

Glass Bonding

Instructions For Glass Bonding with UV-curing Adhesives

1. Material Selection (check suitability for adhesive):

Depending on the chosen material and the corresponding adhesive (see section 3), different bonds will have different final strengths:

Maximum Strength

glass/glass
glass/metal (stainless steel)
glass/stone (granite)
glass/wood (hard wood)

Medium Strength

glass/plastic
tempered glass
laminated glass
colored glass
ornamental glass
sand-blasted glass
satinized glass

Low Strength

all porous or open-pore materials
and heavily structured (>0.5 mm)
materials as well as lacquered
and coated materials

The columns above refer to transparent, UVA light permeable float glass. Clear float glass, mirror (on front) and tempered glass can be bonded without problems. Special glasses may lead to lower strength values or cannot be bonded at all. Problematic glass includes all structural glasses, like ornamental glass, wired glass, sand-blasted glass or satinized glass. The UVA light permeability depends on the glass thickness and how intensely colored the glass is.

Caution: Glasses with high UV absorption like laminated glass, intensely colored glass (e.g., green/blue/bronze) **cannot** be bonded with common UV adhesives. For these applications, only the highly sensitive "Lamifix" is suitable and must be special ordered.

Remember:

The smoother the bonding surfaces and the **thinner** the adhesive layer, the stronger and more load resistant the bond. When bonding glass to metal, the metal parts should be free of separating agents (e.g. grease, polishing agents, silicones, oils, etc.), and they should not be coated in any way (chrome, nickel, lacquer, etc.). Stainless steel is the most suitable material.

2. Preparing the Bonding Surfaces

Bonding surfaces must be absolutely clean, free of grease and totally dry. Use appropriate cleaners when UV bonding (without tensides and separating agents). Common household cleaners are not suitable in most cases. Somaca recommends Liquid Hi-Sheen (#337-1086) or alternatively IP cleaner in combination with steel wool. After the glass is cleaned, wait a few minutes before proceeding. In order to obtain a durably stable bond, remove any visible moisture on the bonding surfaces using a consumer-grade hair dryer. Set the hair dryer at the lowest temperature. Warm the bonding surfaces of both the glass and the metal parts. Parts, glass and adhesive should be room temperature prior to assembly.

Disregarding any of these recommendations may lead to considerable, in some cases not immediately, noticeable loss of strength finally resulting in a break of the bond.

3. Choosing the Right Adhesive

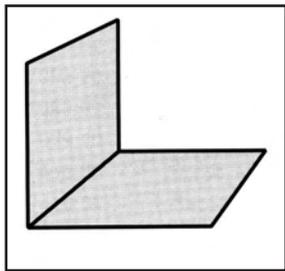
Depending on the requirement of the bonding materials, applicable loads, and the purpose of the finished object, different Bohle UV-curing adhesives are recommended.

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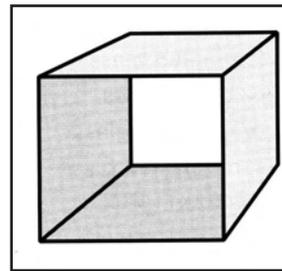
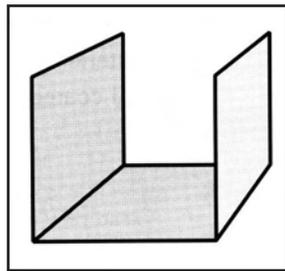
Remember:

Glass/metal bonds: To obtain an optimum result, **only** Bohle UV adhesive 210-9302 should be used.

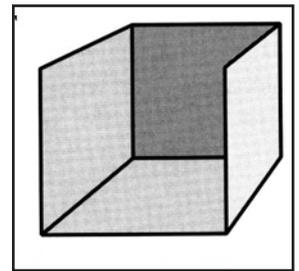
Glass/glass bonds: When planning an all-glass construction, a "closed" (i.e. self-stabilizing) construction should always be strived for in order to obtain the highest possible stability (see illustrations). Special order elastic adhesives, with medium viscosity, such as **B-678-0** and **B-690-0** are **exclusively suitable** for "closed" constructions. Use **210-9300** or **210-9302** for "open construction" where it is not possible to use medium viscosity product due to a design problem.



Open Construction

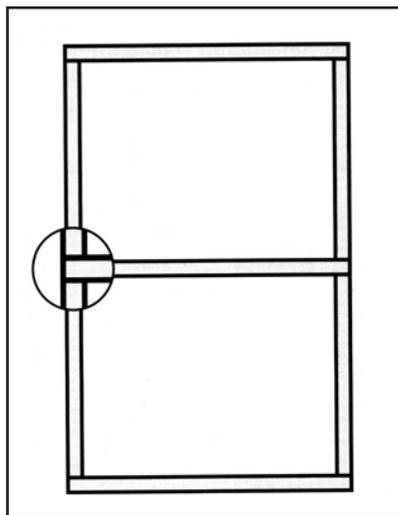


Closed Construction

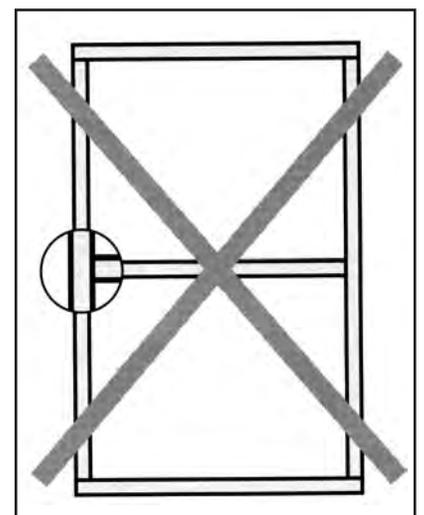


Constructions:

Whenever possible, the glass construction should be "self-stabilizing" (see illustration): High bending tensions within the glass and the bond are avoided, and the construction is more stable and can durably bear higher loads.



Self-stabilizing Construction



Non Self-stabilizing Construction

4. Positioning Devices

For optimum curing of the UV adhesive, you must prevent bonding parts from sliding out of place. We recommend VERIFIX positioning devices, such as Stock No. 210-6389.

5. Application of Adhesive

- Before applying the adhesive, it is recommended to check if bonding parts fit in their intended position. This is best done by building the complete construction without bonding with the help of positioning devices.
- The adhesive should be applied within 5 minutes after having heated the parts. Should a longer period have passed, the parts should be heated again.
- Bonding should preferably be done in horizontal position, vertical application of the adhesive may lead to problems.
- Too much adhesive reduces the strength of the bond and increases the workload for removing excess adhesive.
- Dispensing needles (#210-9319) allow a precise and economic application of the adhesive.

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5.1 Adhesive Application BEFORE Joining the Parts

Medium viscosity adhesive 210-9302 is always applied in the form of a caterpillar before joining the parts. When bonding surfaces, the adhesive is always applied before joining the parts.

- When bonding horizontally, the bonding parts should be evenly and carefully lowered to avoid trapping any air bubbles.
- The weight of the bonding parts is sufficient to evenly spread the adhesive over the complete bonding area.

5.2 Adhesive Application AFTER Joining the Parts

Low viscosity adhesives (210-9300, B-678-0 and B-690-0) possess a capillary action creeping into the bonding gap by itself. Therefore the bonding parts can be joined before applying the adhesive.

- Do not work on all parts at the same time but build the object step by step.
- Should the adhesive not have spread over the whole bonding surface, the parts should be slightly lifted and lowered again (enlarging and decreasing the bonding gap) before curing.

6. Curing (Exposure to UV Light)

Curing the bonding connection is done in two steps:

1. By **pre-curing** a working strength (approx. 70% of the final strength) is achieved. At this stage, excess adhesive outside the bonding surface can easily be removed.

2. After the **final curing**, the bond is fully functional and can be put under load.

- Use suitable UV lamp: The lamp should not be shorter/smaller than the bonding edge/surface to avoid build-up of tensions due to uneven curing.
 - For optimum final strength, use only white light. Black light does not have the required intensity and therefore does not achieve maximum strength.
 - Position lamp as close as possible to the bonding surface.
 - Never move parts during the curing process and do not permit any vibrations.
 - **Pre-curing** takes from **10 seconds to approximately 2 minutes**, depending on the type and efficiency of the lamp.
 - Exposing the bond longer than necessary to UV light does not have any negative effect but does not improve the bond either.
 - After pre-curing, remove any positioning devices and clean object from possible adhesive residues. (Bohle special cleaner, glass scraper, steel wool)
 - End-curing the bond: expose for between 60 seconds to approx. 5 minutes depending on the type of lamp.
- All Bohle UV lamps are equipped with UV filters to avoid any damage to eyes and skin. For your own safety, you should additionally use appropriate protection, for example, **protective glasses with UV filter** and **nitrile disposable gloves** (#240-4124/26).

7. Test Bonding

If you are uncertain of ideal bonding conditions, always make trial bonds:

- Bond parts following above instructions.
- Test strength of the bond by subjecting to stresses in excess of those to which it would normally suffer, e.g., impacts, tilting or sudden movements. If necessary use tools like pliers etc.
- Put under load until parts disconnect or break to determine the load limit.

Warranty: Bohle guarantees the satisfactory quality of the products and the materials supplied by them. However, the quality of the bond depends on parameters which are outside our control. We therefore have to reject any liability which exceeds the replacement of faulty material. This refers especially to any indirect or consequential loss, damages or expenses.