

Recommended Process for Machining COMPOTOOL

Compotool CT300, and Compotool CT850 is a ductile ceramic tooling board making it easy to cut and machine. Compotool is very soft and chips easily leaving pits in the surface if not machined correctly. The quality of the surface finish is very reliant on the sharpness and type of cutter as well as spindle and feed speeds. Below are some starting point suggestions but as every CNC is different we recommend you do your own testing to find the correct speeds and feeds for your machine.

Secure Work Holding:

Use a machine vice for small parts, ensure vice is securely bolted in place.

The friable nature of Compotool means that care must be taken to avoid over tightening vice/clamps used to hold Compotool.

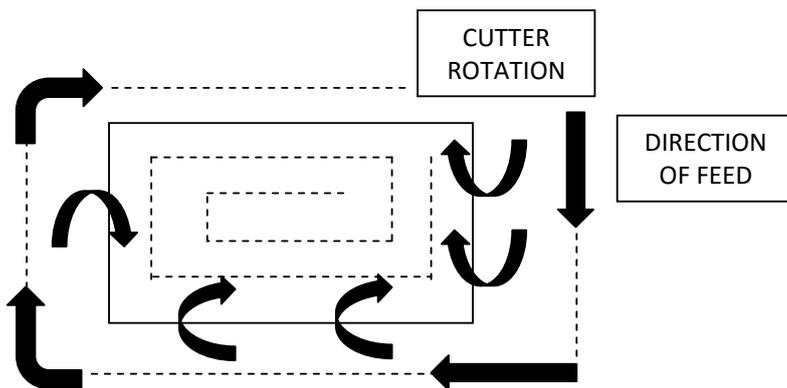
Large parts can be screwed to plywood or MDF backboard using wood screws, the plywood or MDF can then be clamped/bolted/screwed firmly to the machine.

NB: Compotool needs to be pre-drilled for wood screws 0.5mm [.020 in] diameter smaller than the screw thread diameter.

Tall thin sections may need to be supported. Where this is not possible roughing and finishing should be done in sections to avoid cracking of the Compotool.

Due to the friable nature of Compotool excessive machine or tool vibration can have a detrimental effect on the part including cracking. For best results use speeds and feeds that are low enough to minimise vibrations.

Climb milling will minimise edge chipping.



Dust:

Compotool swarf tends to come off with a consistency of talcum powder and will tend to blow everywhere.

For machines that are not enclosed a simple solution to contain the dust is to hang clear plastic over a catenary wire enclosing the machine like a tent and tape the ends closed.

A vacuum system can be as simple as a vacuum cleaner near the machining area (or mounted directly on the spindle for better dust extraction) feeding into a fabric bag similar to those used on circular saw bench etc.

Tools:

Carbide tools are recommended either solid carbide or carbide tipped. We strongly recommend using a new, previously unused cutter. The new cutter, if only used on Compotool will last a long time and yield the best surface finish.

Harder grades of carbide should be used such as ones used for machining steel to avoid excessive tool wear.

When using extremely long tools you should opt for positive rake inserts of tools that have very sharp cutting edges to avoid excessive deflection.

Roughing:

Machine your mould oversize by between 0.75mm (.030 inch) to 1mm (.040 inch)
N.B Larger roughing cuts may require leaving more material for prep cut.

Speeds = 600SMM (Surface Meters/Minute) [1900 SFM] or up to 800SMM [2600 SFM] depending on the rigidity of your machine equipment.

Feed = 0.25 mm/tip (4800 mm/minute) [.010 in/tip (190 in/minute)]
5-6mm [.188-.250] cut depth, 45% step over (deeper cuts depend on tool rigidity)

Prep Cut:

Make a prep cut pass on the mould that is oversize by between 0.125mm (.005 inch) to 0.25mm (.010 inch) above part net size.
To reduce pitting in the surface we highly recommend using solid carbide ballnose or bullnose (radius corner) cutters that have not been used on any other material other than Compotool.

Finishing Speed RPM's = 600 SMM [1900 SFM] (reduce to avoid chatter if needed) Finishing Feed = 0.10 – 0.15mm/tip per revolution [.004-.006 in/tip per revolution] Set the cut depth to leave 0.125 - 0.25mm [.005 - .010 in.] above net dimension.

Stepover = bullnose use step over of 25% of the corner radius, Ballnose use 20% of cutter diameter (or finer if finer finish is required)

Final Finishing:

Machine your tool to its final size. (net size)

To reduce pitting in the surface we highly recommend using solid carbide ballnose or bullnose (radius corner) cutters that have not been used on any other material other than Compotool.

Finishing Speed RPM's = 600 SMM [1900 SFM] (reduce to avoid chatter if needed) Finishing Feed = 0.10 – 0.15mm/tip per revolution [.004-.006 in/tip per revolution]

Stepover = bullnose use step over of 25% of the corner radius, Ballnose use 5% of cutter diameter (or finer if finer finish is required) Additional information may be found here:

- Imperial speed and feed calculator <http://americanmachinist.com/speedsfeeds-conversions-calculator>
- Machining Formula's <http://www.toolingpro.com/machining-formulas.php>
- Metric to imperial conversion calculator:
- Speed: SMM to SFM :<http://www.unitconversion.org/velocity/meters-per-minute-to-feet-per-minute-conversion.html>
- Feed : MM/M to F/M: <http://www.unitconversion.org/velocity/millimeters-per-minute-to-feet-per-minute-conversion.html>

If you have any questions or need further information for recommended cutting and machining process please contact your local Compotool agent.

Health and Safety:

When handling this product prolonged skin contact may lead to skin irritation and airborne dust can be released. It is recommended that gloves, respiratory protective equipment and eye protection are used when handling. When machining use tools with appropriate dust extraction and work in a well-ventilated area.

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