Technical Brief

Cleaning Closed Loop Systems Using BCP® 1015

Closed Loops Require Cleaning

Closed loop systems, commonly found in industrial processes, are prone to the accumulation of organic deposits over time. These deposits can compromise the efficiency and integrity of the system. To address this issue, many companies are turning to organic deposit cleaner/dispersant chemistries as an effective cleaning solution.

Water treatment professionals are using BCP® 1015 to clean fouled closed loop systems. These AMSA products are well known for their ability to dislodge and disperse organic deposits within open and closed loop systems. The effectiveness of AMSA BCP® chemistry hinges on the nature of the deposits present within the system. While it aids in destabilizing and dispersing organic deposits through flow-associated shear forces, its impact on mineral scale or corrosion products may vary depending on their adherence to the pipe surfaces. Applying BCP® 1015 in closed loop systems requires careful consideration and strategic planning to ensure optimal results and system integrity.

Offline vs. Online Cleaning: Choosing the Right Approach

The approach to cleaning closed loop systems depends on whether the operation will be conducted offline or gradually during normal operation. Offline cleaning, though faster and more aggressive, requires the system to be taken out of service temporarily. On the other hand, gradual online cleaning can be conducted during normal operation but demands careful monitoring to prevent overloading system filtration and ensure compatibility with other industrial water system treatment products.

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Offline Cleaning Protocol with BCP® 1015

For offline cleaning with BCP® 1015, the process typically involves the following steps:

1. **Power Flush:** Power flush the loop to clean treatment chemicals and loose debris from the system.

2. **Cleaner Application:** Fill the loop with a cleaner mixture containing BCP® 1015 (ensure compatibility with other products) and circulate it 12-24 hours at maximum velocity.

3. **Debris Removal:** Power flush the system with fresh water to remove dispersed deposits.

4. **Additional Cleaning:** Apply inorganic deposit cleaners if necessary, followed by another round of flushing.

Online Cleaning Protocol with BCP® 1015

Cleaning a closed cooling loop during normal operation is challenging, it requires a gradual, incremental approach so that the loop continues to perform normally as organic deposits are gradually dispersed by BCP® 1015 and removed from the system by filtration. The objective is to be aggressive enough to gradually remove deposits, while at the same time having no negative impact on the overall loop system. It requires careful monitoring to ensure deposits are dispersed at a rate faster than they are forming in the system, but at a low enough rate that the loop's filters can efficiently remove the dispersed solids, and other solids-sensitive parts of the system are not impacted.

Keep in mind every system has unique features which may require additional considerations, or an alternative approach. Water treatment professionals, working with system engineers, are in the best position to determine the most cost-effective cooling loop cleaning program.

The general approach to cleaning a closed cooling loop with BCP® 1015 while continuing normal operations includes the following steps:

1. Confirm BCP® 1015 cleaner/dispersant is compatible with all other products present in the loop, and under normal operating conditions in the loop.

2. Identify any subsystems or instrumentation that would be impacted by high suspended particulate solids in the water.

3. In a completely closed loop there should not be the opportunity for a cleaning slurry (thick foam carrying organic and inorganic deposits) to become an issue; nevertheless, confirm this is the case, as foam may impact some sensors.

4. Check the loop filtration system to be certain it can accommodate increased solids loading, and more frequent backwash.

5. Start BCP® 1015 dosing at a low level (e.g., 10 ppm of product), adding the product over the period of time equivalent to the loop's recirculation time (or longer). Low dosing is not only economically preferred, but will also prevent BCP® 1015 from going through the loop as a concentrated slug. Please note, depending on the severity of the organic deposition, gradual cleaning is the best practice in order to avoid any potential for overloading filters.

6. Allow the first BCP® 1015 treatment to circulate in the loop for 24 hours. Monitor filter operations. Keep an eye on chiller temperatures. For non- operational performance measurements, collect a water sample from the loop, and examine for increased turbidity as an indicator of total solids release. For less routine, but also a fast field measurement, ATP is a good measure to detect deposits of biological origin dispersed into the bulk water.

7. If you see evidence of initial organic deposit penetration and subsequent removal at 10 ppm of product, do a second treatment at this concentration, and monitor in the same way. Allow this dose to circulate for a longer period of time (several days to 1 week). Monitor the water as described in step 6.

8. If you're not seeing evidence of organic deposit penetration and subsequent removal after the second 10 ppm treatment, and the system continues to operate normally, increase the treatment to 25 ppm. Monitor the system as described above. Continue until filter loading decreases, and other indicators of deposit release return to pre-cleaning levels.

9. Eventually you want to see improvements in chiller performance. If you see indications of organic deposit removal, but chiller performance doesn't improve, you may have to consider that you're dealing with scale or corrosion deposits that are not going to be removed by an organic deposit cleaner/dispersant.

Remember, cleaning deposits from a closed loop does not prevent the deposits from forming, and accumulating again. Using BCP® 1015 in conjunction with a suitable biocide, however, will limit the formation of biofouling deposits in the loop. Consider supplementing the cleaner/dispersant and biocide in the loop with regular (e.g., monthly) additions of BCP® 1015 to keep the system clean.

Considerations for Effective Cleaning

- Product Concentration: The concentration of BCP® 1015 used depends on the nature and amount of deposits in the system. Concentrations can range from as low as 10 ppm to over 1000 ppm, based on experience and cleaning requirements.

- Compatibility Testing: It's crucial to test the compatibility of BCP® 1015 with other treatment products to avoid adverse reactions and ensure long-term effectiveness.

- Solids Removal: If possible, flush dispersed solids to waste. First isolate any side stream filters or bypass any inline filters before cleaning the system. If dispersed solids cannot be sent to waste, optimize and monitor filtration systems during cleaning to assure full flow of the cleaning solutions is maintained. Be certain to address filtration in offline and online cleaning sections.

Conclusion

Cleaning closed loop systems requires a systematic approach and the right choice of cleaning agents. An organic deposit penetrant/dispersant/cleaning product, like BCP® 1015, offers an effective solution for removing organic deposits and restoring system efficiency. By following proper protocols, conducting compatibility tests, and ensuring adequate filtration, companies can clean and maintain the integrity and performance of their closed loop systems.