

# Tool-X

Tech Data Sheet 102  
Horizontal CNC Machining

**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:** Horizontal CNC machining of 1018 cold-rolled steel in a job shop environment.

**Problem:** Insufficient material removal rates and poor tool life.

**Situation:** Milling of 75 parts per 8 hr shift; annual volume 12,000 parts per year for their customer, DE-STA-CO; milling cutter cost \$72 plus 10 resharpenings at \$33 each with an average of 31 parts machined per resharpening; water-based synthetic coolant.

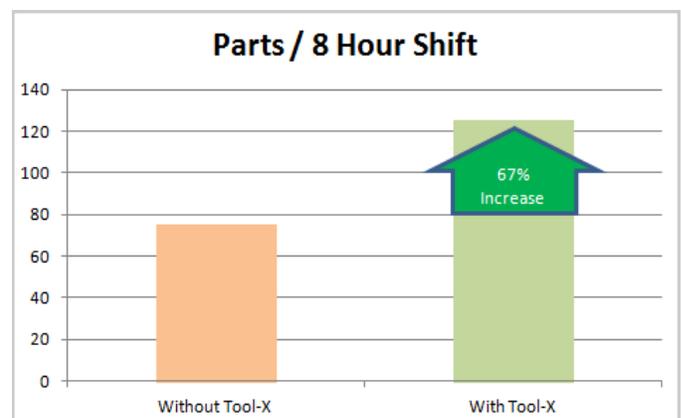
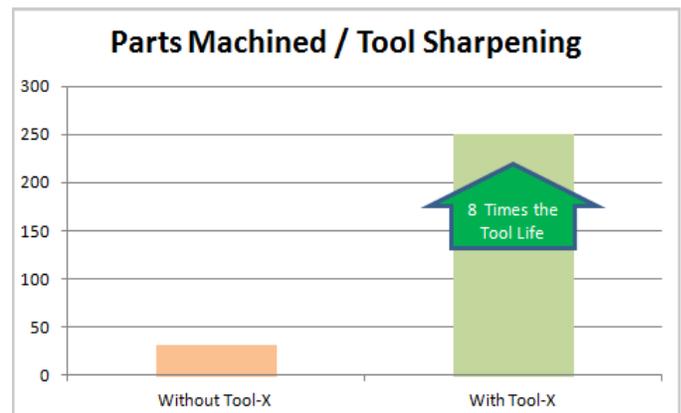
**Evaluation Process:** The initial evaluation was conducted across two identical CNC machines using semi-synthetic, water-based cutting fluid in 80-gallon sumps. This side-by-side assessment demonstrated Tool-X's ability to reduce spindle loads, improve the surface finish, extend tool life and increase material removal rates.

**Solution:** The addition of Tool-X to existing coolant allowed for increased feed rates and increased tool life by a factor of eight times while significantly reduced tooling costs.

**Results:** Production rates were increased from 75 parts / shift without Tool-X to 125 parts / shift. Tool life was increased from 31 to 250 parts per sharpening. \$60,960 savings was realized on the production of 12,000 parts and production capacity was increased.

**Outcome:** After extensive testing and evaluation over several months the owner committed to using Tool-X on five of their key machines with plans to continue expanding its use.

**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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