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Technical Tip #76 – Basic Machining Coolant Considerations

Coolant can dramatically affect the performance of cutting tools, which can impact the cost of your operation. Consider these guidelines for using coolant:

Cutting fluids perform two basic functions in drilling, milling, and threading:

1) to reduce heat generated in cut
2) to lubricate the tool

Water-based coolant helps to cool the chip when it is sheared from the workpiece material.

Coolant acts as a lubricant to reduce friction between the chip and the tool. This improves the surface finish and helps force chips out of the flutes. Coolant can improve tool life because excessive heat and friction can dull the tool.

Sometimes users will reduce the coolant/water ratio significantly because they assume this will help cut costs. However, tool life can decrease rapidly if the proper amount of coolant is not used when operating the tool.

If the recommended soluble oil concentration of 8%-10% is reduced to 5%, tool life will be sacrificed. A drill that typically makes thousands of holes may now get only hundreds of holes at the reduced coolant level. Once coolant levels are returned to the recommended amount, drill tool life should return.

For high-speed machining with carbide tools, it is very important to provide adequate water-based fluids to cool the tool. However, if you are high-speed steel tapping, heavier oil-based coolant is recommended.

Always follow the tool manufacturer’s mixing recommendations for coolant.