Description and application guidelines

Roxtec lamination guidelines

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Abstract

This guideline is a help for the lamination responsible when attaching Roxtec GRP composite products to a structure. The GRP products offer two options for installation. The products can be fastened by lamination or with glue. The information presented in this guideline can be unique for every site due to local requirements and regulations.

Personnel competence and lamination method recommendations

For reliable and high-quality results, the installer is recommended to be experienced in working with lamination of fiber composite materials. The recommended method to use is "Hand lay-up".

For an optimal gluing result, a qualified person should carry out the preparatory work and apply the recommended adhesive, Methyl Methacrylate Adhesives (MMA), using suitable equipment.

Occupational requirements

Read the safety data sheet for all concerned products that are to be used (e.g. the resin, the fiber, the MMA) and use them in accordance with the recommendations provided by the manufacturer.

Occupational Exposure Limits (OEL) must be considered for a safe working environment. Provide sufficient ventilation and wash skin with soap and water after handling.

Generally recommended protective equipment:

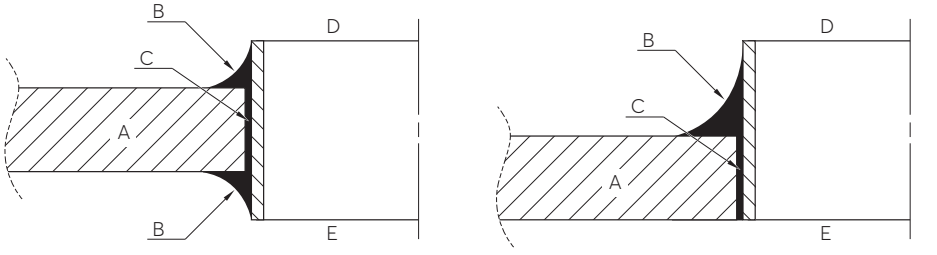
- Safety goggles
- Protective mask
- Protective gloves
- Comprehensive clothing

Waste must be handled in accordance with the manufacturer's recommendations.

Requirements after lamination or gluing

The Roxtec GRP sealing systems have been tested for pressure up to 3 bar. Therefore, we recommend non-destructive testing of the finished installation such as with liquid penetrant. The dimensions should be according to the table in chapter 4, page 6, to obtain optimal performance of the transit.

Legend

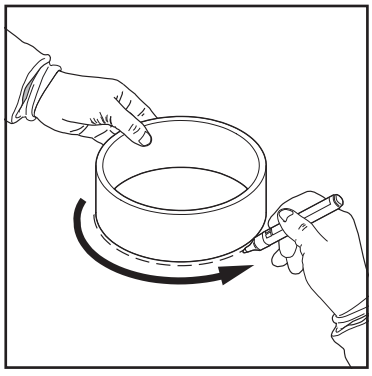


A. Structure
B. Lamination/glue
C. Putty
D. Front side of frame/sleeve
E. Back side of frame/sleeve

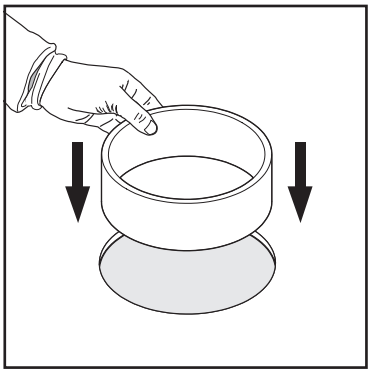
Contents

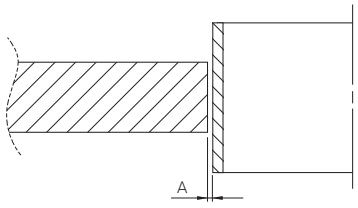
1 Aperture

Make the aperture as close as possible to the outer dimension of the frame to avoid large gaps. Maximum allowed total gap between frame/sleeve and structure is 10mm. All gaps need to be filled with putty during the lamination process.



Measure the aperture by using the frame/sleeve.





A = Max 10mm

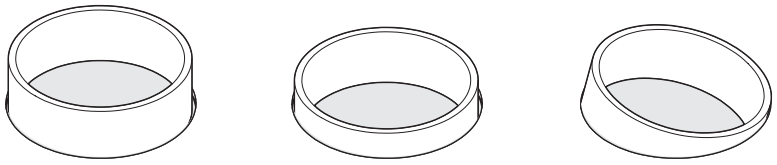
2 Positioning and fixing

The recommended position of a frame or sleeve is centered in the aperture and symmetrically placed within the structure.

The rectangular frames should not protrude more than 25mm from the surface of the structure at any side.

The round sleeves can protrude more since they come in various lengths.

Check fire certification with regards to allowed positioning.



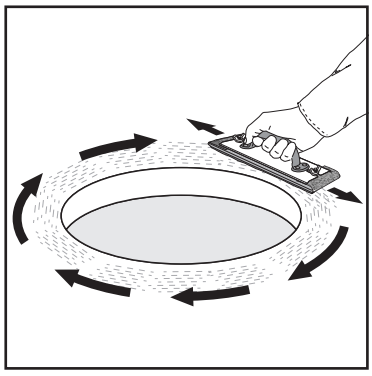
3 Installing the GRP products: procedure and dimensions

Take part of and follow the procedure as described below.

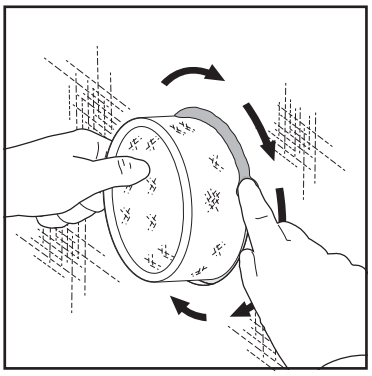
If lamination is used to fasten the GRP product, read section 3.2 a.

If glue is used to fasten the GRP product, read section 3.2 b.

3.1 Preparation



The outer surfaces of the FRP structure and the sleeve need to be sanded and thoroughly cleaned before the fastening can take place.



After placing the sleeve in the aperture in the structure, all gaps between the FRP structure and the sleeve need to be filled with putty before the fastening can take place.

Check if the FRP structure is made of polyester, epoxy or other resin.

Use the same type of putty as the resin in the structure.

Let the putty harden.

The putty will keep the sleeve in place during the lamination process.

Sand and clean the surface again before final lamination.

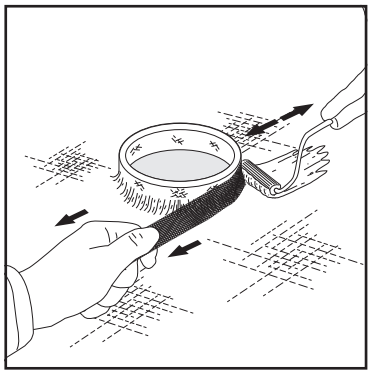
3.2 a) Fastening with lamination

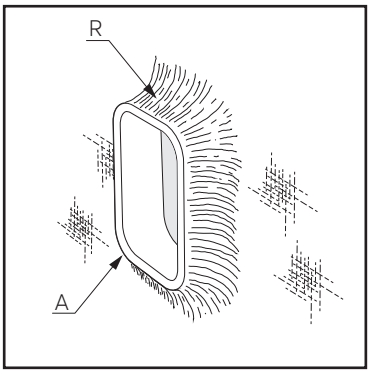
The lamination between a fiber-reinforced polyester structure and the Roxtec GRP sleeve can be done with polyester resin or equivalent and powder bound chopped strand matting. It can also be done with epoxy resin and in that case fiber fabric without any binder.

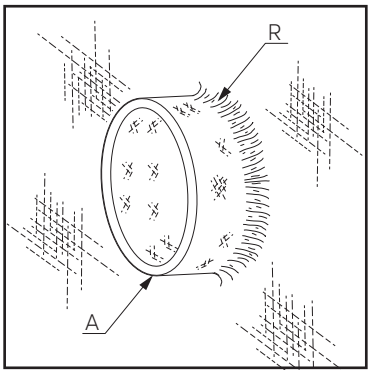
The lamination between a fiber-reinforced epoxy structure and the Roxtec GRP sleeve shall be done with epoxy resin and fiber fabric without any binder.

The recommended amount and dimensions of the lamination are as follows:

- The lamination is recommended to be applied double sided (symmetrically) in all possible cases (see picture).
- The laminations are recommended to be done with at least 5 layers of fiber (at least 450g/m² each).
- The lamination for round sleeves (variable lengths) shall have a minimum radius of 20mm.
- The lamination for rectangular frames (L=60mm) shall extend all the way to the edges of the frame with a minimum radius of 20mm (see pictures).







A: Edge of frame/sleeve
R: Radius of lamination

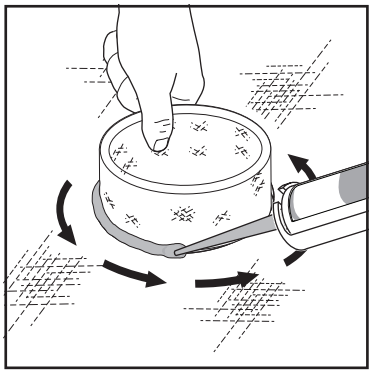
3.2 b) Fastening with glue

GRP products may be fastened using MMA (Methyl Methacrylate Adhesives). For easy application, a suitable dispersing gun may be used.

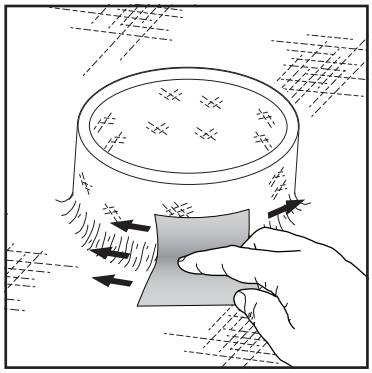
To ensure optimal bonding strength, make sure that all concerned surfaces are clean and free from contaminants.

When the dispersing gun is prepared and ready, apply the MMA to the GRP product. In most cases, it is enough to apply the adhesive to one set of surfaces, but it can be applied to all mating surfaces.

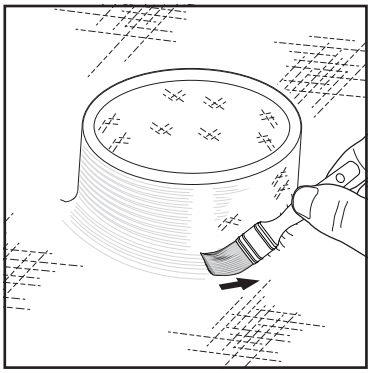
The curing process starts as soon as the two components are mixed together at room temperature. The nature of the curing process depends on the used products as well as on the quantity used. Generally, a higher temperature environment reduces the curing time and increases the bond strength.



3.3 Surface finish



The outer surfaces of the FRP structure and the sleeve need to be sanded after the fastening to remove any sharp edges.



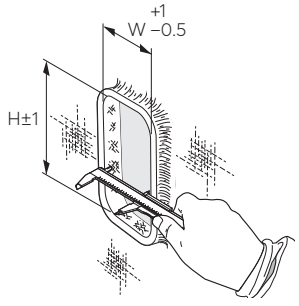
Finally, the surface needs to be treated with top coating.

4 Measuring

Measure 10mm into the frame depth on the front and back side in accordance with the table. The measurements are to be made with a frame or sleeve temperature below 50°C.

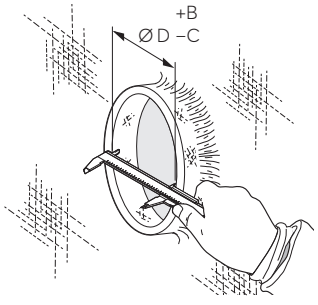
Roxtec GRP frame dimensions

Size	H (mm)	W (mm)
4	159.5	120
6	218	120



Roxtec GRP sleeve dimensions

Size Ø D	B (mm)	C (mm)
25	1	0
50	2	0
75	2	0
100	2	0
125	2	0
150	2	0
200	3	0



5 Caution!

The guideline is a help to make safe lamination, but it is important to be aware of potential errors that can lead to system failure. Below sections are examples of errors that can occur during lamination.

5.1 Lamination

Internal blisters
Make sure that the fiberglass is well soaked by the resin. Apply it carefully and roll it/work it to remove all air blisters in the lamination.

Heat blisters
Avoid using too much hardener in the lamination process.

Make sure that the lamination takes place in a controlled environment (approximately 15–20°C ambient temperature).

Follow the recommendations provided by the manufacturer.

Sharp edges
Make sure to smoothen all surfaces after the lamination to remove any sharp edges.

Add top coating to protect the lamination from water ingress.

5.2 Gluing

Ambient temperature
Avoid an ambient temperature that is excessive. A too rushed curing time may weaken the final bonding strength which may cause structural failure. Follow the manufacturer's instructions for an optimal result.

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(b) Installation shall be carried out in accordance with Roxtec installation instructions in effect from time to time.

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