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# PROTOCOL SC-101

## CLEANING PROCEDURE

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Time is required for the cleaning solution to be used-up (spent) and this will depend on several factors, such as temperature, rate of circulation, solution strength, etc. Under normal circumstances, the exposure time typically lasts from 8 to 24 hours. PROTOCOL SC-101 and SD-102 are commissioned in a pH range of 6.0 to 6.5. Depletion of the cleaner is generally recognized when the pH rises above 8. Once the higher pH is achieved the cleaning solution is spent and should then be removed from the system.

- 1.) Drain the original fluid from the system and select an appropriate inspection site. This site is necessary for determining the scale thickness and will be used later for inspection after the cleaning procedure has been completed. Note: be sure to locate and drain all low points.
- 2.) Fill the system with fresh water with all air bleeds in the open position and circulate for 30 minutes.
- 3.) Stop circulation and drain the entire system as quickly as possible through the low point drains. This is necessary to remove any loose debris.
- 4.) Refill the system with fresh water and the suggested concentration of PROTOCOL System cleaner and degreaser.
- 5.) Operate the system at as high a temperature as possible, but do not exceed 190°F (88°C) continue to operate until the cleaning solution is spent (pH ~ 8.0). Note: Air should be purged from the cleaning solution by venting through the air bleeds.
- 6.) Discontinue circulation and drain the system as quickly as possible through the low point drains. Then flush the system with fresh water.
- 7.) Inspect the system for cleanliness. If the system has not been satisfactorily cleaned, repeat steps 4-7.
- 8.) Once the cleaning procedure is satisfactory flush with fresh water until the water runs clear.
- 9.) It is suggested that the final rinse be done with deionized water and 1-2 v% of PROTOCOL S-317 layup inhibitor to minimize the potential for flash rusting if the system remains empty and wet for an extended period prior to recharging the system with the new coolant. A final rinse with deionized water is recommended to remove of any calcium, magnesium, sulfate, and chloride ions that might be left behind after flushing the system with tap water. The engine/pumps should run long enough to ensure the thermostats open and coolant flows through the piping and heat exchangers.
- 10.) Recharge the system with industrially inhibited PROTOCOL or SubZero heat transfer fluid premixed with deionized water.

NOTE: Systems containing significant amounts of mixed metals (iron, copper, and steel) are susceptible to galvanic corrosion, which can be detrimental to long term system cleanliness. However, this copper metal deposition can be avoided by injecting air into the cleaning solution...after the cleaning solution is spent. Air injection should be done at a low rate and downstream of the engine/pump to minimize cavitation of the liners and/or pump impellers. Continue circulating the spent cleaning solution for approximately 1 hour before draining the cleaning solution.

### Special Consideration

PROTOCOL System cleaners and degreaser are fairly corrosive to metals containing zinc. Metallic zinc is commonly used to coat galvanized steel sheets or tubular products. Therefore, the cleaner should not be used in systems containing galvanized parts. The same is true for magnesium based metals, and therefore, this cleaner should not be used unless etching of either metal is acceptable.

PROTOCOL SC-101 and SD-102 do not contain heavy metals and are biodegradable. However, disposal of the cleaning solution, and flush water, should be done in compliance with all regulatory agencies at a federal, state, and local level.

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