



**Den Braven**

# Installation of window and doorframes with Polyurethane Foam

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## Installation of window and doorframes with Polyurethane Foam

Window and doorframes are made of materials such as wood, aluminum, steel and UPVC. Traditional window and doorframes are installed by using frame anchors. This method is time consuming and requires craftsmanship. Therefore, more often now, window and doorframes are installed using polyurethane foam. Using polyurethane foam can significantly reduce labour costs and produce higher insulation value. It is important to take into account the properties of polyurethane foam during the installation, to avoid damage and costs later.

### Types of polyurethane foam

Polyurethane foams can be distinguished into one and two component systems.

#### One component polyurethane foam

A one component polyurethane foam is extruded from an aerosol can, using a dosing gun or a straw. The can (with dosing gun) must be shaken thoroughly so the different components are well mixed. The foam can then be extruded by the propellants inside the can. After application, the polyurethane foam will expand and cure under influence of moisture of the substrate and the air, in combination with temperature. There are multiple grades of polyurethane foam available like: flexible, fire-retardant, winter grade, and high yield foams.

#### Two component polyurethane foam

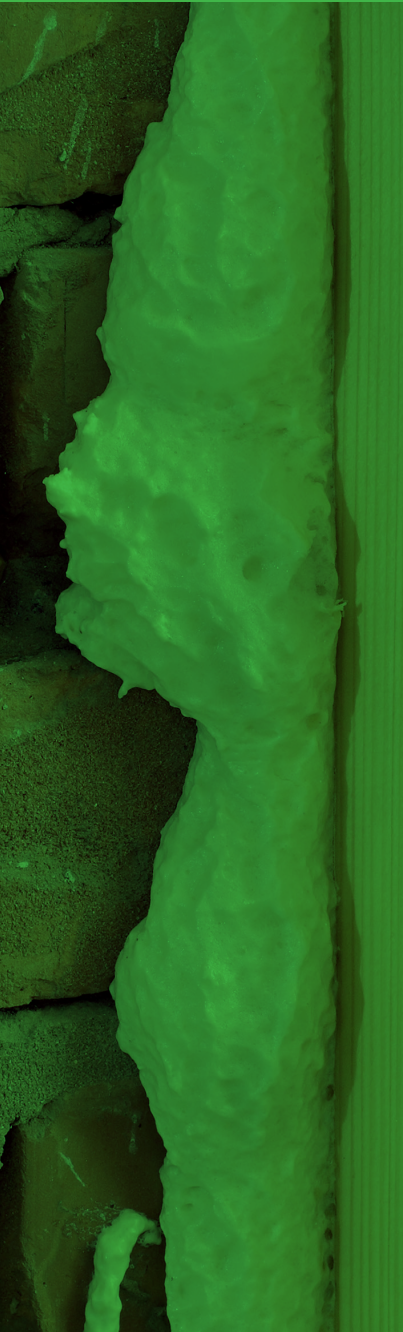
In a two component polyurethane aerosol foam the basic components and the hardener are separated from each other, but are supplied in one can. Different packaging systems with different activation systems are available on the market. The most common activation system is a can with a twist mechanism at the bottom, which, by twisting, brings the basic components and the hardener together. Another activation system available works by using a plastic pin or key which is placed into the can for activation. After activating the can, the reaction is triggered by shaking thoroughly, the foam will cure homogeneously without influence of moisture.

#### Installing frames with polyurethane foam

As polyurethane foam expands during curing, and when cured can cause some shrinkage, it is important to realize that during this process forces are built up. Frames of Upvc, aluminum and wood can show deformation during the curing process if the frames are not correctly stabilized by mechanical fixings, couple blocks and spacers/adjusting slats. During placement of the frames always use supporting blocks between frame and wall in order to position the frames at right-angles and keep them level. The correct width of the frame is created by using an adjusting slat at the bottom of the frame in the rabbet of the frame.

When using polyurethane foam to fill the joint between frame and wall, attention must be paid to stabilizing the frame during curing. Well positioned adjusting blocks between wall and frame will prevent any shrinkage, which could occur during curing. With these blocks the built up tensile stress will not be able to deform the frame. We recommend placing hard adjusting blocks every 50 cm. Place more adjusting slats to guarantee the correct distance between the frame parts to prevent deformation by the pressure build up while the polyurethane foam expands.

When using one component foam for the for the installation of frames. the adjusting slats may be removed only when the foam is fully cured. We recommend keeping the joints around the frame as small as possible, no wider than 2,5cm. Foam in a joint width as such with equal joint depth will not further expand 1 to 2 hours after application at normal room temperature and humidity.



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There are many factors influencing the curing of one component polyurethane foam, such as temperature, humidity, substrates, and joint width and depth. As circumstances can vary, it is difficult to determine when the expansion of foam is complete. When in doubt, leave the adjusting slats in place longer. We recommend leaving the slats in place for at least 24 hours. Cutting the excess foam away too early can lead to after expansion as humidity again comes in contact with uncured foam. When using one component polyurethane foam, the adhesion and curing speed are improved if sprayed with water to pre-moisten the substrate. The curing process can also be accelerated by moisturizing the freshly applied foam.

Installing window frames is easy using Polyurethane foam as long as these instructions are followed in order to prevent mishaps. Flexible foams are also suitable for sealing frames which are fixed with frame anchors. Because of the flexible character of this type of foam, we recommend using more mechanical fixings.

For this type of application a two component polyurethane foam is most often used, because of the more consistent curing, better dosing, quicker application and less waste. No humidity/-moisture is required to cure this type of foam, which makes it less dependent on any external circumstances. When using 2 component polyurethane foam, some conditions need to be taken into account. For one component foam pre-moisturizing is recommended, while for two component foam no moisture is needed. In fact too much moisture can create excessive shrinkage. The minimal temperature of the environment must be  $+ 10^{\circ}\text{C}$ , while the temperature of the can must be between minimum  $+ 10^{\circ}\text{C}$  and  $+ 25^{\circ}\text{C}$ . Lower temperatures have a bad influence on the curing process and may cause after expansion.

As an activated can of two component polyurethane foam will react and expand instantly, we strongly recommend working as efficiently as possible in order to empty the can in one use. Interrupting the extrusion process from the foam can lead to a temperature increase and possible bursting of the can. Read the instructions on each can before use. Two component polyurethane foam will mostly be fully cured after 1 hour, allowing removal of the adjusting slats after 3 hours, under the correct circumstances.

#### **Conclusion**

Installing window and doorframes by mechanical fixing in combination with polyurethane foam, can save a lot of time and money. When polyurethane foam is used, allow sufficient time for affixing and installation of the frames and wait to cut the excess foam away until fully cured. All substrates must be dust and grease free before use.

Moisten the substrates before applying the one component foam and also moisten the fresh foam immediately after application. Thicker layers of foam are better installed in a few thinner layers, allowing 30 minutes in between applications. One component Polyurethane foam is used to seal joints between the frame and wall and not for fixing the frames without mechanical fixings. For faster installations with less after expansion, use two component foam. In order to prevent foam sticking to unwanted areas, cover these sides of the frame with masking tape. Uncured polyurethane foam can easily be removed with PU Cleaner Universal. However, the cleaner can damage sensitive and painted substrates. Always test a on an inconspicuous area before use. Fully cured foam can only be removed mechanically .

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