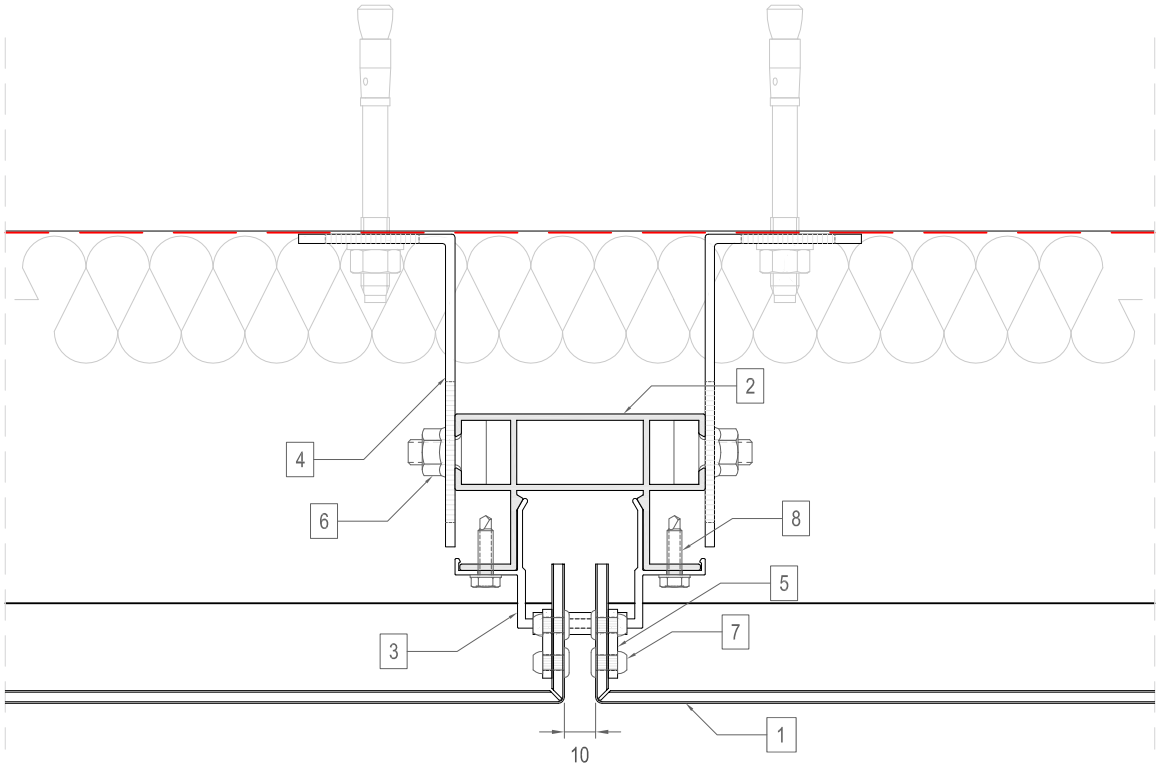
1. **larson®** composite panel
2. LC-2 profile
3. LC-3 hanging piece with rubber
4. LC-1 bracket
5. Aluminium plate 3mm
6. Hammer head screw LC-8 M8x17
   Steel protected by deltatone **(UNE 17021)**
   Hexagon nut with flange EN 1661 M8-4,8 ISO 4161 **(DIN 6923)**
7. Blind rivet ISO 15977-Ø4,8x12 AIA/St (d_k=9,5mm) **(DIN 7337)**
8. Screw ISO 15480 St Ø4,8x19 **(DIN 7504-K)**

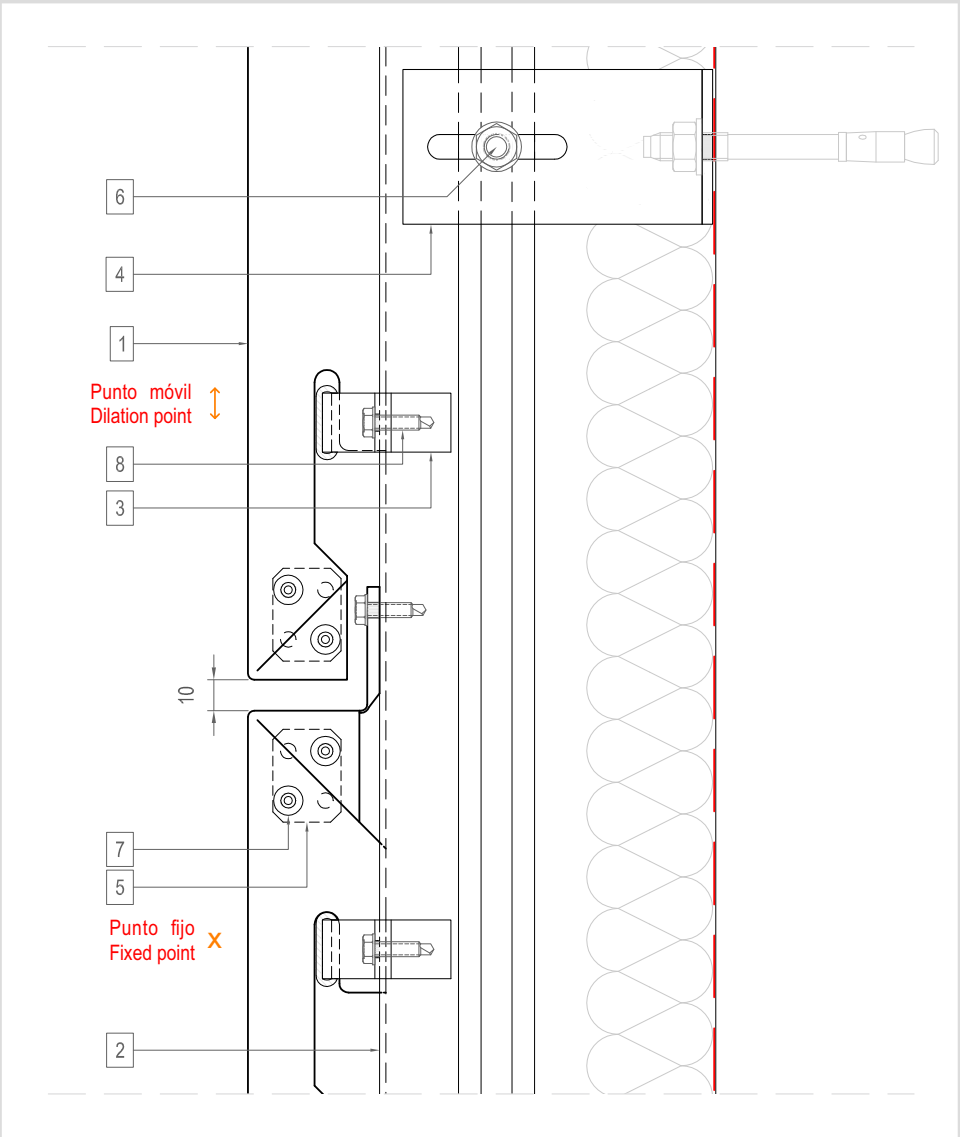

LC-2



TOP Quality ACM

Aluminium Composite Panels for Architectural Wall Cladding





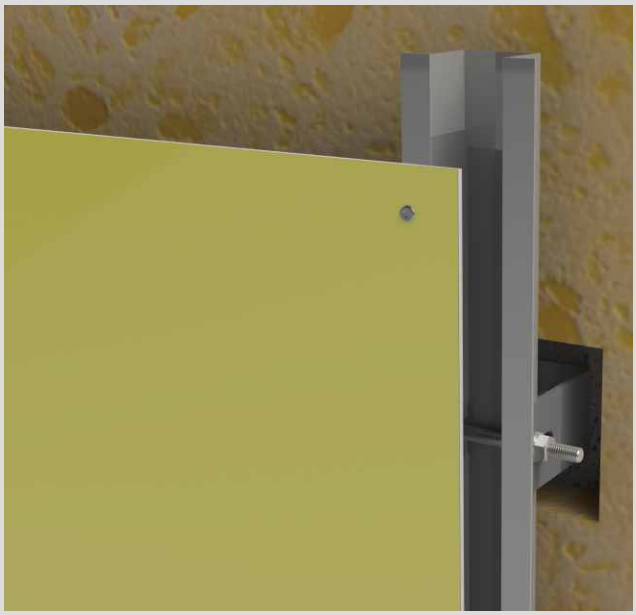
larson®
by Alucoil
Top Quality ACM - Worldwide

Riveted system - VERTICAL PROFILES

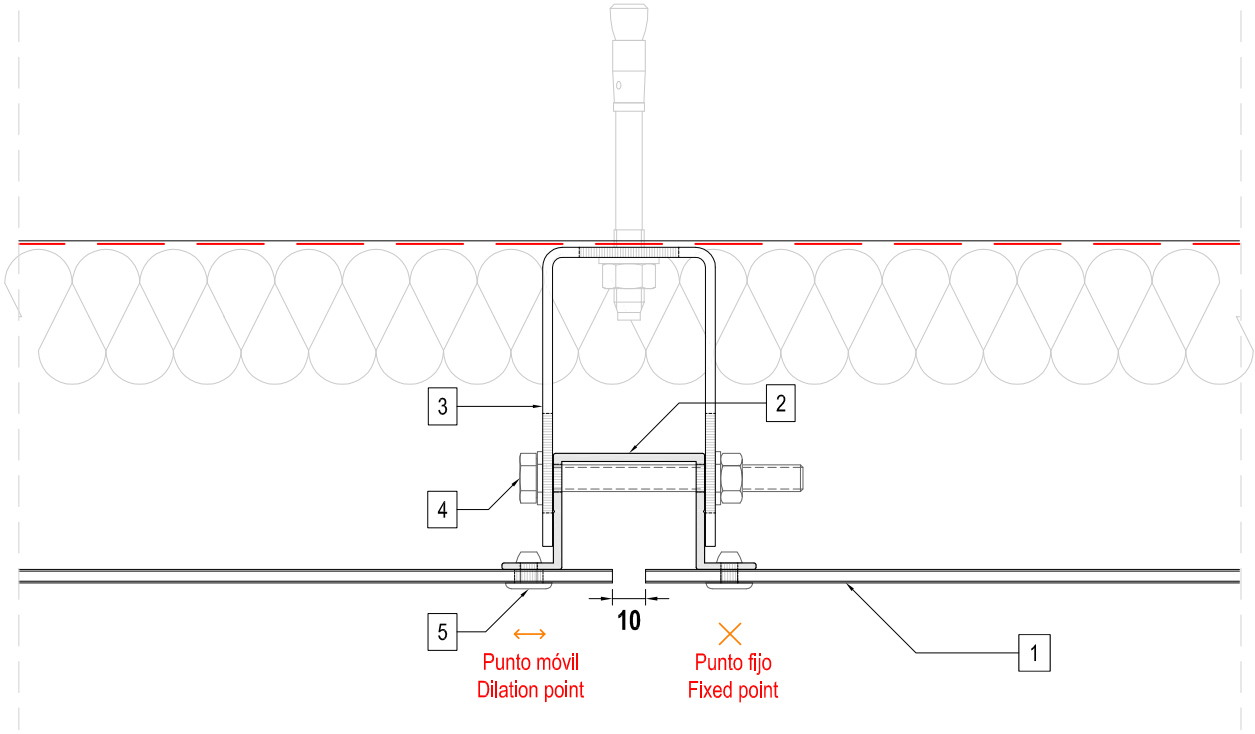

LCH-2


LCH-1


DIN 7337 rivet

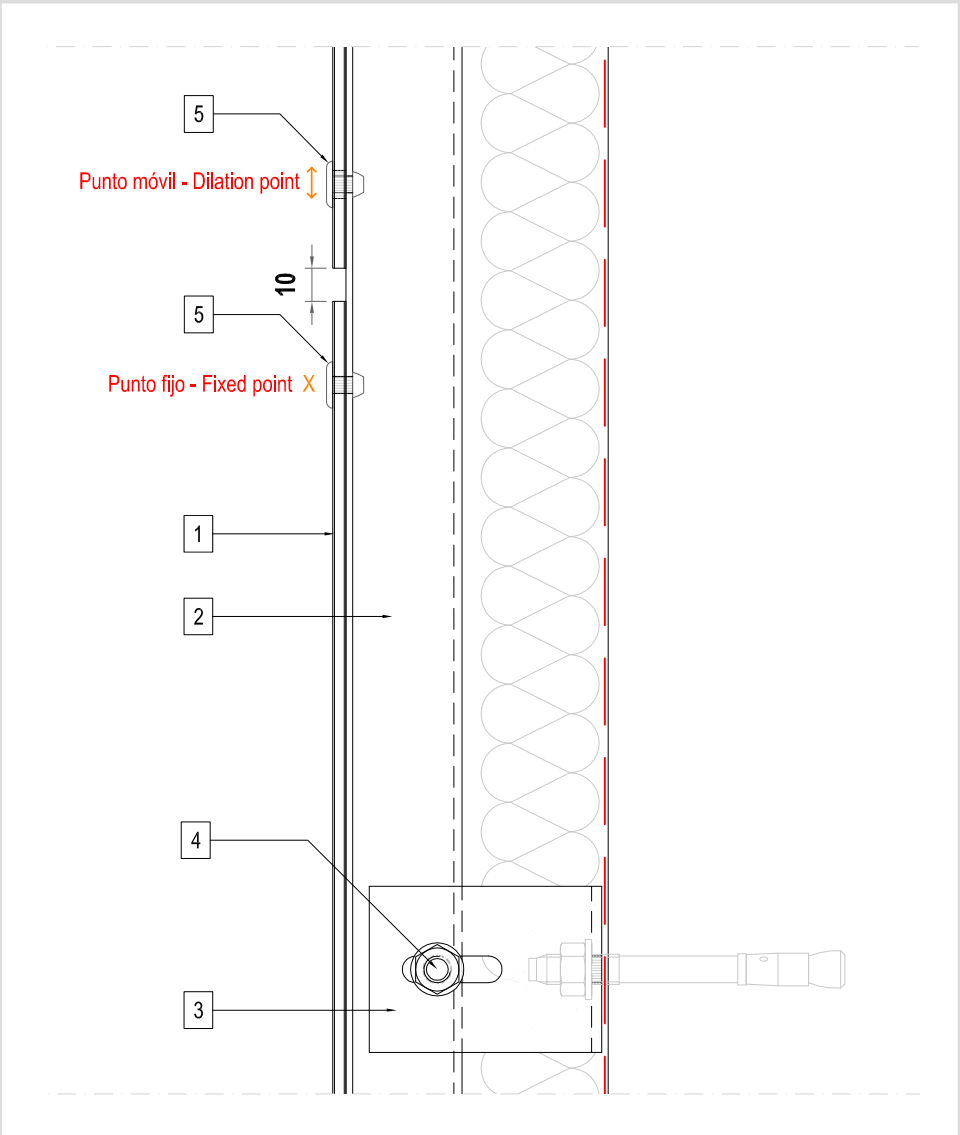


1. **larson®** composite panel
2. LCH-1 profile
3. LCH-2 bracket
4. Hex head screw ISO 4017-M8x80 **(DIN 933)**
   Washer ISO 7089-8 200HV **(DIN 125)**
   Hex nut ISO 4032-M8-8 **(DIN 934)**
5. Blind rivet ISO 15977-Ø5x12 AlA/St (d_k=14mm) **(DIN 7337)**



TOP Quality ACM

Aluminium Composite Panels for Architectural Wall Cladding



larson®
by Alucoil
Top Quality ACM - Worldwide

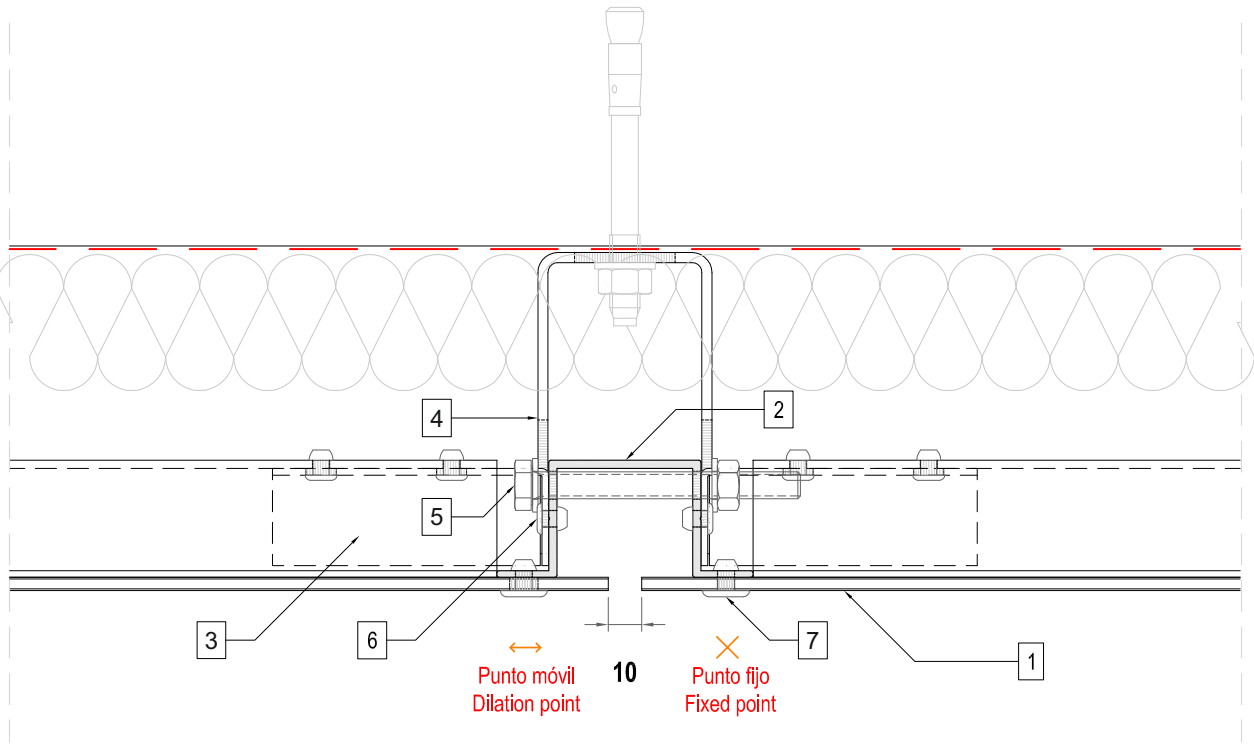
Riveted system - VERTICAL & HORIZONTAL PROFILES

LCH-2

DIN 7337 rivet

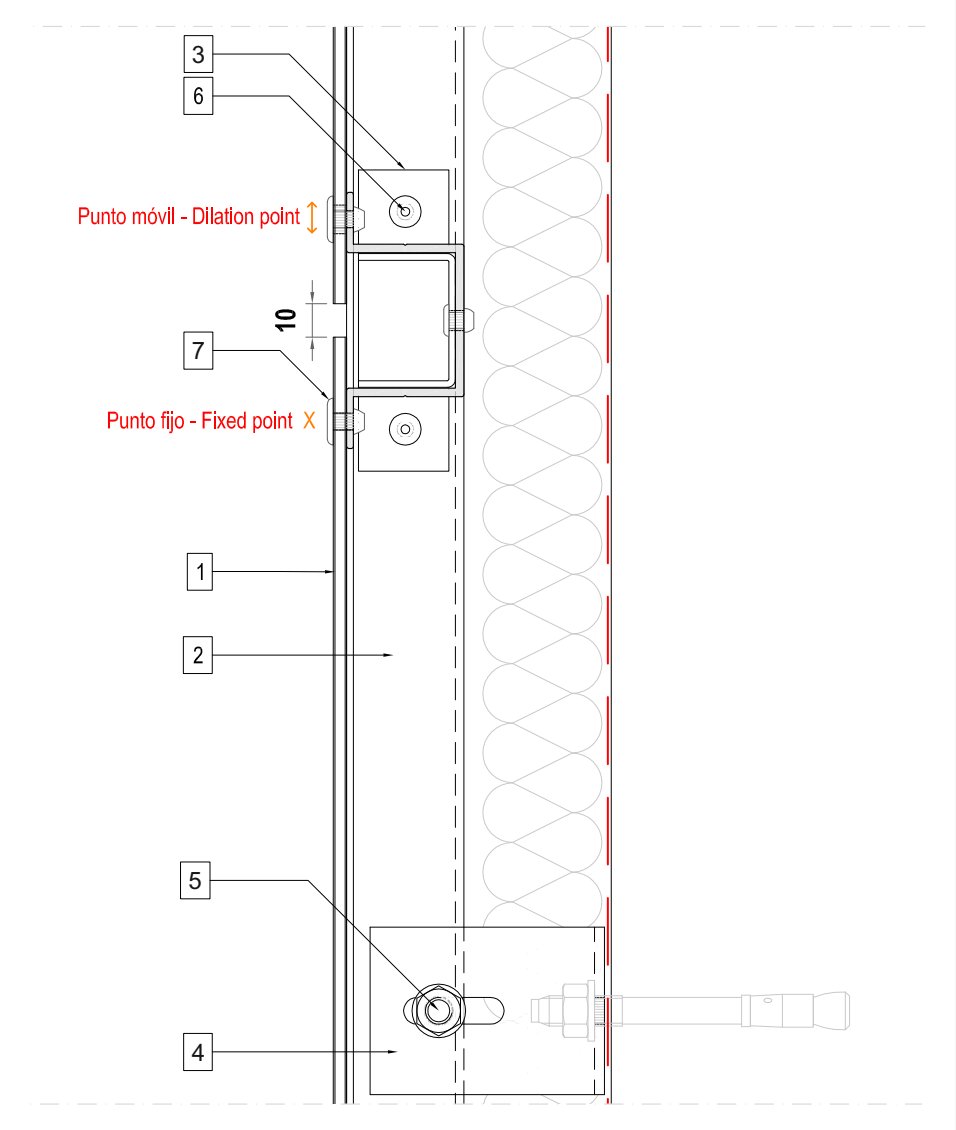
LC-13

1. **larson®** composite panel
2. LCH-1 profile
3. LC-13 Aluminium plate
4. LCH-2 bracket
5. Hex head screw ISO 4017-M8x80 **(DIN 933)**
   Washer ISO 7089-8 200HV **(DIN 125)**
   Hex nut ISO 4032-M8-8 **(DIN 934)**
6. Blind rivet ISO 15977-Ø4,8x12 AlA/St (d_k=9,5mm) **(DIN 7337)**
7. Blind rivet ISO 15977-Ø5x12 AlA/St (d_k=14mm) **(DIN 7337)**



TOP Quality ACM

Aluminium Composite Panels for Architectural Wall Cladding



larson®
by Alucoil
Top Quality ACM - Worldwide

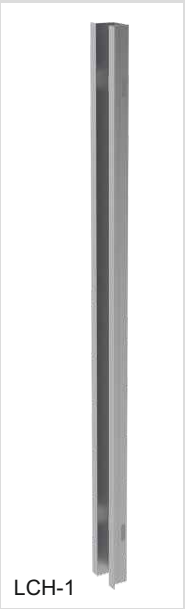
LC-4 / LC-6 system

LCH-2

LC-4

LC-6

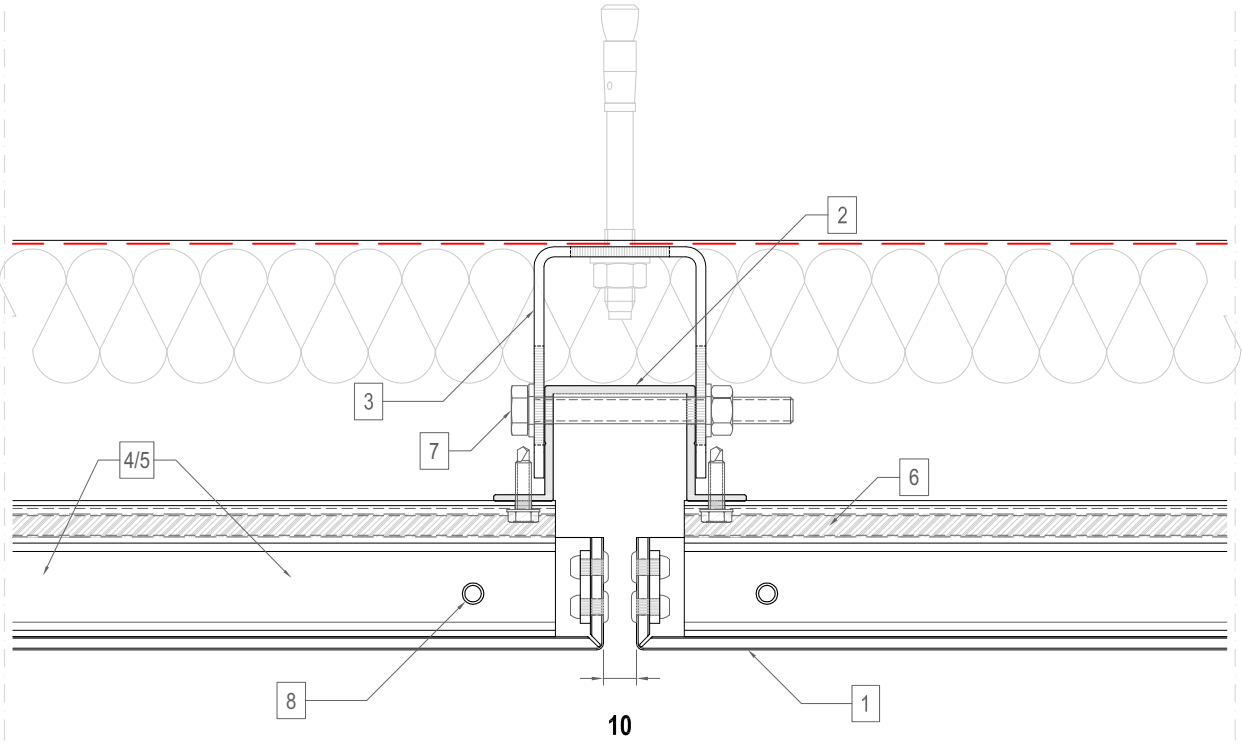
1. **larson®** composite panel
2. LCH-1 profile
3. LCH-2 bracket
4. LC-4 profile
5. LC-6 profile
6. PE foam double-sided with adhesive tesa®
7. Hex head screw ISO 4017-M8x80 **(DIN 933)**
   Washer ISO 7089-8 200HV **(DIN 125)**
   Hex nut ISO 4032-M8-8 **(DIN 934)**
8. Blind rivet ISO 15977-Ø4,8x12 AlA/St (d_k=9,5mm) **(DIN 7337)**
9. Screw ISO 15480 St Ø4,8x19 **(DIN 7504-K)**

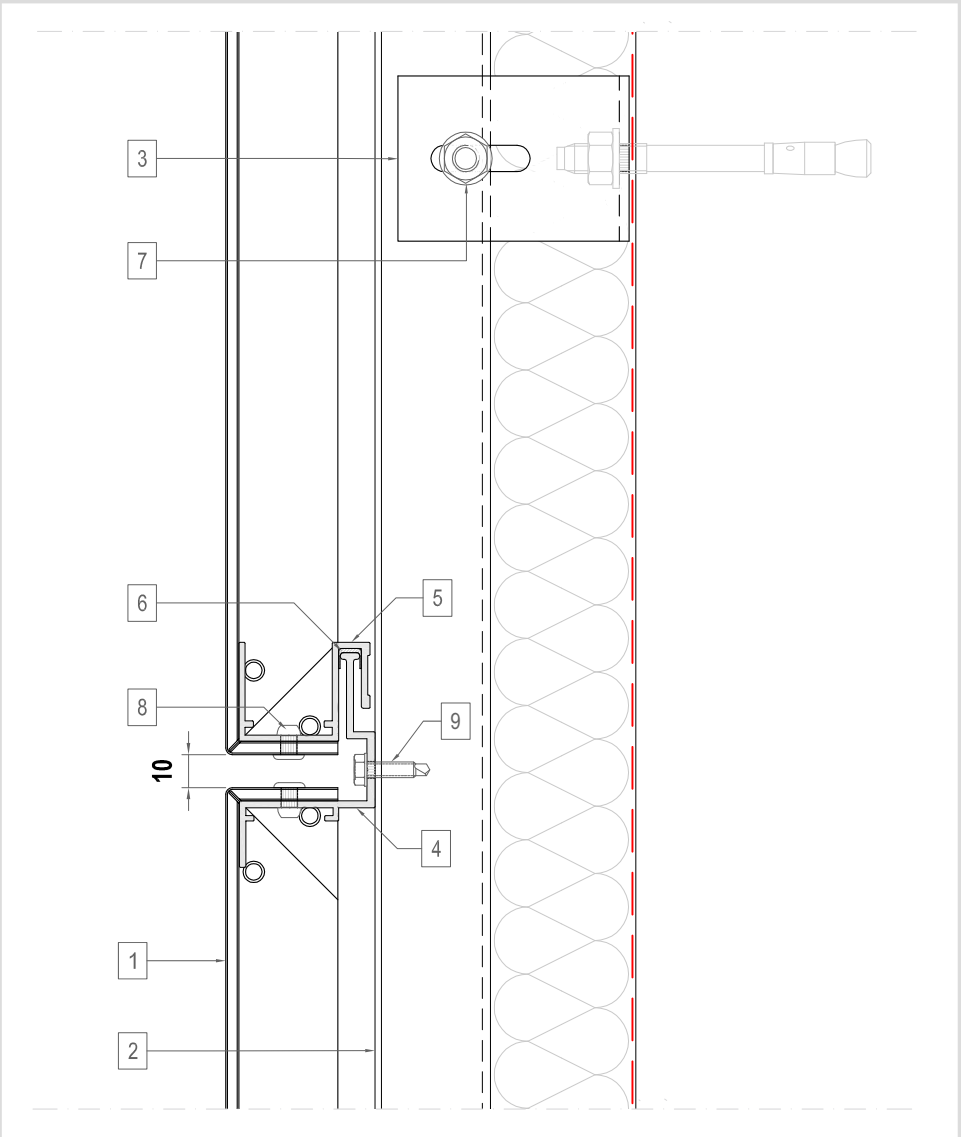


LCH-1

TOP Quality ACM

Aluminium Composite Panels for Architectural Wall Cladding





larson®
by Alucoil
Top Quality ACM - Worldwide

LC-9 system

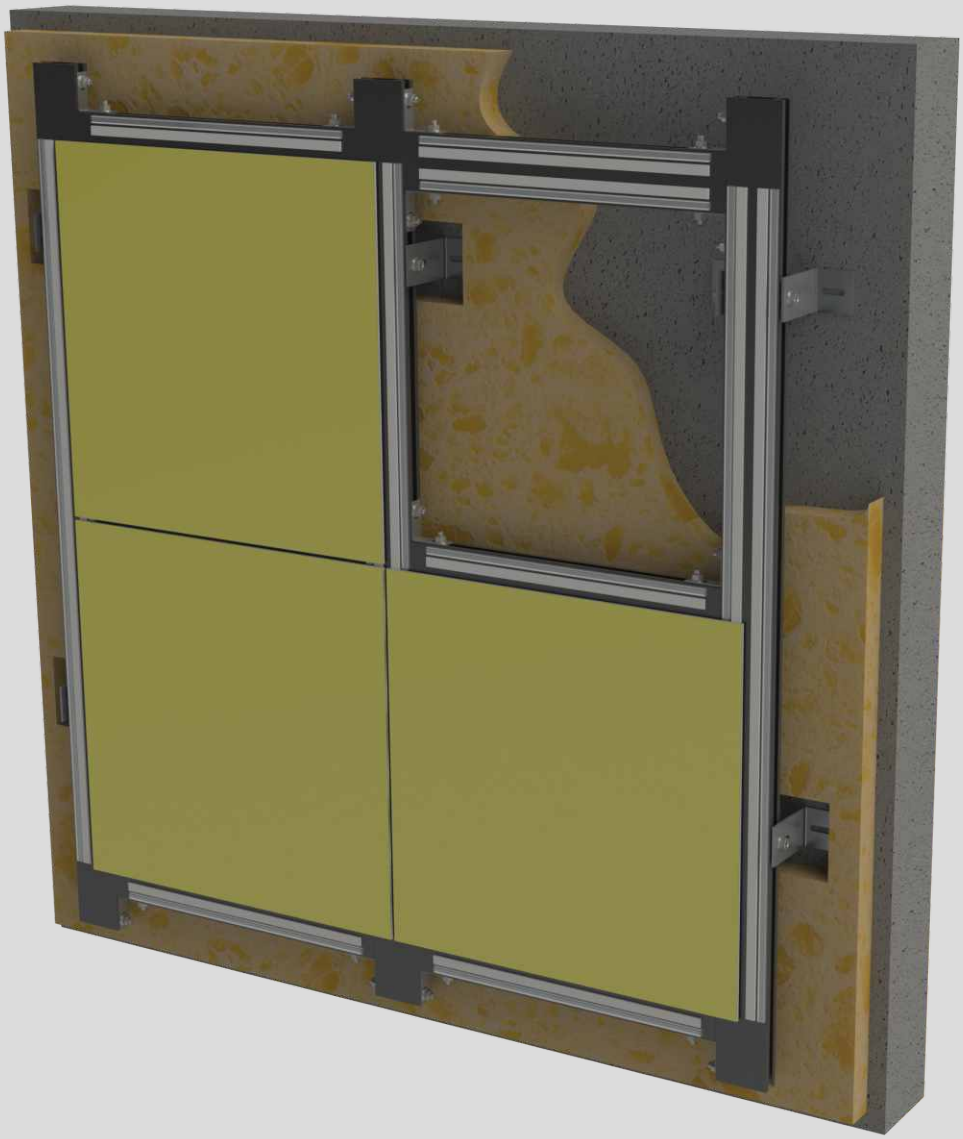

LC-1


LC-5


LC-8

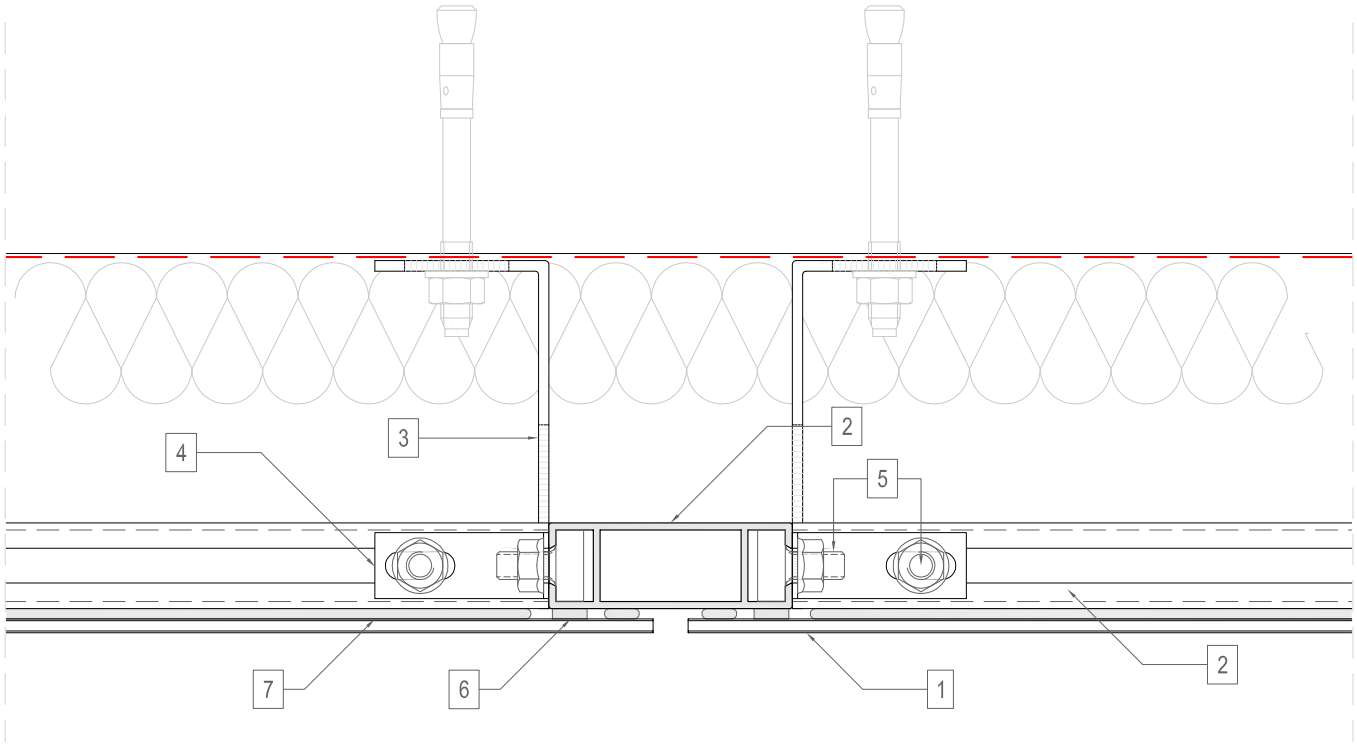

LC-9

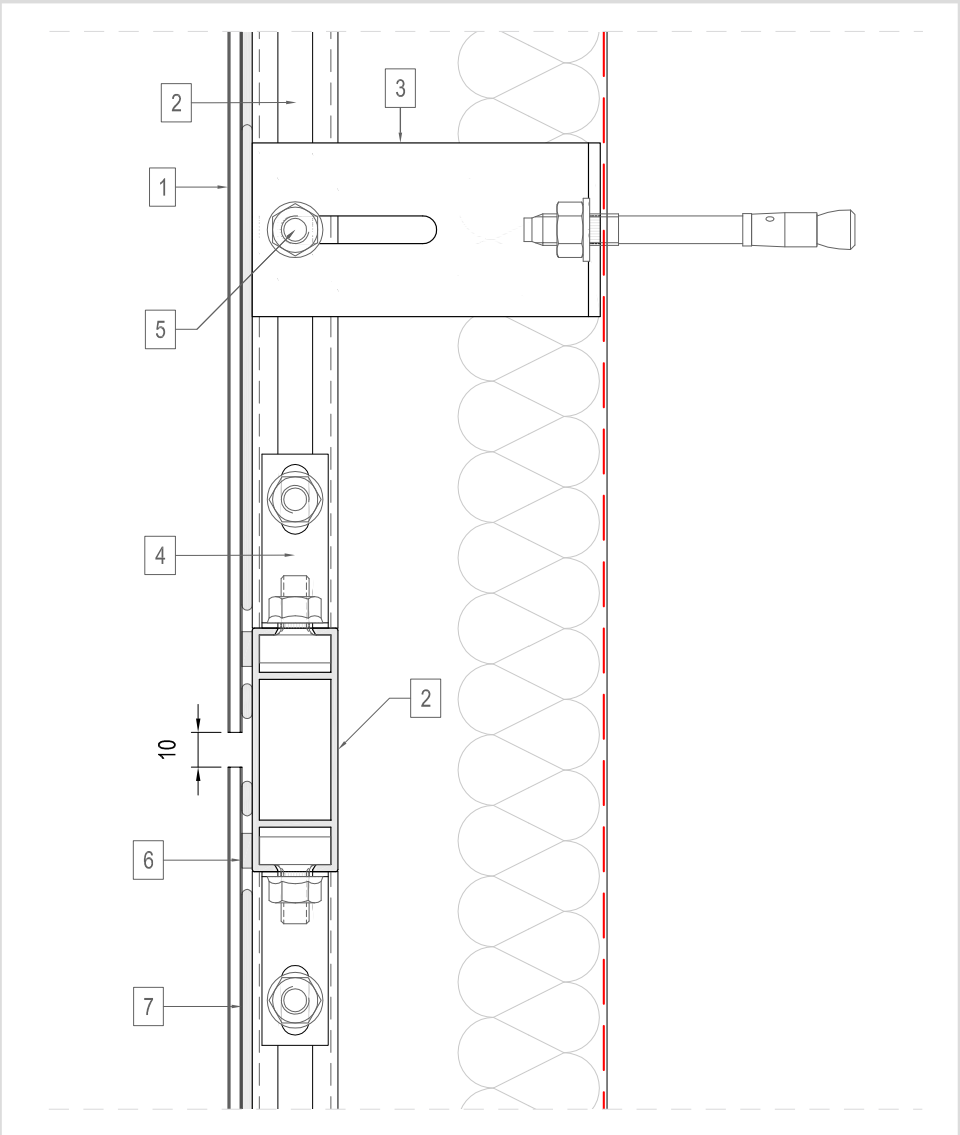
1. **larson®** composite panel
2. LC-9 profile
3. LC-1 bracket
4. Aluminium plate LC-5
5. Hammer head screw LC-8 M8x17mm
   Steel protected by deltatone UNE 17021
   Hexagon nut with flange EN 1661 M8-Ø4,8 ISO 4161 **(DIN 6923)**
6. SIKATACK PANEL 5
7. SIKA PRIMER 210 T



TOP Quality ACM

Aluminium Composite Panels for Architectural Wall Cladding





13. Inspection and maintenance guidelines

This recommendation covers procedures for cleaning and maintaining coated aluminium roof covering and wall cladding. The information contains recommended methods as an aid in establishing safe, sound cleaning and maintenance practices with respect to coated aluminium roof covering and wall cladding.

13.1 General Considerations

It is recommended that the building owner provide a qualified inspector who will see that the desired effect is being obtained with the use of sound cleaning and maintenance procedures.
Two inspections per year and associated cleaning of all areas is required for Limited Warranty coverage (cleaning and maintenance records should be kept and made available to **Alucoil®** if they are required). Cleaning is vital in areas where industrial deposits have dulled the surface, where materials from construction processes have soiled the surface or where cleaner run-down from other surfaces should be removed. Local conditions as well as building location within a geographical area quite naturally have an effect on cleanliness.

Regular inspection and maintenance should consist of:

- Checking the condition of the sealants, fasteners and flashings to ensure water tightness
- Examining local defects (e.g. scratches) that may cause early deterioration of the coating or corrosion of the substrate
- Removing any blockage in gutters to avoid overflow or buildup
- Removal of leaves, grass, mould and other objects and debris
- Removal of dirt in areas of cladding not rinsed naturally by rainwater
- Removal of graffiti or other marks

Cleaning of coated aluminium may be scheduled with other cleaning. For example, glass and painted aluminium components can be cleaned at the same time.Cleaning is specifically required in areas of low rainfall or in industrialized areas. Foggy coastal regions with cycles of condensation and drying may tend to cause a build-up of atmospheric salts and dirt. In any climate, sheltered areas, such as overhangs, may become soiled due to insufficient rainwater rinsing. Thorough rinsing is especially important after cleaning of these sheltered areas.
If automatic or pressure-based wall cleaning equipment is to be used on a building, a test should be made early in equipment design to ensure that the cleaning solutions, brushes, as well as the frequency of cleaning should be taken into consideration to ensure no detrimental effect on or to the coating.
After completion of the building, special attention should be paid to fixings, damages
to the coating, drilling swarf, pop rivet systems and general building debris.
Construction soils, including concrete or mortar, etc. should be removed as soon as possible. The exact procedure for cleaning will vary depending on the nature and degree of soil. Try to restrict cleaning to mild weather. Cleaning should be done on the shaded side of the building or ideally on a mild, cloudy day.
Method of cleaning, type of cleaner, etc. of one component of the building must be used with consideration for other components such as glass, sealant, painted surfaces, etc.

13.2 Cleaning

- Removal of light surface soil:

Removal of light surface soil may be accomplished in several ways. Some testing is recommended to determine the degree of cleaning actually necessary to accomplish the task. Ideally, an initial step of forceful water rinse from the top down is recommended prior to any cleaner application. Significant benefit is gained with some type of surface agitation. Low water volume with moderate pressure is much better than considerable volume with little pressure. Physical rubbing of the surface with soft, wet brushes, sponges or cloth is also helpful.
The simplest procedure would be to apply the water rinse with moderate pressure to dislodge the soil. If this does not remove the soil, then a concurrent water spray with brushing or sponging should be tested. If soil is still adhering after drying, then a mild detergent will be necessary.
When a mild detergent (PH7) or mild soap is necessary for removal of soil, it should be used with brushing or sponging. The washing should be done with uniform pressure, cleaning first with a horizontal motion and then with a vertical motion. Apply cleaners only to an area that can be conveniently cleaned without changing position. The surface must be thoroughly rinsed with clean water. It may be necessary to sponge the surface while rinsing, particularly if cleaner is permitted to dry on the surface. The rinsed surface can be air dried or wiped dry with a chamois, squeegee or lint free cloth.
Run down of cleaner (from any operation) to the lower portions of the building should be minimized and these areas should be rinsed as soon as and as long as necessary to reduce streaking etc. from unavoidable run down. Do not allow cleaning chemicals to collect on surfaces or to "puddle" on horizontal surfaces, crevices, etc.
These areas should be flushed with water and dried via air or wiped dry with a chamois, squeegee or lint free cloth.
Always clean coated surfaces down from top to bottom and follow with a thorough rinsing with clean water. (With one storey

or low elevation buildings, it is recommended to clean from bottom up and rinse from top down). To avoid water stain, the surface should be wiped.

● Cleaning of medium to heavy soil:
Some type of mild solvent such as mineral spirits may be used to remove grease, sealant or caulking compounds.

Stronger solvent or solvent containing cleaners may have a deleterious or softening effect on coatings; accordingly, great care should be taken. To prevent harm to the finish, these types of solvent or emulsion cleaners should be soap tested and preferably the coating manufacturer should be consulted. Care should be taken to assure that no marring of the surface is taking place in this manner since this could cause an undesirable appearance at certain viewing angles. Cleaners of this type are usually applied with a clean cloth and removed with a cloth. Remaining residue should be washed with mild soap and rinsed with water. Use solvent cleaners sparingly.
It may be possible for solvents to extract materials from sealants which could stain the painted surface or could prove harmful to sealants; therefore, possible adverse effects must be considered. **Test clean a small area first.**
If cleaning of a heavy surface soil has been postponed or in cases of tenacious soil, stubborn stains, etc., then a more aggressive cleaner and technique may be required. Cleaner and technique should be matched to the soil and the painted finish. Some local manual cleaning may be needed at this point.
Always follow the recommendations of the cleaner manufacturer as to proper cleaner and concentration. Test clean a small area first. Cleansers should not be used indiscriminately. Do not use excessive, abrasive rubbings as such may alter surface texture or may impart a "shine" to the surface. Concrete spillage that has fried on the coated surface may become quite difficult to remove. Special cleaners and/or vigorous rubbing with non-abrasive brushes or plastic scrapers may be necessary. Diluted solutions of Muriatic Acid (under 10%) may be effective in removing dried concrete stains; however, a small test clean area should be tried first, and proper handling precautions must be exercised for safety reasons.

Never mix cleaners. Doing so may be ineffective, and worse, very dangerous. For example, mixing chlorine containing materials, such as bleaches, with other cleaning compounds containing ammonia can cause poisonous gas emissions. Always rinse the coated material after removal of heavy surface soil.

Summary of general cleaning tips
● Overcleaning or excessive rubbing can do more harm than good.
● Strong solvents or strong cleaner concentrations can cause damage to painted surfaces.
● Avoid abrasive cleaners. Do not use household cleaners that contain abrasives on painted surfaces.
● Abrasive materials such as steel wool, abrasive brushes, etc. can wear and harm finishes.
● Avoid drips and splashes. Remove run downs as quickly as possible.
● Cleaning should be done in shade at moderate temperatures. Avoid temperature extremes. Heat accelerates chemical reactions and may evaporate water from solution. Extremely low temperature may give poor cleaning effects. Cleaning under adverse conditions may result in streaking or staining.
● Do not substitute a heavy duty cleaner for a frequently used mild cleaner.
● Do not scour coated surfaces.
● Never use paint removers, aggressive alkaline, acid or abrasive cleaners, phosphate or highly alkaline or highly acid cleaners.
● Follow manufacturers recommendations for mixing and diluting cleaners.
● Never mix cleaners.
● To prevent marring, make sure cleaning sponges, cloth etc. are grit free.
● Always test clean small surface.
● "An ounce of prevention is worth a pound of cure".

13.3 Repair
Damage may be found on the surface of the coating when cleaning or otherwise maintaining the coated roof covering or wall cladding. Paint repair should be restricted to small areas (max. 5.0 m²).
¡Any significant repair work should be informed **Alucoil®**!

Execution when no corrosion is found:
● The damaged surface should be washed and dried as described above.
● A recommended touch-up paint should be applied for protective and aesthetic reasons.
Execution with small corrosion defects:
● Remove the dust by abrading, scraping, and sand blasting to the bare material.
● Degrease the complete surface.
● Clean and dry the surface (as described above) before applying a repair paint system (primer and top coat) recommended by the material supplier.

13.4 Repainted
If it is deemed necessary to re-paint or reclad large surfaces, contact **Alucoil®** before execution.
Investigating the economic feasibility of over-painting the existing structure or replacing the coated sheets is recommended.

In case of any questions about overpainting please contact us. Using non-compatible systems of repair paints and original coated surfaces might cause undesired effects.

14. Organisation of the works

14.1 Transport, storage and manipulation
The maximum storage period is eight months. It is recommended to stack panels horizontally one on top of he other, avoiding storage in the upright position. Each stack shall contain a maximum of seven pallets and may not exceed 10 000 kg. It is recommended not to remove the protective film until after installation on the worksite.

14.2 Project design
Firstly, the condition of the support must be verified in both new building and retrofitting. The anchoring brackets are then installed followed by the thermal insulation if possible (rigid hydrophobic and flame-retardant plates are recommended) before installation of the uprights. The general part of the cladding is then installed from the bottom up (blank parts) and finally the intersection trays (corners, singular points, etc.).

14.3 Installers
Installation of the system may be performed by the beneficiary or by specialised companies approved by the former.

14.4 Preparation of the support
The substructure must be perfectly aligned in order to ensure flatness of the cladding system. Before mounting the board system the anchor points must be subjected to an in situ pull-out test to ensure the stability and bearing capacity of the support structure. The façade installer shall check the state of the support and approve the flatness of the same before mounting the system, which must be installed with proper levelling and vertical alignment to ensure that the final cladding is properly flat.

14.5 Cassettes
Care must be taken to install the trays in the right direction (marked with an deflection on the protective film and on the concealed side). The protective film shall be removed once the façade is finished to prevent excessive exposure to sunlight and the elements from making later removal more difficult. The first step for installation on the worksite is layout of the LC-3 hanger positions and subsequently, provided the distribution so permits, installation of the trays by rows and always from the bottom up, placing the notches on the LC-3 hanger. Next, rivet the trays to the upright flanges and slotted holes located in the double fold of the top horizontal edge. If the trays require stiffeners fixed to the extrados with adhesive it is recommended to wait 24 hours to ensure proper curing of the adhesive before installing the cassette in its final position.

14.6 Panels
Care must be taken to install the trays in the right direction (marked with an arrow on the protective film and on the concealed side). The protective film shall be removed once the façade is finished to prevent excessive exposure to sunlight and the elements from making later removal more difficult.

14.6.1 Panels with perimeter riveting
The first step for installation on the worksite is mounting the substructure, laying out the position of the T-shaped connectors (ref LC-13) and subsequently, provided the distribution so permits, installation of the panels by rows and always from the bottom up, riveting them to the flanges of both the vertical and horizontal LCH-1 profiles.

14.6.2 Vertically riveted panels
Provided the layout so permits, installation of the panels by rows and always from the bottom up, riveting them to the flanges of the vertical LCH-1 profiles.



15. Screws, rivets, nuts and washers

Shaping cassettes
a) Rivet ISO 15977 Ø4,8x12mm AIA/A2 (d_k =9,5mm)

Fixing of the panels with Riveted system
a) Rivet ISO 15977 Ø5x12mm AIA/A2 (d_k =14mm)

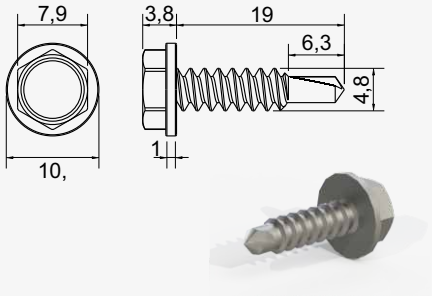
Fixing of the LC-13 with LCH-1 profiles (riveted system)
a) Rivet ISO 15977 Ø4,8x10mm AIA/A2 (d_k =9,5mm)

Fixing of the LC-3 piece and cassettes in its upper edge to the profiles
a) Self drilling screw ISO 15480 Ø4,8x19mm A2/50 *(also known as DIN 7504-K)*

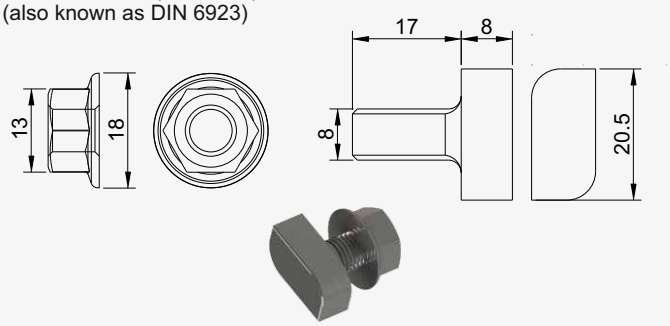
Fixing of the LCH-1 profile with the LCH-2 bracket
a) Hex head screw ISO 4017 M8x80mm 8.8 (*also known as DIN 933)*
b) Washer ISO 7089 M8 8.8 (*also known as DIN 125)*
c) Hex nut ISO 4032 M8 8.8 (*also known as DIN 934)*

Fixing of the LC-2 profile to the LC-1 bracket
a) Hammer head screw UNE 17021 M8x17mm 4.8 Deltatone
b) Hex nut ISO 1661 M8-4.8 (*also known as DIN 6923)*

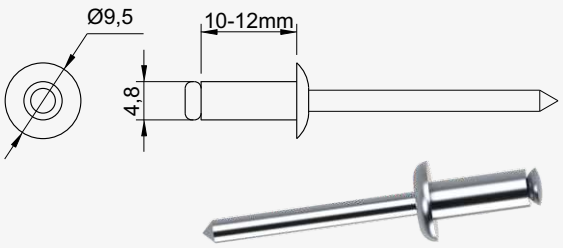
Self drilling screw Ø4,8x19mm A2/50 (ISO 15480)
(also known as DIN 7504-K)



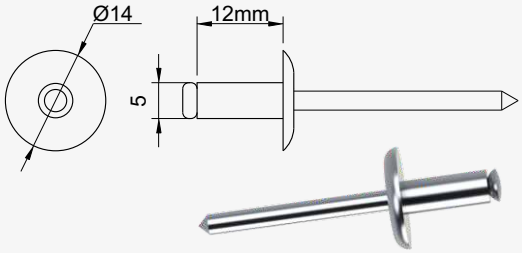
Hammer head screw LC-8 M8x17mm 4.8 Deltatone (UNE 17021)
Hex nut M8-4.8 (ISO 1661)
(also known as DIN 6923)



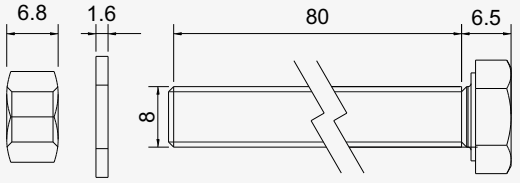
Rivet Ø4,8x10mm-12mm AIA/A2 (d_k=9,5mm) (ISO 15977)



Rivet Ø5x12mm AIA/A2 (d_k=14mm) (ISO 15977)

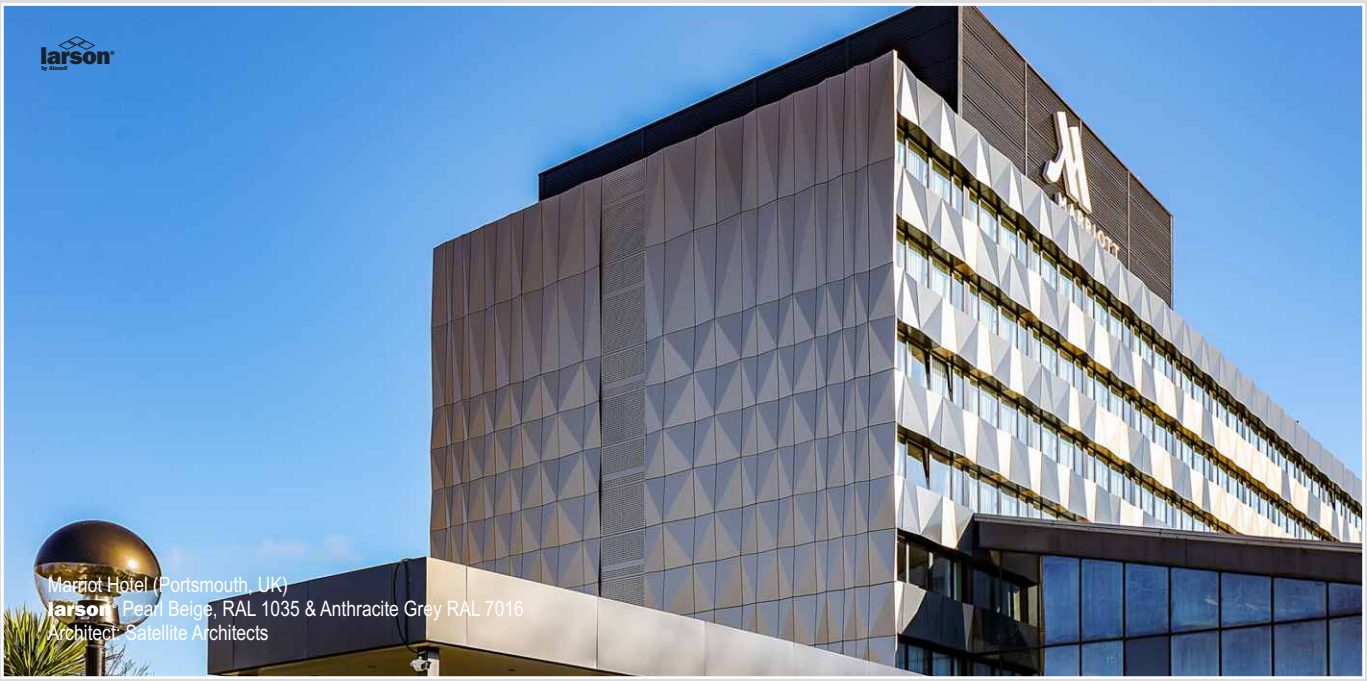


Hex head screw ISO 4017 M8x80mm 8.8 (DIN 933) + Washer ISO 7089 M8 8.8 (DIN 125) + Hex nut ISO 4032 M8 8.8 (DIN 934)



Hotel d'agglomération (Bayonne, France)
larson® Illusions Holo Gold Silver
Architecte: GARDERA-D

La Cité des civilitations du vin (Bordeaux, France)
larson® Illusions HOLO Gold Silver
Architect: X-TU

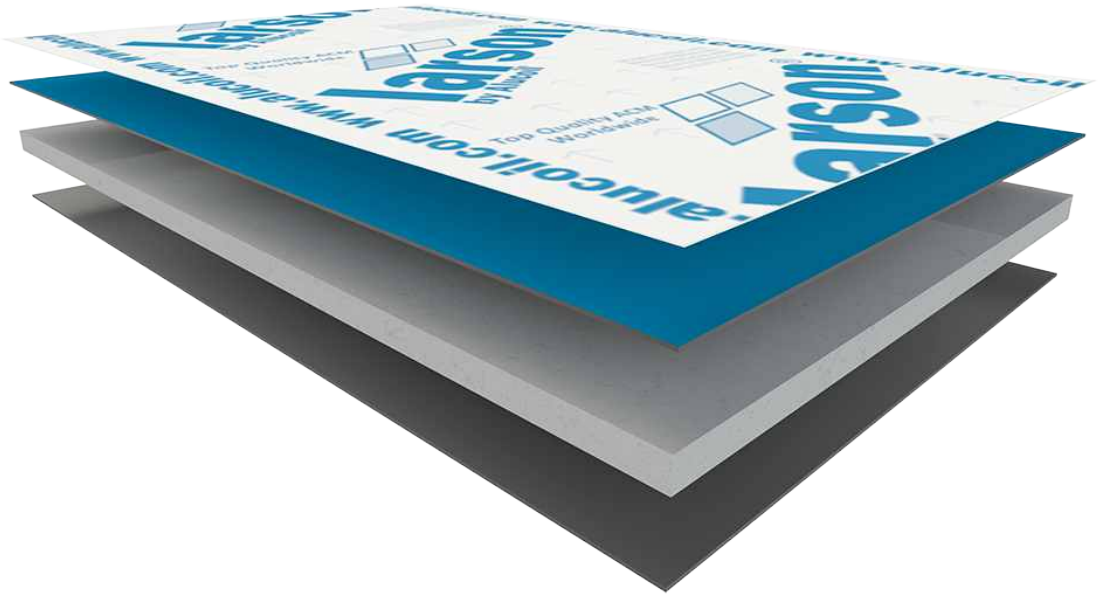


Marriot Hotel (Portsmouth, UK)
larson® Pearl Beige, RAL 1035 & Anthracite Grey RAL 7016
Architect: Satellite Architects

larson®
by Alucoil®

Paneles Composite de Aluminio para Revestimiento de Fachadas

Top Quality ACM - Worldwide



Alucoil®
Grupo Alibérico

Polígono Industrial de Bayas - C/Ircio. Parcelas R72-77
09200 Miranda de Ebro, Burgos. SPAIN
Tlf: +34 947 333 320 Fax: +34 947 324 913
info@alucoil.com

www.alucoil.com

Advanced Materials for Architectural Wall Cladding

Alucoil®
Grupo Alibérico

Polígono Industrial de Bayas - C/Ircio. Parcelas R72-77
09200 Miranda de Ebro, Burgos. SPAIN
Tlf: +34 947 333 320 Fax: +34 947 324 913
info@alucoil.com

www.alucoil.com

Technical information **larson**®
Edición 11-2018 (03) (ENGLISH)