COOLANT MANAGEMENT

# THE VITAL ROLE OF THE COOLANT MANAGEMENT SYSTEM IN LENS MANUFACTURING

*When concerned with effective lens production, it's imperative for labs to consider not only the most efficient, productive and cost-effective methods, but also those which will not cause negative environmental repercussions.*

satisloh®

*By preventing tools from reaching a critical temperature, coolant plays a key role in any manufacturing lab and is not something to be ignored:*

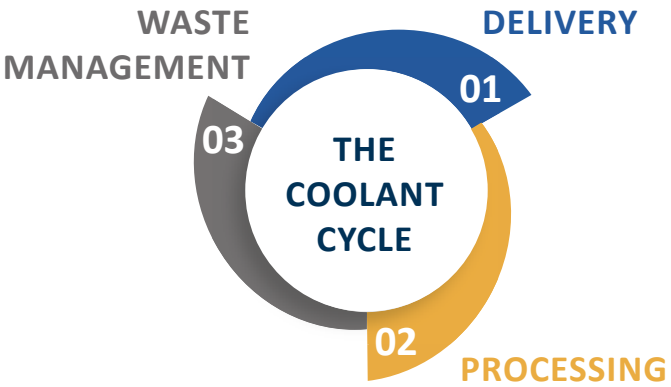
*'As coolant breaks down, it damages not only machine tools but pumps, sumps and even electronic components. Machine parts and interiors become vulnerable to rust and corrosion, equipment surfaces suffer from abrasion.'*

*- Mike Hook, CTEMag*

*Therefore, coolant management systems play a vital role in lens manufacturing; through managing and recycling fluids from lens production, productivity is increased, and machine downtime and waste costs are dramatically reduced. Furthermore, effective coolant management can ultimately lead to a lowered environmental footprint.*

## THE COOLANT CYCLE FRAMEWORK

Effectively, there are three core aspects to coolant management, which can be described as the 'Coolant Cycle Framework.' This framework consists of delivery, processing, and waste management.




## DELIVERY

Delivery refers to having coolant at the correct temperature and being delivered to the cutting surface with sufficient pressure whenever the generator demands it. Coolant is essential to the smooth operation of the generator; ultimately, without coolant, lenses can't be produced.

Controlling temperature is core to delivery. It's vital to remove heat generated through the cutting process to avoid damage, the lens, tool, block and coolant itself should be held to correct temperatures. Shocking the lens with higher or lower than room temperature coolant can cause thermal stress and distort the lens, so it's important to control the coolant temperature.

## PROCESSING

Processing is used to ensure stable delivery and control the factors established in delivery. Processing is concerned with automating as much as possible in coolant management to reduce potential points of contamination, operator error, and to control labor costs.

Furthermore, controlling chemistry through automatic coolant makeup is critical; space is at a premium in most labs so it's vital to access the smallest process systems possible. Bazell Technologies has developed a process system called the Microseparator®, with one of the 'highest efficiency central coolant systems in the industry,' according to Paul Dick, President of Bazell Technologies.

satisloh®

## MICROSEPARATORS

Microseparators have been designed specifically to service optical generators and feature unique swarf characteristics of ophthalmic production. This industry-specific design maximizes efficiency while maintaining the lowest coolant volume and smallest footprint per generator.

Moreover, because Microseparators are modular, they are able to be maintained without downtime; most routine PMs and, in the case of HC6, even component replacements, can be completed while production continues. Microseparator systems contain only one point of daily maintenance, which takes a mere few minutes and can be actioned without stopping the generators.

*The HC2 is an automated coolant cleaning system for up to two generators, any mixture of organic lens materials. The HC2 is capable of processing debris from up to 200 lenses per hour.*

In addition, a control loop monitors pressure of the generators, automatically adjusting the pumps to control delivery pressure. This occurs regardless of the number of working generators or what stage they are currently at in the cycle. Microseparators feature automatic tank filling, coolant mixing and defoamer dosing; this automation eliminates one of the primary points of operator error in coolant management: mismanaging coolant and additives and introducing contaminates.

## COOLANTS AND DEFOAMERS

Quality coolant is vital in the smooth operation of coolant delivery. When such chemistry goes wrong, it can lead to bacterial or microbial growths, which not only damage the equipment but is also harmful to humans. Mitigating these hazardous impacts, Satisloh's LH-305/405 coolants are the best in their class, having been formulated specifically for lubricity, thermal efficiency and the prevention of microbial growth.

*For these, Satisloh recommends a coolant concentration of 3%, which is measured with a brix refractometer at a level of 1%.*

Proper coolant chemistry has a significant impact on throughput and finished lens quality.

A good defoamer is just as critical as the proper coolant additive due to the fact most coolants contain surfactants. If the coolant is foaming, tool life, proper coolant pressure, and debris settling rates in Microseparators are compromised. Satisloh's Super Loh Foam 10 defoamer is second to none and typical dosage rates to control foam are a fraction of any other competitive brands.

## WATER HARDNESS

It's also vital to control water hardness with respect to coolant management; as it can have detrimental effects, causing mineral deposits and scale to build-up and ultimately damage equipment. However, by contrast, soft water can cause foaming and reduce thermal efficiency of coolant and lubrication of cutting tools.

Therefore, the optimum level resides at 50 -100ppm (parts per million). Deionized water is never recommended for any ophthalmic surfacing coolant system.

Combined, processing systems from Bazell and Satisloh make up the HC series; these Microseparator systems are fully automatic, contain a self-cleaning basket centrifuge and have calibrated coolant and defoamer dosing amongst other benefits.

Furthermore, Microseparators are also Lab 4.0 ready, and capable of sharing critical metrics with MES-360. Such systems eliminate swarf from the coolant, which then needs to be controlled via waste management.

## WASTE MANAGEMENT

*Through waste management, swarf is further processed to maximize utility and to minimize costs, as well as environmental impact.*

To further promote sustainability, it's vital to focus on the advancement of efficiency for compressing waste management and the reduction of water intensity. Furthermore, these two factors are fundamental in the reduction of costs.

Swarf can be used as a business model, fetching up to 1EUR per KG; this has been seen in some regions through the recycling and reuse of swarf. However, this can only be achieved with pure (93% or higher) polycarbonate. Because of this, the segregation of processes is best practice.

Additionally, the practice of briquetting can also reduce the volume of swarf and loss of coolant. This is important to consider as 40,000 tons of swarf are generated by the industry every year, which, put into context, is enough to fill an entire ocean liner.

satisloh®

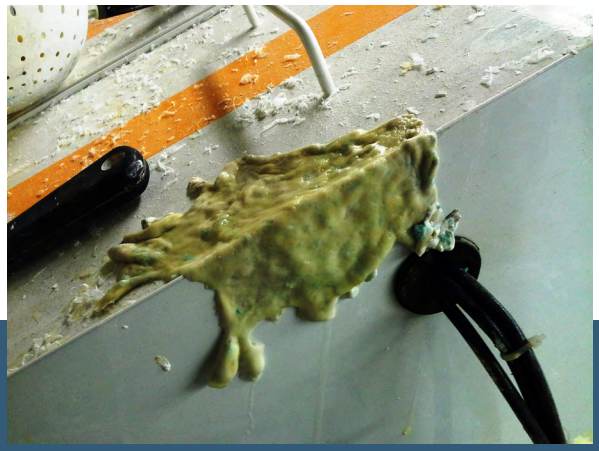
Since 2017, German company Weima has been in exclusive partnership with Satisloh for briquetting.

*A long-term study found that simultaneously using a Microseparator and briquette press equated to a 55% decrease in coolant consumption, which is not only beneficial to the bottom line but also reduces the lab's environmental footprint.*

This study also found an increase in productivity and capacity by 10%, as it creates less downtime and operator intervention. Currently, there are two briquette press models; the TH600 and the TH800 which, in accordance with safety regulations, are fed through a conveyor.

However, the briquette press is not the only tool that can be utilized for waste management and Satisloh and Bazell Technologies have two further options. The chip separator is a low maintenance and low cost machine and works best in conjunction with the Weima briquette press.

Furthermore, Bazell Technologies has developed the Water Filtration System 2 (WFS-2) which is designed to service two of Satisloh's ART-deblocker-2. This promotes up to 200,000 liters per year of water savings.



## SUMMARY

Ultimately, the chosen coolant management system is heavily dependent on the type of lab that's in operation. For small labs, the Microseparator HC2 is recommended, which supports one digital lens generator when used with the pump station and chip separator. For midsize labs, Satisloh recommends the HC3 and for large labs, the HC6.

The benefits of coolant filtration and swarf management are extensive, promoting maximum productivity, reliability and energy efficiency. Furthermore, they aid in the creation of a safe working environment, save money through the optimization of tool life and reduce machine downtime while encouraging more sustainable production.

Satisloh offers a range of coolant and debris management equipment for monitoring, managing and recycling coolant in the lens production process, to find out more, click here.

## CONTACT

**Satisloh AG**
Neuhofstrasse 12
CH - 6340 Baar
Switzerland
Phone: +41 (0) 41766 16 16
Email: info@satisloh.com

www.satisloh.com

| | | Sales | Service |
|---|---|---|---|
| **North America** | **Phone:** | +1 262 255 6001 + | 1 262 255 6001 |
| | **Email:** | info.usa@satisloh.com | service.usa@satisloh.com |
| **Europe** | **Phone:** | +49 (0) 6441 912 0 | +49 (0) 6441 912 222 |
| | **Email:** | info.de@satisloh.com | service.de@satisloh.com |
| **Asia** | **Phone:** | +852 27 56 7711 | +852 27 56 7654 |
| | **Email:** | info.asia@satisloh.com | service.asia@satisloh.com |
| **Central & South America** | **Phone:** | +55 (11) 2930 8600 | +55 (11) 2930 8600 (pt)<br>+57 300 798 3374 (es) |
| | **Email:** | info.latam@satisloh.com | servicio.latam@satisloh.com |

satisloh®