

# FABRICATING METALWORKING®

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THE BUSINESS OF METAL MANUFACTURING

## SMART STUFF

**DRIVEN BY DATA,  
MACHINES AND TOOLS ALMOST  
THINK FOR THEMSELVES**

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 **FABTECH**

**PRE-SHOW  
PRODUCT  
SHOWCASE**

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# AUTOMATED MONITORING OF COOLANT RESULTS IN CLEANER MACHINES

## SENSORS MONITOR AND MEASURE FLUID CONCENTRATION AND TEMPERATURE, TWO MAJOR FACTORS IMPACTING PERFORMANCE.

Have you ever entered a shop and been hit with a bad smell of coolant? Not the familiar scent of machining metal that we know and love, but an unpleasant odor that clings to your nose and clothes after you leave? That's a sure sign that the situation isn't under control. Your nose knows the team is lacking time, procedure, or experience to properly maintain the metalworking fluids.

On its own, the unpleasant odor is a quick indicator of a low level of concentration and an unstable emulsion. After a time there really is no remedy to save it. The tank must be emptied, thoroughly cleaned, and then refilled, adding to disposal costs and downtime for maintenance. Unfortunately, there are usually additional and less obvious problems that also arise and have an even bigger impact on production.

So why is it so difficult to properly maintain coolant and why is coolant's reputation so bad? Most likely it is because coolant is somewhat difficult to understand. It's a chemical in our mechanical world, and most of us don't like the mystery of it. But when you can visualize the condition of coolant through data, it becomes much easier to understand and take measures to improve the situation.

### CONTROL THE KEY VARIABLES

Every coolant manufacturer provides a safety data information sheet (SDS) for that specific product. It details the maximum and minimum concentration levels to keep the emulsion stable and happy. Those important boundaries can vary by machine, application and product.

It is not entirely easy to stay within that recommended bandwidth. Naturally, when water evaporates the concentration in the tank will rise. Therefore, the amount of product being used is unnecessarily



The magnetic Liquidtool Sensor is easy to install near the coolant tank on any CNC machine. The sensors, pump and computer are all within this compact housing.

high – and that's a waste of money. A more serious consequence is the likelihood of skin irritation. The high concentration means more active substances in the coolant and those more aggressive ingredients can harm your skin. Finally, high concentration also provokes foaming. Coolant full of foam is full of air, and that condition can't deliver the same cooling or lubricating effect as a perfectly balanced emulsion.

The common reaction to a high concentration level is to top off the tank with a watered-down emulsion. This will drop the level, and maybe even overcompensate for the evaporation. Thus, a return to instability and bacteria growth, and again an increase in unpleasant odors in the shop.

With a low concentration there are unseen problems developing, aside from the smell. The condition results in lower lubricity and can't prevent premature tool wear. Neither can it protect work pieces and expensive CNC machines from possibly irreversible corrosion.

It's a careful balance. If the concentration is too high or too low, trouble awaits. Constantly maintaining the optimum level, not just a range within the bandwidth, is the sweet spot for perfection. The more precise you can be, the higher your chances to achieve optimum reliability. At the same time, each machine has its own process and requirements, so it's important to look at them individually.

### A DIGITAL SOLUTION FOR COOLANT MANAGEMENT

Now we have an opportunity to shape the future with digital solutions. To address the often-overlooked issue of coolant management, Liquidtool has developed a sensor to measure and monitor the two primary factors impacting performance: fluid concentration and temperature.

The Liquidtool Sensor and Liquidtool Manager are easily installed and operated, so users can have reliable measurements with minimal



Any shop can benefit from a coolant monitoring system that will reduce waste and maintenance while protecting tools, people and the environment.



Push notifications from the Liquidtool Manager alert key employees if corrective action is needed. They can focus on other tasks and know the coolant is properly maintained without really thinking about it.



The near-field communication token, shown here mounted to the CNC, allows the operator to monitor the coolant by holding the smartphone over the token to collect new data.

effort. Key values are continuously documented and can be checked anytime on the software dashboard. Real-time push notifications are programmed to alert the machine operator or manager when conditions approach defined limits. The software also suggests corrective actions to stabilize the coolant. These critical alerts allow the team to stay focused on other production tasks, and at the same time, to properly maintain the fluid without thinking about it.

The sensor is compatible with coolants of all manufacturers and any water-miscible coolant. The sensor draws coolant from the machine tank and measures the sample with the built-in refractometer and thermometer. Data is securely stored and allows any deviations to be detected at an early stage.

The software component is called the Liquidtool Manager. It provides secure access to all real-time and historical data from devices such as smartphones or tablets. The stored data can be displayed via graphics, statistics and reports to aid troubleshooting and maintenance. At the same time, the software is keeping a record of coolant conditions over time, which is essential for many critical applications.

In addition to automatic measurements taken by the sensor, the platform allows users to manually add data such as pH, nitrite and water hardness. For example, weekly pH levels can be added for each machine. Or there may be machines without a monitor because they are not often used. Enter the coolant condition manually into the app to keep data on all machines in one place.

Reliable, regular measurement forms the basis for stabilizing and optimizing processes, increasing efficiency, and identifying problems early on. This in turn can reduce machine downtime and contributes to longer service life of coolant and tools.



The Liquidtool Manager is the first intelligent solution for monitoring coolants that uses plug-and-play technology and reliable sensors to automatically monitor the condition of coolant.

## AN OPEN AND CUSTOMIZABLE PLATFORM

There are as many situations as manufacturers and each one is unique. For example, a shop may have one machine dedicated to titanium and using a special coolant. The second machine may be a grinding machine that requires a lower concentration. Two more conventional machines may use yet another formula but at different concentration levels.

This kind of complexity and the potential to improve the situation for manufacturers were the motivating factors to develop an easy monitoring system. The Liquidtool Manager makes it possible to manage different physical locations, production centers, departments or cells and machines. The hierarchy is completely customizable, as is the level of security access for different shop personnel.

The Liquidtool Manager is built on an open platform so the device can talk with other devices on the shop floor. Allowing integration with other systems is when it gets interesting. The combination of data from different platforms creates the opportunity for new insights and more opportunities to reduce waste and improve productivity.

## SET UP ANY SHOP IN ONE DAY

The Liquidtool system is plug-and-play and designed to make data collection easy. The sensor housing is magnetized so it's easy to place on any sheet metal. Naturally, it must be positioned near the sump, which is usually at the back of the machine. There is a small hose with a filter to extract coolant and another to return it to the tank, plus a power cord. A small pump is fully integrated into the sensor housing.

The sensor must be connected to the company WLAN or LAN internet connection and is controlled with the corresponding app on a tablet, smartphone or PC. A small token using near-field communication (NFC) protocol is installed at the front of the machine or other convenient location for quick access.

The NFC token allows the operator to monitor coolant concentration and temperature without going around to the back of the machine. Simply hold the connected tablet or smartphone over the token to connect. The app has present values for every machine. Simply walk from machine to machine and scan the token to collect data from each piece of equipment.

Liquidtool is an easy step toward digitalization and Industry 4.0 for any shop. Automated monitoring takes the mystery out of coolant and makes it manageable through data. Use this information to take the mystery out of fluid management. Reduce maintenance, increase productivity, and enjoy a clean and healthy work environment. ■

Daniel Brawand is head of marketing and sales for Liquidtool.  
Email [d.brawand@liquidtool.com](mailto:d.brawand@liquidtool.com).