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Engineering Your Competitive Edge

Technical Tip #46 – Elements of Tool Testing in Machining

Kennametal routinely conducts tests of our tools against competitive brands to validate our tool performance.

There are many variables to consider when testing tools against each other in the same application. Every aspect of the application should be considered and measured for each tool in the test.

Many parameters are not changeable, such as desired hole depth, thread size, finished diameter, machine cost per hour, material, etc.

But some performance factors can vary significantly and include:

- *Feed Selected*: IPR (inches per revolution); IPM (inches per minute); CLPT (chip load per tooth, end-mills) are variable, while tap feeds are set by the pitch.
- *Speeds Selected*: rotational RPM's (rotations per minute); SFM (surface feet per minute)
- *Tool Geometry/Style*: point, web, helix, length, chamfer (taps), etc.
- *Tool Materials*: HSS, premium HSS, powdered metal, carbide
- Number of regrinds possible can vary by style
- Regrind time can vary by style and type
- Coatings recommended can affect results significantly
- Price per tool has minimal affect in most tests

Lot size may impact how important these variables become. Goals of the comparisons also may vary from tool life, tolerance, scrap reduction, and amount of material removed in a given timeframe, etc. Machine condition and type also may limit or increase options available.

One common mistake is to compare the exact same tool types, styles, coatings or operating parameters to define cost effectiveness.

The goal of testing should be to examine each element of the operation and select the best possible combination to maximize performance.