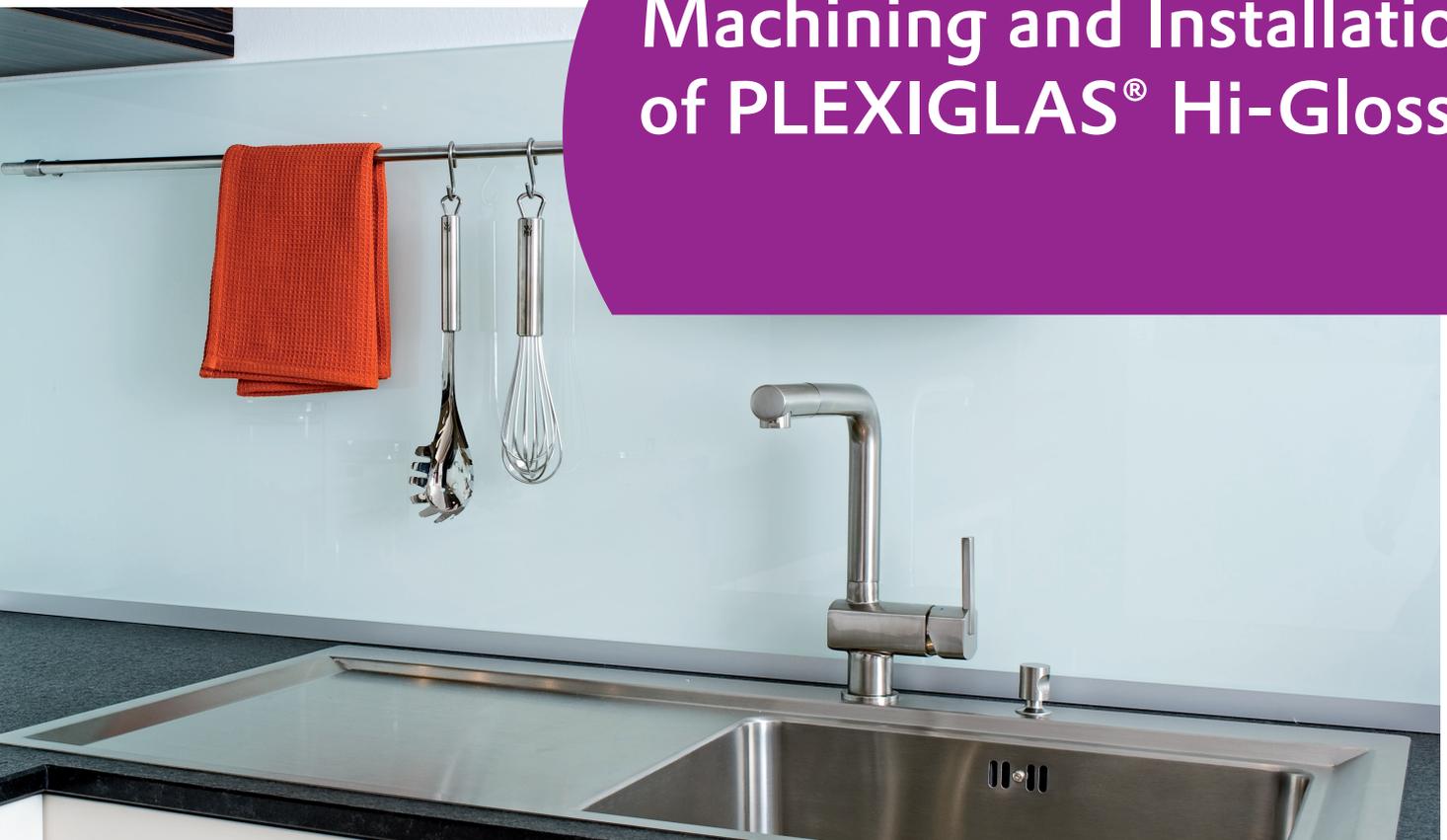


Machining and Installation of PLEXIGLAS® Hi-Gloss



PLEXIGLAS® Hi-Gloss

Brilliant Solutions for Noble Applications

Clear, high-gloss PLEXIGLAS® is coextruded over a color-effect layer in just one operation, adding a glossy touch to all your applications.

The outstanding optical and mechanical properties of PLEXIGLAS® make it an excellent choice for designing stylish walls and interiors.

PLEXIGLAS® is mounted as sheet material on a wall or supporting structure and serves as a “curtain type” design element.

The material is installed invisibly according to the key and lock principle. This means the sheets can be dismantled at any time. They are fastened to the wall or supporting structure by means of double-sided mirror tape combined with neutrally crosslinking silicone. The ideal method of fastening PLEXIGLAS® indoors is invisible suspension.

This brochure tells you how this works and provides a great deal more information on working with PLEXIGLAS®.

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1. Waterproof marker
2. Medium to fine machine file
3. Scraper
4. Spray bottle
5. Compass saw max Ø 60 mm (for machining plastics and acrylic)
6. Step drill
7. Conical drill
8. Countersink
9. Metal drill with correct grinding for acrylic (point angle 60° to 90°)
10. Flush cutter with stop ring
11. Contour cutter with stop ring
12. Jigsaw blade with straight teeth and tooth pitch of 2.5 mm
13. Circular saw blade with straight teeth (ideally trapezoidal flat teeth) and tooth pitch of approx. 13 mm

Using the Right Tools for Success



Ideally, tools should only be used for machining PLEXIGLAS®

Dirt finds it hard to adhere to the perfectly smooth surface of PLEXIGLAS®. Dusty surfaces can be cleaned with water to which some washing-up liquid has been added, using a soft, non-linting cloth or sponge. Do not rub dry.

Vileda® Microclean cloths dampened with water have a good and practically smear-free cleaning effect.

In the event of heavier soiling, particularly with grease, benzene-free petroleum ether or isopropyl alcohol can be used to clean PLEXIGLAS®.

Suitable cleaning agents are:

- lukewarm water with a little washing-up liquid
- vinegar essence diluted with water
- isopropyl alcohol (2-propanol)
- pure petroleum ether
- soft, damp viscose sponge
- soft, damp non-linting cloth
- sponge cloth
- chamois leather
- glove-lining fabric
- cotton tea-towel
- shower squeegee with soft rubber lip
- damp microfiber cloth for the final touch (e.g., Vileda® Microclean)

Cleaning and care of PLEXIGLAS®

Tip

Abrasive cleaning agents should never be used for cleaning acrylic.



Always predrill recesses and apertures in the corners of cut edges and cut them out with a jigsaw or overhead template router.

Machining PLEXIGLAS®

Drilling

Commercially available twist drills (for metal) always have to be ground correctly before using them on acrylic. DIY enthusiasts can order them preground from: www.plexiglas-shop.com

Please bear in mind the following when drilling:

- Position the drill slowly and carefully when you start drilling.
- Slow the feed just before the bit exits the bottom surface. The aim is to ease the drill through gently (possibly place a sheet of wood underneath).
- Use tap water for cooling.

Commercially available step drills and conical drills have proved especially suitable when working on site with a manual drill.

Step drill

This one-edged drill does not leave any chatter marks and guarantees clean cylindrical bores. With each subsequent drilling step, the hole is simultaneously chamfered.

Conical drill

The drill holes are slightly conical, but there is no chipping on the exit side of the hole. Pay attention to a triple-edge design.

Routing

When working with overhead template routers, bear in mind the following:

- Only use immaculate, sharp cutters.
- The cutter shaft must be inserted in the collet chuck deep enough to fill this completely.
- The workpieces must always be firmly clamped. If possible, start by cutting a larger workpiece and then sawing it into smaller sections.
- Always guide the workpiece against the cutting direction (opposed routing).
- Perform a trial cut on a piece of PLEXIGLAS® and check the setting of the overhead template router.
- Always work with a stop and/or a template.

A guide rail or parallel stop is used to safely guide the circular handsaw.



Sawing

The standard machines used for wood and metalworking are suitable for machining PLEXIGLAS®. Non-vibrating high-speed machines provide clean cut edges.

Circular handsaws and circular table saws

When cutting PLEXIGLAS® to size, the blades of circular handsaws or of circular table saws should protrude only slightly beyond the sheet.

- Always use carbide-tipped saw blades.
- Teeth: trapezoidal flat tooth or alternate teeth
- Tooth pitch: ~ 13 mm
- Always work with a stop.
- Carefully saw into the sheet with the saw running.
- Make sure that cutting is exact.
- Do not tilt the material.
- Fix the sheets to avoid flutter.
- Saw at an average feed rate.

Jigsaws

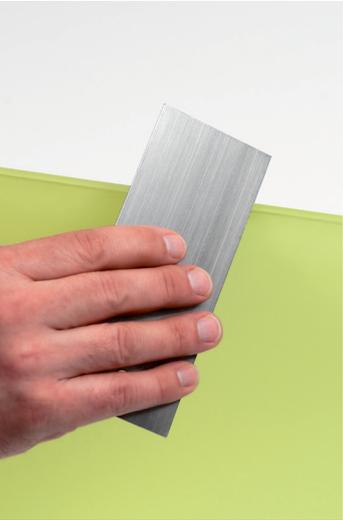
- Only use saw blades with straight teeth and a tooth pitch of 2.5 mm.
- Only tackle the workpiece with the saw running.
- Place the shoe firmly on the masking film of the sheet.
- Set an average cutting speed and adjust stroke action to zero.
- Select average feed rate.
- Cool with tap water.
- Prevent water from splashing the machine.

Tip

Cool thoroughly with water, especially when working with spiral drills, conical drills, compass saws and jigsaws.

PLEXIGLAS® GS and XT

Clearance angle	3° to 8°
Rake angle	0° to 4°
Point angle	60° to 90°
Angle of twist	12° to 16°, usually 30°
Cutting speed	10 to 60 m/min
Feed	0.1 to 0.3 mm/rev



Routers with ball bearing bits require no other guides and can be used both for straight and curved edges.

Edge Treatment

By sanding and polishing, parts of PLEXIGLAS® whose cut edges have become rough and dull during machining can be restored to their original high gloss and transparency.

- Always perform wet sanding (prevents thermal stress in acrylic and clogging of the abrasive surfaces).
- Sanding is performed in three steps:
 - coarse, 80–240 grit
 - medium, 400 grit
 - fine, 600–1000 grit
- For polishing, use waxes, pastes or commercially available car polish.
- Use very soft materials for polishing, such as glove-lining fabric or a buffing wheel.
- Remove traces of polish after treatment and clean the edges with water or petroleum ether.

Deburring the edges

- Sawed or routed edges can be smoothed and deburred using a scraper or machine file.

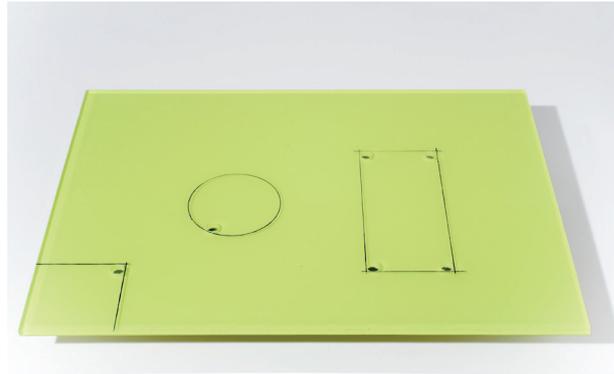
Profiling the outer edges

- The edges can be given the desired form using a profile router with ball bearing bit.

Tip

It is quite sufficient to smooth or deburr the edges with a scraper if they are concealed once they are installed (e.g., by a light switch).

Always mark recesses and apertures on the masking film and predrill holes in the corners of cut edges.



PLEXIGLAS® Sheet

The ideal sheet size

When installing the sheets, allowance must be made for expansion of the sheets on all sides due to heat and moisture. For use indoors, at least 3 mm must be allowed per meter of length and width. This should be considered when ordering the sheets.

Masking film

The PLEXIGLAS® sheets are protected by polyethylene films. The masking film must be left on the clear-transparent side of the sheet until it is put to its final use, and should normally be left on the sheet underside until machining is completed. If the masking film is no longer in place, the area to be machined should be covered with parcel tape.

Marking out

Please bear in mind the following when marking out:

- Leave the masking film on the PLEXIGLAS® sheet during machining.
- Only mark drill holes, cut edges and contours on the masking film.
- Do not use scribes or prick punches.

Drill holes and recesses

Please bear in mind the following when drilling and cutting recesses:

- Place the PLEXIGLAS® sheet on a flat and stable surface.
- Turn the 'useful' side upwards.
- Transfer the dimensions of any recesses to be made (e.g., for switches) to the masking film.
- Drill holes in the corners of the recesses.
- Debur drill hole edges.
- Cut recesses or apertures using a jigsaw or overhead template router.

Preparing the Sheet for Installation

Tip

Always predrill holes in the corners of edges to be cut when routing or sawing recesses or apertures. This prevents notch effects and possible sheet breakage. The holes should have a diameter of at least 10 mm. All machined edges should be deburred.



There is a suitable method for fastening PLEXIGLAS® Hi-Gloss to almost any substrate.

Preparing the substrate

Substrate and installation surface

The right substrate

The following substrates and carrier materials are particularly suitable for installing PLEXIGLAS®:

- waterproof gypsum wallboard
- coated* moisture-resistant chipboard
- coated* MDF panels
- firmly installed mirror tiles
- lath and plaster partition treated with adhesion promoter
- stone (brick, sand-lime brick) or concrete wall painted with latex paint

*coated at the points where the adhesive tape is applied. The coated surfaces must be completely dry and cured.

Preparing the substrate

Please bear the following in mind when applying the bonding method:

- If tiled surfaces are to be covered, remove any loose tiles.
- Fill any spaces with tiles or tile fragments and tile adhesive.
- There must be no parts on the wall that protrude.
- Countersunk head screws (e.g., used to install wall sheets) must be flush with the wall.
- Substrates must be clean, dry, flat, dust- and grease-free, solid and load-bearing.
- Chemical interaction with the substrate must be excluded.

Tip

Always pay attention to adhesive tape manufacturers' statements on the subject of "ideal carrier materials."

PLEXIGLAS® Hi-Gloss
instead of tiles in the
kitchen



Installation variant 1: Permanent connection

Since direct bonding cannot be corrected, it is advisable to perform two or three "dry runs" before removing the masking film.

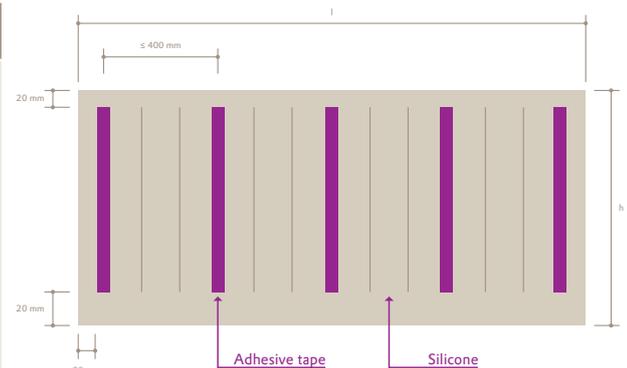
- Test the load-bearing capacity of the substrate using parcel tape.
- Remove the masking film from the colored reverse side and clean with petroleum ether or isopropyl alcohol.
- Fix 19 mm wide double-sided mirror tape using a pressure roll according to instructions.
- Apply neutrally crosslinking silicone in strips between the strips of adhesive tape.
- The silicone beads should be between 3 and 4 mm high.
- Attention to the processing guidelines of the silicone manufacturer.
- Remove paper from the adhesive strips.
- Hold the sheets at a 45° angle to the flat substrate so as to avoid contact with the wall as yet.

- Straighten the sheet and press it against the wall using a spirit level.
- Press the sheet firmly against the wall to ensure that the adhesive tape is in contact with the substrate.
- Leave the neutrally crosslinking silicone to cure for 24 hours.
- Remove the masking film and seal the joints with silicone.

Wall Installation

Tip

Pressing the sheet against the substrate using a spirit level ensures that the silicone is evenly distributed and spreads to the thickness of the mirror tape. Care should be taken to prevent silicone from getting onto the adhesive tape.





Fasten lock (A) by bonding or screwing it to the wall.

Insert key (B) in the lock. Remove masking film from the double-faced adhesive tape.

Hold PLEXIGLAS® Hi-Gloss at an angle in front of the wall and press it against the wall.

Installation variant 2:
Temporary connection

Wall Installation

Installation variant 2: Removable connection

The advantage of the key and lock principle is that the sheets can be quickly and easily removed, which is important for example if extensions are built or pipe and supply systems need to be adapted.

But these are not the only cases where temporary connection is advantageous. It also makes it easier, quicker and less expensive to renovate, move house or change color schemes.

Fastening material for the key and lock principle: moisture-resistant wood, plastic or metal.

Regardless of whether variant I or II is used, the A piece is always bonded or screwed to the wall.

Tip

If using wood, coat the bonding area with clear varnish or paint beforehand.

Always bear in mind the regulations of the adhesive tape manufacturer.

Prepare the wood according to variant I or II.

The coated bonding area per piece is at least 80 mm x 80 mm.

The material is at least 6 mm thick.

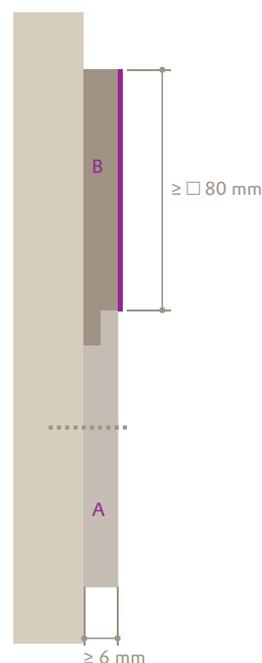
Method 1

Variant I, for example, by bonding at least 3 mm thick pieces of wood together or routing 6 mm thick pieces of wood in the surface.

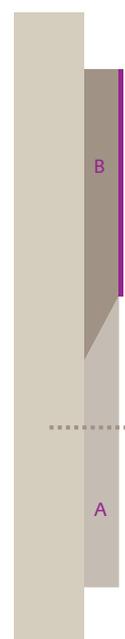
Method 2

Variant II by sawing at least 6 mm thick pieces of wood using a circular saw or jigsaw at a 45° angle.

Method 1



Method 2

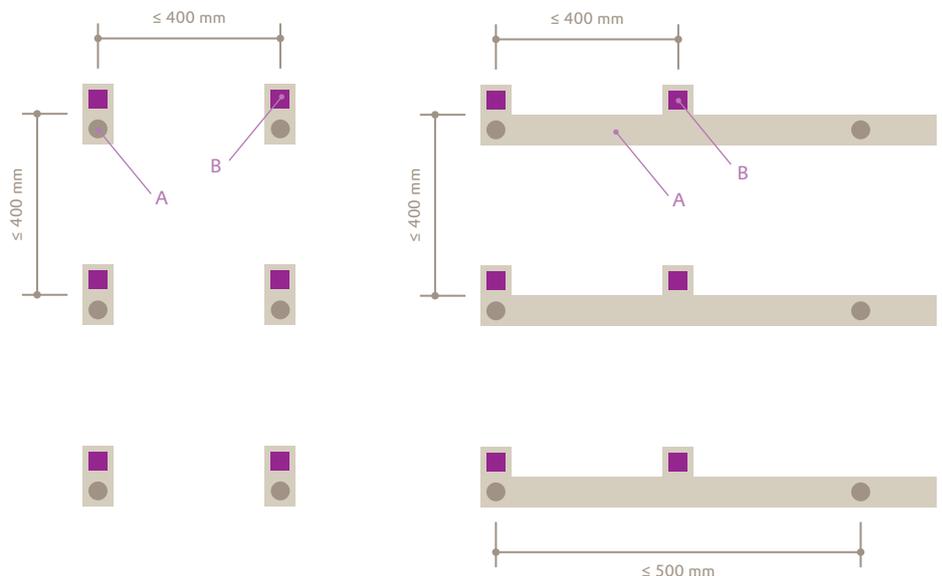


PLEXIGLAS® Hi-Gloss
as a seamless surface in
the shower.

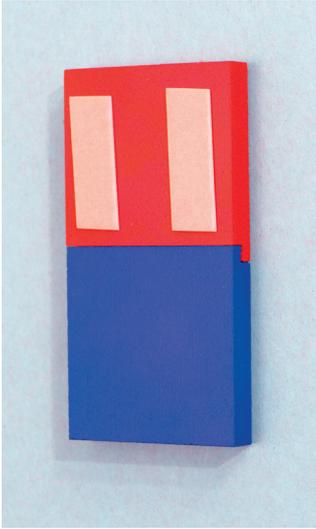


- The following installation procedure is recommended:
- Fix retention points (A) or retention rails to the wall according to the given spacing.
- Screw-fasten or bond them depending on the substrate.
- Apply additional supporting strips at the points where switches and sockets are to be installed.
- Apply the additional strips about 15 mm from the edge of the switch surround.
- If several switch surrounds are to be installed next to or below each other, fix the support strips according to their length.
- Apply (roll on) the double-sided mirror tape with an adhesive surface of at least 80 x 80 mm to retention device (B).
- Loosely insert retention device (B) in holder (A) and remove the masking film.
- Remove masking film from the colored reverse surface, stand the PLEXIGLAS® sheet up and press it against the wall.
- Roll on firmly using the pressure roll.

Wall Installation



Key and lock principle



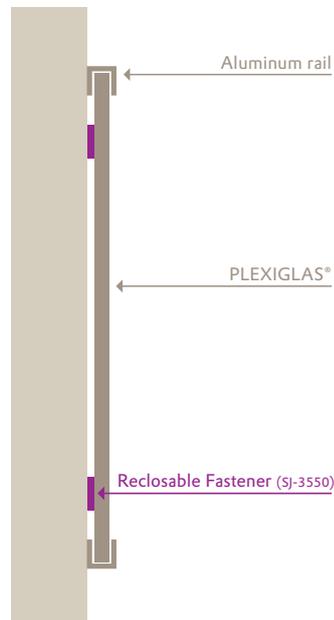
Double-sided mirror tape. Both sides have the same adhesive strength.



Magnetic strip (types A and B)

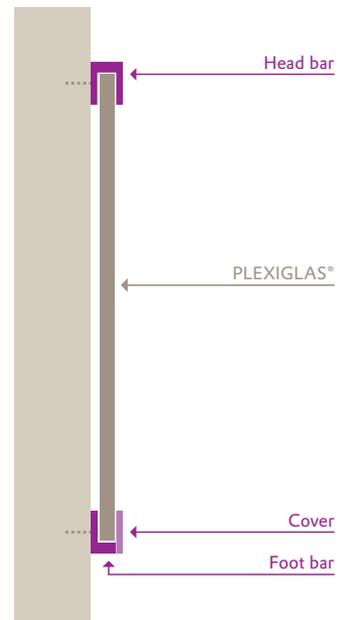


Temporary Fastenings at a Glance



Principle: self-adhesive, flexible press-on fastener system.

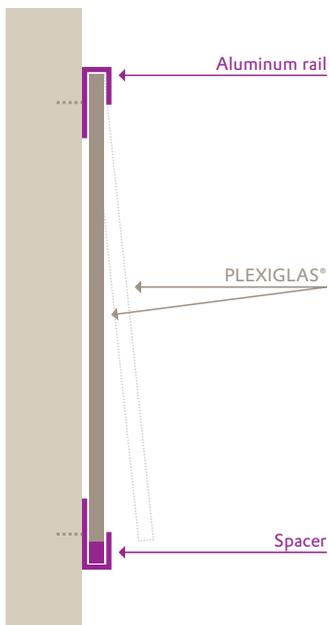
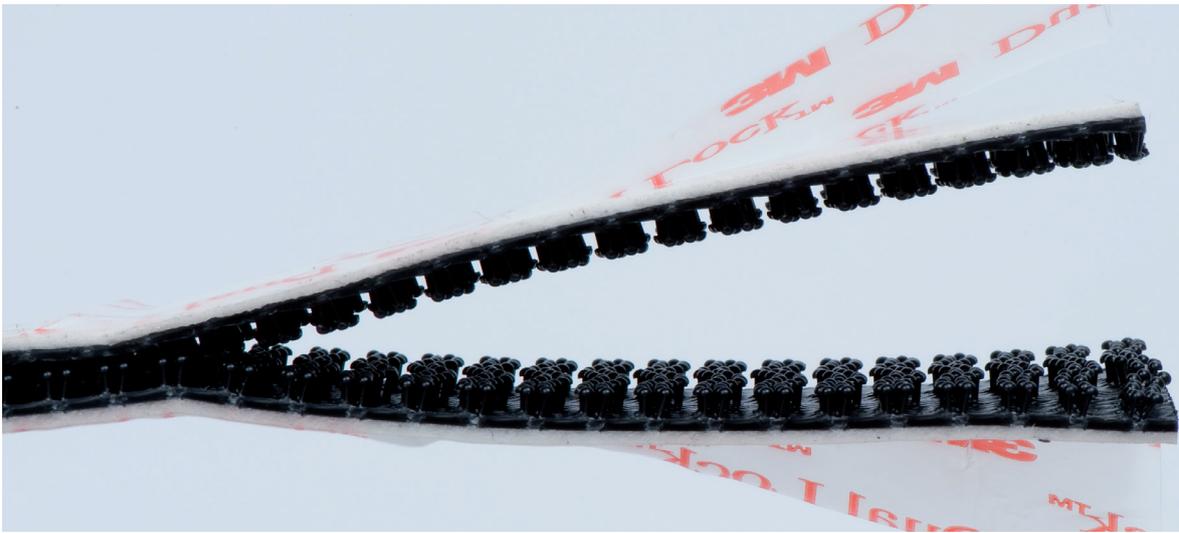
A strong but temporary connection is obtained simply by pressing together the mushroom heads.



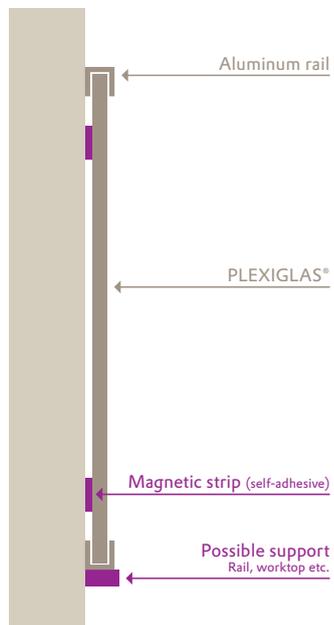
Principle: Foot and head bar.

U-shaped head bar, L-shaped foot bar, fasten cover to foot bar, fasten bars by bonding, screw-fastening or a combination of the two.

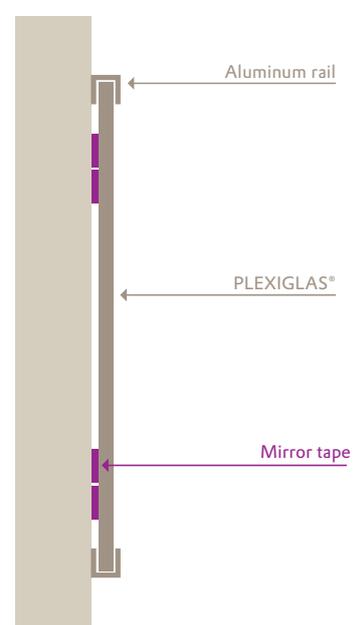
Preparing the temporary key and lock fastening system



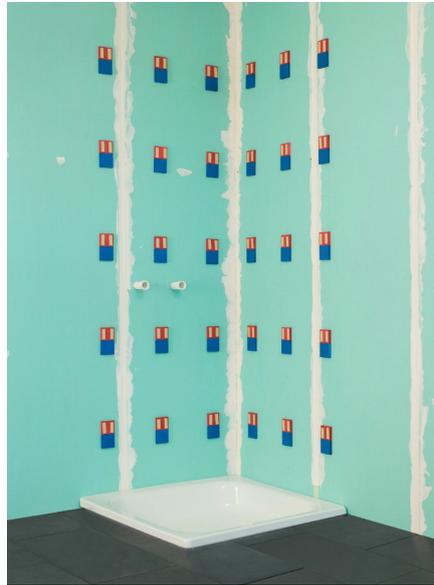
Principle: Aluminum U-rail with long leg
Fasten rails by bonding or with screws.
Place the spacer in the lower profile.
Insert PLEXIGLAS® Hi-Gloss.



Principle: self-adhesive magnetic strip
(types A and B).
When using either type of magnetic strip,
the precise fit of the two strips is specified.
Support is advisable.



Principle: Key and lock insertion.
Lock is fastened to wall by bonding or
with screws.
Always fasten key to the PLEXIGLAS®
sheet using double-faced adhesive tape.



Installing a rear shower wall by means of the key and lock principle

Example of Installation

Installing a rear shower wall by means of the key and lock principle

1. Examine the substrate structure

- It is advisable to clean the substrate using petroleum ether or isopropyl alcohol.
- Substrates must be clean, dry, flat, dust- and grease-free, solid and load-bearing.
- Chemical interactions with the substrate must be excluded.
- Bear in mind the instructions of the adhesive tape manufacturer.

2. Fasten the load-bearing element (lock)

To ensure there is a space for ventilation between PLEXIGLAS® and the wall (especially outside walls), the load-bearing elements (green, at least 6 mm thick) are screwed into or bonded to the wall surface, depending on its structure.

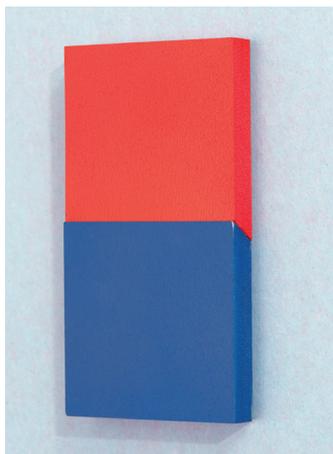
Then carry out two to three dry runs with the sheets. After this, position 3 mm spacer strips on the edge of the shower tray and examine whether both sheets are vertical using a spirit level.

3. Insert suspension element (key)

Insert all suspension elements (red).

4. Corner solution with corner profile

Position one edge of the profile so that it is flush and tap it onto the entire length of the PLEXIGLAS® sheet with gentle taps so that the flanks of the profile sit tight. Check how it sits (no overlap) and tap it on firmly down to the bottom.





Stand the PLEXIGLAS® Hi-Gloss sheets up and press them against the wall.

5. Installation

The drill holes for the metal fittings and taps have to be lined in order to provide a firm support when the screw fastenings are tightened.

Remove the (white) masking film from the first side to be installed.

6. Bonding the 1st PLEXIGLAS® sheet to be installed (left)

Place one short edge of the sheet on the 3 mm spacer strip and hold the sheet away from the wall at an angle. Then press the sheet firmly against the wall by hand from the bottom upwards.

As soon as the sheet is suspended, roll over it firmly at the fastening points using a rubber roll.

7. Bonding the 2nd PLEXIGLAS® sheet (right)

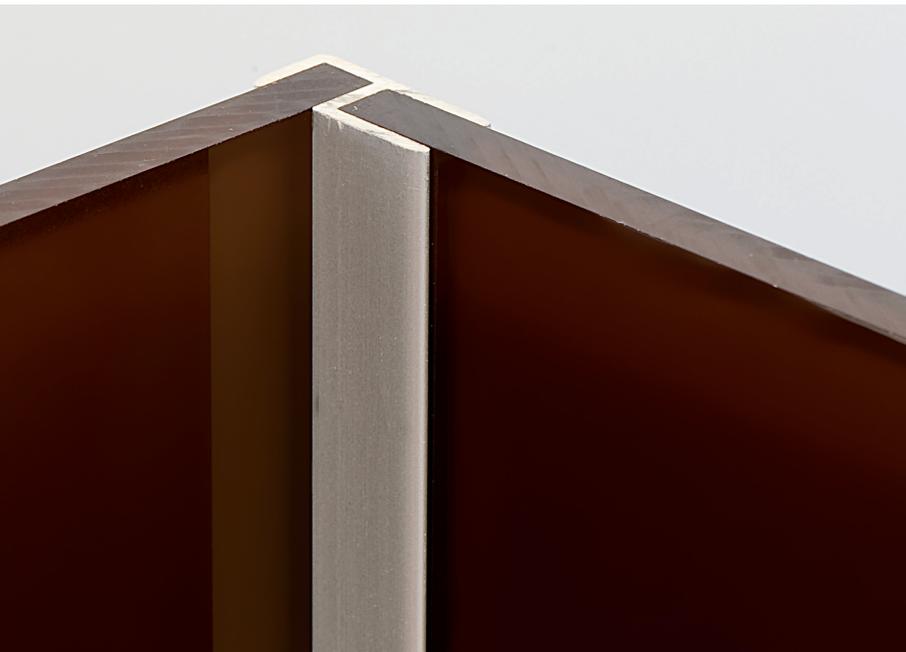
Here too, line the drill holes for the metal fittings in the shower wall. Then remove the masking film from the retention elements.

Hold the long edge of the sheet to be installed flush with the sheet that has already been installed. Place the short edge of the sheet on the 3 mm spacer strip and hold the sheet away from the wall at an angle. Then press the sheet firmly against the wall by hand from the bottom upwards.

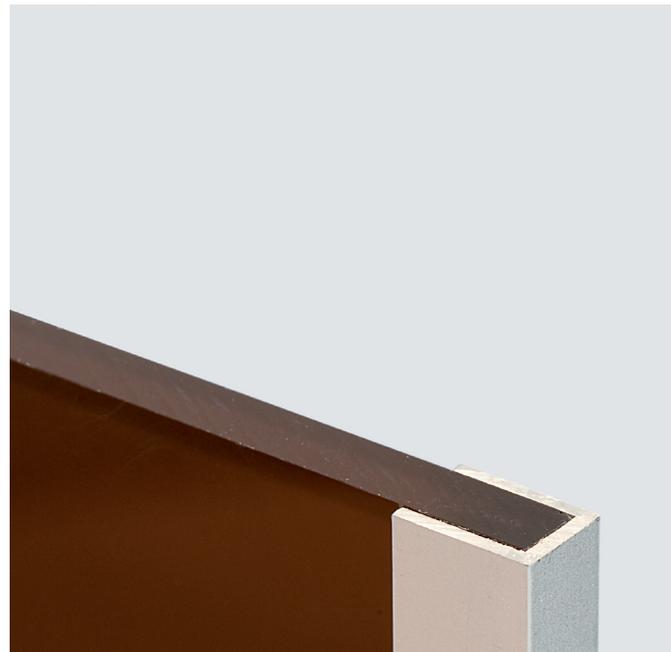
As soon as the sheet is hanging, roll over it firmly at the fastening points using a rubber roll.

Remove the sheets again, insert the second sheet flush in the corner profile, tap it till it sits tightly and install both sheets together

Elegant Corner and Edge Solutions for Wall Design

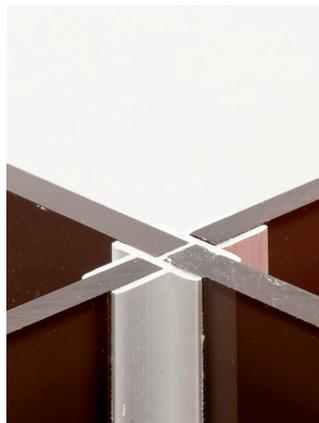


Corner profile
This profile enables elegant corner solutions that can be reversed at any time, while being very stable.



U-shaped cover section
This section protects the edges and harmoniously rounds off the final appearance.

The cross profile and T profile enable mobile yet stable partitions with PLEXIGLAS® Hi-Gloss.

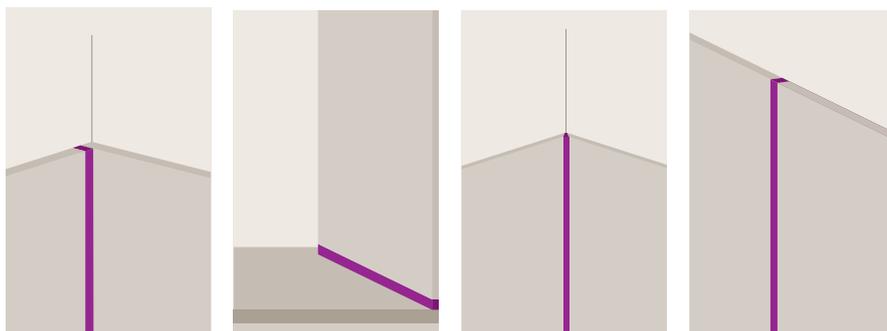


H-profile
PLEXIGLAS® Hi-Gloss sheets can be produced in lengths up to 12.5 m. If greater lengths are required, they can be obtained using the H profile.

Tip

Bear in mind the allowance for expansion for all corner solutions. This is 3 mm per meter for all indoor applications.

Corner solutions with silicone



Corners can also be produced using neutrally crosslinking silicone. Bear in mind the instructions of the silicone manufacturers before commencing work.



Bear in mind the specified minimum distance from the individual hob.

Tips and Tricks for Working with PLEXIGLAS®

What you should know before working with PLEXIGLAS®:

- Carefully read the statements of the adhesive tape manufacturers.
- Prior to installation, examine whether the dimensions of the cut-to-size sheets are correct.
- Do not use aggressive scouring agents or solvents, and never use brushes or abrasive sponges for cleaning.
- Only bring parts sealed with neutrally crosslinking silicone into contact with water 24 hours after sealing.
- speaking, acrylic must not come into direct contact with incompatible materials like uPVC or PU sealing compounds and MS polymer insulation materials. Recommended materials are: ethylene-propylene-terpolymer rubber (EPDM/APTK), polychloroprene, polyethylene (PE), polypropylene (PP), thermoplastic elastomers (TPE), polytetrafluoroethylene (PTFE), polyamide (PA) and silicone rubber.
- The distance between the outer edge of a ceramic hob and the wall must be at least 60 mm. The distance for gas hobs must be at least 200 mm. The manufacturers' statements must be strictly observed.
- Only use double-sided mirror tape with an all-acrylic adhesive.
- It takes two people to install the sheets.
- PLEXIGLAS® sheets are masked with environmentally friendly polyethylene film to protect them during transport and storage. The surface protection must remain on the sheet until the finished part has been finally installed.
- If the sheets are exposed to weathering, the film must be removed within four weeks. If not, there is a risk that the polyethylene film will become brittle or adhere more strongly to the sheet.

Technical Data

Characteristic data of PLEXIGLAS®

Mechanical data

Properties	PLEXIGLAS®	Unit	Test Standard
Impact strength (Charpy, unnotched)	16	kJ/m ²	ISO 179/1 fu
Tensile strength	77	MPa	ISO 527-2/ 1B/5
Elastic modulus	3,300	MPa	ISO 527-2/1B/1
Nominal elongation at break	7.6	%	ISO 527-2/ 1B/5
Max. thickness tolerance for 6.0 mm	0.3	mm	ISO 7823-2
Ball indentation hardness H _{961/30}	180	MPa	ISO 2039-1
Pencil-Hardness	4H	-	ASTM D 3363-92a

Thermal properties

Properties	PLEXIGLAS®	Unit	Test Standard
Coefficient of thermal linear expansion (0...50°C)	7	10 ⁻⁵ /K	DIN 53752-A
Vicat softening temperature	109	°C	ISO 306, B50
Heat deflection temperature under load HDT (1.8 MPa)	102	°C	ISO 75
Forming temperature (infrared heating)	140 ...160	°C	-
Max. permanent service temperature	79	°C	-
Ignition temperature	430	°C	DIN 51794
Smoke gas volume	very low	-	DIN 4102
Smoke gas toxicity	none	-	DIN 53436
Smoke gas corrosiveness	none	-	-
Material class	B2 Class 3 TP (b)	-	DIN 4102 BS476, parts 7+6 BS2782, method 508A
Fire rating	E	-	DIN EN 13501

Miscellaneous

Properties	PLEXIGLAS®	Unit	Test Standard
Density	1.19	g/cm ³	ISO 1183
Water absorption (24 h, 23°C) compared with dry state Sample 50 x 50 x 2 mm	40	mg	ISO 62, Method 1

® = registered trademark

PLEXIGLAS is a registered trademark of
Evonik Röhm GmbH, Darmstadt, Germany.

Certified to DIN EN ISO 9001 (Quality)
and DIN EN ISO 14001 (Environment)

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Evonik. Power to create.