

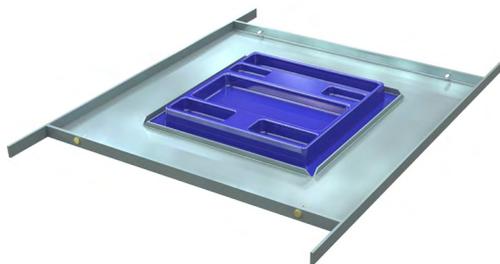
Reducing Windows - Issue 8

December 2016

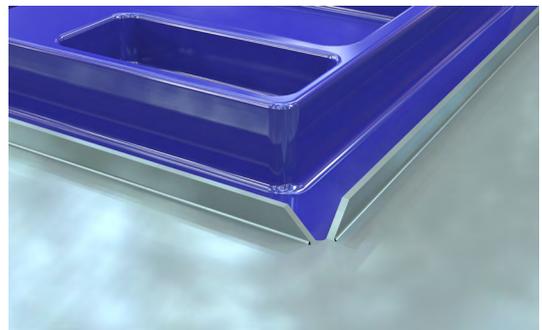
Welcome to 'Formech Technical Notes' a quarterly publication in which we delve in to the secrets of the 'Dark Art' of vacuum forming. In this issue we focus on reducing windows.

Reducing windows are a fundamental part of the vacuum forming process, allowing you to use smaller sheets of plastic to achieve a better yield, making the job more cost effective, reducing waste and helping to create a better product by reducing webbing.

Why use a reducing window?

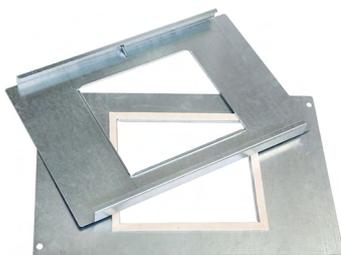


Reducing windows are used for several reasons. These include using smaller sheets of plastic on a larger aperture vacuum forming machine and also to reduce the amount of plastic in order to control the webbing which can occur on the corners of some tools.

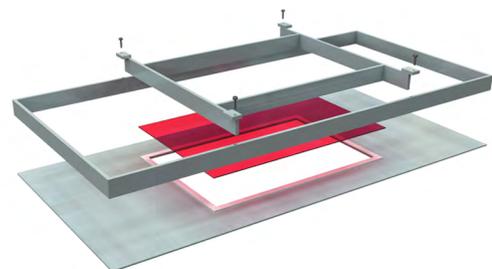


Please note: Tools can be quite close to the edges of the aperture. As a guide you may be able to leave a gap on a single tool between the tool and the aperture on each side of 50% of the height of the tool e.g. tool height 50mm = gap 25mm.

Different types of reducing windows

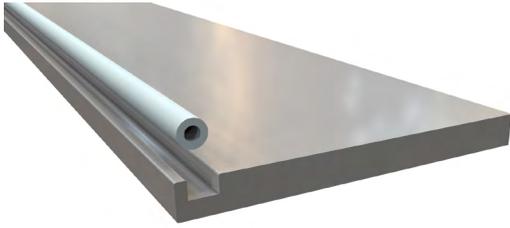


Sheet metal. These are usually a light weight solution and are produced in zinc plated mild steel, punched and folded to fit the machine.

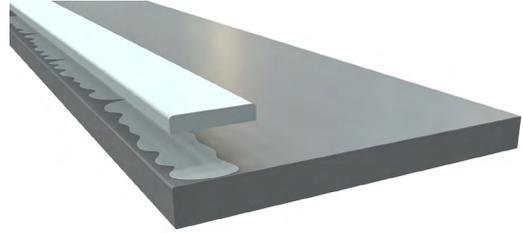


Fabricated steel or aluminium or a combination of the two materials.

Seals for reducing windows

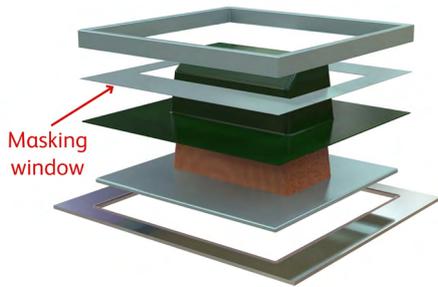


Silicone 'O' ring held in recessed slot in aluminium or steel plate. This method provides a very good grip on the sheet when clamped. We use this system on our semi-automatic and automatic machines.

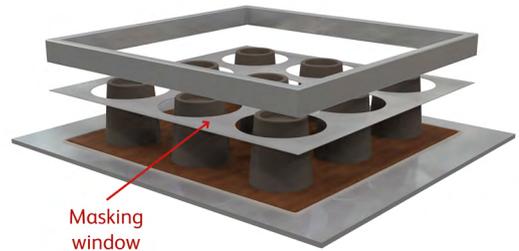


Silicone foam strip glued to aluminium or steel plate with silicone sealant. It is best to use silicone sealant to hold down the silicone foam strip to the aperture plate or bottom reducing window. We use a medium density closed cell foam sponge silicone with a Shore hardness of 5 on our smaller machines.

Masking windows

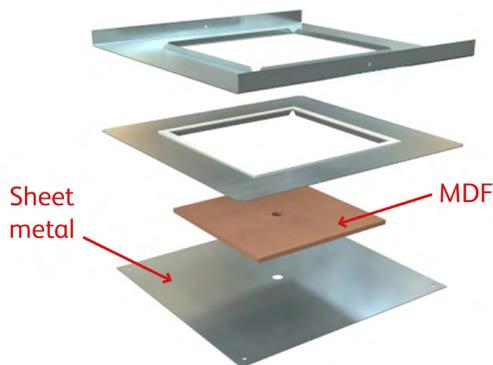


These are used to restrict the amount of heat to the sheet during the heating cycle in order to reduce the possibility of webbing caused by an excess of material.

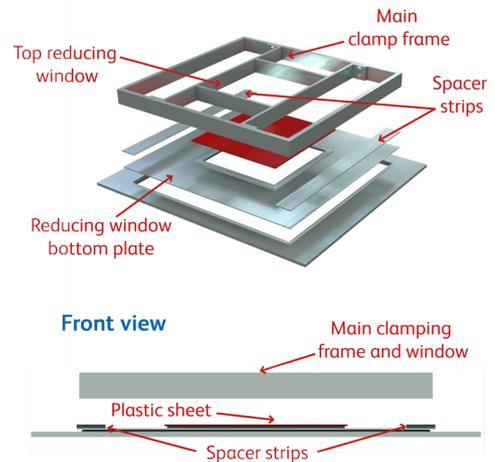


The masking windows are usually produced in sheet aluminium or steel but if need be, a simple rigid card covered in tin foil can be used for a few vacuum formings.

Base boards for reducing windows



Issues with reducing windows



This drawing shows an MDF base-board which is then attached to a thin steel plate, which in turn is screwed down in the corners to the table of the machine. Our base-boards are usually level with the underside of the plastic sheet. Some of our competitors machines use a vacuum box system which requires a deeper baseboard/box. Baseboards are most useful for helping with the release of the tool from the formed plastic sheet. They allow you to use release air to blow the formed part off the tool as the tool and table are lowered.

Two of the most important issues with reducing windows are loss of vacuum and sheets pulling out. Reducing windows often need to be carefully set up in order to make sure that there is even clamping across the entire reducing window.

Additional spacers are used to provide even clamping.

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Look out for the next quarterly Technical Notes in March where we will be offering handy hints on tool spacing and material stretching.

Martin Smith, Product Manager

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