Splash

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Installation Guide

Add a Splash of Living Colour

Zenolite®

A Splash of Living Colour

Zenolite® Technical Information

General Properties

Zenolite® is an extruded, high gloss, rigid thermoplastic material made entirely of Acrylic (PMMA - polymethyl methacrylate). It consists of a thick water clear top layer which has been permanently fused to a high colour solids layer. Zenolite features include:

- Unique Integrated colour layer
- High chemical resistance
- Easy on site fabrication
- Repairable surface
- Fully recyclable polymer system
- Excellent colour consistency
- Easy to clean
- 10 year indoor UV warranty

Environment

Zenolite is completely inert and does not release any emissions to the environment. Zenolite is ultra hygienic and does not promote bacterial growth or transmission. Zenolite consists of Carbon, Hydrogen and Oxygen and is recyclable by mechanical, chemical or thermal means.

Zenolite can be ground and pelletised for re-use in sheet extrusion or injection molding.
If correctly incinerated Zenolite produces only water and carbon dioxide. Zenolite can also be chemically reduced to its original monomer for use in other acrylic based products.

Applications

Zenolite sheet is suitable for many vertical surface applications around the home, office or commercial environments. Typical uses include kitchens, bathrooms, laundries, partitions and vast array of interior features. Zenolite can be applied to flat or curved surfaces.

Zenolite is not recommended where a direct heat source is applied such as behind cooktops or in shower cubicles where aggressive cleaners are used. For more information on the installation of gas cooktops, refer to local standards or contact the appliance manufacturer.

6mm - Wall cladding, splashbacks, shop fitting, feature panels and signage.
4mm - Glazing infills, lamination, furniture and signage.
2mm - Lamination, joinery and furniture

Protective Film

Both faces of Zenolite sheets are protected by high quality polyethylene film.

It is preferable to leave the protective film in position throughout machining, to keep the sheet surface in perfect condition. It is strongly recommended to avoid external storage. Protective film and adhesives could be damaged by UV exposure, which would make it difficult to remove the masking film.

Storage of sheets

Sheets must be stored in a dry place. It is advisable to place a polyethylene cover over the stack when a sheet is removed, to reduce moisture absorption. It is recommended that sheets of Zenolite be stored horizontally on their original delivery pallets, and that the pallets be placed on horizontal storage shelves. It is strongly recommended that pallets should not be stacked, which carries the risk of creating internal tensions and spoiling the flatness of the sheets.

If a vertical storage method is adopted, it is preferable that Zenolite sheets be leaned against solid supports inclined at approximately 80° to avoid any bending.
It is strongly recommended to avoid storage longer than 6 months.

Cleaning

Best results are achieved by using a soft micro fibre cloth or chamois with a non abrasive soap or detergent in warm water.

Do not rub the Zenolite surface when it is dry. Do not use brushes, scrapers or scourers at any time. Grease or oil can be removed with kerosene. Avoid using window cleaning sprays or any acidic solutions. Do not use acetone, chloroform, benzene, Ammonia, Thinners, caustic soda, Toluene, Xylene, dichloromethane, amylacetate, glacial acetate acid, butyl alcohol, butyl acetate, cellusolve, cresols/phenols, ethylacetate, chlorinated solvents, halogenated solvents, methyl alcohol, methyl ethyl keytone.

Refer to Surface Re-finishing (page 7) to restore the Zenolite surface to its original condition.

Appropriate safety precautions should be used when handling Zenolite sheets.
We recommend suitable gloves and safety glasses be worn at all times. Appropriate manual lifting and handling practices should be used with a minimum of 2 people at all times.

Machining

In terms of hardness, Zenolite is similar to aluminium or light alloys. It can be machined (cut, milled, turned or drilled) using typical tools for either wood or metal.

Recommendations for machining

Excessively fast machining causes local overheating, generating internal stresses which must subsequently be relieved by annealing.

Best results will be achieved by using only very sharp tools, ensuring the efficient removal of swarf, not overheating the material.

During machining, parts must be clamped properly to avoid any vibration. Strong vibration may result in a poor edge finish or broken sheet.

For more information go to www.zenolite.com.

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Some Zenolite machining operations will produce hard and sharp swarf. Appropriate eye, hearing and dust inhalation protection must be worn by all operators during the machining or fabrication of Zenolite.

Cutting and other machining

When a sheet is being cut, the blade entry and exit stages are the most critical.

A number of industrial cutting methods are suitable for Zenolite.

Circular saws are normally used for straight cuts, with bandsaws or router cutters for other shapes. Other more sophisticated methods such as lasers or water jets give excellent results. Zenolite can be machined using numerous other processes such as drilling, routering, milling or sanding.

Circular saw

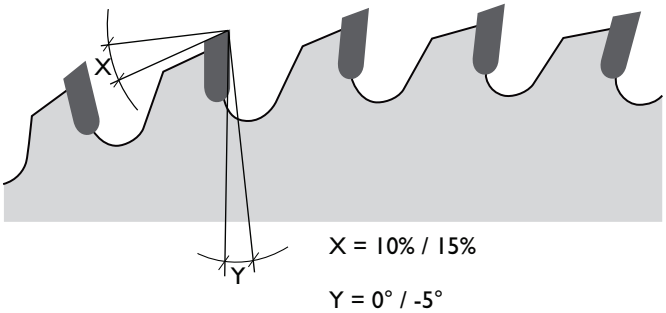
Circular saws give a straight, accurate cut. This is the most frequently used technique. When cut correctly, Zenolite sheets have a clean surface.

Carbide-tipped blades are recommended for industrial use, for cutting piles of sheets.

The teeth are radial (the cutting edges are aligned with the centre) and are backed-off to form an angle of 45°at the tip. The teeth are not set but the saw must have a rake of approx 0.2 % on each face.

Pitch: 2 to 5 teeth per cm. Cooling by a jet of compressed air or water is recommended.

A polished finish can be obtained in a single operation if diamond-tipped tools are used.



X = 10% / 15%

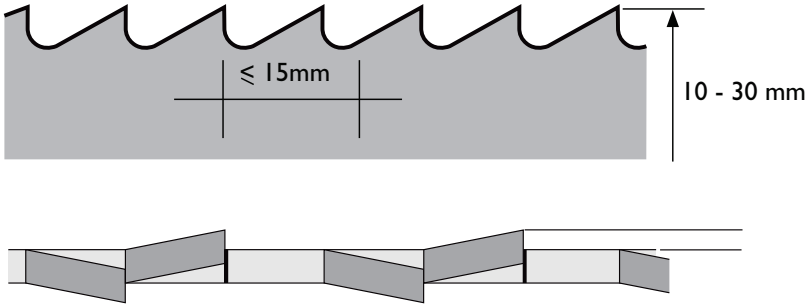
Y = 0° / -5°

Recommended Speed for different saw diameters	
Saw diameters (mm)	Rotation speed (rpm)
150	6400
200	4800
250	3800
300	3200
350	2800
400	2400

Bandsaw

Bandsaws should only be used to cut curves.

Bandsaws do not result in a clean edge and lengthy finishing operations are necessary to achieve a satisfactory finish. Woodworking machines with a blade speed of 15m to 25m/sec can be used.



Jigsaw

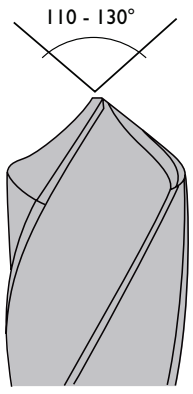
Jigsaws with blades suitable for wood or plastics can be used for short distances such as power point openings. Do not allow blade to overheat.

Drilling machines and bits

Drilling can be carried out with fixed or portable drilling machines, fitted with high speed, super-high speed or carbide-tipped steel drills for light metal, specially ground for Zenolite.

It is recommended that the edge of the drill be ground parallel to its centre line, to suit the special characteristics of Zenolite. Step Drills are ideal for larger diameter holes.

A DRILL SPECIALLY GROUND FOR ZENOLITE



STEP DRILL

Method

The use of carbide-tipped drills is recommended, to obtain a high-grade finish on the sides of the holes.

Best results will be achieved with a slow to medium drill speed.

For more information go to www.zenolite.com.

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Milling / Routering

Milling can be used to obtain complex shapes with a clean, polished machine finish. Zenolite sheet must be securely held to avoid vibration and a poor edge finish.

It is advisable to use plain cylindrical milling cutters with two or more cutting edges, preferably one-piece carbide-tipped. High speed or super-high speed steel tools will give indifferent quality results.

The rotation speed must be between 10,000 and 30,000 rpm, depending on the diameter and number of cutting edges used, and compressed air cooling may be helpful.

Feed rates of 12m to 15m/min are suitable.

Milling can be used for several operations such as:

- Cutting through
- Engraving
- Finishing edges

Engraving

Engraving can be carried out using computer controlled milling or laser equipment. Removal of large areas of the colour layer may result in deterioration of the clear layer.

Always conduct a trial of any new engraving design prior to proceeding to production.

Sanding

Sanding is required to finish the edges of coarsely cut sheet. Wet carborundum paper is used, either by hand or on a disc or belt sanding machine. For the latter, the recommended belt speed is 10 m/sec. A water spray should preferably be applied during sanding, to minimise overheating of the material. It is preferable to proceed in stages, using in turn:

- A coarse-grain abrasive paper (e.g. 100)
- A medium-grain abrasive paper (e.g. 220)
- A fine-grain abrasive paper (e.g. 500)

After sanding Zenolite can be polished to a high gloss finish using either manual or machine methods if required.

Edge Finishing

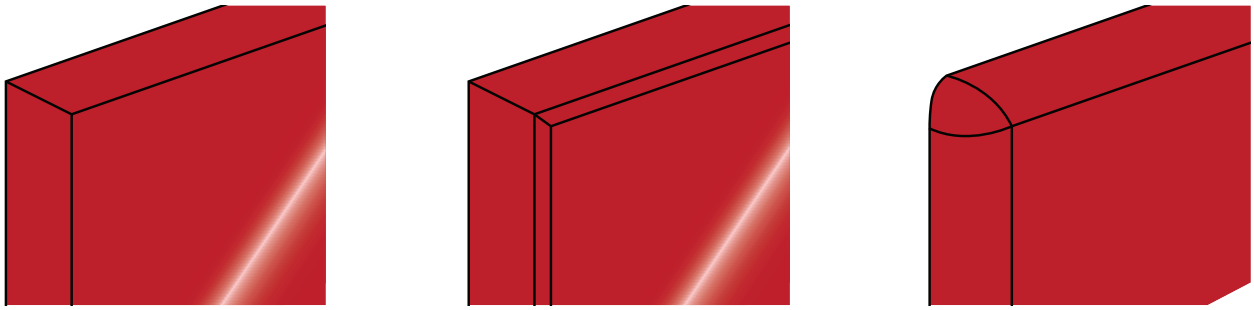
- Edges can be finished square, arised or bull nosed (see diagram next page). For best results, edges should be sanded & polished after shaping (Refer Polishing and Re-Finishing Instructions on the Zenolite web site)

- A wide variety of edge bands, aluminium and plastic trimming can also be used in conjunction with Zenolite. Zenolite sheets are also compatible with many standard aluminum framed door systems for cabinets, wardrobes etc.

- Allow 3mm/1000mm clearance between Zenolite & the frame

- Do not use PVC edge trimming or gaskets at any time

3 types of edges



SQUARE EDGE | ARISED EDGES | BULL NOSE EDGE

Polishing

Machine polishing

Zenolite edges can be polished using diamond tipped router cutters or specialist diamond polishing machines. Zenolite edges can also be polished with a felt-belt or disc polisher using cotton or flannel buffs combined with a suitable polishing paste.

Machine speed below 3000rpm is preferred to avoid overheating and deforming the Zenolite.

Hand polishing

Use felt or fine micro fibre polishing cloths with a non abrasive liquid polishing agent.
Do not use silicone based polishes.

Flame polishing

Zenolite edges can be flame polished by a suitably trained operator. Flame polishing leaves a residual stress at the edge and is not recommended in areas exposed to strong chemicals.

For more information go to www.zenolite.com.

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Surface Re-Finishing

Minor scratches and scuffing can be easily removed from Zenolite by hand with selected liquid polishes and soft polishing cloths. More severe damage can be restored completely to the original high gloss finish using very fine grades of wet and dry sandpaper by hand or by machine where necessary.

Ensure Zenolite is clean and only use clean micro fibre cloths or lambs wool buffs.

Apply liquid polish sparingly, using a light circular motion manually or a polishing machine with speed below 3000rpm.

Fine scratches or scuffing

Apply liquid polish to the target area using cloth one. Then remove the liquid polish whilst still damp using cloth two.

Moderate scratches

Apply fine water spray to the affected area and sand lightly for a few seconds using a 3000grit wet paper then wipe off sanding residue.

Apply extra cut to area using polishing cloth one then remove extra cut with polishing cloth two.

Apply liquid polish to area using polishing cloth three then remove liquid polish whilst still damp using polishing cloth four.

Severe damage

Apply fine water spray to the affected area and sand lightly for a few seconds using a 1500grit wet paper then wipe off sand residue. Repeat this sanding process with 3000grit wet paper and wipe off sanding residue.

Apply extra cut to area using polishing cloth one then remove extra cut with polishing cloth two.

Apply liquid polish to area using polishing cloth three then remove liquid polish whilst still damp using polishing cloth four.

Refer to the Zenolite web site for more details www.zenolite.com.

Laser Cutting

This process offers many advantages:

- It allows most shapes to be produced extremely accurately
- It minimises off-cuts
- It gives an excellent edge-finish, generally requiring little or no final polishing. Differences in quality of the cut depend on the source and power of the laser and the speed of cut.

Laser cutting causes high internal stresses, which mean there must be no contact with solvents (adhesives, harsh cleaning products, etc). Annealing will reduce the risks of crazing. It is not recommended to use adhesives in conjunction with laser cutting.

Water-jet cutting

This process offers similar advantages to laser cutting, except for the edges which are not glossy in appearance. An additional advantage is that there are no internal stresses near the cut edge. Contact with solvents is permissible, including adhesives.

Heat Bending

If the part to be produced requires only straight forward bends between flat surfaces, it is preferable not to heat the entire sheet, to ensure that the excellent flatness remains unaffected.

The technique is to heat the Zenolite locally along the length of the bender, using one or more straight electrical heating elements.

The heating element may, for example, be a nickel/chromium wire held taut by a spring or counterweight and heated by a low voltage supply (24 or 48 volts).

Recommended procedure

- Heat the material to a temperature at which bending can be carried out with the least possible force, as a guide 150° to 170°C. A single unit containing a heating wire and two water boxes is generally sufficient for sheets up to 6 mm thick
- Heat a zone that is at least as wide as the sheet is thick. The width of the zone for a right-angle bend is roughly 5 times the thickness

Cold Bending

Zenolite sheets can be cold bent to certain curves. The minimum bend radius is 330 times the sheet thickness.

6mm = 2000mm radius
4mm = 1350mm radius
2mm = 660mm radius
For more information go to www.zenolite.com.

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Dimensional variation and expansion gaps

Zenolite has a coefficient of expansion roughly 10 times that of metals 0.7mm/1000mm/10°C. Consequently, the sheet must be cut to dimensions which leave sufficient space for expansion and contraction. This applies to the length and width of the sheet and to the diameters of fixing holes. As a general rule allow 3mm/1000mm for thermal movement.

Where the sheet is fixed by screws, the following guidelines are recommended:

- The drilling diameter should be substantially greater than the diameter of the screw thread
- The hole must be protected from the screw threads by a plug made of compatible material (PE type)
- Soft insulating EPDM-type washers should be used when screw fixing

Incompatibility with other materials

Zenolite must not be placed in contact with incompatible plastic materials such as plasticised P.V.C. or silicone sealing compounds containing acetic acid or acetates.

Recommended contact products are: Teflon®, Dutral®, EPDM rubber, neoprene, butyl, polyethylene (PE), polypropylene (PP) and neutral silicone.

Lamination

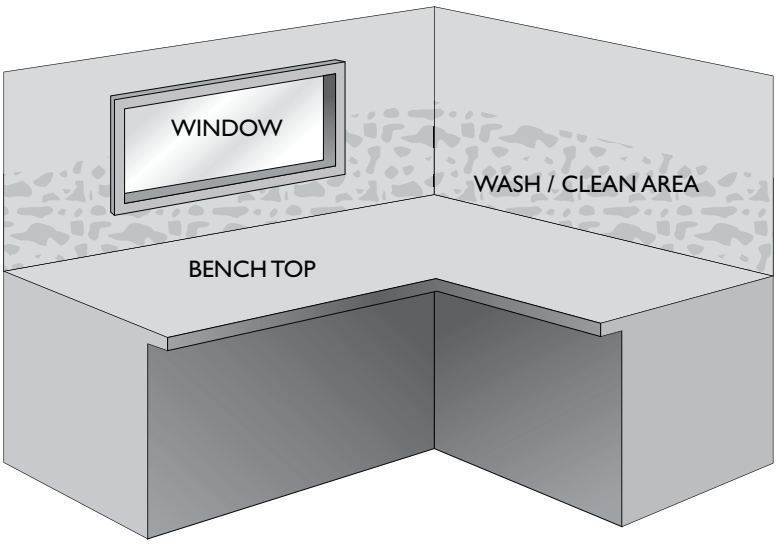
Zenolite 4mm and 2mm can be laminated to a variety of substrates using several different adhesive types. Hand and machine lamination methods are available.

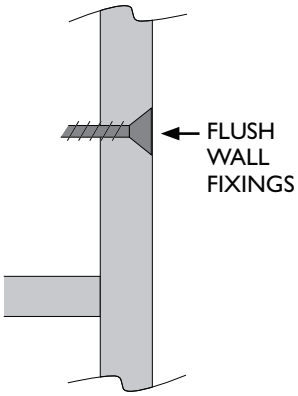
Zenolite must only be laminated at ambient temperature using nib rollers or cold pressing in order to achieve a suitably flat panel.
Refer to the Zenolite web site for more information - www.zenolite.com.

For more information go to www.zenolite.com.

Area Preparation

- For best results, ensure walls are dry, smooth and clean
- All wall panel fixings must be set flush or recessed
- New fibre cement sheet or plasterboard walls (drywalls) can be natural, primed or painted prior to installation
- Previously painted or tiled walls may be suitable if they are in sound condition and thoroughly cleaned with a detergent based de-greaser such as "Sugar Soap"
- Once joint locations have been determined we suggest painting the wall at the joint area a similar colour to the Zenolite panel





Measuring

- Measure each wall area and decide on suitable panel size
- Allow for 6mm joints at each corner and 3mm joints between panels
- Allow 3mm sealant/corking gap to the bench top
- Allow 3mm sealant/corking gap to overhead cupboards or window openings
- Check for square of each panel area, if the area is not square we recommend fabrication and trial fitting of a full size template before cutting the Zenolite sheet

For more information go to www.zenolite.com.

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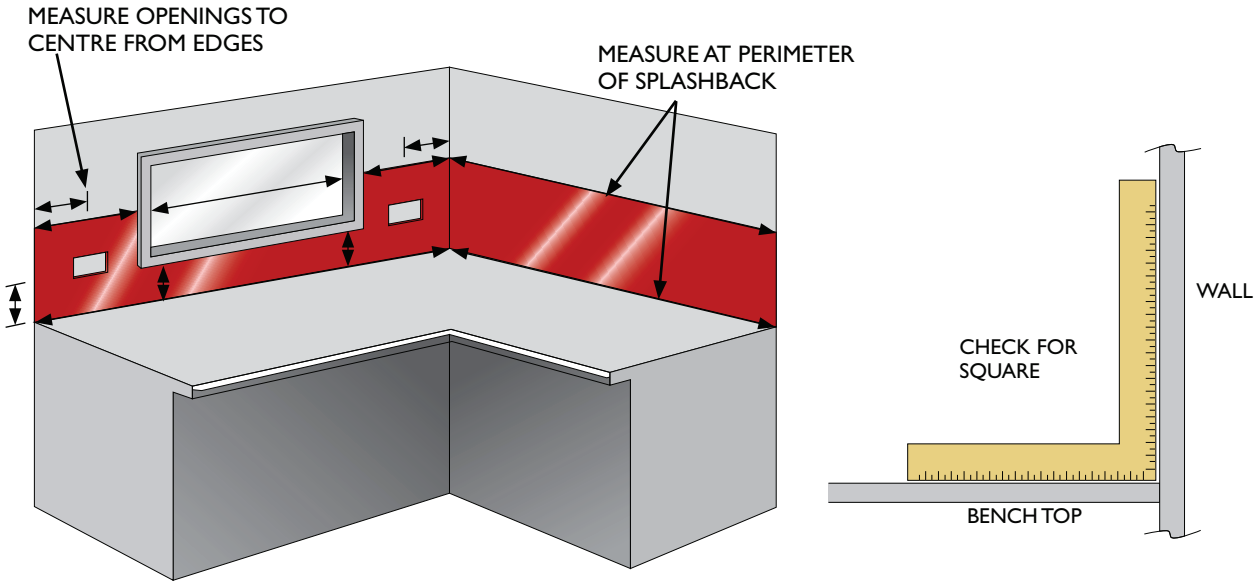
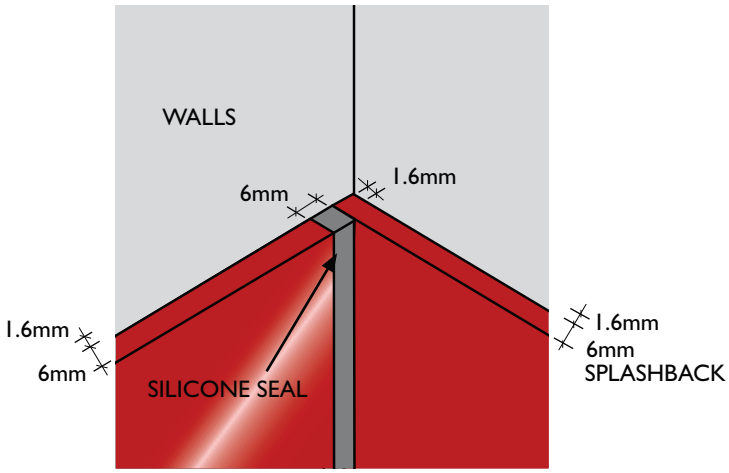
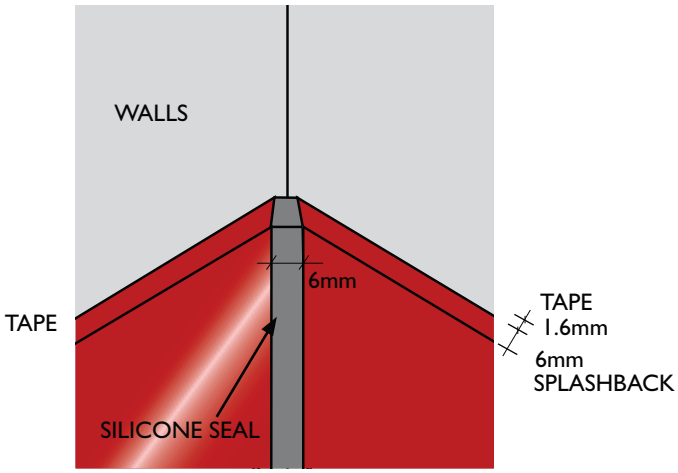
Zenolite® Installation Guide



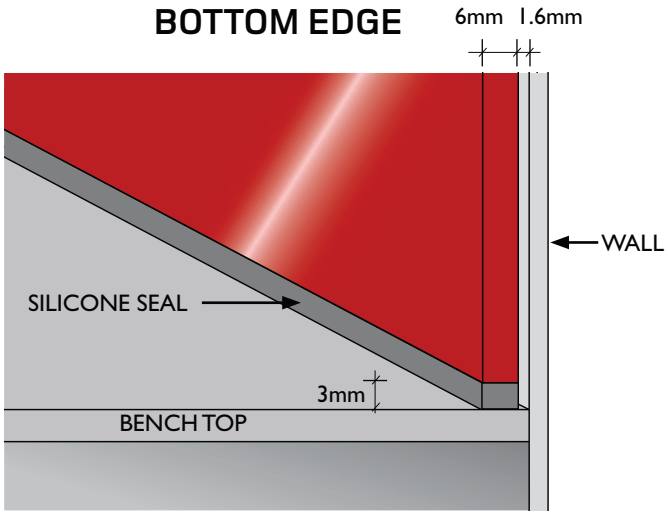
SQUARE CUT CORNER JOINT



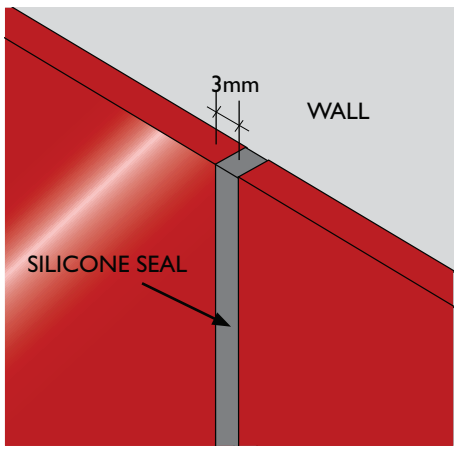
MITRED CORNER JOINT



BOTTOM EDGE

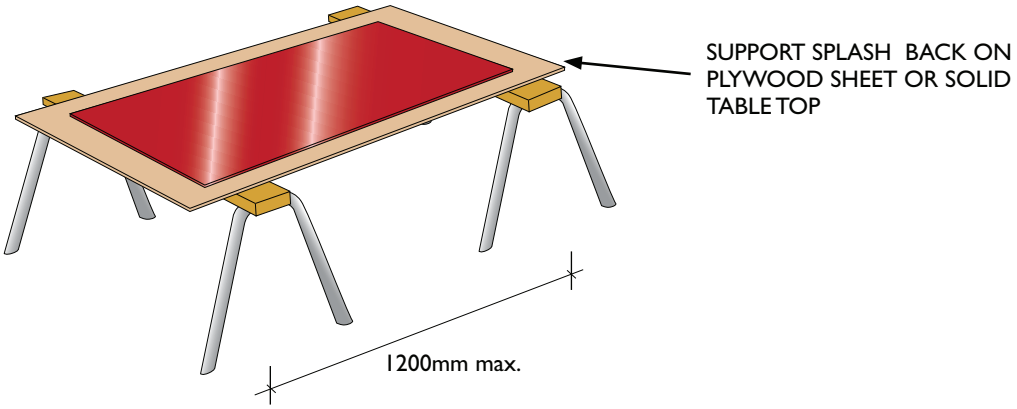


VERTICAL JOINTS



Marking Out

- Zenolite is supplied with a protective film
- Mark all holes and cut lines on the film using a soft pencil or felt tip pen, do not use metal scribes
- Only remove the film immediately prior to installation of Zenolite
- Do not mark out in direct sunlight or very cold conditions as thermal expansion and contraction can effect panel size prior to installation

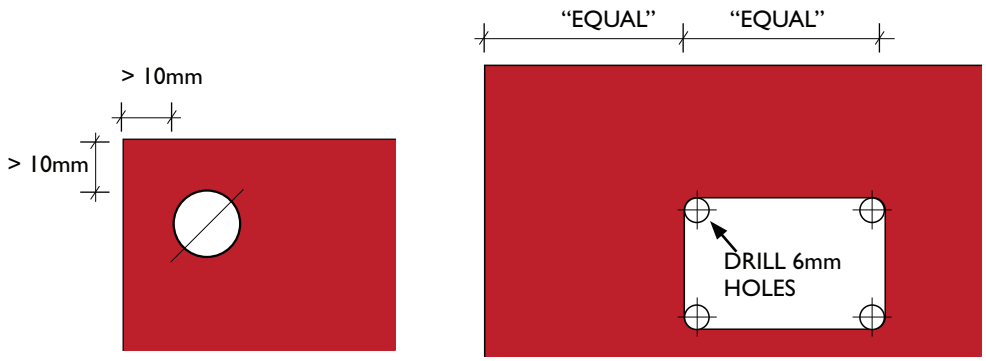


Cutting

(Refer Fabrication Guide for suitable cutting methods)

Drilling and Openings

- Drilled holes should be no closer than 10mm to the edge of the sheet
- Larger openings should be no closer than the largest dimension of the opening away from the edge of the sheet



HOLES **OPENINGS**

Panel Install

- Remove protective film from inside surface and scuff rear surface of Zenolite with coarse ScotchBrite® pad or 240 grit sandpaper. Ensure rear surface is free of dust.
- Apply 12mm x 1.6mm thick double sided tape with synthetic rubber adhesive horizontally along the inside surface of each panel at approximately 300mm vertical spacing. Many mirror mount tapes are also suitable.

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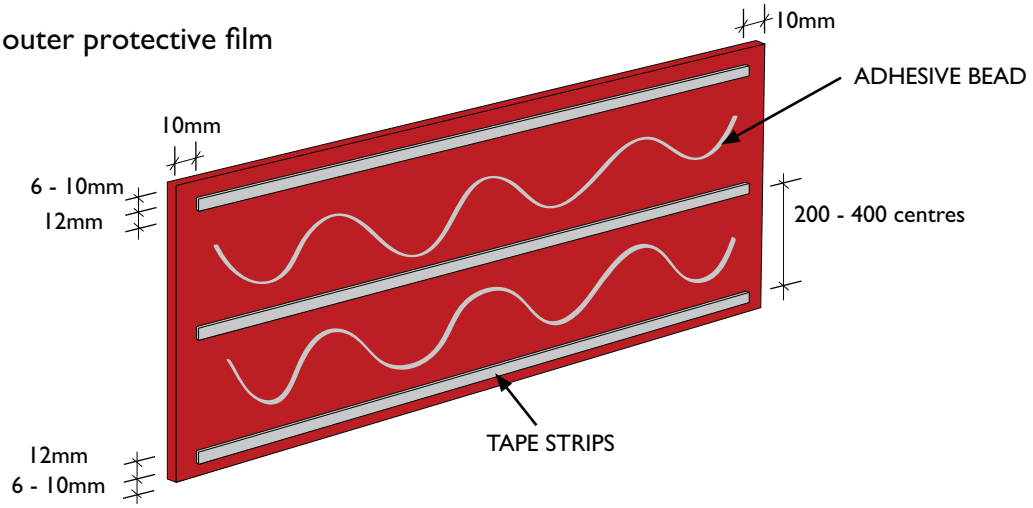
For more information go to www.zenolite.com.

Panel Install cont.

- Dry fit each panel with tape applied to ensure trim size is correct
- Apply a 6mm bead of adhesive (neutral cure silicone) in wavy pattern between each tape strip
- Remove tape liner and install panel resting on 3mm spacers at the bottom and 6mm clear each end and 3mm clear between panels. Firmly rub down panel to ensure tape bonds and adhesive contacts the wall
- Allow to dry for 24 hours before sealing all joints with neutral cure silicone if required. Do not use Acetic cure silicone
- Remove outer protective film

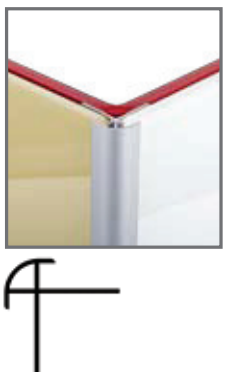


Quality Aluminum Edge Extrusions

Zenolite 6mm can be installed and finished using a variety of profiles. There are 5 profiles, all are supplied in 2500mm lengths with a robust clear anodized finish. Zenolite edge profiles are designed to float at the joint by being secured to one Zenolite panel only using spots off neutral cure silicone at 200mm-300mm centres.

Allow 2mm -3mm clearance to the non-fixed Zenolite panel.

ZNEX0001
Outer Quad Corner



ZNEX0002
Internal Quad Corner

ZNEX0003
Straight Joiner

ZNEX0004
Square Edge Cap

ZNEX0005
Quad Edge Cap

Physical Properties

EGR Zenolite Panel

		Metric		US	
General					
Specific Gravity	ASTM D-792	1.19	-	1.19	-
Water Absorption	ASTM D-570	< 0.5	%	< 0.5	%
Dimensions					
Diagonal Difference	-	< 4	mm	< 0.16	in
Thickness	-	6	mm	0.24	in
		4	mm	0.16	in
Mass					
	6mm	7.14 kg / SQ M		1.4 lbs / SQ Ft	
	4mm	4.76 kg / SQ M		0.94 lbs / SQ Ft	
Mechanical					
Tensile Strength, Max.	ASTM D-638	70	MPa	10,000	psi
Elongation at Break	ASTM D-638	4	%	4	%
Tensile Modulus	ASTM D-638	3000	MPa	435,000	psi
Flexural Strength	ASTM D-790	100	MPa	15,000	psi
Flexural Modulus	ASTM D-790	3000	MPa	435,000	psi
Izod Impact Strength, Milled Notch	ASTM D-256	15	J/m	0.28	ft/lbs.in
Abrasion (Taber, 10 rots. CS10F 500g)	ASTM D-1044	11	% Haze	11	% Haze
Thermal					
HDT, 264psi, 1.82MPa	ASTM D-648	96	°C	203	°F
Specific Heat Capacity		1.47	J/gK	0.35	BTU/lb-°F
CTE, -30 to 30C	ASTM D-696	7	mm/(mm.°C)x10 $^{-5}$	4	in/(in.°F)x10 $^{-5}$
Thermal Conductivity	ASTM C-177	0.18	W/mK	1.25	BTU-in/hr-ft2-°F
Continuous service temperature	6mm	77	°C	170	°F
Max temperature, short term	6mm	95	°C	202	°F
Continuous service temperature	4mm	70	°C	158	°F
Max temperature, short term	4mm	80	°C	176	°F
Degradation Temperature		> 275	°C	> 530	°F
Flame Spread	ASTM E84	130*	-	130*	-

*As tested at Bodycote
(report 08-002-719) on 6mm (0.24")

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