SYSTEM GUIDELINES

RIVERCLACK

SHAPING ROOFS

SYSTEM GUIDELINES

GENERAL NOTES

The technical data provided in this communication is for information purposes only.

You can download the last release from our website: www.riverclack.com.

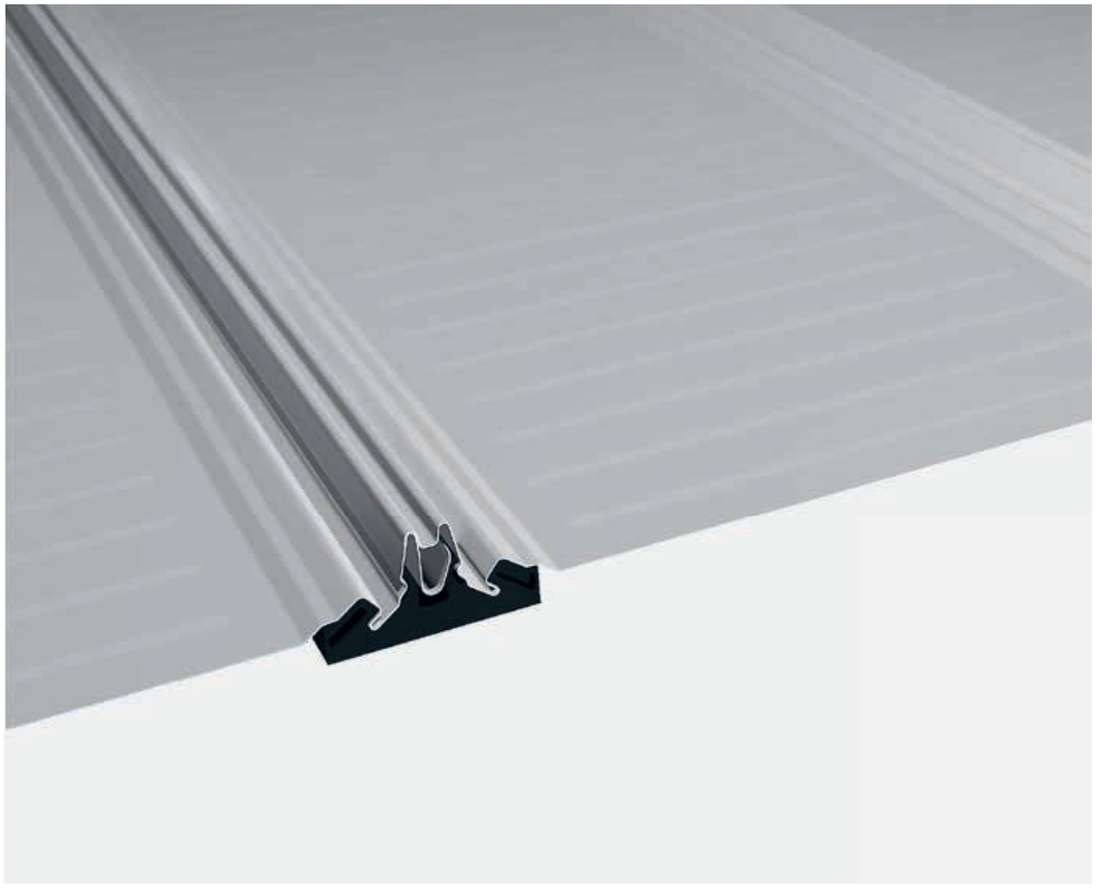
ISCOM SPA provides this information based on its experience and knowledge and accepts no liability for any loss, damage, costs or expense incurred in relation to or arising from any person relying on the suggestions and information rendered.

All information issued by ISCOM SPA is subject to continuous development without notification. The information/details contained in this communication are correct at the date of issue. It is the addressee's responsibility to ascertain from ISCOM SPA that the information contained in this communication has not changed at the time of use by the addressee.

For any other information on the Riverclack® system, please contact our dealer in your area or ISCOM Technical Department.

PRODUCT OVERVIEW

Riverclack® is a “secret fix” standing seam metal roofing system that has proven itself in the most challenging climatic conditions across the globe. The metal panels can be roll formed on-site to any length, removing the need for end laps on long slopes. The joint between two adjacent panels features a drainage channel that eliminates any risk of leaks into the building, while the unique perforation-free locking system means that the system is installed onto purpose-designed clips by foot pressure alone, with no need for specialist installation machinery.



KEY FEATURES OF RIVERCLACK

FULLY WATERPROOF

Thanks to its unique gasket-free drainage joint, the roof system is watertight even when completely submerged in water.

QUICK TO INSTALL

Installation is quick and easy and there is no need for pre-assembly of the clips.

PERFORATION / FREE LOCKING SYSTEM

The Riverclack® “secret fix” locking system makes no perforations anywhere on the roof surface and allows for free thermal expansion of the panels.

COST / EFFECTIVE

As a long life, low maintenance system with rapid installation, Riverclack® is a cost effective solution for large and small-scale projects alike.

DURABLE

Select metals such as aluminum, copper and stainless steel are used in combination with the roof system’s own inherent reliability. All metals are 100% recyclable.

HIGHLY SELF-BENDING

With probably the highest self-bending capabilities of any structural standing seam system, Riverclack® panels can self-curve down to a minimum radius of 25m (0.7mm mill-finish aluminum), thereby removing the extra costs of machine curving work.

FULLY WALKABLE

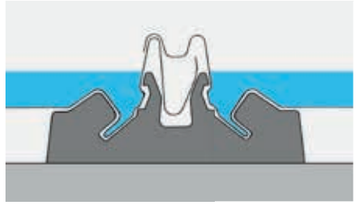
Thanks to the temper of the metals used, it is possible to walk on the panels after installation without creating any permanent deflection, even after countless heavy-footed trips across their surface.

UNRIVALED WATER TIGHTNESS

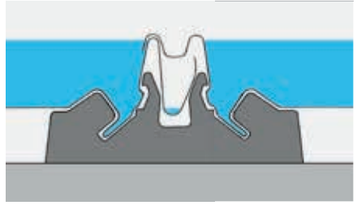
The high-tensile side lap prevents any easy water penetration into the joint and, even if this should happen, the drainage channel captures the water and runs it away into the gutter, eliminating the risk of leakage into the building.

Riverclack® has been designed to be watertight even when completely submerged in water. The secret fix locking system prevents any penetrative fixing of the panels, but the features that really set the Riverclack® system apart from the competition are the high-tensile, anti-capillary conical joint side lap and the drainage channel (Riverclack® 500 and 550).

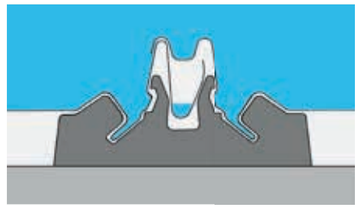
1.



2.



3.



Water tightness has been tested according to the following ASTM standards:

ASTM E-1646-95 Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference: for this standard, water is sprayed at the exterior face of the panels simultaneously with the application of a static air pressure difference between the exterior and interior faces (pressure on the outside being kept higher).
ASTM E-2140-01 Test Method for Water Penetration of Metal Roof Panel Systems by Static Water Pressure Head: for this standard, the Riverclack® roof sample is subjected to a static water pressure head (determined by 150mm of water) applied to the outer face of the roof panel.

In addition, under laboratory conditions we subjected the Riverclack® system to a hugely demanding test for any product. A pool was built at the ISCOM headquarters using Riverclack® 550 panels, with no additional side lap sealant, as the base. The pool was then filled with 300mm of water, submerging the Riverclack® system. After 45 days under these conditions, not a single drop of water had leaked through.

PERFORMANCE STANDARDS / TESTS & CERTIFICATIONS

Riverclack® has been tested against many other international standards, including:

ASTM E-2140-01 TEST METHOD FOR WATER PENETRATION OF METAL ROOF PANEL SYSTEMS BY STATIC WATER PRESSURE HEAD

ASTM E-1646-95 TEST METHOD FOR WATER PENETRATION OF EXTERIOR METAL ROOF PANEL SYSTEMS BY UNIFORM STATIC AIR PRESSURE DIFFERENCE

ASTM E-1680-95 TEST METHOD FOR RATE OF AIR LEAKAGE THROUGH EXTERIOR METAL ROOF PANEL SYSTEM

ASTM E-1592-01 TEST METHOD FOR STRUCTURAL PERFORMANCE OF SHEET METAL ROOF AND SIDING SYSTEMS BY UNIFORM STATIC AIR PRESSURE DIFFERENCE

ASTM E-108-07A SPREAD OF FLAME TEST, CLASS A

UL-580 TESTS FOR UPLIFT RESISTANCE OF ROOF ASSEMBLIES, CLASS: UL 90

FM-4471 SIMULATED WIND UPLIFT PRESSURE TEST CLASS: I-75, I-225

TEST METHOD FOR DETERMINING THE SUSCEPTIBILITY TO HAIL DAMAGE OF ROOF COVERINGS, CLASS SH

FOOT TRAFFIC RESISTANCE TEST PROCEDURES, NO DAMAGE

The DIBt (Deutsche Institut für Bautechnik), BBA (British Board of Agrément), CSTB (Centre Scientifique et Technique du Bâtiment), TÜV Rheinland and FM Approvals have certified the Riverclack system according to the above-mentioned and other standards (DIN, EN, UNI, IEC).

Deutsches Institut für Bautechnik DIBt

FM APPROVED

CSTB le futur en construction

TÜV SÜD

BBA BRITISH BOARD OF AGRÉMENT CERTIFICATE No 07/4428

in the UK for material manufactured by CA group with the trade-name of River-Therm

CHOICE OF METAL

Riverclack® is available in a wide range of metals. Besides the superior 5754 aluminum alloy (guaranteed to deliver unrivaled performance in terms of corrosion resistance, mechanical strength and cost effectiveness), Riverclack® is also available in copper, stainless steel and titanium zinc.

MATERIAL		THICKNESS USED*	NOTES
ALUMINUM ALLOY 5754		0.7 / 0.8 / 1.0	LIGHT, STRONG AND RUSTPROOF, THIS IS THE MOST COST EFFECTIVE SOLUTION. ON CONTACT WITH AIR, A TOUGH, TRANSPARENT LAYER OF ALUMINUM OXIDE THAT RESISTS FURTHER CORROSIVE ACTION ENSURING A VERY LONG LIFESPAN FOR YOUR ROOF, RAPIDLY COATS ALUMINUM. ITS SPECIFIC WEIGHT IS ABOUT 1/3 THAT OF STEEL. AS REPORTED IN VARIOUS SCIENTIFIC ARTICLES, THE EN AW 5754 H18 MAGNESIUM-BASED ALLOY USED IN THE MANUFACTURING OF RIVERCLACK® HAS A HIGHER CORROSION RESISTANCE THAN OTHER ALLOYS COMMONLY USED FOR ROOFING PURPOSES.
COPPER		0.6 / 0.7 / 0.8	AN ELEGANT MATERIAL THAT IS HIGHLY CORROSION RESISTANT. WHEN IT WEATHERS, IT DEVELOPS A PATINA THAT CAN VARY FROM GOLD/BROWN SHADES TO BLUE/GREEN TONES, PROVIDING UNIQUE AESTHETICS. IT IS USED FOR RIVERCLACK® IN A RAW PHYSICAL STATE, ENSURING SUPERIOR TOUGHNESS AND ELASTICITY.
STAINLESS STEEL		0.5 / 0.6 / 0.7	ITS SUPERIOR CORROSION RESISTANCE IS THE RESULT OF A STABLE AND HIGHLY RESISTANT LAYER OF CHROME OXIDE ON ITS SURFACE THAT PREVENTS ANY CONTACT BETWEEN THE ENVIRONMENT AND THE STEEL'S INTERIOR. AS OPPOSED TO COMMON SURFACE TREATMENTS, SUCH AS GALVANIZATION OR COATING, THE PROTECTIVE OXIDE LAYER IS ABLE TO REGENERATE, EVEN AFTER NUMEROUS BREAKAGES..
GALVANIZED STEEL		0.5 / 0.6 / 0.7	FOR STEELS THAT CANNOT PRODUCE A SELF-PROTECTING LAYER IN THE WAY STAINLESS STEEL DOES, A PROTECTIVE ZINC COATING PROVIDES THE EXPOSED STEEL WITH CATHODIC PROTECTION FROM THE POTENTIALLY AGGRESSIVE ENVIRONMENT SO THAT IF THE SURFACE IS DAMAGED, IT IS THE ZINC RATHER THAN THE STEEL THAT WILL CORRODE. AN EXTRA PROTECTIVE COLOR COATING IS OFTEN APPLIED TO GALVANIZED STEEL.
TITANIUM ZINC		0.8 / 1.0	THIS TITANIUM-ZINC-COPPER ALLOY HAS A ZINC RATE CLOSE TO 99.995%: THE OTHER ELEMENTS CAN BE SEEN AS "IMPURITIES" IN THE ZINC. THE MATERIAL IS CHARACTERIZED BY A HIGH DEGREE OF RESISTANCE TO ATMOSPHERIC CORROSION, THANKS TO ITS PASSIVATION LAYER. TITANIUM ZINC IS A HIGHLY EXPRESSIVE MATERIAL WITH THE COLOR SHADES OF ITS GRAY PATINA PROVIDING A STRONG AESTHETIC QUALITY. BEING MALLEABLE, UNLIKE ANY OTHER MATERIAL USED FOR RIVERCLACK®, IT DOES REQUIRE A RIGID BACK SUPPORT TO ALLOW WALKABILITY.

* UNDERLINED VALUE = STANDARD THICKNESS

METAL LINEAR EXPANSION COEFFICIENTS

When an object is heated or cooled, its length changes in proportion to the original length and change in temperature. The key factor for a Riverclack® panel is linear thermal expansion, which is dependent on the linear expansion coefficient of the metal used (λ), the original length (Lo) and the temperature difference (Δt):

MATERIAL	λ (°C^{-1})	λ (°F^{-1})
ALUMINIUM ALLOY 5754	24 * 10-6	12.9*10-6
COPPER	16.8 * 10-6	9.4*10-6
STAINLESS STEEL	16 * 10-6	9.6*10-6
GALVANIZED STEEL	12 * 10-6	6.7*10-6
TITANIUM ZINC	22 * 10-6	12.22*10-6

$\Delta l = \lambda \, Lo \, \Delta t$

where

Δl = change in length (mm, inches)

Lo = length of Riverclack® panel (mm, inches)

Δt = temperature difference (°C, °F)

λ = linear expansion coefficient (°C^{-1}, °F^{-1})

Example: an aluminum panel with an original length of 20m can be expected to expand by 24mm from a fixed point (see THERMAL MOVEMENTS AND FIXED POINTS) given a temperature difference of 50°C (an average panel temperature difference that can be assumed between winter and summer), derived from:
$\Delta l = \lambda \, Lo \, \Delta t$ = (24 * 10-6) * 20m * 50°C =0.024m

SYSTEM COMPONENTS

RIVERCLACK® PANEL

FIXING CLIP

METAL PANELS

PANEL WIDTHS

	WIDTH (MM)	HEIGHT (MM)	SITE ROLL / FORMING	MACHINE / CURVING	DRAINAGE / CHANNEL	MINIMUM / ROOF PITCH
RIVERCLACK® 500	500	46	YES	YES	YES	0,5%
RIVERCLACK® 550	550	46	YES	YES	YES	0,5%
RIVERCLACK® GRIP 600	600	46	YES	NO	NO	5%

Custom widths are possible, with or without a drainage channel, allowing for maximum freedom of design.

The patented design of Riverclack® 500 and Riverclack® 550 panels, including their unique drainage channel, guarantees that the system is waterproof, even when completely submerged in water, without any risk of leakage into the building. This means that the system can be used, after steelwork deflection at panel ends, with roof pitches as low as 0.5% if the pitch length is < 30m and 1% if the pitch length is > 30m. For Riverclack® Grip 600, a slope of at least 5% is required.

CONFIGURATIONS

STRAIGHT PANELS

THE STANDARD PANELS ARE AVAILABLE IN VARIOUS TYPES OF MATERIALS, THICKNESSES AND FINISHES AS REQUIRED BY THE CUSTOMER.

PANEL LENGTH: AS REQUESTED.

CONVEX CURVED PANELS

CURVING RADIUSES	AL 0.7	AL 0.8	CU 0.6	STEEL 0.6	T.ZINC 0.8
SELF-CURVING RMIN (M)	25	25	30	30	20
MACHINE SMOOTH CURVING RMIN (M)	3	3	6	6	3

SMALLER RADIUSES ARE ACHIEVABLE BY CRIMP CURVING.

CONCAVE CURVED PANELS

CURVING RADIUSES	AL 0.7	AL 0.8	CU 0.6	STEEL 0.6	T.ZINC 0.8
SELF-CURVING RMIN (M)	30	30	36	36	25
MACHINE SMOOTH CURVING RMIN (M)	10	8	16	16	10

TAPERED PANELS

TAPERING LIMIT		MAX DIM.	MIN DIM.
RIVERCLACK® 500	(MM)	490	170
RIVERCLACK® 550	(MM)	540	170
RIVERCLACK® GRIP 600	(MM)	560	170

L>3000MM

SHORTER LENGHTS TO BE EVALUATED CASE-BY-CASE

TAPERED CONVEX OR CONCAVE PANELS

TAPERING AND CURVING VARIABILITY AND LIMITS ARE DETERMINED BY THE ISCOM TECHNICAL DEPARTMENT ON A CASE-BY-CASE BASIS, ACCORDING TO THE GEOMETRY OF THE ROOF.

Panels produced in the factory (average temperature 18°C) have a length tolerance of:
+10mm / -5mm per panel for lengths shorter than 3m
+20mm / -5mm per panel for lengths from 3m to 20m
In case of on-site production or longer panels, it is advisable to take into account for thermal expansion.
Panels produced in the factory (average temperature 18°C) have a width tolerance of:
+2mm / -2mm for all panel widths
In case of curved and tapered panels, it is advisable not to exceed the standard span of 1200mm and in case of smaller radiuses (<15m) it is advisable to furtherly reduce the span so as to grant a correct fastening.
Please contact ISCOM technical department over this matter.

FIXING CLIPS

The fastening of Riverclack® panels to the underlying metal structure is carried out by means of special clips made from thermoplastic material. The clips are fixed to the underlying structure with two screws and the Riverclack® panels are simply pressed into the clips.

A series of clips are available to ensure optimal performance under any circumstances.

CLIP OPTIONS

STANDARD CLIP

Glass fiber reinforced technical polymer.

Dimensions: 105 x 50 x 38.5mm

Each clip is fastened to the underlying structure with 2 screws.

ENHANCED SMOOTHNESS CLIP

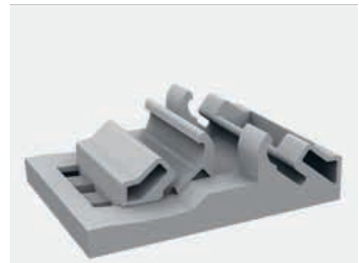
Technical polymer – low friction – no “stick-slip” motions.

Dimensions: 105 x 50 x 38.5mm
Each clip is fastened to the underlying structure with 2 screws.

This clip is recommended where greater smoothness is required to reduce possible clanging noise due to thermal expansion movements.

In case of installation at low temperatures, the utmost care in setting up the tightening torque is necessary.

CLIP FOR SPECIAL APPLICATIONS



Reduced friction coefficient polymer.

Dimensions: 128 x 100 x 40mm

Each clip is fastened to the underlying structure with 2 screws.

This clip can be appropriate for projects with complex curved roof shapes, to facilitate installation of standard, tapered and/or curved panels.

In the above cases, a reduced span may be necessary to ensure a proper fastening.

When using this clip, ensure a support element width > 100mm and seek the assistance of the ISCOM technical office.

FASTENING SCREWS

The clips should be fixed to the underlying structure with the appropriate screws for the material type, thickness and load. Fixing clips are supplied with the appropriate screws based on the information received from the customer.

For details of screw properties please ask for the relevant specific technical datasheets on our website www.riverclack.com.

COLORS AND FINISHES

NON-COATED MATERIAL FINISHES / THE FINISHING TOUCH

Depending on the metal you're using, Riverclack® can offer a range of finishes to enhance the visual character of your building.

STUCCO EMBOSSED ALUMINUM

Embossing is a unique stucco pattern that, besides its aesthetic qualities, helps reduce glare – an important issue with airports or buildings near busy roads.

ANODIZED ALUMINUM

Aluminum anodizing provides an aesthetically appealing matt finish, as well as an extra layer of protection against atmospheric agents.

PRE-PATINATED COPPER

Copper is available at various stages of oxidation and patination.

PRE-OXIDIZED ZINC

Zinc, which is always pre-oxidized, offers dramatic architectural possibilities with its ultra-modern combinations of darker and lighter shades.

RIVERCLACK COLOR COATINGS

TREND COLORS

Riverclack® 550 / Grip 600

Minimum order: none
Delivery time*: 2-3 week

Riverclack® 500

Minimum order: 1800m²
Delivery time*: 5-7 weeks

PALE GREEN RAL 6021

ANTHRACITE GREY RAL 7016

DUSTY GREY RAL 7037

WHITE ALUMINUM / SILVER MET RAL 9006

GREY WHITE RAL 9002

TESTA DI MORO RAL N.A.

OXIDE RED RAL 3009

SIGNAL WHITE RAL 9003

PURE WHITE RAL 9010

According to the color chosen, the gloss can vary from a minimum of 20 to a maximum of 50.

* Delivery times are ex works Pescantina (Italy) and only indicative: actual delivery times can be shorter. In case of on-site roll forming, please contact our sales office.

EXCEL COLORS

Riverclack® 550 / Grip 600

Minimum order: 1800m²
Delivery time*: 5-7 weeks

Riverclack® 500

Minimum order: 1800m²
Delivery time*: 5-7 week

COMPLETE RAL COLOUR COLLECTION

FEEL COLORS

Riverclack® 550 / Grip 600

Minimum order: 1800m²
Delivery time*: 5-7 weeks

Riverclack® 500

Minimum order: 1800m²
Delivery time*: 5-7 weeks

PATINA COPPER I

PATINA COPPER II

WEATHERED ZINC I

WEATHERED ZINC II

* Delivery times are ex works Pescantina (Italy) and only indicative: actual delivery times can be shorter. In case of on-site roll forming, please contact our sales office.

HIGH SRI COLORS: FOR A COOLER ROOF

The SRI (Solar Reflectance Index) measures a material's ability to reflect heat. In warmer climates especially, SRI coatings help cool the roof and reduce the UHI (Urban Heat Island) effect. As part of a total system design, a cool metal roof can be an economical method to obtain better energy efficiency (more reflective roofs can save up to 40% in cooling energy). High-rating SRI colors can also contribute to LEED® credits for your building.

COOL COLORS

Riverclack® 550 / Grip 600

Minimum order: 1800m²
Delivery time*: 5-7 weeks

Riverclack® 500

Minimum order: 1800m²
Delivery time*: 5-7 weeks

RAL 9001 PVDF

RAL 9010 PVDF/PE

RAL 9016 PVDF

NCS S 1200 Y50R

* Delivery times are ex works Pescantina (Italy) and only indicative: actual delivery times can be shorter. In case of on-site roll forming, please contact our sales office.

Though white or light colors remain the most reflective, we can achieve relatively high SRI values even in dark colors, by using special pigments. The following table shows the SRI values for the Riverclack® Color Coatings range, plus some additional high SRI color options.

COLOR	REFLECTANCE	EMITTANCE	SRI VALUE
TRAFFIC WHITE RAL9016 PVDF	0,79	0,87	98
SIGNAL WHITE RAL9003	0,77	0,85	95
PURE WHITE RAL9010 PVDF / PE	0,73	0,87	89
CREAM WHITE RAL 9001 PVDF	0,68	0,83	80
NCS S 1002 Y50R	0,67	0,90	79
GREY WHITE RAL9002	0,60	0,84	70
ZINC LOOK I	0,48	0,88	55
RED METALLIC	0,53	0,76	54
SILVER RAL9006 MET	0,46	0,68	44
PALE GREEN RAL6021	0,40	0,83	42
ZINC LOOK II	0,33	0,88	35
LIGHT BRONZE	0,43	0,70	35
COPPER PATINA LOOK I	0,24	0,87	23
OXYDE RED RAL3009	0,25	0,83	22
COPPER PATINA LOOK II	0,21	0,89	20
DUST GREY RAL7037	0,22	0,82	18
TUSCANY BRONZE	0,14	0,89	10
ZINC PRO	0,20	0,69	1
ANTRACITE GREY RAL7016	0,07	0,86	1
TESTA DI MORO RAL N.A.	0,08	0,85	0

REFLECTANCE MEASURES THE ABILITY OF A SURFACE TO REFLECT LIGHT OR OTHER ELECTROMAGNETIC RADIATION.
EMITTANCE MEASURES THE ABILITY OF A MATERIAL'S SURFACE TO EMIT ENERGY BY RADIATION.

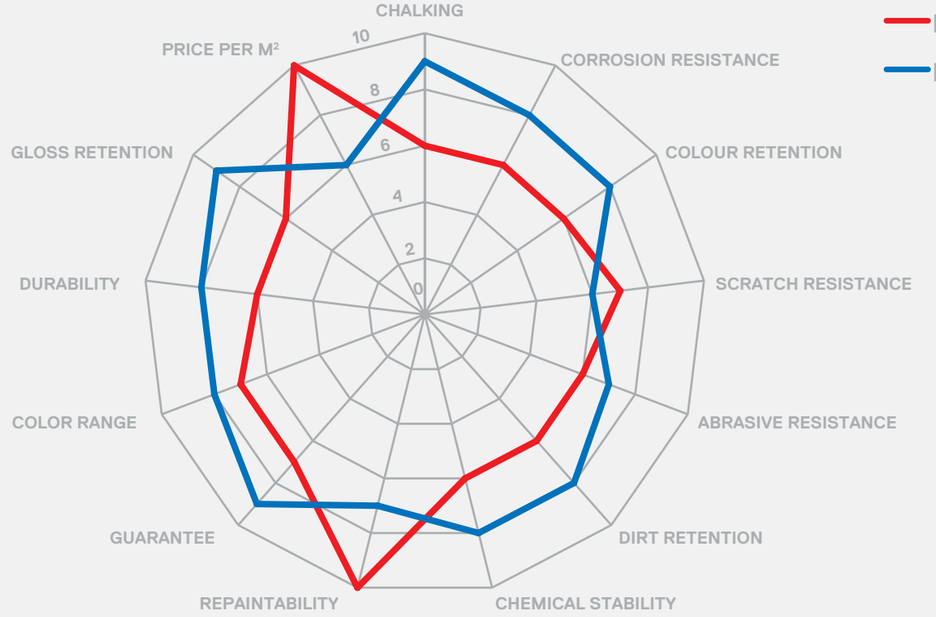
THE SOLAR REFLECTANCE INDEX (SRI) IS A MEASURE OF THE CONSTRUCTED SURFACE'S ABILITY TO REFLECT SOLAR HEAT, AS SHOWN BY A SMALL RISE IN TEMPERATURE. IT IS DEFINED SO THAT A STANDARD BLACK (REFLECTANCE 0.05 – EMITTANCE 0.90) IS 0 AND A STANDARD WHITE (RELECTANCE 0.80 – EMITTANCE 0.90) IS 100. TO CALCULATE THE SRI VALUE FOR ANY GIVEN MATERIAL, FIND ITS REFLECTANCE AND EMITTANCE VALUES. SRI VALUES ARE CALCULATED ACCORDING TO ASTM 1980.

POLYESTER OR PVDF?

A standard polyester coating has an average thickness of about 20-25 microns. It provides a reasonable resistance to UV rays and a moderate durability if exposed to particularly aggressive atmospheric agents. Polyester coatings deliver good value for money and are recommended for regions with mild, dry climates.

The average thickness of a PVDF coating is also about 20-25 microns, but it is possible to deposit up to 4 layers for a total thickness of 60 microns. The PVDF resin is not subject to degradation by UV radiation and maintains its color and gloss practically unchanged, even after a long period of exposure. It has excellent chemical resistance and is difficult to stain. PVDF is less resistant to scratches than polyester, and is more expensive. It is recommended for regions where solar radiation is particularly high. Forming PVDF coils also requires an ambient temperature ≥ 20°C.

POLYESTER (PE) / POLYVINYLIDENE DIFLUORIDE (PVDF) COMPARATIVE COATINGS CHART



LOADS AND WALKABILITY

WALKABILITY: DEALING WITH POINT LOADS

The performance of roof panels is normally calculated based on their ability to withstand distributed loads. However, many roof panels, if not adequately supported by a continuous element at the back of the panel, cannot deal with significant point loads without sustaining permanent deflections in the planarity of the metal surface. The mechanical functionality of such roofs may not be undermined, but their aesthetic qualities are compromised. A distinctive key feature of Riverclack® has always been that you can walk on a Riverclack® roof without affecting its metal surface, even after countless heavy-footed trips.

TRIED & TESTED

Tests according to the UNI EN 14782 norm were carried out in order to guarantee trouble-free walking on Riverclack® roofs. Foot traffic was simulated, under laboratory conditions, by the application of a point load equal to 1.2kN (about 120kg) to the center of the flat part of the panel via a rubber-clad piston, whose size, specified by the norm, replicated the area of a footfall. Based on the test results, the table opposite (showing Riverclack® 550) shows the conditions necessary for guaranteeing trouble-free roof crossings.

NOTES

It is advisable to walk on the flat area of the panel and not within 600mm of either of the panel's ends.

We recommend allowing access to the roof to specialized personnel only, and always observing safety protocols.

When frequent access to the roof is anticipated for maintenance/HVAC operating and/or transit with heavy equipment or devices, it is advisable to install walkways too allow for easier mobility and enhanced safety.

SUPPORT SPACING [CM]		100	120	140	160	180
MILL FINISH ALUMINUM	0.7 MM					
	0.8 MM					
	1.0 MM					
PRE-PAINTED / ALUMINUM	0.7 MM					
	0.8 MM					
	1.0 MM					
COPPER	0.6 MM					
	0.7 MM					
	0.8 MM					
STAINLESS STEEL / COR-TEN	0.5 MM					
	0.6 MM					
	0.7 MM					
PRE-PAINTED GALVANIZED STEEL	0.5 MM					
	0.6 MM					
	0.7 MM					
TITANIUM ZINC	0.8 MM	GIVEN ITS LOW YIELD POINT TITANIUM ZINC ALWAYS REQUIRES A RIGID SUPPORT UNDERNEATH THE PANELS.				
	1.0 MM					

WALKABLE
WALKABLE ON THE FLAT AREA
USE SPREADER BOARDS

Table 1: These figures are based on a point load of approx. 120kg on Riverclack® 550 panels.

EVENLY DISTRIBUTED NEGATIVE LOADS: WIND

Wind action creates a heterogeneous (varying) force system on the shell of a building, both in terms of direction and of intensity.
However, direction and intensity depend not only on the characteristics of the wind, but also on the height and shape of the building, with the shape in particular, playing a key role.
Some parts of the building shell may be compressed and others subject to suction loads with, for example, more intense forces around the eaves and corners.

It is therefore very important to take wind action, especially suction loads, into account during the design phase (including for all components of the roof build-up).
Riverclack® 550 is designed to ensure a superior wind suction load resistance.
The tables on the following pages show the permissible loads for Riverclack® 500, Riverclack® 550 and Riverclack® Grip 600. In areas where the wind suction load is intensified by geometric factors (see figure 2), the spacing between the clips should be reduced.
In very windy and exposed areas, if the building has even a peculiar shape – including wing shaped parts, marquees and so on – it is advisable to undertake fluid dynamics studies to prevent possible even though rare events of uncontrolled vibrations.

FIGURE 1: FORCE SYSTEMS AFFECTING THE BUILDING ENVELOPE

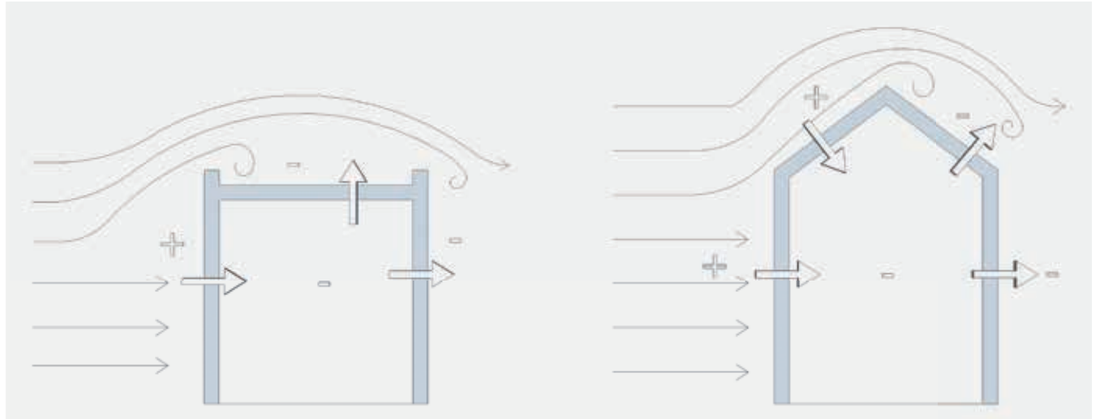
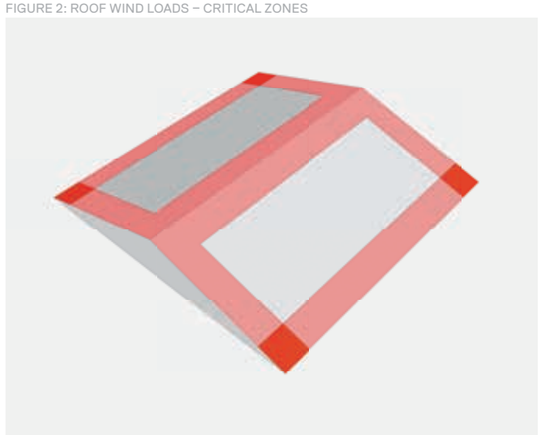


FIGURE 2: ROOF WIND LOADS – CRITICAL ZONES



NOTES

It is assumed that all loads are applied in a uniform manner and to multiple-span conditions, i.e. three or more spans.

The weight of the panels themselves has been taken into account in the loading.

The following load factors have been taken into account in the design capacity of the Riverclack® system: deflection = 1, ultimate load = 1.5.

Negative (wind) deflection limit = span/90.

All spans are assumed to be equal to or within 15% of the largest span.

Load span values are determined by both tests and calculations.

LOAD TABLES: WIND ACTION

RIVERCLACK® 500

MATERIAL	THICKNESS (MM)	LOADING (KN/M2) / PURLIN SPAN (M)									
		1.0		1.2		1.4		1.6		1.8	
		1/90 SPAN	ULTIMATE LOAD	1/90 SPAN	ULTIMATE LOAD	1/90 SPAN	ULTIMATE LOAD	1/90 SPAN	ULTIMATE LOAD	1/90 SPAN	ULTIMATE LOAD
MILL FINISH ALUMINUM	0.7	-	5.75	-	4.60	-	3.60	2.69	3.10	1.67	2.45
	0.8	-	5.75	-	4.60	-	3.60	2.91	3.10	2.06	2.70
	1.0	-	5.75	-	4.60	-	3.60	-	3.10	2.54	2.70
PRE-PAINTED ALUMINUM	0.7	-	4.55	-	3.40	-	2.30	-	1.95	-	1.30
	0.8	-	4.55	-	3.60	-	2.60	-	2.20	-	1.55
	1.0	-	4.55	-	3.60	-	2.60	-	2.20	-	1.55
COPPER	0.6	-	5.75	-	4.60	-	6.60	-	3.10	2.62	2.45
	0.7	-	5.75	-	4.60	-	3.60	-	3.10	-	2.45
	0.8	-	5.75	-	4.60	-	3.60	-	3.10	-	2.45
GALVANIZED STEEL STAINLESS STEEL	0.5	-	5.60	-	3.98	-	2.92	-	2.40	-	2.00
	0.6	-	5.75	-	4.60	-	3.50	-	2.68	-	2.20
	0.7	-	5.75	-	4.60	-	3.70	-	3.10	-	2.30
*TITANIUM ZINC	0.8	-	2.70	-	2.30	-	1.60	-	1.20	-	0.70
	1.0	-	2.80	-	2.40	-	1.70	-	1.30	-	0.80

* Rigid continuous support required. Values represent maximum permissible workloads. Correctly design the panel support.

RIVERCLACK® 550

MATERIAL	THICKNESS (MM)	LOADING (KN/M2) / PURLIN SPAN (M)									
		1.0		1.2		1.4		1.6		1.8	
		1/90 SPAN	ULTIMATE LOAD	1/90 SPAN	ULTIMATE LOAD	1/90 SPAN	ULTIMATE LOAD	1/90 SPAN	ULTIMATE LOAD	1/90 SPAN	ULTIMATE LOAD
MILL FINISH ALUMINUM	0.7	-	5.40	3.81	4.30	2.98	3.30	2.21	2.80	1.67	2.20
	0.8	-	5.40	-	4.30	-	3.30	2.52	2.80	1.91	2.20
	1.0	-	5.40	-	4.30	-	3.30	-	2.80	-	2.20
PRE-PAINTED ALUMINUM	0.7	-	4.20	-	3.10	-	2.10	-	1.65	-	1.05
	0.8	-	4.20	-	3.30	-	2.30	-	1.90	-	1.30
	1.0	-	4.20	-	3.30	-	2.30	-	1.90	-	1.30
COPPER	0.6	-	5.40	-	4.30	-	3.30	-	2.80	-	2.20
	0.7	-	5.40	-	4.30	-	3.30	-	2.80	-	2.20
	0.8	-	5.40	-	4.30	-	3.30	-	2.80	-	2.20
GALVANIZED STEEL STAINLESS STEEL	0.5	-	5.10	-	3.70	-	2.80	-	2.30	-	1.90
	0.6	-	5.30	-	4.30	-	3.10	-	2.40	-	2.00
	0.7	-	5.40	-	4.30	-	3.30	-	2.80	-	2.10
*TITANIUM ZINC	0.8	-	2.40	-	2.00	-	1.30	-	0.80	-	0.50
	1.0	-	2.50	-	2.10	-	1.40	-	0.90	-	0.60

* Rigid continuous support required. Values represent maximum permissible workloads. Correctly design the panel support.

RIVERCLACK® GRIP 600

MATERIAL	THICKNESS (MM)	LOADING (KN/M2) / PURLIN SPAN (M)									
		1.0		1.2		1.4		1.6		1.8	
		1/90 SPAN	ULTIMATE LOAD	1/90 SPAN	ULTIMATE LOAD	1/90 SPAN	ULTIMATE LOAD	1/90 SPAN	ULTIMATE LOAD	1/90 SPAN	ULTIMATE LOAD
MILL FINISH ALUMINUM	0.7	-	4.50	-	3.40	-	2.30	-	1.70	-	1.10
	0.8	-	4.70	-	3.60	-	2.50	-	1.90	-	1.30
	1.0	-	4.70	-	3.60	-	2.50	-	1.90	-	1.30
PRE-PAINTED ALUMINUM	0.7	-	3.40	-	2.40	-	1.30	-	0..70	-	0.20
	0.8	-	3.60	-	2.50	-	1.40	-	0.80	-	0.30
	1.0	-	3.60	-	2.50	-	1.40	-	0.80	-	0.30
COPPER	0.6	-	4.00	-	3.00	-	1.90	-	1.30	-	0.70
	0.7	-	4.50	-	3.40	-	2.30	-	1.70	-	0.80
	0.8	-	4.70	-	3.60	-	2.50	-	1.90	-	1.30
GALVANIZED STEEL STAINLESS STEEL	0.5	-	4.50	-	3.20	-	2.30	-	1.70	-	1.20
	0.6	-	4.70	-	3.60	-	2.50	-	1.90	-	1.30
	0.7	-	4.70	-	3.60	-	2.50	-	1.90	-	1.30
*TITANIUM ZINC	0.8	-	1.30	-	0.9	-	-	-	-	-	-
	1.0	-	1.60	-	1.10	-	-	-	-	-	-

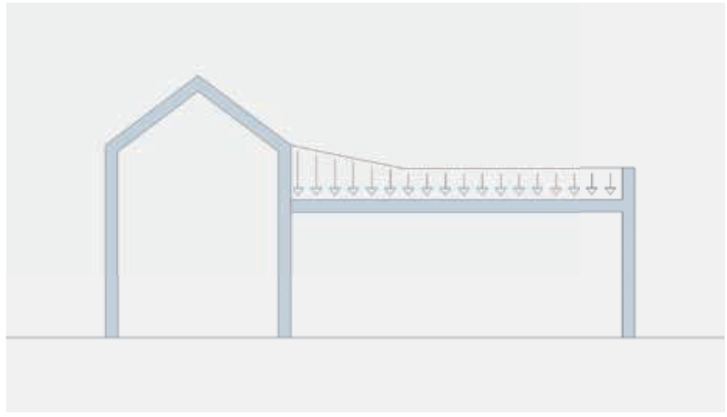
* Rigid continuous support required. Values represent maximum permissible workloads. Correctly design the panel support.

EVENLY DISTRIBUTED POSITIVE LOADS: SNOW

In the case of snowfall, accumulated snow generates uniformly distributed loads across the entire covering surface. As with wind action, taking account of snow loads during the design phase is very important. Underestimating this factor could cause failures, damage and/or safety issues.

The tables on the following pages show the permissible loads for Riverclack® 500, Riverclack® 550 and Riverclack® Grip 600.

SPECIAL ATTENTION SHOULD BE PAID TO AREAS WHERE SNOW COULD ACCUMULATE DUE TO THE GEOMETRY OF THE ROOF



NOTES

It is assumed that all loads are applied in a uniform manner and to multiple-span conditions, i.e. four or more spans.

The weight of the panels themselves has been taken into account in the loading.

The following load factors have been taken into account in the design capacity of the Riverclack® system: deflection = 1, ultimate load = 1.5.

Positive (snow) deflection limit = span/200.

All spans are assumed to be equal to or within 15% of the largest span.

Load span values are determined by both tests and calculations.

LOAD TABLES: SNOW

RIVERCLACK® 500

MATERIAL	THICKNESS (MM)	LOADING (KN/M2) / PURLIN SPAN (M)									
		1.0		1.2		1.4		1.6		1.8	
		1/200 SPAN	ULTIMATE LOAD	1/200 SPAN	ULTIMATE LOAD	1/200 SPAN	ULTIMATE LOAD	1/200 SPAN	ULTIMATE LOAD	1/200 SPAN	ULTIMATE LOAD
MILL FINISH ALUMINUM	0.7	7.86	8.64	4.55	6.00	2.85	4.41	2.37	3.38	1.53	2.67
	0.8	9.70	9.87	5.61	6.86	3.51	5.04	2.93	3.86	1.89	3.05
	1.0	11.96	12.11	6.92	8.41	4.34	6.18	3.61	4.73	2.33	3.74
PRE-PAINTED ALUMINUM	0.7	-	7.41	4.39	5.14	2.75	3.78	2.29	2.89	1.47	2.29
	0.8	-	8.46	5.41	5.88	3.39	4.32	2.82	3.31	1.82	2.61
	1.0	-	10.38	6.68	7.21	4.18	5.30	3.48	4.06	2.25	3.20
COPPER	0.6	-	10.19	-	7.08	4.48	5.20	3.73	3.98	2.41	3.14
	0.7	-	11.88	7.74	8.25	4.85	6.06	4.04	4.64	2.60	3.67
	0.8	-	13.58	-	9.43	5.98	6.93	4.98	5.30	3.21	4.19
GALVANIZED STEEL STAINLESS STEEL	0.5	-	5.74	-	3.98	-	2.93	-	2.24	-	1.77
	0.6	-	6.88	-	4.78	-	3.51	-	2.69	-	2.12
	0.7	-	8.03	-	5.57	-	4.09	-	3.13	-	2.48
*TITANIUM ZINC	0.8	-	6.14	-	4.26	-	3.13	-	2.40	-	1.89
	1.0	-	7.53	-	5.23	-	3.84	-	2.94	-	2.32

* Rigid continuous support required. Values represent maximum permissible workloads. Correctly design the panel support.

RIVERCLACK® 550

MATERIAL	THICKNESS (MM)	LOADING (KN/M2) / PURLIN SPAN (M)									
		1.0		1.2		1.4		1.6		1.8	
		1/200 SPAN	ULTIMATE LOAD	1/200 SPAN	ULTIMATE LOAD	1/200 SPAN	ULTIMATE LOAD	1/200 SPAN	ULTIMATE LOAD	1/200 SPAN	ULTIMATE LOAD
MILL FINISH ALUMINUM	0.7	6.52	7.88	3.77	5.47	2.37	4.02	1.49	3.08	1.15	2.43
	0.8	7.45	9.00	4.31	6.25	2.71	4.59	1.71	3.51	1.31	2.78
	1.0	9.16	11.01	5.30	7.65	3.33	5.62	2.10	4.30	1.61	3.40
PRE-PAINTED ALUMINUM	0.7	6.29	6.75	3.64	4.69	2.29	3.44	1.44	2.64	1.11	2.08
	0.8	7.19	7.71	4.16	5.36	2.62	3.93	1.65	3.01	1.27	2.38
	1.0	8.84	9.44	5.12	6.56	3.22	4.82	2.03	3.69	1.56	2.91
COPPER	0.6	-	9.29	5.50	6.45	3.46	4.74	2.18	3.63	1.68	2.87
	0.7	-	10.83	6.42	7.52	4.04	5.53	2.54	4.23	1.96	3.34
	0.8	-	12.37	7.34	8.59	4.62	6.31	2.91	4.83	2.24	3.82
GALVANIZED STEEL STAINLESS STEEL	0.5	-	5.23	-	3.64	-	2.67	-	2.04	-	1.62
	0.6	-	6.27	-	4.36	-	3.20	-	2.45	-	1.94
	0.7	-	7.31	-	5.08	-	3.73	-	2.86	-	2.26
*TITANIUM ZINC	0.8	-	5.59	-	3.88	-	2.85	2.06	2.18	1.58	1.73
	1.0	-	6.84	-	4.75	-	3.49	2.53	2.67	1.95	2.11

* Rigid continuous support required. Values represent maximum permissible workloads. Correctly design the panel support.

RIVERCLACK® GRIP 600

MATERIAL	THICKNESS (MM)	LOADING (KN/M2) / PURLIN SPAN (M)									
		1.0		1.2		1.4		1.6		1.8	
		1/200 SPAN	ULTIMATE LOAD	1/200 SPAN	ULTIMATE LOAD	1/200 SPAN	ULTIMATE LOAD	1/200 SPAN	ULTIMATE LOAD	1/200 SPAN	ULTIMATE LOAD
MILL FINISH ALUMINUM	0.7	-	6.93	4.02	4.81	2.80	3.53	1.67	2.71	1.18	2.14
	0.8	-	7.90	4.60	5.48	3.20	4.03	1.91	3.08	1.34	2.44
	1.0	-	9.56	5.60	6.64	3.90	4.88	2.33	3.73	1.64	2.95
PRE-PAINTED ALUMINUM	0.7	-	5.94	3.88	4.12	2.70	3.03	1.61	2.32	1.13	1.83
	0.8	-	6.77	4.44	4.70	3.09	3.45	1.84	2.64	1.30	2.09
	1.0	-	8.19	5.40	5.69	3.76	4.18	2.25	3.20	1.58	2.53
COPPER	0.6	-	8.16	-	5.67	4.09	4.16	2.44	3.19	1.72	2.52
	0.7	-	9.52	-	6.61	4.77	4.86	2.85	3.72	2.00	2.94
	0.8	-	10.86	-	7.54	5.45	5.54	3.26	4.24	2.29	3.35
GALVANIZED STEEL STAINLESS STEEL	0.5	-	4.59	-	3.19	-	2.34	-	1.79	-	1.42
	0.6	-	5.51	-	3.83	-	2.81	-	2.15	-	1.70
	0.7	-	6.43	-	4.47	-	3.28	-	2.51	-	1.98
*TITANIUM ZINC	0.8	-	4.91	-	3.41	-	2.50	-	1.92	-	1.51
	1.0	-	5.94	-	4.12	-	3.03	-	2.32	-	1.83

*Rigid continuous support needed. Values represent maximum workloads. Correctly design the panel support.

TRANSPORT / HANDLING AND STORAGE

PACKING

RIVERCLACK® PANELS ARE PACKED AS FOLLOWS:

Panel packs are sized according to weight to enable their transportation and handling with relevant machinery. A maximum 37 panels are allowed per pack, provided the material is aluminum.

Two “L” shaped steel profiles of the same length as the pack are placed along its lower edges to avoid damage to the top panels during handling.

Wooden framing is placed approximately every three meters on the panels, nailed and sealed with a steel strap. Framing distance will not exceed one meter from either end.

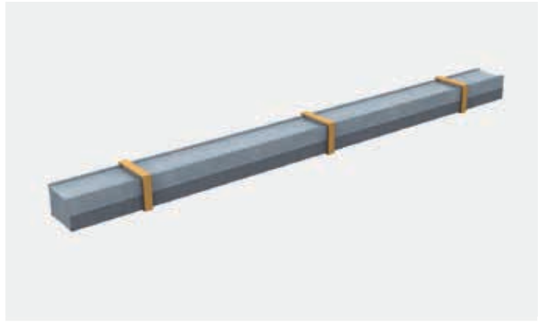
A piece of polystyrene foam is inserted between the last panel in the pack and the wood fillet closing the frame, to prevent movement of the panels.

ROOF COVERING ACCESSORIES ARE PACKED AS FOLLOWS:

Support brackets are supplied packed in cardboard boxes, coated with a plastic film.

Other accessories (e.g. flashings, snow guards, clamps, clips etc.) are supplied in packs or assembled on a pallet and, where required, coated with a plastic film.

If necessary, depending on their shape and length, accessories can be stored with wooden rings, like the metal panels.



PANEL WEIGHTS

MATERIAL	THICKNESS (MM)	APPROXIMATE WEIGHT (KG/M2)		
		RIVERCLACK® 500	RIVERCLACK® 550	RIVERCLACK® GRIP 600
ALUMINUM ALLOY 5754	0.7	2.82	2.57	2.36
	0.8	3.23	2.94	2.69
	1.0	4.04	3.67	3.37
GALVANIZED STEEL	0.6	7.15	6.50	5.96
	0.7	8.35	7.59	6.96
	0.8	9.54	8.67	7.95
COPPER	0.5	6.80	6.19	5.67
	0.6	8.17	7.42	6.80
	0.7	9.53	8.63	7.94
STAINLESS STEEL	0.5	6.08	5.52	5.06
	0.6	7.29	6.63	6.07
	0.7	8.50	7.74	7.09
TITANIUM ZINC	0.8	8.75	7.96	7.29
	1.0	10.94	9.95	9.11

TRANSPORT

Riverclack® panels up to a maximum length of 35m can be transported to site, depending on the availability of standard and exceptional load carriers. If the panel length does not allow for transportation, or the project would require numerous deliveries to site, thus increasing transport costs and CO_2 emissions, the option of on-site roll forming is available.

THE GENERAL REQUIREMENTS AND INDICATIONS FOR OVERLAND TRANSPORTATION ARE:

Both trucks and containers must allow loading from the top (an overhead travelling crane is used for loading).

The loading platform must be flat and clean and packs must be placed on wooden spacer blocks that correspond to the wooden frames, avoiding the upper panel to overhang the lower panel for more than one meter. The wooden spacers permit to slip and position the ropes for uplifting the panels.

Do not stack more than three full packs (each pack includes a maximum 37 panels) and do not place heavy parcels on top of the uppermost pack.

When using trailers, the carrier must fix the packs to the vehicle using transversal belt ties (at least two), at a maximum distance of three meters apart and in correspondence with the wooden rings. Attention must also be paid to the pressure applied when binding the packs.

Placement of products on the vehicle's platform must also always adhere to the carrier's instructions.

SUITABLE TRAILERS ARE:

Curtain sider semitrailer

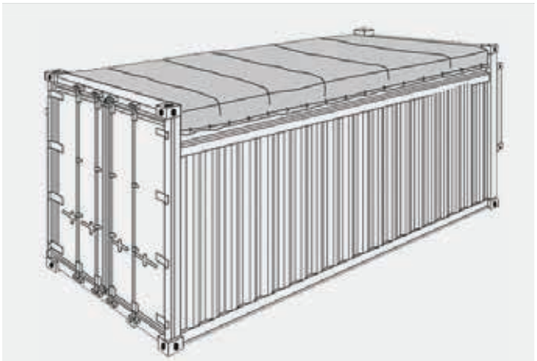
Flatbed semitrailer

Lowboy semitrailer

The lowboy semitrailer is only suitable for transportation of high rise curved panels, or if the entire length of the straight panel packs is placed on one of the two decks.

SUITABLE CONTAINERS ARE:

Open Top 20' / Open Top 40'



Open Top 20' – Inner dimensions: L=5895mm W=2350mm H=2380mm
Open Top 40' – Inner dimensions: L=12029mm W=2350mm H=2380mm

HANDLING

Loading, unloading and handling of packs must always be carried out one pack at a time, with at least two hanging points at a suitable distance not to generate deformations due to the heavy weight. Depending on the length of the panels and the number of panels per pack, a forklift truck, crane or lifting beam can be used.

In general, a forklift truck or crane truck with belts is suitable for panels less than 6m long. For longer panels, a lifting beam is recommended.

PANEL LENGTH < 6M

PANEL LENGTH < 6M

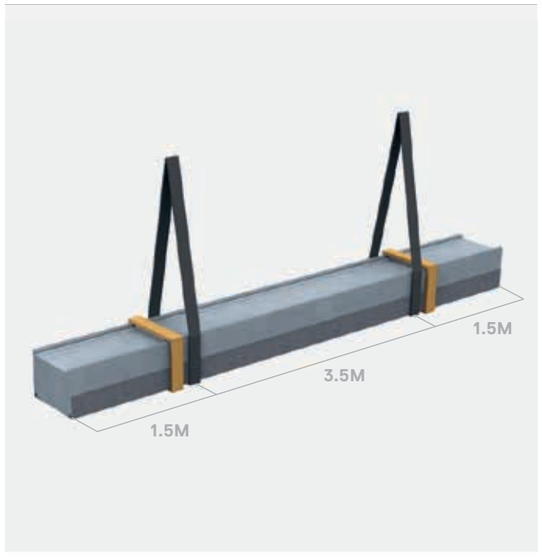
PANEL LENGTH > 6M

For both crane truck and lifting beam operations, the packs must have a sling at least every 3-3.5 meters and the overhang at the ends must not exceed 1.5 meters.

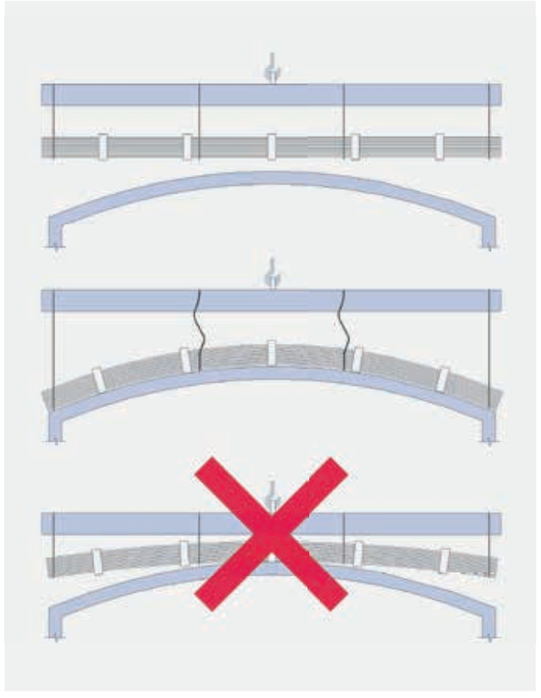
Woven nylon (or other synthetic fiber) belts with a minimum width of 60mm and a minimum length of 4 meters are recommended to avoid damaging the sheets.

Before laying the profiled panel packs on the roof, ensure that the load bearing capacity of the roof substructure is sufficient. Then secure the packs to prevent any sliding.

LIFTING



When using a lifting beam to lay the packs of panels on a curved roof surface, use belts of sufficient lengths to avoid the lifting beam coming into contact with the roof surface before completely setting down the packs.



STORAGE

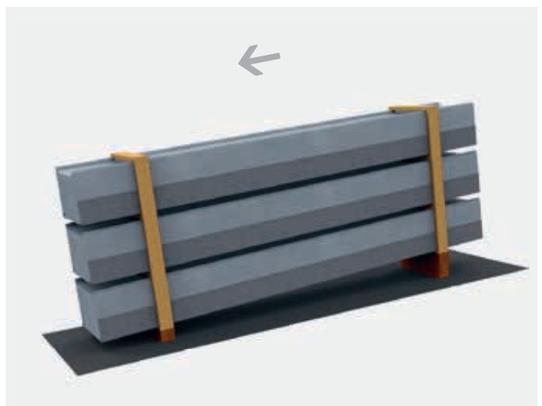
Do not place panels directly on the ground and always keep them raised off the ground by using spacers. Place the spacers in correspondence to the wooden frames. Particular care must be taken with uncoated metal panels (e.g. mill finish aluminum).

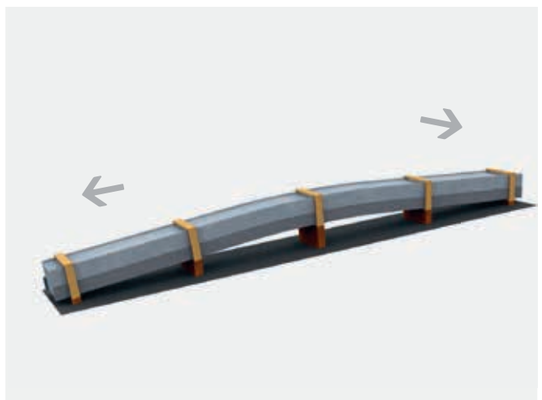
Minimize the time the panels are left packed, or ensure that packs are sheltered in a covered, dry place. If this is not possible, it is advisable to slightly tilt the packages as shown in the images below, to ensure the runoff of any condensation water, thus avoiding stagnation.

Stagnating water between two adjacent metal panels can cause a localized galvanic reaction, producing oxidization spots on the surface of the panels. Though they will not affect the lifespan of the panel, these spots can be aesthetically unappealing and removing them could prove difficult. Inclining the panels greatly reduces the risk of such oxidization spots, although it does not completely eliminate it.

If panels are to remain stored for long periods, it is advisable to ensure good ventilation in order to prevent the formation of condensation between two adjacent panels.

The shape of the packs allows for the stacking of panels during storage up to a maximum recommended limit of three stacked elements.





INSTALLATION

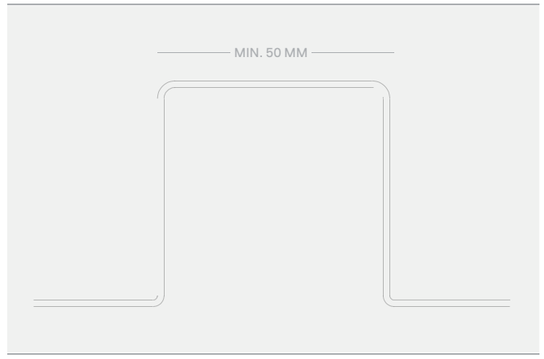
SUPPORT ELEMENTS

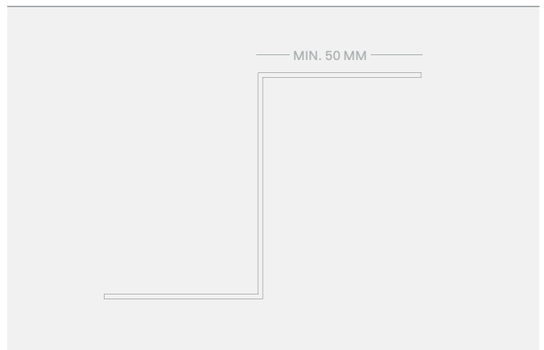
Riverclack® Roof System panels can be installed on the following support elements: linear (metal purlins, wood purlins) and continuous (plywood or wooden planks, Foamglas®).
The type of materials and geometric characteristics of the supporting structure can significantly affect the roofing system's performance. It is therefore necessary to design and dimension the structures to support the predicted stresses, both in terms of positive loads (e.g. snow loads) and negative loads (e.g. wind suction). If not listed in the Riverclack® clips screw specifications, the compatibility of the support used should be checked against the clips' screws.

Clips should never be installed directly onto the concrete surface, in the case of installation on concrete slabs, but instead be fixed to linear support elements, such as metal or wood purlins, in order to ensure proper installation planarity and roof performance.

METAL PURLINS

The minimum width of the purlin to guarantee the correct installation of the Riverclack® clips is 50 mm.





The metal support elements are generally cold shaped profiles (C, U, Z, Ω sections) made from galvanized steel.

Use of Ω section metal purlins with a thickness greater than 1.5mm is recommended for highest wind load resistance.

WOOD PURLINS

The minimum width of the purlin to guarantee correct installation of Riverclack® clips is 50mm.

All wood types used in construction are allowed, so long as the mechanical strength and dimensional stability are checked. Strength class (EN338) ≥ C24, p =350kg/m3. When delivered, the wood humidity must be slightly lower – in any case not higher than 18% - than the humidity of the place where it will be stored and used. This may be achieved by natural or artificial aging.

The elements must never have defects that materially reduce the static resistance over time and must not, under any circumstances, possess the following defects:

biological alterations: presence of fungi or insects;

localized defects (knots, resin pockets, ring shapes etc.) that act to reduce the resistance section by at least 1/3;

cracks that might compromise stability.

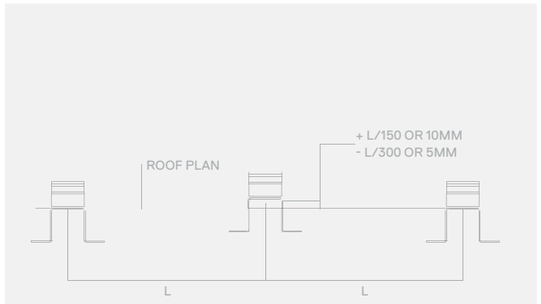
PLYWOOD OR WOODEN PLANKS

Given the relatively low thickness used in this type of support (20-30mm) and the wide variety of materials from which they can be made, we recommend a pull-out test on the Riverclack® clip's screws, drilled into the specific board to assess whether an increased number of clips per square meter is required.

FOAMGLAS®

For the installation of Riverclack® on thus type of substrate, please ask for and refer to the related guide.

PURLIN LEVELS



PURLIN SLOPE

TOLERANCES

The Riverclack® secret-fix standing seam metal roof system is a high-engineering product, as the locking method relies on the engagement of the metal panel laps with the clips. To ensure proper functioning, possible fluctuations in the level, alignment and slope of the support on which the clips are fixed must be included as part of the consideration of admitted tolerances.

THE FOLLOWING ARE POSSIBLE CONSEQUENCES OF NOT RESPECTING TOLERANCES IN THE SUPPORT STRUCTURE:

reduction of the load bearing capacity (whether negative or positive);

compromising of the system's water tightness;

water stagnation;

compromising of the capacity for thermal expansion and contraction.

To ensure proper functioning of the secret-fix metal roof system, tolerance recommendations should be taken into consideration at an early stage of the structure design process.

Where tolerances have not been respected, it may be possible to make adjustments on-site through the positioning of spacers below clips or purlins, in order to restore the proper installation plans.

INSTALLATION PROCEDURE

The installation of the first panel is extremely important, since it serves as a reference for the installation of all subsequent panels. The impact of mistakes and inaccuracies made in this initial phase can become more pronounced as the installation of successive elements of the roof progresses.

Install the first run of Riverclack® clips on the support elements by using a plumb line. If the panels are not too long, the panel itself can be used for alignment. In case of the use of templates for the positioning of clips, the admitted alignment tolerance of the clips is ±1mm.

The procedure for securing Riverclack® panels onto the relevant clips is a 6 step process (please also refer to the corresponding images):

Remember to include a fixed point at the correct location, as specified by the project, between steps 3 and 4.

1.

Once the panel is completely secured to the first run of clips, insert the second run of clips to the free side of the panel (gutter side for Riverclack® 500 and Riverclack® 550, overlapped side for Riverclack® Grip 600).

2.

2.Push down carefully on the top until the panel locks into the clip (you should feel a “click”). The panels themselves determine the correct location of the clips.

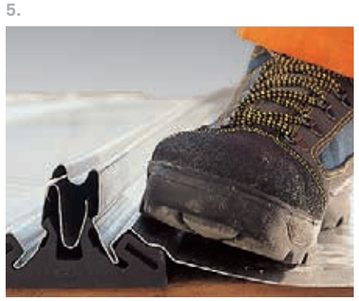
3.

Secure the clips to the supporting element using the appropriate fixings.

4.

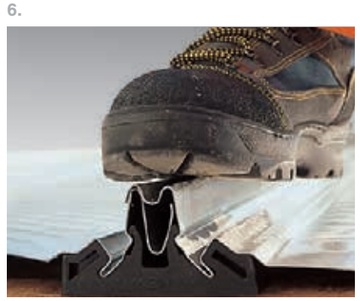
Place the overlapping edge of the next panel into the clip by repeating step 1.

5.



Stand on top of the profile to ensure the panels are properly connected.

6.



Apply pressure as shown.

THERMAL MOVEMENT AND FIXED POINTS

A secret-fix standing seam metal roof system like Riverclack® is commonly used for long panels, which makes the understanding and control of thermal movement essential.

The extent of thermal movement depends on the type of material used.

THERMAL MOVEMENTS

THERMAL MOVEMENTS OF A 10M ALUMINUM PANEL WITH RESPECT TO AN INITIAL PANEL TEMPERATURE OF 25°C		
	SUMMER (+70°C)	WINTER (-10°C)
ALUMINUM	1.12 CM	-0.71 CM
COPPER	0.85 CM	-0.50 CM
STEEL	0.60 CM	-0.36 CM
TITANIUM-ZINC ALLOY	1.10 CM	-0.66 CM

The above table gives an indication of the expansion and contraction that may occur on a 10m long roof panel exposed to summer/winter temperature changes. For example, a 100m long roof panel can undergo thermal movements of up to 20cm over a four-season period: the longer the panel, the more attention needs to be paid to thermal expansion and contraction.

Longitudinal thermal movement is accommodated for by Riverclack’s unique locking system, while transversal expansion is easily accommodated for by the flexibility of the profile across its width.

Just as important as understanding thermal movement, is controlling it. This control is achieved by the creation of fixed points.

FIXED POINTS

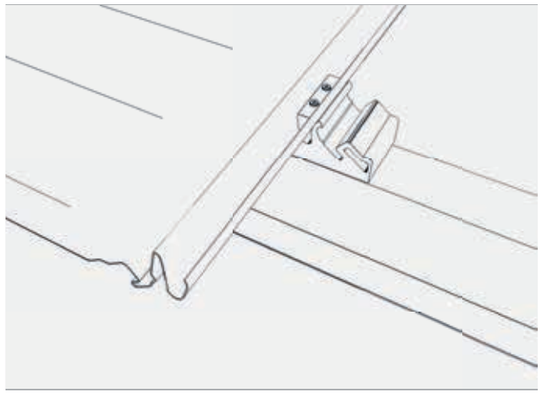
The fixed point is introduced into the roof sheeting system to control thermal movement and avoid creeping.

The roof panel's longitudinal movement is locked to a single point on the underlying structure by purpose designed locking brackets, thus allowing thermal movement only in the desired direction. It is essential that a fixed point is created for every panel.

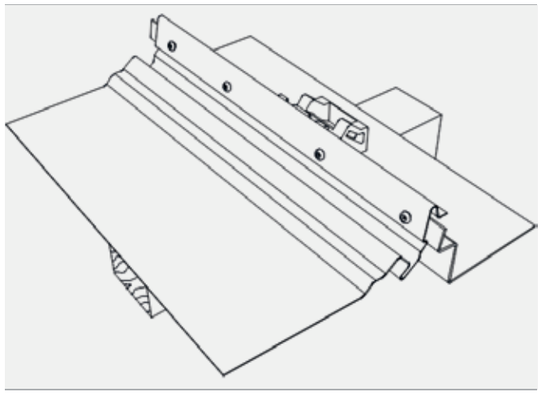
The design of the fixed point (including the relative support spacer on the underlying structure) must be appropriate for the panel's length, the slope, the project loads, safety lines etc.

Please refer to the specific technical datasheets to identify the appropriate locking bracket.

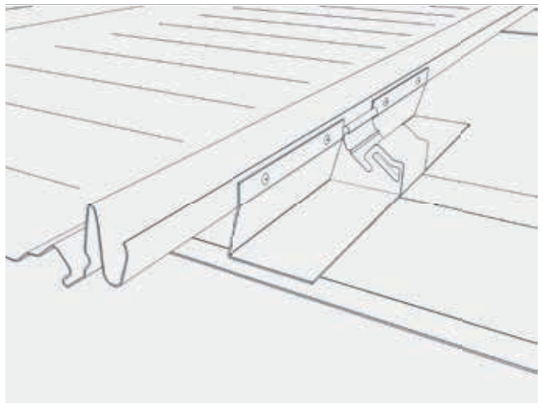
RA110 FIXED POINT BLOCK (RIVERCLACK 500 AND 550)



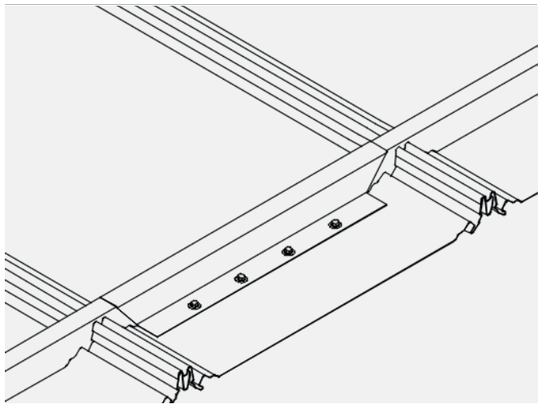
RA121 FIXED POINT BRACKET (RIVERCLACK GRIP 600)



RA120 FIXED POINT BRACKET (RIVERCLACK 500 AND 550)



RA157 RIDGE BRACKET/FIXED POINT



LOCATION OF FIXED POINTS

Fixed point are normally set at the ends of the panels (ridges/ eaves), even though the ideal positioning would be at the center of the panel, in order to split the total extent of the movement in two directions.

Depending on the position of the fixed point, you need to ensure sufficient spacing in gutter areas, ridge areas and at connections with chimneys and skylights, to accommodate the expansion of the panels. These elements should therefore be arranged accordingly.

FIXED POINT AREAS

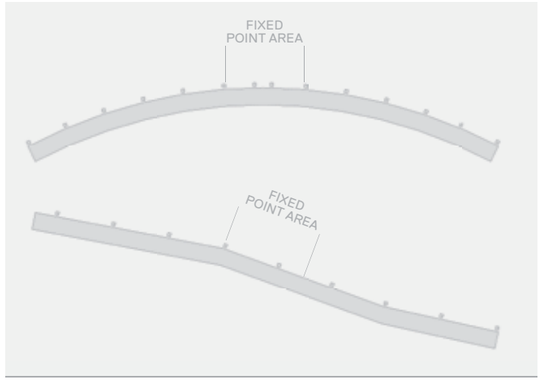
FIXED POINT AREAS

In the above image, the fixed-point area should be located in the same position for all panels. More than one fixed-point area per panel length should be avoided to prevent the buckling of panels, shearing of fixings or opening of seams.

APPLYING MULTIPLE LOCKING-BRACKETS

With longer panels, curved roofs, excessive purlin misalignment or excessively large tolerances in the structure width, it may be necessary to consider the application of two or more locking brackets in the same fixed-point area (max. extension 2m).

FIXED POINT AREA



For further information please contact ISCOM Technical Assistance.

ON-SITE PRODUCTION

Where panels are too long to be produced in our factory and transported to the construction site, we provide on-site forming and curving. This is also an option when the size of the project would otherwise require numerous deliveries to the site.

The following indications are intended to complement local construction site arrangement plans, relevant machinery and equipment instructions, and to be used in compliance with current regulations and other requirements related to operational instructions, security and safety and risk assessment.

Before the Mobile Profiling Unit (MPU) arrives on site, the roof contractor is responsible for ensuring that the site is prepared as described in this section, so work can be carried out properly on-site.

FEATURES OF THE MOBILE PROFILING UNITS (MPUs) AND CURVING MACHINES (CVs)

As dimensions and weights can change from model to model, the information provided is approximate and refers to the biggest/heaviest models.

MPUs are available in two configurations, naked or sheltered in a container, depending on current availability and the location of the project.

CVs are available in different models, depending on the shapes of the panels and the required curving radiuses.

SAMPLE OF NAKED MPU WITH HYDRAULIC LIFTING JACKS

APPROXIMATE WEIGHT	22 TONS
OVERALL TRANSPORT DIMENSIONS [MM]:	LENGTH / 11800 WIDTH / 2200 HEIGHT / 2050

SAMPLE OF SHELTERED MPU WITH OR WITHOUT HYDRAULIC LIFTING JACKS

APPROXIMATE WEIGHT	22 TONS / WITHOUT LIFTING JACKS 25 TONS / WITH LIFTING JACKS
OVERALL TRANSPORT DIMENSIONS [MM]:	LENGTH / 12192 WIDTH / 2438 HEIGHT / 2591

SAMPLE OF CV

APPROXIMATE WEIGHT	4 TONS
OVERALL TRANSPORT DIMENSIONS [MM]:	LENGTH / 1700 WIDTH / 1500 HEIGHT / 2300

ON-SITE PROFILING

GROUND PREPARATION

A flat, compact area free from stagnant water must be prepared in order to support the weight of the MPU. It should be assumed that the weight will be distributed over 4 support points ϕ 200mm when loading and unloading using hydraulic jacks (i.e. for the naked MPU).

Access to the site must be verified and confirmed by the roof contractor. Unrestricted transport access means that a total weight of approximately 27 tons can be accommodated.

ON-SITE LOADING AND UNLOADING OF MPUs

Depending on the type of MPU employed, the roof contractor will need to provide the following for loading and unloading operations:

nothing for a naked MPU transported on a flatbed semitrailer;

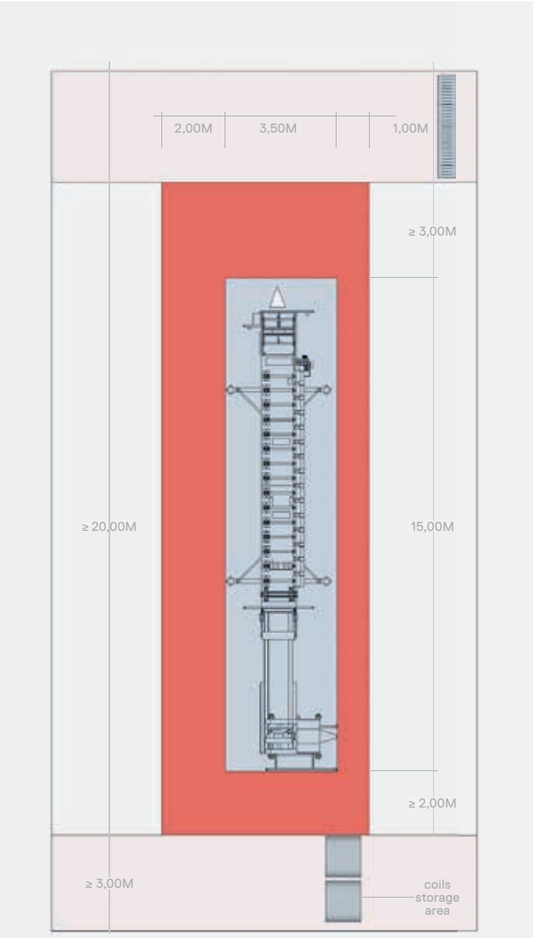
a crane and, if necessary, suitable cables for a naked MPU not transported on a flatbed semitrailer;

nothing for a sheltered MPU with hydraulic jacks;

a crane and, if necessary, suitable cables for a sheltered MPU without hydraulic jacks.

WORK AREA

A work area of approximately 7m by 20m + the length of the longest panel + 3m must be made available to ensure sound roll forming operations.
The size of the area required depends on the size of the project.
The area must be accessible to lifting machinery in order to allow loading and unloading of the machine. The area must also be free of standing water and mud as any contact with these substances could damage the coils.



COIL HANDLING AND STORAGE

The maximum weight of a coil is approximately 4 tons for aluminum coils and 5 tons for steel or copper coils.

A suitable forklift truck with an operator must be made available by the roof contractor for lifting and handling coils throughout the period of on-site production.

Coils must always be kept raised off the ground by means of spacers. Furthermore, they must be kept covered and protected from humidity to prevent oxidation.

Coil handling and correct storage are the responsibility of the roof contractor.

STAFF REQUIREMENTS

An operator will be provided by ISCOM to operate the MPU. He will be the only person authorized to use the profiling machine.

The roof contractor must provide sufficient manpower for the handling of the Riverclack® panels produced. The number of workers required will depend on the length of the panels and the material used, based on the following calculations:

1 person per 7 meters for aluminum panels

1 person per 4.5 meters for copper or steel panels

ELECTRICAL SUPPLY

The availability of appropriate electrical power on the construction site must be confirmed before the start of operations.

The MPU requires a 30kW – 380V 50Hz 3-phase power source or minimum 100kW – 380V – 50Hz 3-phase power generator.

Power board as per IEC standard, socket IEC EN 60309-2 63 Amp 3P+E.

A 50m power-feed cable is provided by ISCOM. The roof contractor is responsible for ensuring adequate electrical supply to the MPU.

WASTE DISPOSAL

The roof contractor is responsible for ensure the correct disposal of packaging and waste.

ON-SITE CURVING

GROUND PREPARATION

A flat, compact area free from stagnant water must be prepared in order to support the weight of the CV. It should be assumed that the weight will be distributed over 4 support points.

ON-SITE LOADING AND UNLOADING OF CVs

The roof contractor will need to provide the following for loading and unloading operations:

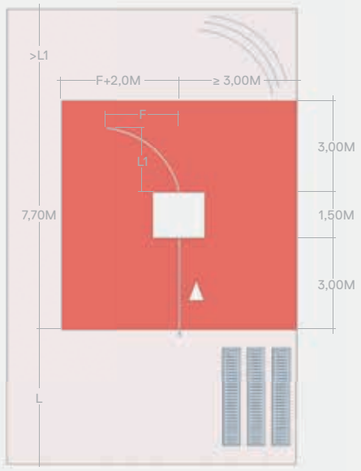
a crane or forklift truck suitable for a weight of 4 tons.

WORK AREA

A sufficiently spacious work area must be made available and cordoned off using barriers or reflective bands to ensure sound roll forming operations.

A space must be kept free on the feed-in side of the CV in order to accommodate the package of straight panels and to feed the CV. The minimum area should be the panel length + 3m.

There must be sufficient space for retrieving the curved panels on the exit side, as well as a free area for storage before lifting (see plan).



The area must be free of standing water and mud as any contact with these substances could damage the panels.

The roof contractor must arrange for the temporary laying out of the curved panels produced on wooden spacers free from contact with the ground and in a safe location.

STAFF REQUIREMENTS

An operator will be provided by ISCOM to operate the CV. He will be the only person authorized to use the curving machine.

The roof contractor must provide sufficient manpower for the unpacking of the straight panels, as well as for the handling, receipt, storage and possible repacking of the curved panels. The number of workers required will depend on the length of the panels and the material used, based on the following calculations:

1 person per 7m for aluminum panels;

1 person per 4.5m for copper or steel panels.

ELECTRICAL SUPPLY

The availability of appropriate electrical power on the construction site must be confirmed before the start of operations.
The CV requires a 10kW – 380V 50Hz 3-phase power source.

Power board as per IEC standard, socket IEC EN 60309-2 32 Amp 3P+E.

A 20m power-feed cable is provided by ISCOM. The roof contractor is responsible for ensuring adequate electrical supply to the CV.

WASTE DISPOSAL

The roof contractor is responsible for ensure the correct disposal of packaging and waste.

ON-SITE PROFILING OF TAPERED PANELS

The semi-finished panel is reintroduced into the MPU for the profiling of the overlapped side. A roll change and setup adjustment of the equipment on the MPU is carried out between the first and second phases.

The tapered panels are produced using an MPU equipped with an additional kit, and the processing is divided into two phases:

coil profiling of the overlapping side of all panels, tapered cutting and length cutting;
profiling of the overlapped side.

GROUND PREPARATION

A flat, compact area free from stagnant water must be prepared in order to support the weight of the MPU. It should be assumed that the weight will be distributed over 4 support points of 400mm x 400mm when loading and unloading using hydraulic jacks (i.e. for the naked MPU).

ACCESS TO THE CONSTRUCTION SITE

Access to the site must be verified and confirmed by the roof contractor. Unrestricted transport access means that a total weight of approximately 27 tons can be accommodated.

ON-SITE LOADING AND UNLOADING OF MPUs

Depending on the type of MPU employed, the roof contractor will need to provide the following for loading and unloading operations:

nothing for a naked MPU transported on a flatbed semitrailer;

a crane and, if necessary, suitable cables for a naked MPU not transported on a flatbed semitrailer;

nothing for a sheltered MPU with hydraulic jacks;

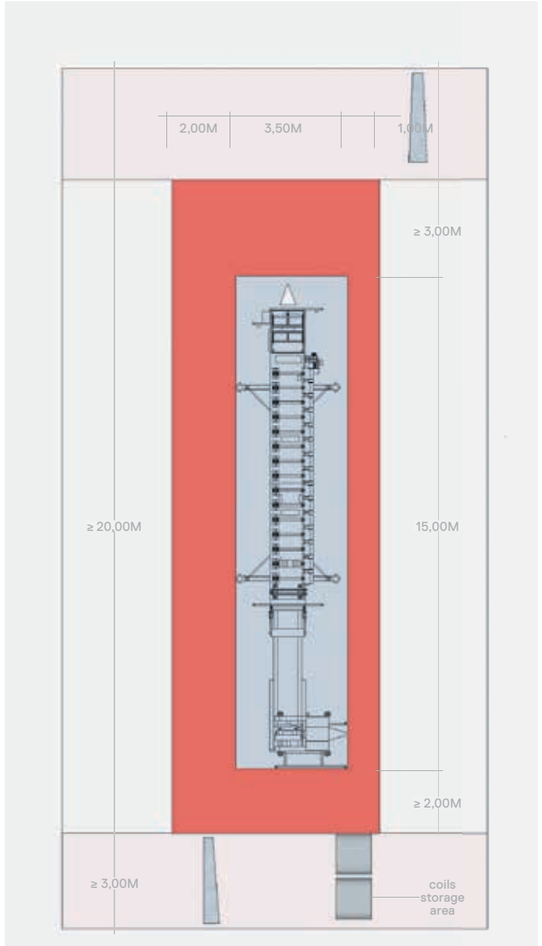
a crane and, if necessary, suitable cables for a sheltered MPU without hydraulic jacks.

WORK AREA

A work area of approximately 7m by 20m + the length of the longest panel + 3m must be made available to ensure sound roll forming operations. This work area must be cordoned off using barriers or reflective bands.

A space must be kept free at the front of the MPU in order to receive and stack profiled panels. The minimum area should be the panel length + 3m.

There should be an additional free area at the back of the MPU for storing the coils (the size of this area is dependent on the size of the project) and for feeding the semi-finished panels into the machine. The area must be accessible to lifting machinery in order to allow loading and unloading of the machine. The area must also be free of standing water and mud as any contact with these substances could damage the coils. The minimum area required for feeding the semi-finished panels into the MPU is the panel length + 3m.



COIL HANDLING AND STORAGE

The maximum weight of a coil is approximately 4 tons for aluminum coils and 5 tons for steel or copper coils.

A suitable forklift truck with an operator must be made available by the roof contractor for lifting and handling coils throughout the period of on-site production..

Coils must always be kept raised off the ground by means of spacers. Furthermore, they must be kept covered and protected from humidity to prevent oxidation.

Coil handling and correct storage are the responsibility of the roof contractor.

TEMPORARY PLACEMENT OF SEMI-FINISHED PANELS

Do not place semi-finished panels directly on the ground and always keep them raised off the ground by using spacers. Place the spacers in correspondence to the wooden frames. Particular care must be taken with uncoated metal panels (e.g. mill finish aluminum).

STAFF REQUIREMENTS

An operator will be provided by ISCOM to operate the MPU. He will be the only person authorized to use the profiling machine.

The roof contractor must provide sufficient manpower for the handling of the Riverclack® panels produced. The number of workers required will depend on the length of the panels and the material used, based on the following calculations:

1 person per 7m for aluminum panels;

1 person per 4.5m for copper or steel panels.

ELECTRICAL SUPPLY

The availability of appropriate electrical power on the construction site must be confirmed before the start of operations.

The MPU requires a 30kW – 380V 50Hz 3-phase power source or minimum 100kW – 380V – 50Hz 3-phase power generator.

Power board as per IEC standard, socket IEC EN 60309-2 63 Amp 3P+E.

A 50m power-feed cable is provided by ISCOM. The roof contractor is responsible for ensuring adequate electrical supply to the MPU.

WASTE DISPOSAL

The roof contractor is responsible for ensure the correct disposal of packaging and waste.

OPERATION AND MAINTENANCE

In order to ensure the safety of construction site staff, all maintenance operations and inspections must be carried out in full compliance with the current safety regulations.

INSPECTIONS

Inspections must be carried out at regular intervals. The initial inspection must coincide with the building inspection or completion of construction work. Subsequent inspections must occur at least once per year, although it is preferable to carry out inspections twice annually, for example in spring and autumn.

During the first inspection following completion of the roof, it must be verified that foreign or scrap materials that could cause corrosion or damage to the covering system have not been left on the roof. Such corrosion could also detract from the aesthetic appearance of the roof, impede the proper flow of rainwater and/or lead to the accumulation of unwanted substances (dust, sand, leaves etc.).

Subsequent inspections should consist of a verification of the general conditions of the covering – the state of the elements, ridges, flashings, gutters, fixture resistance and possible seals – and also verify the efficiency of rainwater drainage and technological systems.

CLEANING

It is important to clean away any dirt or debris that has accumulated on the roof covering and that has not been washed away by rainwater. Special attention must be paid to roofs with low slopes, since they are more prone to this phenomenon. Proper cleaning of the roof covering also avoids the risk of standing water forming and stagnating.

Cleaning must be carried out by hand with a soft broom (hard brooms are strongly discouraged), or by using a pressure cleaner at a maximum pressure of 50 bar.

In the case of formation of mold, the roof must be treated with appropriate anti-mold products and the area then washed with warm water.

Graffiti or other unwanted marks must be removed using special solvents.

MAINTENANCE

MAINTENANCE IS NECESSARY IN THE CASE OF DEPOSIT OF MATERIALS OF ANY NATURE

Leaves, sand, dust etc., particularly in gutters or drains, can obstruct the proper flow of rainwater.

In such cases, first remove the foreign material and then wash with running water until the surface of the components is visible, in order to confirm the integrity of the base material.

Where roofs are installed in industrial areas where running water alone is not enough, neutral soaps (10% on water) may also be used. It is very important to make sure that the soap can be washed away through the sewerage without polluting waters. Once cleaned with soap, rinse thoroughly.

AREAS WITH SIGNS OF CORROSION ON GALVANIZED PRE-PAINTED PANELS

Remove the layer of paint in the area surrounding the point of corrosion;

Remove all corroded elements;

Smooth the relevant area evenly and apply a coat of anti-corrosive primer;

Once the anti-corrosive primer is dry, apply a new primer for the painting phase;

Once this second primer coating is dry, apply the paint.

WEAK ACCESSORY FIXINGS

All weak fasteners must be tightened using special tools, paying particular attention to safety lines and snow guards.

DEFECTS IN THE SEALING OF ACCESSORIES OR COMPLEMENTARY ELEMENTS

In such cases, fasteners must be integrated or, depending on the extent of the defect, completely replaced.

EN_2

ISCOM SPA
VIA BELVEDERE, 78
37026 PESCANTINA
ITALY

WWW.ISCOM.IT
INFO@ISCOM.IT
T +39 045 773 21 77
F +39 045 773 29 70

iscom