



## CASE STUDY: AM SMOOTH BORE DS | CONTINUOUS MIXER

# AN EFFECTIVE SHAFT SEAL FOR CLOSE PROXIMITY SHAFTS

### THE DOMINO EFFECT OF A LEAKING MIXER

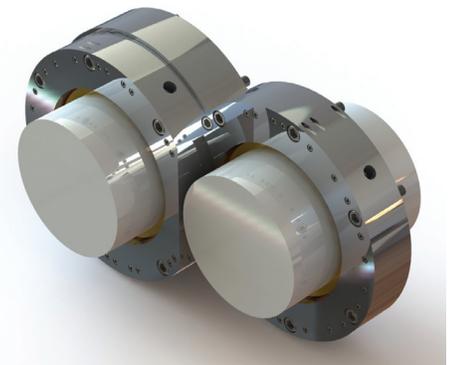
In February 2012, a large Midwestern chemical plant contacted Inpro/Seal® seeking a solution for a leaking continuous mixer. The mixer was using packing to seal the shaft, but the seal was proving ineffective. Packing uses contact on the shaft as its sealing mechanism. Over time, mechanical packing wears at the point of contact due to friction. When the packing wore out on this mixer, it opened a gap, allowing powder to leak out of the mixer onto the floor and surrounding equipment. The powder needed to be washed away periodically, causing water to enter the application and damage the components. The leaking mixer increased total cost of operation, decreased reliability and created a hazardous working environment.

### AN INNOVATIVE SOLUTION FOR A UNIQUE APPLICATION

For standard mixer applications, Inpro/Seal AM (Air Mizer®) Solutions™ shaft seals would be used to seal the shaft. AM Solutions are non-contacting permanent shaft seals that use a small amount of air, or inert gas, to create a positive purge along the shaft that effectively seals product in the vessel. This proven technology has been installed on many mixers around the world with great success. However, the continuous mixer at this chemical plant was anything but standard.

The leaking mixer had two shafts positioned very close to each other. The typical AM Solutions shaft seal design for two shafts uses a separate seal on each shaft, each with a flat side. The design has a limited cross section between the two seals and neither seal extends beyond the halfway point between the shafts. The shafts at the chemical plant did not allow for this configuration, however, as there was not enough room between the shafts.

The Inpro/Seal engineering team needed to think outside the box to provide an effective sealing solution to this unique application. The right technology was there; it was a matter of applying it in a new way. After months of product design, an innovative solution was developed that created enough space to seal both shafts. The design called for two AM Solutions AM Smooth Bore designs with a staggered orientation. Operation and performance of the seal was identical to the standard AM Smooth Bore design with the exception of the placement of the seals. The first sealing interface and an adapter plate were mounted against the housing, while the second sealing interface was mounted to the adapter. This new AM Smooth Bore DS (Dual Shaft) design allowed the seals to overlap, giving them enough cross-sectional space to operate correctly. The symmetrical design of the solution made orientation a non-issue and allowed for easy installation and repair, if needed.



The Inpro/Seal® AM Solution™ AM Smooth Bore DS shaft seal for mixer applications with close proximity shafts

### SUCCESS SUMMARY

The AM Solutions AM Smooth Bore DS shaft seal was manufactured and installed in October 2012 and used a nitrogen gas purge to seal both shafts. Since installation, the seal has been running continuously with no problems, reducing product loss, downtime and costs. The plant has been pleased with the solution and has told the company's other facilities about the success. Since then, the AM Smooth Bore DS design has been installed on other applications and has become a standard solution in Inpro/Seal's growing AM Solutions shaft seals product line.