

## Routing & Trimming Pet

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PET (polyethylene terephthalate) is a popular material for thermoforming. PET can be formulated several ways, as unreinforced, glass fiber reinforced, other reinforced and as PETG to name a few. Each of these formulated materials have unique characteristics which may require different cutting tools, spindle speeds, feed rates and fixturing to optimize finish and production rates. Unreinforced PET and PETG are flexible materials that will flutter when machined if not fixtured properly. All PET materials can be gummy yet tough and require the less violent cutting action of an O flute router bit. Do not use V or Z flute cutting tools with PET because all grades are subject to crack propagation which will occur more frequently with such geometry.

PET is used for POP displays, drafting templates, window well covers, beverage centers, auto accessories and many types of clear or see through covers. Routing these products on a CNC router is best accomplished with solid carbide single edge O flute router bits, such as the one shown in Figure 1. If a curved edge is required then a solid carbide O flute edge rounding bit as shown in Figure 2 is the best choice. Both tools are also available in a two flute configuration which can be tested if finish is a problem with the single flute tool.

If air routers are being used to route or trim unreinforced PET or PETG then high speed steel O flute router bits may be the most cost effective choice. The high speed O flute bit is shown in Figure 3. Solid carbide O flute bits are also a good choice for air routers when cutting all types of PET.

When programming a CNC router for cutting PET, there are a few considerations that will dramatically affect production, scrap and finish. Entry into the cut should be a ramping and not plunging action. Outside or perimeter sharp corners should be programmed as a loop or exit ramp movement to prevent tool stops or dwells which can cause crack propagation, heat or burning. Spindle speed should be set at 18,000 RPM and feed rates between 200 to 350 inches per minute for ¼ inch and below diameter tools. PET should be cut as fast as possible with a one pass cut. There is reasonably little experimenting to be done other than finding the fastest speed rate when routing PET materials once the right cutting tool has been selected and proper programming techniques have been employed.



FIGURE 1



FIGURE 2



FIGURE 3