A producer of custom-blended PVC compounded products replaces a worn slide–gate valve in a blending line to ensure continued efficient operation.

Replacing a worn slide–gate

Each custom-blended PVC product the company makes contains various amounts of specialty additives that give a product its particular characteristics. To ensure a quality finished product, the specialty additives are precisely weighed before being added to a blender with the PVC resin powder. The blended product is then screened to the appropriate particle size range before being packaged in boxes or bulk trucks for transport to a customer.

In 2003, the company installed a new blending line for a product that required a dedicated gain-in-weight scale for weighing up to 30 pounds per batch of a specialty additive with particles up to 25 microns. To maintain weighing accuracy, the company installed a transfer tube between the scale discharge and the blender inlet. The tube has two material-flow-control valves, effectively creating a double check valve that prevents the blender from exerting negative pressure on the scale during weighing. Once the additive reaches the set weight on the scale as determined by the blend recipe, the two valves simultaneously open and the additive gravity-discharges from the scale through the 4-inch-diameter, 10-foot-long tube into the blender. After a preset time, the valves close and the additive batching process repeats.

When planning the blending line, the company specified a butterfly valve for the blending operation's slide–gate valve helps maintain an upstream gain-in-weight scale's weighing accuracy, ensuring that the correct amount of a specialty additive is delivered to the blender every time.
scale’s discharge and a slide–gate valve for pressure relief. For the slide–gate valve, the company worked with an equipment manufacturer it had purchased valves from in the past and whose valves it’d had good success with in other areas of the facility. This manufacturer, Lorenz Conveying Products, Cobourg, Ont., manufactures slide–gate valves, couplings, tube and pipe bends, fittings, diverter valves, cyclones, and custom-fabricated accessories for pneumatic pressure and vacuum conveying and bulk handling systems in the plastics, food, and chemical industries.

According to Craig Adams, Welcome facility maintenance manager, the blending line’s slide–gate valve was no exception; it provided reliable and trouble-free operation from the start and over the following years. However, in summer 2011, Adams noticed that while the valve was functioning reliably, it was beginning to show signs of wear and tear that 8 years of continuous use can produce.

“When the valve started to wear out, we had to decide whether to rebuild it or purchase a new one,” says Adams. “When evaluating both options, we found that completely rebuilding the valve would cost almost as much as purchasing a new one, so we decided to get a new valve. Since we used the original valve for all those years without experiencing any major problems, we decided to stay with the same valve manufacturer and purchase the replacement valve from them.”

The slide–gate valve

In January 2012, the model SG2-400 Series E slide–gate valve arrived at the Welcome facility, and Adams installed it in the blending line. The fabricated valve has a light-weight aluminum frame, Type 304 stainless steel contact points, a 4-inch-diameter opening, and tube stubs on the inlet and outlet sides that connect to the transfer tube. Other features include a cushioned air cylinder with an internal magnetic piston and single-acting spring-return solenoid valve, and a positive blade lock between the polished stainless steel slide–gate blade and cylinder rod. Including the tube stubs, the valve only requires about 5 inches of vertical space and 30 inches of horizontal space for installation. With a NEMA 4 water- and dust-tight electrical enclosure, the valve can be used in damp or dusty processes and is rated for temperatures up to 180°F (82°C).

The pneumatically actuated valve requires 80 psi of compressed air to activate the cylinder. A PLC activates the solenoid valve based on a preprogrammed timing sequence, and the compressed air flows to the valve’s cylinder, which instantaneously opens the slide–gate blade to allow the specialty additive to move from the scale into the blender. After a predetermined time, the PLC deactivates the solenoid valve to cut off the compressed air to the cylinder and close the slide–gate. Position switches on the cylinder indicate whether the slide–gate is open or closed. To ensure successful operation upon installation, each slide–gate is fully tested before shipping.

Valve ensures continued success

The company chose to purchase its new slide–gate valve from the manufacturer because “the valve has a simple design, requires very little maintenance or upkeep, and lasts a long time,” says Adams. “We’ve never had any problems with the additive powder getting into any of the valve components; it performs extremely well in our environment. Additionally, the valve manufacturer provides fast and reliable service whenever we’ve had a technical issue with any of their valves — they’ll send us what we need right away or help us troubleshoot things over the phone. We expect to get the same, if not better, performance and long operating life from the new valve as we did the previous one.”

Note: Find more information on this topic in articles listed under “Valves” in Powder and Bulk Engineering’s comprehensive Article Index in the December 2011 issue and at PBE’s website, www.powderbulk.com, and in books available through the website in the PBE Bookstore. You can also purchase copies of past PBE articles at www.powderbulk.com.

The slide–gate valve’s pneumatic cylinder and single-acting spring-return solenoid, which is connected to an 80-psi compressed-air source, controls the slide–gate valve blade’s opening and closing.

Lorenz, Cobourg, ON 905-372-2240 www.lorenz.ca