



**INDUSTRY** Manufacturing

**CUSTOMER** West Michigan Compounding

**LOCATION** Greenville, Michigan, USA

**BACKGROUND** Plastic extrusion company West Michigan Compounding operates five 24/7 production lines and a sixth R&D line. Each line has its own recirculating water bath where strands of extruded plastic are cooled before entering the pelletizer. The water baths are filled with recirculating water from the company's enclosed cooling tower system, which also cools the extruder barrels.

**PROBLEMS TO SOLVE** Quarterly cleaning of each line required nine hours of labor involving harsh chemicals and putty knives and only two weeks later, the lines would be dirty again. Production lines were experiencing frequent downtime from overheating. In addition to causing the equipment to overheat, excessive water temperatures were producing defective pellets that had to be scrapped. The company was replacing pumps, motors, heat exchangers and other parts frequently—roughly every 2-3 years at up to \$12,000 for each piece of equipment.

**SOLUTION** In December 2020, an Armstrong Nanobubble Generator (2"x3") was installed for the cooling tower process water, as well as an Armstrong Nanobubble Generator booster (3/4"x1.5") for one of the water baths.



**“The line operators have seen what’s happening and they’re asking for their own boosters. We can’t add the other nanobubble generators to the lines fast enough.”**

**—DAVE DOOLITTLE, MAINTENANCE MANAGER**

## **SIGNIFICANT RESULTS**

Within weeks of installation, the infusion of nanobubbles into the process water had produced substantial improvements.

### **CLEANER PRODUCTION LINES**

Because the lines’ heat exchangers were cleaner, their heat transfer coefficient was increased, resulting in water baths with cooler, more consistent temperatures and no occurrences of overheating.

The time required to clean each line was dramatically reduced to just 20 minutes using a nonabrasive, nonchemical scrubber, and production lines remain clearer and cleaner for months. Annual savings on this task alone is estimated at \$16,000.

### **EXTENDED EQUIPMENT LIFE**

Prior to installation of the Armstrong Nanobubble Generators, one of the company’s shell and tube heat exchangers had been nearing the end of its life and a replacement had been purchased. Several months later, the previously failing heat exchanger remained in place, having been returned to a state of efficient and acceptable operation.

### **INCREASED QUALITY AND HIGHER PRODUCTION VOLUME**

After installing Armstrong Nanobubble Generators, West Michigan Compounding experienced more consistent temperatures in its water baths, resulting in less scrap and higher production rates.



## **SIGNIFICANT RESULTS**

**RESULTS**  
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### **REDUCED SCALING**

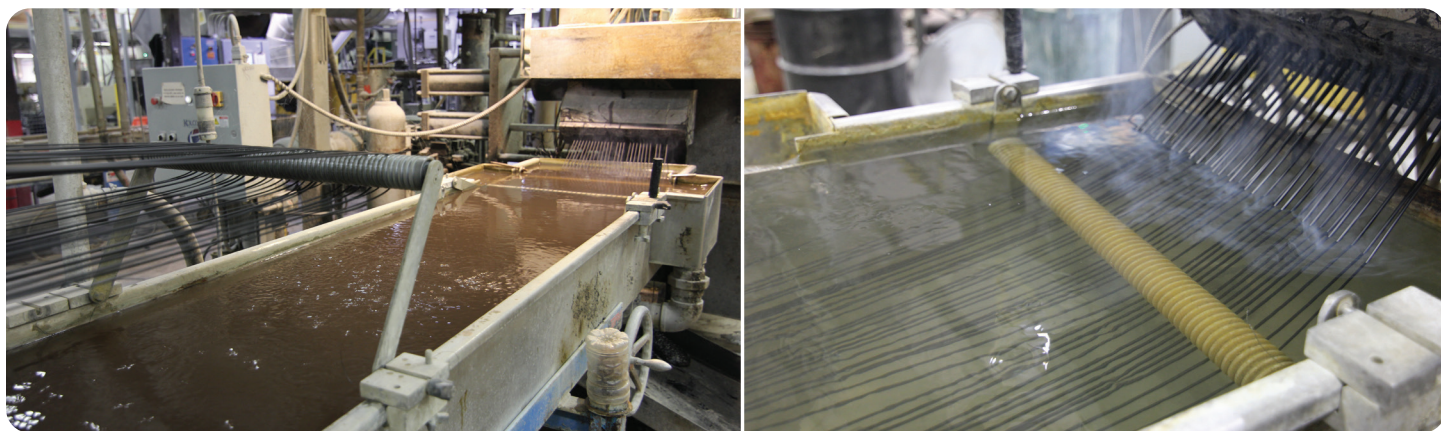
The flow of nanobubbles in process water immediately began removing existing scale and preventing new scale buildup. Evidence of this could be seen in water bath screens, which now filter scale that has broken loose from inside equipment hoses. In addition, past scaling required that extruder tanks be manually cleaned with an acid – a process that poses safety hazards for employees. With nanobubbles now flowing through these tanks, no such cleaning has been required.

### **DECREASED CHEMICAL USE**

West Michigan Compounding was able to reduce its \$3,500 monthly chemical budget by 25% with no loss in efficacy. Ongoing reduction of chemical use and monitoring of results is planned, with a 50% overall reduction in chemical use expected.

### **ENERGY SAVINGS**

Initial results during winter months, just 10 days after installation, revealed a 15° drop in the cooling tower's operating temperature, with greater energy savings expected during hot summer months.



*Extrusion baths before and after installation of Armstrong Nanobubble Generator booster (3/4"x1.5").*