

Reynodual® double sheet aluminium panel

Guidelines for handling, storage and fabrication

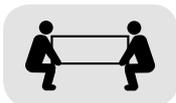
- **GUIDELINES:** The general instructions for the fabrication, handling and storage of our Reynodual® double sheet aluminium panels are presented in this manual. However you should respect the national working regulation of your country.
- **DO NOT REMOVE** the protective film before installation is completed as specified below. Protective film should be peeled-off within 6 months after delivery.
- **INSPECTION:** Any Reynodual® double sheet aluminium panels that show visible damage (dents, impact damage, deep scratches through the protective film, etc.) should be rejected unless the damaged section is outside of the required usable area.

1. Overall parcel inspection before unloading: Any defect detected should be notified to the carrier by writing on the official delivery document with a copy to Arconic Architectural Products within 24 hours.
 2. Inspection of the merchandise after unloading, when implementing: Any defect detected should be notified to the sales representative by providing precise traceability data (coil number, pallet number, etc.)
- **SAFETY:** For all handling, transformation and installation steps ensure that appropriate protective equipment is worn: eye protection, hearing protection and gloves. As a general precaution, safety boots are also recommended.



1. Handling and storage

- In order not to damage the Reynodual® double sheet aluminium panels, please handle them with care by supporting them at several points lengthwise according to the length and the weight. Handle several panels at a time so as to avoid scratching the finish. Do not slide the coated surfaces against each other. Insert cardboard between the panels and the pallet.
- Always transport Reynodual® double sheet aluminium panels horizontally on a solid pallet that supports the entire length and a suitable flat trolley. Ensure that the panels are carefully strapped and protected with top and bottom coversheets to prevent damage.



- Store the material in a dry, temperate place on a flat horizontal support whose dimensions are greater than or equal to the panels.
- You will need to put in the actually requirements of the protective film to back this up.
- Store the panels in a moderate workshop from 18 °C to 20 °C at least 24 hours before the transformation work begins in order to deal with dimensional changes due to weather and climate and to optimise the transformation work.
- Always make sure that the weight of the material does not affect the panels below.

2. Protective film

The protective films used by Arconic Architectural Products are intended to protect temporarily the surfaces against dirt, scratches and tool marks during the complete utilisation cycle: handling, storage, transport, transformations and mounting. However, they are not intended to protect against corrosion, humidity or chemical products. After removal our protective films do not affect the surface of the Reynodual® double sheet aluminium panels and thus do not lower the quality of the digital and screen printing.

- **Durability:** deadline for the removal of the protective film

Removal	Inside (away from UV)	Outside (UV)
Not UV resistant	12 months	6 months

- **Removal:** The ambient temperature has an influence when the protective film is removed: The highest the temperature is, the easiest the peel off will be.
- **Important:** Avoid stagnant water as it can create a risk of transfer of glue when the film is removed. Do NOT stick PVC tape, polyurethane and modified silicone sealant onto the protective film. Plasticizers contained in these materials penetrate the film and may cause gloss change on the coating. Do NOT use permanent markers on the protective film.



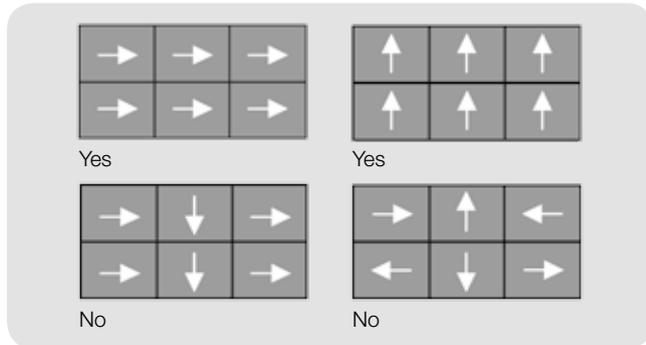
3. Fabrication

- **Thermal expansion and dimensions:** Expansion and shrinkage behaviour must be considered when calculating dimensions. **The expansion of a Reynodual® panel** corresponds to solid aluminium and must be considered when choosing the fixing system and calculating the sides and the joint width.

Length of panel (m)	1	2	3	4	5	6
Expansion for a temperature difference of 60 °C (mm)	1.4	2.9	4.3	5.8	7.2	8.6

The Reynodual® double sheet aluminium panels may only be used at temperatures between -40 °C and +80 °C

- **Panel inspection:** Inspect Reynodual® double sheet aluminium panels for obvious signs of damage during transport or handling. Do not fabricate damaged panels unless the damaged section can be eliminated.
- **Batch:** Always use Reynodual® double sheet aluminium panels from the same batch for one project, this will avoid any minor colour variations.
- **Product traceability:** Should be kept all through the transformation process in order to facilitate the future information research. Check that all panels of the same colour are from the same batch code. It is printed onto the back of the panel. The first six numbers refer to the date and the last four refer to the time.
- **Direction of coil-coating:** Panels can be fabricated to enable the grain direction to be both horizontal or vertical. Metallic coatings have a reflective or pearlescent finish, which is oriented in the longitudinal direction during the coil-coating process. This gives the panel “active colour” behaviour, dependent on the angle from which it is viewed. The same applies to the decorative coatings (wood, granite...). Directional arrows are printed onto protective film and should be used **to maintain the same orientation for all panels** and avoid shading differences between adjacent panels. This orientation must be taken into account when making panel optimisation calculations. Note the direction of the coating on any cut pieces left without arrows.



- Do not bring the Reynodual® double sheet aluminium panels into direct contact with metals such as copper, brass, bronze or iron. In the case of a contact with a material other than aluminum, the contact surface should be protected by an impermeable coating in order to avoid the risk of interference.

- It's absolutely **obligatory to square the panels** on the 4 sides especially for panels which are fixed with visible fixing systems like screwed SC/ST, riveted RV/RT or which are directly glued on site. To obtain this squareness, it's necessary to cut the panel only with a sawing (circular saw, CNC ...) or milling solution and to consider a cutting width of minimum 5 mm on the circumference of the panel.
- When storing panels temporarily between different phases of fabrication, use polystyrene or foamwedges.

A) FABRICATION GUIDELINES

Reynodual® double sheet aluminium panels can be fabricated using extremely simple techniques and machinery. Standard or complex elements can be made with minimum investment.

The Reynodual® double sheet aluminium panel must be routed before any bending operation.

We recommend the fabrication to take place in the workshop, however smaller alterations will be possible 'on site'.

Some shaping techniques with our recommendations will be presented below, however, it is highly **recommended that you conduct preliminary tests**, and read the technical information for the machines used.

B) EQUIPMENT

The tools necessary for processing Reynodual® panels may be chosen according to the criteria and conditions detailed in the table below:

	Large scale cutting	Small scale cutting	Occasional cutting	Milling	Drilling	Punching	Riveting	Boring	Tapping
Panel saw	•	•		•					
Circular saw		•							
Jigsaw			•						
Hydraulic shearing machine	•	•							
Milling machine				•		•			
CNC flat milling machine	•	•		•	•	•		•	•
Punching machine						•			
Drilling machine					•			•	•
Rivet gun							•		

C) SAWING

- **Saw:**

Before any cutting is undertaken, it is necessary to calculate the flat size of the elements taking into account the folding parameters. It is also preferable to carry out preliminary tests.

We also recommend that as a precaution, you check with the blade and with a rule.

If the Reynodual® double sheet aluminum panel has burrs, it can be trimmed with appropriate conventional tools.

- **Circular saw:**

Three basic precautions need to be taken to avoid the risk of scratches:

- Keep the work area clean
- Use an exhaust system
- Work on the reverse of the panel

We recommend the use of guides whose length exceeds that of the panel to be cut by 200mm at each end.

To guarantee the longevity of the equipment, we do not recommend to superpose the Reynodual® double sheet aluminium panels.

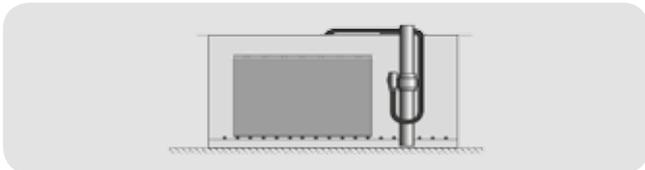
- **Panel saw:**

As for cutting with a circular saw, you must work on the reverse of the panels (the side with the strippable protective film against the saw frame).

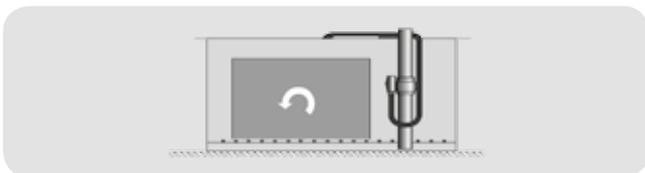
The stops will be placed to the left of the sawing column so that the operator can hold the sawn pieces.

Operation description:

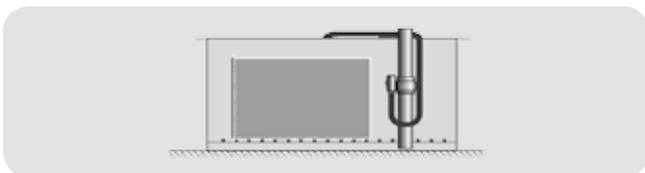
1. The first cut is made horizontally, at the upper edge, to get a straight edge.



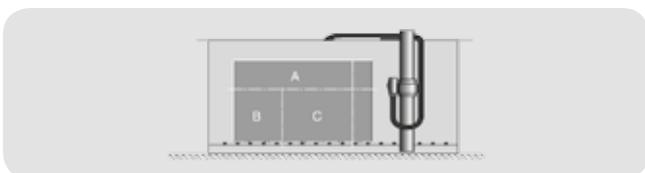
2. Then turn the panel so that the reference edge is resting on the carrying rollers.



3. Make a vertical cut on the left edge of the panel.



4. You now have a panel with straight edges, a straight base and right angles.



Remember, all four sides of each part must be square.

D) FOLDING THROUGH MILLING OR GROOVE CUTTING

- **Preparation for machining – Calculation of design dimensions**

The flat size of panels to be cut and milled must be calculated and marked out before any machining work is begun. This will allow fabrication within the best possible tolerances. In all cases, a test run should be performed beforehand, to work out the adjustments to be made to the dimensions.

When milling for a fold, a thickness of **0.7 mm ± 0.1 mm** of aluminium should be left in the bottom of the groove.

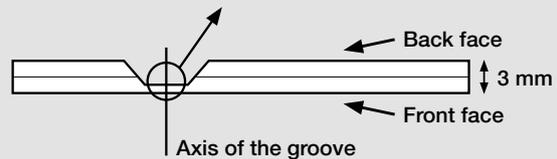
For a fold milled with a cutter with a flat surface of 3 mm, the fold axis will be on the milled groove flat, therefore 0.7 mm from the visible face. This, in the case of a closed 90° fold leads to an oversize of 0.7 mm per angle.

- **Closed 90° fold – milling cutter with 3 mm flat surface:** subtract 0.7 mm from the termination side for each fold.

- **Open 90° fold:** the calculation of the development is done with the termination side.

The dimensional tolerances generally accepted on fabricated elements are ± 1 mm, when using a milling cutter with a 3 mm flat surface.

Keep a thickness of 0.7 mm aluminium in routed channel

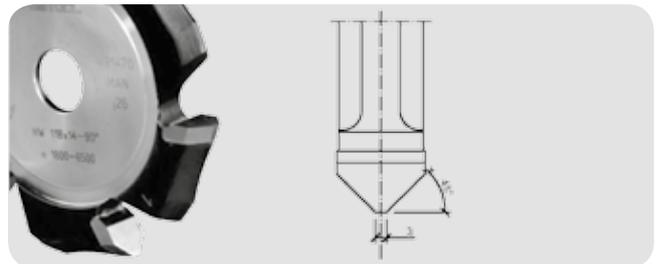


- **Machining:**

Good results were obtained on a CNC with a **groove cutter disc**, 180 mm diameter (or more) with a rotational speed of 6,300 rpm and a feed rate of 8 m/min. The use of an end mill is not recommended.

However, these parameters are different for every set of tools, so preliminary testing is recommended.

Bending radii of between 2 and 10 mm inclusive can be obtained depending on the choice of milling technique and the geometry of the groove.



- **Folding after milling:**

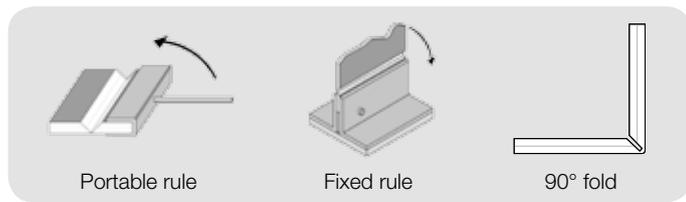
The rout and return technique consists of using shaped milling cutters to make V-shaped grooves on the back of the Reynodual® double sheet aluminium panel. This allows, in most cases, the hand folding of the panels without any need for a folding bench.

Generally speaking, it is essential to:

- Fold the return leg back in one movement.
- Close the fold a few degrees more than the desired angle before making the exact angle.

Depending on the folds, the following techniques may be used:

- **Small formats:** Folding with a folding rule (fixed or portable) consisting of a U or H-shaped profile with a lever.



- **Large formats:** Folding with a folding bed – particularly suited to the folding of returns, especially for long lengths or small folding widths.

We do not recommend folding without a folding tool or folding bench.

E) TRADITIONAL FOLDING (WITHOUT MILLING)

Today, traditional folding without previous routing is not recommended. Please contact us.

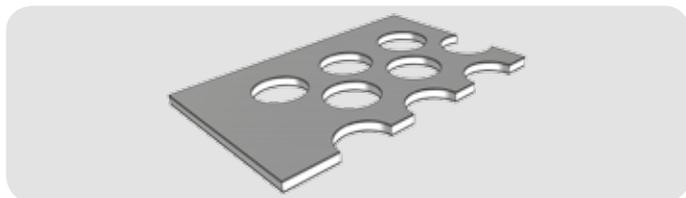
F) PERFORATION

The Reynodual® panel is well suited for perforation. It can be perforated by milling, drilling, or punching.

The recommended minimum distance between two perforations must be greater than or equal to 8 mm.

The minimum distance between the edge of the panel and the first perforation must also be greater than 8 mm.

Please contact us in the case of particular geographical situations (sea, polluted atmospheres, etc.) and any other type of perforation.



G) Bending

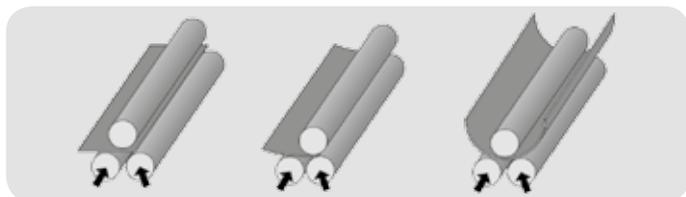
The techniques used for bending Reynodual® double sheet aluminium panels are those generally used for working steel or aluminium panels.

When bending the panel, the original protective film on the top surface must be left on.

Depending on the conditions in the workshop, it is even advised that the protection be reinforced with another self-adhesive film or the insertion of polyethylene or PVC strips 1 mm to 2 mm thick.

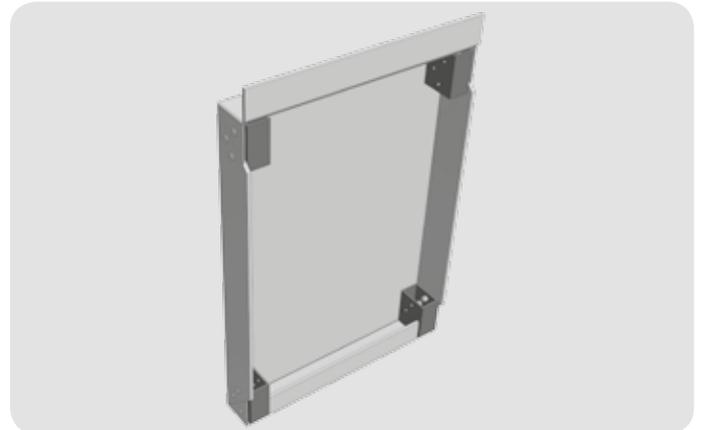
These essential precautions avoid marking and scratching.

We recommend a minimum bending radius of 15 times the thickness of the panel.

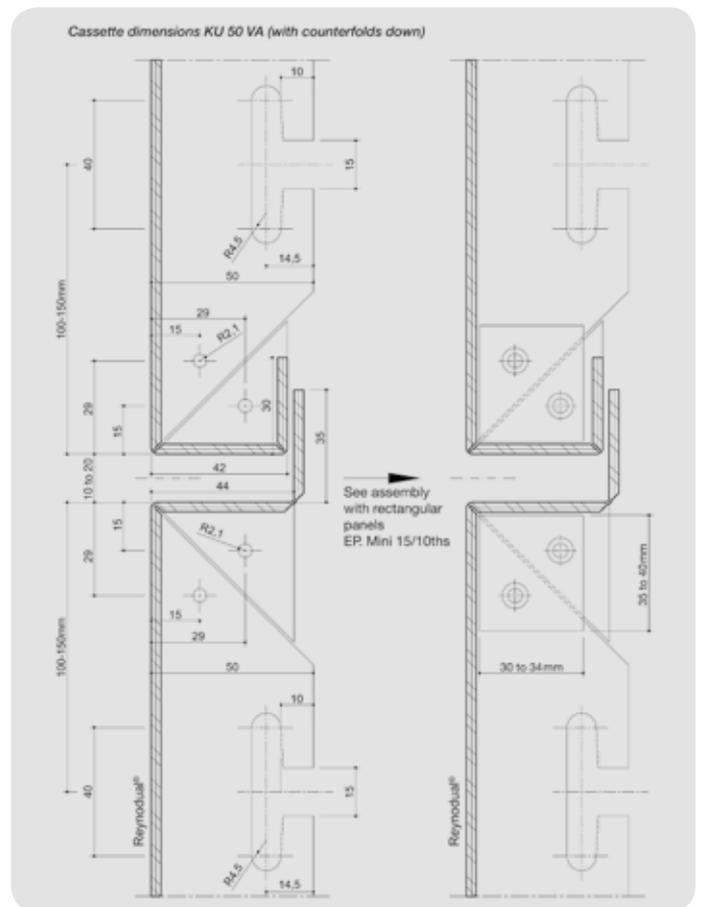


H) FABRICATION AND INSTALLATION OF CASSETTES

Please refer to our Reynobond® fabrication document on how to assemble Reynodual® cassettes and to fix solutions (especially concerning thermal expansion).



Reynodual® cassette



Example for dimensioning a Reynodual® cassette

4. Cleaning and maintenance

Please refer to the document "Maintenance guidelines for Reynolux® coil-coated aluminium".