

Case Study I



Conventional Water Treatment Coolants

Case Study I. A large specialty chemical manufacturer operated two Werner and Pfleiderer twin 91.8-mm diameter screw water-cooled extruders in the manufacturer of thin fibers of grafted thermoplastic polyolefin heat-seal coatings for use as adhesives. Each extruder had twelve zones with the fifth zone reaching the highest operational temperature of approximately 580°F. Initially demineralized water was utilized as the zone coolant (Figure 3), often being supplied to the zones at temperatures between 165 to 185°F from the system's water reservoir tank.



Figure 3. Demineralized water extruder barrel coolant.

The barrel coolant water reservoir tank, supply and return manifolds, and each zone heater/cooler section was carefully flushed with an organic acid-based cleaner followed by repeated flushes with demineralized water until all system debris and cleaning agents were removed. The system was refilled with fresh demineralized water and charged with a conventional closed system multi-metal corrosion inhibitor package. The extruder was placed back into service and sampled daily to track treated water total dissolved solids and inhibitor treatment levels.

At the end of about two weeks of operation, both the treatment level and the inhibitor residual concentrations dropped considerably. On the seventeenth day of operation a second application of the treatment was made, with a corresponding spike in dissolved solids and treatment residuals, only to again be followed by a gradual decline in each over the next ten days (Figure 4).

The consistent and gradual loss of treatment additives in the barrel cooling water indicated possible deposition on the interior surfaces of the cooling water coils embedded in the zone heater/coolers. In addition, there were repeatedly variations in demineralized water qualities being provided throughout the plant, as well as the absence of a method to add inhibitors in proportion to system makeup water additions. Establishing such a program would require sophisticated chemical feed equipment as well as frequent in-plant sampling and testing of cooling water samples.

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The treatment of water-cooled extruder barrel cooling water systems with conventional water management approaches was abandoned in favor of an all-organic chemistry treatment approach. Those chemistries have been refined and are the basis for a Patent application filed with the U.S. Patent and Trademark Office [3].

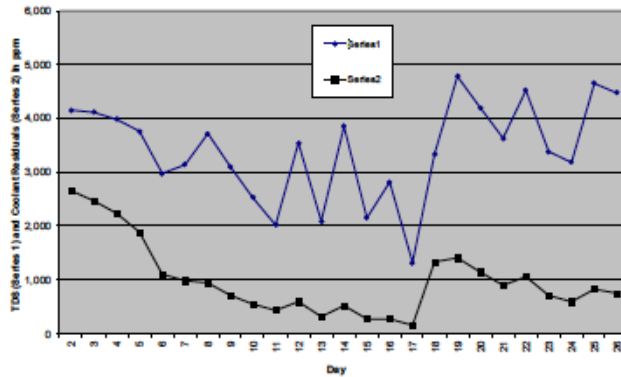


Figure 4. Conventionally treated extruder barrel coolant.

For additional information regarding the cleaning, restoration and maintenance of water-cooled extruder barrel cooling water system, please contact *Chemagineering Corporation* at www.chemagineering.com.