

## MAINTAINING METALWORKING COOLANT DURING EXTENDED SHUTDOWN

Proper maintenance of metalworking fluid (MWF) during an extended shutdown period is important. It can prevent foul odors, preserve coolant stability, and avoid downtime when production resumes.

### PRIOR TO SHUTDOWN

Completing some work prior to the shutdown will aid the overall goal of returning to production with coolant in good condition.

#### CLEAN

Bacteria flourish in stagnant systems in which metal chips accumulate at the bottom and corners of the system and a floating oil layer at the top of the fluid prevents aeration from taking place. Clean out all accessible chips to remove bacteria havens. This includes chip pans, conveyors, chip troughs, and chips on the inside of the machine. Also, empty out the chip bins that the conveyors feed.

#### SKIM

Skim off free floating tramp oil (when the system is idle). This helps minimize the potential for tramp oil to seal the system from air. Wheel and rope skimmers work well, if used in the shop. Oil/water separators are also effective. A shop vacuum can be employed if no permanently installed equipment is available. Skimming tramp oil should also be considered during the shutdown as well, if oil is found collecting from leaks.

#### LEAVE MACHINE CABINET DOORS OPEN

When machines are idle without coolant circulating, leave the machine cabinet doors open. This prevents a closed cabinet from becoming a humidity chamber, which can have condensate accumulate on the interior surfaces and wash away the rust protection of the remaining coolant film. If an extended shutdown is anticipated, beyond 2-3 weeks, consider using a rust preventive such as Castrol Rustilo DW 90 HF to protect bare metal surfaces.

### DURING SHUTDOWN

#### CIRCULATE

Adequate circulation and aeration of the metalworking fluid makes it much more difficult for odor causing anaerobic bacteria to thrive. Circulate the system as much as possible during a shutdown to prolong the life of the fluid. Some machines have built-in programming to regularly circulate

the coolant during shutdown. If circulation is not possible, an alternative is to use an air source to bubble air into the coolant to help prevent anaerobic bacteria growth.

## CONCENTRATION CONTROL

Over an extended shutdown, testing your metalworking fluid frequently and maintaining the concentration remains very important. If the fluid concentration is allowed to drop, some fluid components may become insufficient to maintain the bio-stable nature of the system. Many coolants are formulated with balanced levels of biocide and fungicide and/or other components highly resistant to bio activity. Routine monitoring of the concentration ensures that a depletion of the chemistry is avoided.

Continue to test the fluid normally, in accordance with the fluid's control plan, throughout the shutdown period. Additionally, good practice is to add a small amount of fresh fluid concentrate just prior to an extended shutdown to ensure that a portion of the fluid components are replenished.

## STARTUP

When coming out of extended shutdown, coolant systems should be circulated for several hours and concentration brought into proper range. If concentration is already within range, adding a small amount of coolant concentrate (about 1%) is still recommended in order to boost the coolant components.

In most cases, these actions will bring the Castrol coolant parameters back into control. In cases where it does not, the following additives may be used for adjustment:

- pH Adjuster 400 – A pH drop in the fluid is common once bacteria is present. pH Adjuster 400 will raise the pH of the fluid and make it less hospitable for bacteria to grow.
- Biocide - Kathon® 886MW – If bacteria is present in the fluid, the system may be treated with a killing dose of a site approved biocide. Be sure to add it in an area of high agitation when the fluid is circulating. Castrol recommends Kathon® 886MW (or in Canada, Kathon® 886MW 1.5%). Kathon® products are non-formaldehyde releasing. Typically, site safety officer approval will be required before use.
- Fungicide - Kathon® 886MW or Bioban O 45 Antimicrobial – Fungus may grow during shutdown periods as well, especially in poorly illuminated areas. Fungus differs from bacteria in that it is not present uniformly throughout the system. It is typically present along the water line, at the filtration point, or areas where there is a high splash effect. Physically inspecting the system prior to a fungicide addition is recommended. If any is found (slimy or leathery films), carefully remove it from the system to prevent further contamination. Once this is done, a plant approved fungicide addition can be made to the circulating fluid. Castrol recommends Kathon® 886MW (again, in Canada, Kathon® 886 MW 1.5%) or as an alternative, Bioban O 45 Antimicrobial.

Please contact your Castrol representative for recommended treatment dosage.

## ANOTHER OPTION

Depending on the duration of the shutdown and the sump size, it may be more economical to drain smaller systems and recharge them when returning. Review the system history, while assessing site capabilities for monitoring concentration and circulation, to determine whether to drain or maintain the machine tool metalworking fluid.

Regardless if machines are empty or remain filled with coolant, remember to leave cabinet doors open to avoid rust-causing condensation. Also, if the shutdown is extended, apply a light film of rust preventive to fixtures and other metal surfaces.

Please review the Appendix for an Extended Shutdown Checklist with additional details.

If you have any further questions, please contact Castrol Technical Support.

## APPENDIX

### Extended Shutdown Checklist

1. Identify system(s) to be idled
2. Confirm duration of shutdown for facility or affected system(s)
3. Verify inventory of coolant concentrate and fluid additives (if needed) on hand is sufficient for shutdown period.
4. Confirm level of access (employee, visitor, vendor) to facility during shutdown
  - a. Will facility be staffed during shutdown, if so who/when?
  - b. What job role services will be available during shutdown?
  - c. Will vendors be allowed on-site during shutdown, if so, is access limited to set time(s)?
5. Verify availability of utility and engineering services during shutdown
  - a. Will utilities (electricity, compressed air, water etc.) be available fulltime or limited to a rolling schedule? If limited, what is schedule?
  - b. Will facility go "dark"? If so, when?
  - c. Will systems be circulated during down period?
  - d. Full system circulation (through flumes, overhead pipes, drop lines, side stream high pressure units etc.) or filter pumps only?
  - e. If circulation is limited to filters, will headers, remote plumbing, drop lines be drained back into bulk tank prior to shutdown?
  - f. Verify hours of circulation per day / per week
  - g. Is facility compressed air available for necessary controls or to aerate idled fluids?
  - h. Will water metering systems, proportioners, OWS (Oil Water Separator) units be active or disengaged during shutdown?
6. Assess system contaminant load
  - a. Chips
    - i. Remove all chips from chip pans, conveyors and return troughs
    - ii. Chip masses are great sites for bacteria and fungus to flourish
  - b. Tramp Oil
    - i. Verify OWS operation (if present), assess condition of unit
    - ii. Correct oil leaks (if present)
    - iii. Remove any free oil via skimming, OWS separation, vacuum, etc.
    - iv. Consider use of High Loft filter media in systems with heavy tramp oil loads
  - c. Residues
    - i. Remove gross residue formations (if present) – oil, chips, swarf, suspect biofilms
  - d. Filter cleanliness / efficiency (where possible)
    - i. Assess condition of bag/cartridge filters, replace/clean heavily fouled bags/cartridges
    - ii. Assess cleanliness of side stream high pressure units, clean heavily fouled units
7. Assess Fluid Condition of systems slated for shutdown

- a.** Review system fluid condition reports, on-site system checks, or Castrol general condition analysis *at least 2 weeks prior to shutdown*
  - b.** If system is not routinely analyzed, submit representative fluid sample(s) to Castrol lab for general condition analysis.
  - c.** Respond to any recommended actions to treat bio activity or to raise concentration, and pH.
- 8.** Leave Machine Cabinet Doors open when coolant not circulating
  - a.** Closed machine cabinets can have condensate form inside, especially over a chip pan and filter that contains coolant.
  - b.** Condensate can form on interior surfaces and wash off the coolant film that provides short term rust protection.
  - c.** Apply a light rust preventive film on machines that are anticipated to be idle for more than 2-3 weeks. We suggest Castrol Rustilo DW 90 HF or similar.

If system conditions warrant treatment, please treat or adjust as recommended.

Industrial Technology Deployment