



PVC Sheet Working Techniques

Machining

EX-CEL® PVC sheets can be easily machined using ordinary tools used for processing metal or wood. However, the following precautions need to be taken. Avoid sharp edges and deep notches which can cause stresses leading to early breakage.

Cooling is not necessary under normal conditions if the cutting edges are kept sharp and the processing heat is dissipated by quickly removing the shavings. However, compressed air, water or cooling liquid is suitable if used in accordance with the existing safety instructions.

To obtain smooth or glossy surfaces, finishing with felt buffing wheels or tapes is recommended.

Sawing

EX-CEL® PVC sheets up to 3mm thickness can be cut with a knife or blade. Thicker sheets can be cut with hand saw or circular saw.

High saw speeds up to 3000 RPM with tooth pitch of 5 to 10mm are used depending on sheet thickness. For circular saws, it is commonly recommended to use tooth geometry alternating between flat tooth, trapezoidal tooth and rigid metal.

Always fasten the sheet and avoid vibrations during cutting to achieve clean cutting edges.



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Drilling

EX·CEL® PVC sheets can be drilled with conventional, high helix, high speed steel carbide tipped metal bits. Cutting edges must be kept sharp to prevent poor surface finish and undersized holes. Cutting and feeding speed depends on depth of bores, the thicker the sheet the lower the speed.

Routing

Stationary or hand routers can be used for slotting, beveling, rabbeting, rounding edges and trimming. Best cutting results are obtained with carbide tipped router bits.

Milling

EX·CEL® PVC sheet can be milled with milling tool that has allowance to accommodate smoother removal of chips. High forward feed along with moderate cutting speed and deep cuts will lead to good results.

Turning

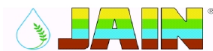
EX·CEL® PVC sheets can be worked by turning with a point of turning tool rounded to 0.50 mm radius to avoid linear marks on cutting surfaces. During precision turning, lower cut (2mm) and faster feeding should be used to prevent sheet breakage.

Cutting & Punching

EX·CEL® PVC sheet can be easily cut by shearing up to 3mm thickness. In case any deformity, rougher cut surface or fracturing is noticed, it is primarily because of sheet temperature. PVC sheet, a thermoplastic material, tends to acquire brittleness at lower temperatures. Therefore, pre-heat the sheet material to 95° - 131° F, before shearing.

Die cutting by “Steel rule dies” is a common practice. Ideally it is 25mm wide strip steel, thickness 0.35 – 1mm, with one edge pre-shaped as knife.

Bevel may be used depending on cut requirements with one side or both side honing. The bevel should be 5 or 6mm in length.



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Bonding

EXCEL® PVC Sheet can be bonded both to itself and other materials. Adhesive types must be chosen according to bonding requirements.

Edge bonding and joining parts of sheet materials:

PVC solvents such as Tetrahydrofuran, Methyl Ethyl Ketone or Cyclohexanone can be used. Solvents must be fresh and effective.

Bonding to nonporous materials such as other plastics/metals:

Polyurethane or other synthetic rubber based adhesives are recommended. Solvent-free two part Polyurethane adhesive can also be used.

Adhesives must be applied to both faces; quantity approximately 150g/m². A parallel bead of adhesive is often preferred because it offers evaporation of solvent providing faster cure.

Bonding with flexible PVC sheets:

Only plasticizer-resistant type adhesives should be used.

Bonding porous material such as, papers, Textiles, Fabrics or Wood:

Contact adhesive with solvent can be used. Follow same directions for application as for non-porous bonding. Pressure sensitive tape can be used for stress free and less demanding applications.

Painting & Coating

EXCEL® PVC sheets are easy to paint with rigid PVC compatible paints. These can be Vinyl, Acrylic lacquers, or two part Polyurethane based paints.

Sheets must be dry, clean and oil/grease free. Cloth soaked in Isopropyl alcohol is recommended for surface cleaning.

Screen printing should be allowed to air dry instead of heat drying. Temperatures in excess of 149° F may cause sheet warping or blowing.



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Heat Bending

EX-CEL® PVC free foam sheet can easily be bent by using localized heating. It is recommended that the sheet be cut to final dimensions and/or machined prior to heat bending.

Spray Painting, Screen Printing, Gluing and Fastening can be done after heat bending has been preformed.

PVC sheet should be heated to 248°- 302°F to achieve optimum bending.

Fixing recommendations for EX-CEL® PVC Free Foam sheets

Linear thermal expansion for the material is to be considered during mounting or installation of PVC sheets. This, as in all thermo-plastic materials, is necessary to avoid Warping, Bulging or Stress induction in the sheet.

The linear thermal expansion for Ex-CEL PVC free foam sheet is; $a = 0.055\text{mm} / \text{m } ^\circ\text{C}$. The table gives the Expansion/Contraction in (mm) with temperature change for common sheet sizes

Temperature Change °F	48" long	72" long	96" long	120"long
41° F	0.34	0.50	0.67	0.85
50° F	0.67	1.01	1.34	1.68
68° F	1.34	2.01	2.68	3.36
86° F	2.01	3.02	4.03	5.02
104° F	2.68	4.02	5.37	6.71

All information given is based on our laboratory experience and feedback from customers on various applications. It must be noted that conditions may vary in each application and suggestions must be considered as recommendations only without warranty expressed or implied. Each user of the material should make his own test in their local conditions to confirm suitability of the product for particular use.

Fixing recommendations for EX-CEL[®] PVC Integral Foam sheets

Linear thermal expansion for the material is to be considered during mounting or installation of PVC sheets. This, as in all thermo-plastic materials, is necessary to avoid Warping, Bulging or Stress induction in the sheet.

The linear thermal expansion for Ex-CEL PVC free foam sheet is; $\alpha = 0.080\text{mm} / \text{m } ^\circ\text{C}$. The table gives the Expansion/Contraction in (mm) with temperature change for common sheet sizes

Temperature Change °F	48" long	72" long	96" long	120"long
41° F	.49	.73	.98	1.22
50° F	.98	1.46	1.96	2.44
68° F	1.95	2.92	3.90	4.88
86° F	2.93	4.39	5.86	7.32
104° F	3.90	5.86	7.80	9.76

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