

Machine Cleanout Procedure

Overview

The purpose of this document is to provide detailed instructions on how to properly clean a machine tool or central system in preparation of a fresh coolant charge.

There are several benefits to a good cleanout, including:

- Reduction of bacteria count
- Removal of slime and solid buildup (hard water soaps, etc.)
- Reduces odor problem
- Reduction in blockage and clogging of pipes, nozzles, etc.
- Prevents cross contamination of fluids (especially important where different biocides are used)

The overall result of a clean system is:

- Longer tank life
- Better tool operation
- Improved work environment
- Lower operating costs

There are three major steps to perform- cleaning, dumping, and recharging. Simple as they sound, there are some important areas in each element that must be considered to gain the benefits of new coolant and to prolong the fluids life. This document aims to educate the reader to identify these points, to ensure a facility and end user is aware of key steps to make this task successful. If questions arise, please reach out to your Castrol sales representative or contact techhelp@castrol.com as they can help you avoid common pitfalls along the way.

First, we will consider the steps to take when cleaning a central system, followed by instructions for an individual machine tool.

Preparing for cleaning

Prior to any additions of cleaner, or removal of the fluid, it is important to prep the system to be cleaned for maximum efficiency and reduced downtime. The following is a general outline of considerations that should be taken. Individual circumstances may dictate the modification of these procedures due to unforeseen problems or schedule demands.

1. All loose and foreign materials must be removed from the central system flumes and tanks.
2. Welding rods or pieces of plastic or cardboard may be caught in the drag-out conveyors, causing maintenance problems before the system can even be used.
3. Inspect all flumes and auxiliary tanks for cracks, open seams and dead areas which may lead to pockets of stagnant cutting fluid that may later be sources of contamination.

4. Upon inspection and repair, operate all central system equipment to see that it is functioning properly prior to adding fluid to the system.
5. Machines on the system, and those to be added to the system, must be inspected to assure that they have no dead areas holding stagnant fluid.
6. Machines on central systems should be designed or modified so that upon shutting off the fluid supply, all fluid and chips are washed from the machine into the central system. If machines have fluid in their sumps from run-in or previous use, it must be removed so it will not contaminate the central system.

Cleaning the System

Charge the central system tank to pumping capacity with a 3% solution of the recommended Castrol Industrial cleaner, such as Castrol Techniclean® MP Flex. If the machine tools are quite dirty, it may be advisable to wash down the machines, using a more concentrated solution for more effective cleaning. Your Castrol representative may be able to recommend a concentration based on your facility's needs.

Due to environmental regulations and modern health and safety guidelines, most facilities will require approval by the Health and Safety Team or Manager prior to bringing high-alkaline cleaners on site.

The cleaner should then be pumped throughout the central system flumes and machines. If possible, a thorough cleaning of the surrounding areas such as floors, machines, etc., should also be completed. The cleaner should be circulated with the central system drag-out operating for at least four hours, or until all machines and floors are completely cleaned and free of possible contaminating materials. It is advisable to also allow flow through any auxiliary hoses and lines to remove build up and old fluids.

During this cleaning step, it is important to physically remove any fungal masses, buildups, and debris from the system, as chemically they may not be able to be removed or neutralized.

Dumping the System

Dump the system upon completion of recirculation of the cleaning solution. Drain the tank as completely as possible. If all material cannot be removed from the bottom of the tank, the remaining solution should be diluted with clean water. Add to the tank approximately the same amount of water that is in the bottom of the tank. Then drain the tank back to that original level.

Fluid should be handled in accordance to your local waste regulations.

Rinsing the System

Fill the tank to pumping capacity with 1% solution of the Castrol metalworking fluid selected for use in the system. This is done to prevent corrosion of the system during the rinse cycle. This solution should be circulated for a minimum of two hours through both the flumes and machines.

The 1% solution should be dumped upon completion of the circulation of the rinse water. When all the solution is drained from the central system tank, the flumes and walls of the tank should be rinsed with clean water. If all the solution cannot be drained from the tank, it should be drained or pumped as low as possible, then diluted with at least four times the amount of water left in the bottom of the tank.

Charging the System

When the previous Dump, Clean and Rinse steps have been completed, the tank must be charged with metalworking fluid at the recommended concentration. For the majority of our Castrol® products, such as Almarex®[®], Alusol®[®], Hysol®[®], and Syntilo®[®], it is helpful to remember the acronym, “O-I-L.” Oil-in- Last, or in this case, the concentrate is added to the water phase.

- a. In smaller systems, the tank can be charged with approximately 85% of the capacity with water suitable for the coolant dilution. The coolant concentrate can then be added slowly and with sufficient mixing to affect the dilution. The total calculated amount of coolant required to make the finished dilution should be added in this fashion to make sure that the proper solution/emulsion is prepared. When the required amount of concentrate has been added, the operator can then add the remainder of the water to bring the coolant into range.
- b. In larger systems, the basic rules apply, remembering O-I-L. Water suitable for the dilution of the coolant should be added to the system with circulation. Once there is sufficient water in the tank (the bottom of the tank is covered with water), the concentrate should be added as slowly as possible. It is strongly advised to assure proper mixing of the concentrate occurs with the water and that the water is the primary phase. When the system attains pumping level, the diluted coolant should be pumped throughout the flumes and machines. Continue to add water and concentrate until the recommended concentration is reached.

When the system is at operating level, it should be checked for concentration, pH and other appropriate parameters. A sample should be taken and sent for fluid analysis and baseline system data.

Individual Machine Sump Cleanout Procedures

For cleanout of individual machine sumps, follow the same procedures as above using the recommended industrial machine sump cleaner. Disregard reference to flumes and auxiliary tanks. Individual sumps should be cleaned more often than central systems, as dirt and debris can accumulate at a faster rate. Based on the fluid analysis results, it may be possible based on the general condition of the fluid to perform a machine clean out of chips and debris without disposing of the fluid

Special Considerations

When shutdown and cleanout time are short, the following steps may be used to facilitate a good cleanout:

1. Twenty-four hours prior to dumping, add 1% concentration of the recommended Castrol Industrial cleaner, such as Castrol Techniclean®[®]MP Flex and continue to operate the system as normal.

2. After normal system operations have ceased, but prior to dumping, the cleaner concentration should be increased to 4%. This solution should be circulated through the system and/or machines for 2 - 4 hours while the necessary scraping and scrubbing are being done.
3. Dump, rinse and recharge the system.

Cleanout Procedures for Straight Oil Systems

1. Drain spent oil from tanks and lines. Remove all types of filters.
2. Scrape sides and bottom of holding tank, then remove loose residues.
3. Using a brush, scrub down holding tank, filter chamber and lines. Then rinse and flush lines with a suitable high flash aliphatic solvent*, such as Castrol Iloform® 7425.
4. Remove solvent from holding tank, filter chamber and lines.
5. Repeat steps 3 and 4 with solvent (Castrol Iloform 7425).
6. Refill with high flash aliphatic solvent, (Castrol Iloform® 7425) to pumping level, circulate through the system 15-20 min.
7. Drain as much of the solvent as possible. Wipe excess from the bottom of the holding tank and filter chamber.
8. Replace filters and recharge with the recommended Industrial fluid.
9. Run system for 2 - 3 hours prior to resuming production.

*A suitable alternative may be Castrol Techniclean® AS 105. This product may substituted in this procedure for Castrol Iloform® 7425 for customers needing or applications requiring an even higher flash point solvent be used.

Note of Caution

When cleaning with solvents, all safety precautions supplied by the vendor and listed on the Safety Data Sheet (SDS) must be observed. Protective equipment such as goggles, OSHA approved vapor masks, rubber gloves, boots and protective clothing should be worn.

Because of potential fire hazards, we advise that welding not be done in an area containing, or surrounded by, low flash oils and solvents.

If any questions arise concerning the procedures mentioned in this Technical Bulletin, contact your Castrol representative.

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