

# Tool-X<sup>®</sup>

Tech Data Sheet 109  
CNC Machining  
Water-based MWF

**What is Tool-X?** A new line of metalworking fluids that contain a new additive - trillions of carbon-based nano-onions in solution. These nano-onions improve the lubrication along the cutting edge, preventing build-ups and improving heat transfer. The result is longer-lasting tools that cut truer, with more precision, with less force required, than with conventional metal working fluids.

**Customer:** A multinational manufacturer of high-strength fasteners for aerospace and other performance applications.

**Application:** A complex CNC operation on a low volume production line manufacturing high-strength steel fasteners using water-based MWF.

**Problem:** Insufficient tool life and requirements for cost reduction.

**Evaluation Process:** Data was collected for several weeks using their existing water-based MWF. The sump was then emptied and flushed, and Tool-X SS-500 MWF was substituted. Data was collected with both fluids. The data has been annualized for analysis purposes to reflect an operation that runs 10 hours per day for 300 days per year.

**Results:** The Tool-X nanofluid additive enhanced performance and productivity; tool costs were reduced by 48% and parts costs by over 23%. A pro forma calculation was made to assess productivity savings at 20% higher feeds and speeds. Savings of over 30% of parts costs are possible.

**Outcome:** Customer changed to using Tool-X SS-500 water-based MWF for its 5 axis CNC operations.

**Tool-X improves machining processes.** The role of metalworking fluids is to permit tools 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 the extreme temperatures and pressures associated with metalworking. Tool-X nanofluid technology enables our metalworking fluids to attain new levels of performance.

**Tool-X Benefits:** With Tool-X, surface finish is improved (lower Ra, fewer and smaller distortions). Feeds and speeds can be increased, often by 25% or more. Tool life is extended. Problems caused by excess heat (white film layers, long chip sizes, metallurgical damage) can be avoided. Reworks, tool sharpenings, and deburring steps can be reduced or eliminated.

**With Tool-X, it's all about the numbers.** Tool-X metalworking fluids cost more than conventional fluids, as much as twice as much. But the savings that are possible, through extended tool life, increased productivity, and parts with better surface finish and better dimensional accuracy, can provide users with substantial returns on investment. Let us demonstrate how Tool-X can improve productivity and reduce expenses in your facility.

See [www.tool-x.net](http://www.tool-x.net) for more information.

CNC Tool and Coolant Costs Per Part

	Parts per 1 10hr Shift per Day per Machine	Annual Production of Part per Machine	Annual Tool Cost	Annual Coolant Cost	Labor and Machine Time Costs Allocated	Total Annual Evaluated Costs	Annual Evaluated Cost Per Part	Total Savings
Before Tool-X	425	127,500	642,812	8,840	652,673	1,304,325	10.23	
After Tool-X	425	127,500	335,026	14,200	652,673	1,001,899	7.86	302,426
Change (%)			-47.88%				-23.19%	

Pro Forma Analysis with 20% Increase in Speeds and Feeds with Tool-X

	Parts per 1 10hr Shift per Day per Machine	Annual Production of Part per Machine	Annual Tool Cost	Annual Coolant Cost	Labor and Machine Time Costs Allocated	Total Annual Evaluated Costs	Annual Evaluated Cost Per Part	Total Savings
Before Tool-X	425	127,500	642,812	8,840	652,673	1,304,325	10.23	
After Tool-X	510	153,000	402,031	17,040	652,673	1,071,744	7.00	493,446
Change (%)			-47.88%				-31.53%	