ChemTreat
Case Study

Aluminum Industry DAF Operation:
Increased Oil & Grease, TSS, and Ntu Removal by DAF Process Equipment Upgrade

Background

A Midwest aluminum DC casting plant produces aluminum alloy, cast ingot, scalped ingot, extruded rod and bar shapes, and rolled redraw rod. The facility uses recirculating water that supplies water to four DC casting pits. The system water becomes contaminated with castor oil, hydraulic oil, and suspended solids from the DC casting process. As it is the only system with oil removal equipment and the only system able to discharge to the City publicly-owned treatment works (POTW), it also receives water from various other plant systems.

A Denver induced air flotation unit (IAF) is used for solids and oil removal. The ChemTreat chemical treatment program enhances contaminant removal from the water before it is cooled and sent back to the cast house. The current IAF's TSS, Ntu, and oil and grease (O&G) removal efficiency has decreased over the years because of its age and condition. The system could not consistently meet the water quality KPIs specified for the DC casting operation. With ChemTreat's consultation, the plant developed a project to evaluate alternative technology to improve the water quality going to the casting process.

Solution

1. Install a new dissolved air flotation device (DAF) with flocculation tube designed to remove contaminants from recirculation cooling water process.
2. Evaluate different types of technology available in the industry.
3. Investigate how different types of technology affect system contaminant flotation and filtration.
4. Determine the level and range of contaminants in water stream.
5. Determine how different technologies benefit contaminant removal efficiency.
6. Determine the cost of each technology.
7. Determine how each result will generate operating ROI to the plant.

Results

Installing the new DAF unit provided the following benefits to the recirculating cooling water system:

	Old System (IAF)	ChemTreat Solution (DAF)
Total Suspended Solids Removal Efficiency	33%	94%
Ntu Removal Efficiency	53%	92%
Oil and Grease Removal Efficiency	63%	99%

Results are examples only. They are not guaranteed. Actual results may vary.

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Other benefits provided by the new DAF unit:

- Mold packages production quality and spray ring, Hayward strainer, and table plugging issues **reduced by 98 percent**.
- **Percent-solids generation efficiency increased from 3 percent to 45 percent**. This resulted in a drier cake and less material to landfill. It also eliminated the need for a Hoffman filter press and paper usage.
- **Electrical savings in excess of 100 Hp**
- The DAF's polypropylene construction ensures no equipment corrosion or degradation.
- **Total ROI = $232,000/year**

Old IAF – Induced Air Flotation Unit

Old Hoffman Filter for Sludge Drying Off IAF

Oil Spill Event: Cast House Sluice

Oil Spill Event: DAF Inlet

Oil Spill Event: Cold Well Return

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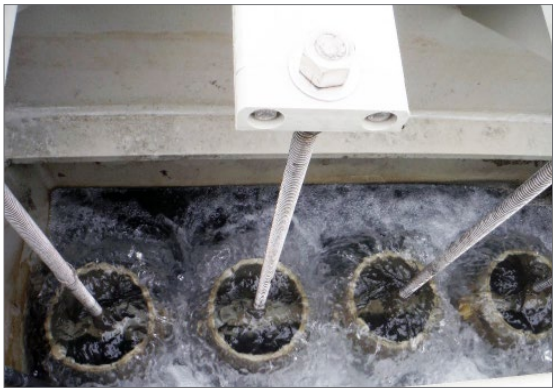
New DAF Equipment

DAF 1

DAF 2

DAF Sludge



DAF Effluent

"Due to a few upset conditions in the casting process that sent heavy contamination to the system, the plant was looking at having to take a 14-day unplanned outage to drain and clean the system. With the install of the new equipment and the chemical addition techniques of ChemTreat, the plant was able to get back on-line and casting within 24 hours of (the) event, saving the plant millions of dollars on production loss and clean-up expenses."

- MW Aluminum
DC Casting Plant
Management Team

Cold Well After New DAF Treatment Program Returning to Casting

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