

Milling, Sawing, Planing & Threading Nylon Materials

Simple tips for getting it right.

Milling & Routing

Nylon castings can be milled by conventional means, e.g., with shank - type cutters, hobbors, and face cutters. Fly cutters are preferred because of their superior rate of swarf removal. High spindle speeds, and fast table travel are best utilized under the following conditions:

Cutting Speed < 3500 fpm
Feed < 0.020 ipr
Rake Angle 15 - 20 Degrees
Relief Angle 8 - 10 Degrees
Lip Angle 25 - 35 Degrees
Cut Depth 0.075 (Smoothing) 0.200 (Roughing) inch

Due to the resiliency and elasticity of cast nylon parts, special attention should be given when holding and clamping parts to prevent deformation. Thin wall parts should be enclosed within the clamping structure, leaving only enough room for the cutting bit, this prevents deflection. Some components such as wear strips can be held to the bed using double sided adhesive tape.

Coolant is rarely required for milling applications, as it impedes chip removal. If overheating is a concern, compressed air should be directed at the cutting bit.

Sawing & Cutting

The use of triple-tip table-saw blades or off-set tooth band-saw blades yield very clean cuts under the following conditions:

Circular Saw:

Cutting Speed 3,000 - 10,000 fpm
Rake Angle 0 - 10 Degrees
Relief Angle 10 - 15 Degrees
Pitch 0.313 - 1.750 inch

Band Saw:

Cutting Speed 600 - 3,000 fpm
Rake Angle 0 - 8 Degrees
Relief Angle 30 - 40 Degrees
Pitch 0.125 - 0.500 inch

Under an adverse combination of circumstances, there is a risk that the cut surface of nylon castings can melt during sawing. This is due to the relatively high cutting speed in relation to the slow feed speed of the material. To counter this effect, a vacuum system should be employed to prevent chip from building up around the blade.. As well, coolants can be used in the form of blade lubricants or compressed air.

Planing & Sanding

Most cast nylon stock sheets can be planed to thickness with acceptable surface finishes, and tolerances can typically be held from .025" to .005". Under the conditions listed below, coolant is not required, or recommended. Cutting speeds are not limited by the work-piece, but is usually the highest that can be obtained on commercial planers for wood and metal.

Feed 0.012 - 0.032 inch/stroke
Rake Angle 25 - 40 Degrees
Relief Angle 8 - 10 Degrees
Radius of Curvature > .0393 inch
Cut < 0.25 inch

At feeds greater than 0.012" per stroke there is a risk that material may break off. This risk is increased when planing material < 0.5" thick, or when planing 6/12 material.

Threading & Tapping

Threads are cut in nylon in very much the same way as metal; external/internal threads with a single-point threading tool or tap and external threads with a die.

British Standard series, or American Standard Uniform thread form (with rounded root) is recommended when threading nylon. This will prevent thread failure due to the "notch" effect.

Four flute taps are preferred to aid chip clearance, and prevent heat buildup. When tapping deep holes, greater than 3:1, the flute area should be enlarged for greater chip clearance.

For more information or for information not listed here, please contact:

<http://www.northamericanplasticsales.com>