

# Tool-X<sup>®</sup>

Tech Data Sheet 107

Gun Drilling

**What is Tool-X?** A nanofluid additive for metalworking fluids that contains trillions of carbon-based nano-onions in solution. When used in conjunction with metalworking fluids, fluid saturated nano-onions flow between a tool and workpiece to change the characteristics of the metal working action. The result is reduced vibration, reduced machine loading and increased heat transfer away from the metal-to-metal work zone.

**Application:** Gun drilling of SP231-DP hot rolled steel in a multi-spindle machine using a high-quality canola oil and biocide metalworking fluid.

**Problem:** Customer driven mandates for cost reduction combined with the need to improve drilled hole surface finish.

**Situation:** Due to environmental pressures, traditional oil-based metalworking fluids had been replaced with veggie-based canola oil. As a result, tool life and surface finish had degraded.

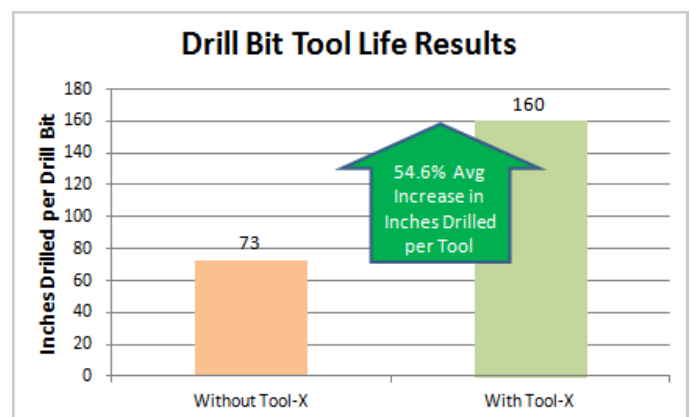
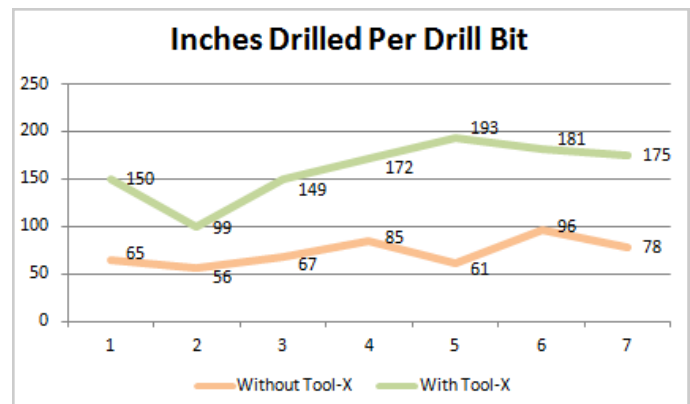
**Evaluation Process:** The evaluation was conducted using a 0.734 diameter Botek self-centering drill bit, designed for drilling deep, accurate holes. To successfully drill high depth-to-diameter ratios, bits are designed with bearing pads that slide along the drilled surface to keep the bit on center. After establishing a baseline, Tool-X was added to the existing metalworking fluid and the evaluation process was repeated.

**Solution:** By adding the Tool-X nanofluid to the existing canola oil / biocide mixture, drill bit tool life was increased significantly.

**Results:** With Tool-X the tool life was increased by an average of 54.6% while improving surface finish.

**Outcome:** Management made a commitment to move forward with the utilization of Tool-X for gun drilling and initiated evaluations in other metal cutting applications.

**What is the role of metalworking fluids in machining?** For many manufacturing applications, metalworking fluids are necessary but insufficient. The role of these fluids is to create an environment where tools can be proficiently used to change the shape of materials as efficiently and effectively as possible. To achieve this objective, metalworking fluids must counteract common failure modes by reducing heat, adhesion, pressure and wear while providing lubricity under extreme temperatures and pressures associated with metalworking. TOOL-X nanofluid technology enables metalworking fluids in such a manner as to meet these objectives and attain new levels of performance. To learn more, visit [www.TOOL-X.net](http://www.TOOL-X.net).



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