

# Imagine if manufacturing jet engines were less complicated.

PURIFY | PROTECT | ENHANCE

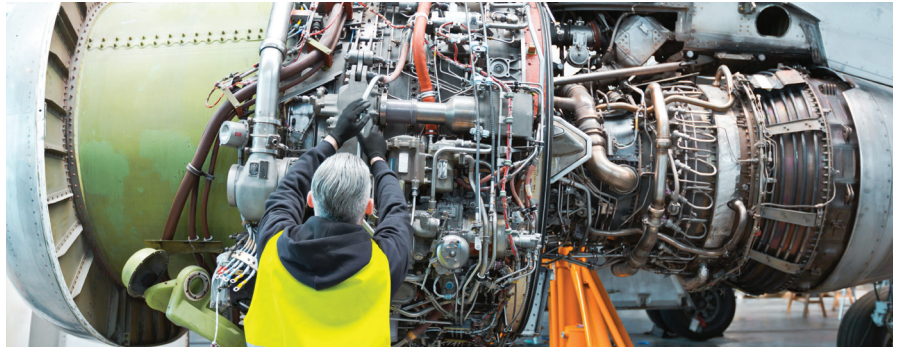
## Customer success story.

**End-use Customer:** Protomatic, Inc.  
**Product:** Diacid 1550™  
**End-use Application:** Machining high-performance metals

### Ingevity: Purify | Protect | Enhance

Ingevity provides specialty chemicals and high-performance carbon materials and technologies that purify, protect and enhance the world around us. Through a team of talented and experienced people, Ingevity develops, manufactures and brings to market products and processes that help customers solve complex problems. These products are used in a variety of demanding applications, including asphalt paving, oil exploration and production, agrochemicals, adhesives, lubricants, publication inks and automotive components that reduce gasoline vapor emissions. Headquartered in North Charleston, South Carolina, Ingevity operates from 25 locations around the world and employs approximately 1,500 people. The company is traded on the New York Stock Exchange (NYSE: NGVT). For more information visit [www.ingevity.com](http://www.ingevity.com).

Ingevity  
Amy Chiconas  
5255 Virginia Avenue  
North Charleston, SC 29406  
[amy.chiconas@ingevity.com](mailto:amy.chiconas@ingevity.com)  
843 740 2005  
[ingevity.com](http://ingevity.com)



Diacid 1550 is a bio-based emulsifier with a growing reputation among metalworking fluid formulators worldwide. Because of its ability to create a more stable metalworking fluid and provide corrosion inhibition, Diacid is a trusted addition to formulations used to machine super alloy metals. This means that customers can expect precision even in the high-heat and high-pressure environments of jet and rocket engine manufacturing. That's The Ingevity Effect.

### Problem

Federal regulations to increase the fuel efficiency of jet and rocket engines continue to become more demanding. Protomatic, Inc., a manufacturer of space vehicle components for Blue Origin, is all too familiar with the challenges of continuous innovation while meeting these demands. The high-performance, super alloy metals required to manufacture today's rocket engines mean that Protomatic needs a state-of-the-art, multifunctional machining coolant.

"The super alloy metals we use to make these massive rocket engines are more difficult to cut," explained Doug Wetzel, vice president and general manager at Protomatic. "They also require higher heat, pressure and lubricity in order to be cut with the desired precision. We use Ingevity's additive in our coolant formulation because it works well in this harsh environment."

### Solution

The value of Diacid 1550 is becoming increasingly well known to even the most demanding metalworking fluid formulators worldwide. Protomatic's material selection process for additives used in their machining coolant formulation is strict: The additive must be compatible with both the metal alloys and the cutting tools; it must have high lubricity at cutting temperatures; it must extend the life of the tools and the overall life of the coolant; and it must be worker friendly in terms of look, smell and feel. Diacid has enabled Protomatic to make a difficult manufacturing environment much less complicated.

### Maximizing Value

- Diacid 1550's dual action functionality and higher affinity for metal surfaces creates a chemical protective barrier, which means increased corrosion inhibition.
- The unique molecular structure of Diacid 1550 means more stability in fluid compositions for metalworking fluid formulators.
- Diacid 1550 can reduce the amount of emulsifier additives and corrosion inhibitors required in formulation, which saves money.

