



*TECHNICAL ARTICLE SERIES*

## **Pneumatic Line Blowouts from Glass-Filled Resin Eliminated with Deflection Elbows**



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# Pneumatic Line Blowouts from Glass-Filled Resin Eliminated with Deflection Elbows

FAIRPORT, NY — Parker Chomerics, a division of Parker Hannifin's Engineered Materials Group, manufactures PREMIER™ electrically conductive plastic injection molded components for the automotive, electronics and telecommunications industries. Molded of Parker Chomerics' thermoplastic resins, these parts provide electromagnetic interference shielding and replace metal assemblies to save weight and cost. However, glass fibers that contribute to the exceptional physical properties of one new resin also caused it to repeatedly wear through sweep elbows of the company's pneumatic conveying system.

## Elbow blowouts in silo fill line required clean-up, repairs

The resins used in the manufacturing process at the Fairport plant — both electrically conductive and nonconductive — are formulated with additives such as carbon fiber, glass fiber, nickel or stainless steel. Some are produced on-site, while others arrive in bulk trucks and are conveyed pneumatically to 25 ft (7.6 m) high outdoor silos, each requiring two 90-degree elbows; a 4 in. (100 mm) diameter pneumatic line is routed vertically up the side of each silo, horizontally for 6 ft (1.8 m), and then down to a silo top inlet connection.

In 2015, a new pelletized mineral plus glass-filled nylon wore holes through the elbows of the silo fill line. "After a certain number of fill-ups, resin would shoot out the top of the line and scatter all over," says maintenance supervisor Mark Withey. "It was a lot to clean up."

Withey and his maintenance crew attempted to solve the problem by switching to other types of elbows.

"We started with stainless steel sweeps, then went to ceramic-lined sweeps, and then to one with a replaceable ceramic back," Withey says, describing earlier efforts to maintain the line. His crew even fashioned elbows in-house using flexible stainless steel pipe and quick-connect fittings.

The stainless steel sweeps, having a 12 ft (3.6 m) long arc, he says are impossible to look into or manually probe to inspect. "All we could do was guesstimate" Withey says. To be safe, Withey's maintenance team swapped them out every few months.

The ceramic-lined sweeps, which were more expensive, lasted only six months. The elbows with a replaceable back didn't actually wear at the back, but at the corners. "We had to take them down to the shop, weld up the hole and then bring them back to the top of the silo."

His crew even fashioned elbows in-house using flexible stainless steel pipe and quick-connect fittings. "They lasted four to five months and were less expensive and quicker to change out, but still time consuming," Withey says. "Regardless, all of the elbows we tried added a great expense in terms of parts, labor and downtime."



*At Parker Chomerics, two 90-degree deflection elbows from HammerTek eliminated elbow wear previously experienced with stainless steel sweep elbows, ceramic lined elbows, ceramic backed elbows, and elbows fabricated in-house using flexible stainless steel pipe and quick-connect fittings.*

## **Deflection elbows prevented impact, wear**

Withey then learned of a deflection type elbow from HammerTek Corp. Unlike sweeps that require pellets to impact the elbow wall to change direction, the company's Smart Elbow® design features a spherical vortex chamber protruding partially beyond the material flow path, causing a loosely packed sphere of pellets to slowly rotate in the direction of flow. Material entering the elbow is gently deflected around the bend by the ball of rotating material without impacting or abrading the elbow wall. Because some material is continuously replenishing the rotating ball of pellets, the process is continuous, and the chamber evacuates fully along with the final portion of material being conveyed.

## **Reduced inspections, no blowouts**

In October 2018, Withey installed two deflection elbows on the line conveying the abrasive pellets, eliminating elbow failure as of this writing. "At first, we went up once a month to unbolt and inspect them," Withey says. "Now as we've become confident in them we go up quarterly." He reports a routine inspection takes 45 minutes and is easier than before. "The other elbows were a lot bigger, a lot heavier and more cumbersome," Withey says. The Smart Elbow is compact, with a radius of just 10.6 in. (270 mm). "One person can pick it up and hold it with no problem. It works really well for us."