

SUPPLIERS' TIPS

What are signs that the rotary valve feeding our pneumatic conveying system is wearing?

Rotary valves are an essential component for efficient pneumatic conveying system operation. Pneumatic conveying is achieved by a combination of pressure-differential and the flow of air supplied by an air mover. The rotary valve or airlock maintains the air pressure differential by preventing air from passing through the valve. If the rotary valve has any kind of wear, this could be detrimental to the system.

Typically, as a rotary valve starts to wear, the clearances between the rotor vanes and the valve housing will become larger, leading to increased air leakage across the valve. Another sign of wear is if the system run times take longer than when the system was initially installed. Lastly, you may find that you need to increase airflow from the air mover because the system is no longer efficient. As a result, you may see a rise in energy usage.

Mike Wood, director of sales, North America, DMN, 870-733-9100

Rotary valves or rotary airlocks are designed to keep a consistent pressure differential between a pneumatic conveying system and the surrounding air so material can travel efficiently through the system. They do this by preventing airflow between the inlet and outlet. Without an airlock, pressurized air would flow upwards through the valve, block material from entering the inlet, and reduce flow significantly.

A true sign that a rotary valve is starting to wear is when you notice an increase in air leakage (also called blow-by) through the rotor vanes. This affects the amount of material that can enter the rotary valve, reducing the pocket-filling efficacy and decreasing the amount of material feeding into the conveying system.

Another sign of wear is a loss in conveying capacity and reduced conveying pressures that differ from your normal design parameters. If the wear is related to an abrasive application, several rotor and housing options are available to increase the valve's life and minimize air leakage. When rotating parts are in constant contact with abrasive material, leakage is an inevitable consequence. Three options that can increase valve life include ceramic-lined housings, high-velocity thermal sprays, and chrome coating.

Leakage can be predicted and calculated, and selecting the correct airlock for the application will help to minimize leakage. Knowing all the system design parameters will allow you to determine the right airlock style, size, rotor features, and rotor speed.

Unfortunately leakage can't be completely eliminated, so it's extremely important to contain and redirect the leakage air in your system through proper rotary valve venting. If the valve is equipped with a connection on the rotor's clean side, venting can be done directly from the body of the airlock after discharging the material. Venting can also be done from a small, vented transition hopper installed between the material discharge and rotary valve inlet.

Gary Brock, regional sales manager, Spiroflow Systems, 877-298-9595

Rotary valve performance is affected by the design and performance of the bulk material handling system. Many bulk materials that may be considered "easy-to-handle" by other process equipment can become "difficult-to-handle" when exposed to the conditions of the rotary valve. A good example is a bulk material that becomes abrasive when entrained by high-velocity air leakage and tight rotor clearances within the valve, causing erosion of the valve surfaces. In applications where the rotary valve is designed to meter the bulk material into the conveying line of a positive pressure system, any amount of wear will begin to reduce performance. The leakage up through the rotary valve can inhibit vane or pocket filling and reduce conveying pressure and the pneumatic conveying system's overall output. Leakage back through the rotary valve can also cause dust problems in the feed hopper.

In applications where the rotary valve is used to meter the bulk material directly into the conveying line of a vacuum pneumatic conveying system, there won't be any obvious sign of rotary valve wear; the rotary valve only serves to meter-feed the bulk material into the conveying line, so wear won't have any adverse effect on system performance.

Doan Pendleton, vice president, Vac-U-Max, 973-759-4600

Equipment suppliers are a valuable source of information about equipment and processes. In light of this, each month we ask suppliers a question of concern to our readers. Answers reflect the suppliers' general expertise and don't promote the suppliers' equipment. If you have a question you'd like suppliers to answer, send it to Kayla Carrigan, Associate Editor, Powder and Bulk Engineering, *1155 Northland Drive, St. Paul, MN 55120; fax 651-287-5650 (kcarrigan@cscpub.com).*