SUPPLIERS' TIPS

What should I know before buying a pneumatic conveying system to ensure that the system will run efficiently?

The key to an efficient pneumatic conveying system is eliminating undue pressure drop, which can stem from excess conveying lines or elbows, higher-than-required conveying velocities, or poor pumping device selection. It's important to remember that pump pressure equates to horsepower usage, which drives power efficiency.

Jonathan Thorn, process technology manager, MAC Equipment, 800-821-2476

Key points to keep in mind to ensure an efficient system include these: Tons per hour of material to be moved; material weight; distance the material will be moved, number of turns in the system transfer line, and total height of material to be lifted; material characteristics (sticky, abrasive, explosive); elevation at site location; and whether additional capacity will be needed in the future.

Keith Ringler, vice president of operations, C & W Manufacturing and Sales, 817-783-5000

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 to have suppliers answer, send it to Jamie Nashban, associate editor, Powder and Bulk Engineering, *1155 Northland Drive, St. Paul, MN 55120; fax 651-287-5650, jnashban@cscpub.com.*

To be sure the system is sized correctly and runs efficiently, ask the following questions:

About the material: What is the material to be conveyed? What form is the material in (pellet, granule, powder, fiber, flake)? What is the particle size in microns? How big is the largest particle? How small is the smallest particle? What is the material's bulk density in pounds per cubic feet? What is the moisture content expressed in a percentage? How would you describe the material's flowability? Is the material abrasive, floodable, friable, toxic, explosive, corrosive, hygroscopic? What is the material's temperature?

About the environment and the application: Will the material be moving a short distance from point A to point B? (If so, a simple self-contained loader will do the job.) Will multiple materials be moving to and from multiple discharge points? (If so, a central vacuum receiving system may be needed.) What is the ambient temperature in the area where the equipment will be installed? What is the height above sea level? (Elevation affects vacuum pressure.) How much headroom is available where the loader or receiver is to be installed? Do special conditions exist, such as vapors or mists? Will the equipment be placed in a hazardous area? What kind of cleaning and sanitary requirements must be met? (This could dictate what the system should be constructed of — stainless steel or aluminum.) What is the electrical supply? What is the air supply?

About the pickup source: What is the material coming out of? A hopper or silo? A bulk bag station? A bag dumping station? A drum or octabin? (Selecting the correct pickup device, such as a wand or spike, is important to ensure that the material successfully flows into the vacuum conveying line.)

About the distance to be conveyed: What is the total distance the material must be conveyed to get from point A to point B? How many horizontal feet and how many vertical feet will the material be conveyed? What is the estimated number of 90-degree bends in the line?

About discharge: What device will receive the material when it's discharged from the vacuum loader or receiver?

Kathy Hunter, director of marketing, K-Tron International, 856-589-0500

The most important consideration when selecting a pneumatic conveying system is the conveying system's pipe size. For a given delivery rate, smaller piping will reduce the system's initial cost. For this reason, most pneumatic conveying system suppliers will critically size the system. However, because of air friction in the pipe, the air pressure required to provide the necessary air velocity will be higher. Larger piping will result in lower frictional losses and, therefore, require less energy to provide the same delivery. Keep in mind, the energy required to operate the system at a lower air pressure and higher airflow is less than the energy required to operate the system at a higher air pressure and lower airflow. Even though the initial cost of the system with larger piping will be higher because of the larger components, the operating cost will be lower.

It's important to know that all pneumatic conveying systems operate on a bell-shaped curve. In other words, for any given system there are two points that can provide the same delivery. To make sure that the selection is efficient, you should ask the blowpipe engineer to provide a system curve. The specified operating point should be on the curve's left-hand side near its top for the most efficient system.

Another consideration is selecting the blower. Most pneumatic convey-

ing system suppliers aim to provide a system at its lowest cost. This means that the blower is selected based on its low initial price. Your process depends on the blower's performance, and you should insist on process-quality blowers packaged by the manufacturer. In addition to enhanced system reliability, process-quality blowers can be as much as 20 percent more efficient. Other advantages over grease-lubricated, OEM-quality blowers include lower noise levels, lower operating temperatures, and reduced maintenance.

Finally, remember to consider the blower type. If the primary design factor is low noise or low pulsation, select trilobe positive-displacement blowers, which feature reduced pulsation and noise. Keep in mind that the trilobe's third lobe occupies space. If the primary design consideration is high efficiency, select two-lobe blowers, which are up to 5 percent more efficient with pressure because there's less internal leakage.

Calvin R. Wallace, national sales manager, Omega Blowers, 540-898-5500

Before buying a pneumatic conveying system, establish tangible criteria to measure system performance. If material degradation is a concern, the acceptable attrition degree must be defined as part of the system's specifications. If air consumption is an issue, a positive and verifiable means of measuring it must be documented. Finally, the system's material delivery rate, along with a method of measuring it, must be considered. Suppliers define air consumption and product delivery rates using various terms. Be sure to understand in detail what the vendor's proposals are saying.

Mike Weyandt, corporate sales manager, Nol-Tec Systems, 651-780-8600

Be sure that the sample you give to the pneumatic conveying system supplier is identical to the material that's being handled at the same point in the process. For example, if you're handling nylon pellets and the system is located at a point before the fines are removed, the sample should include these fines. Sending a material sample that has been further processed and has different physical characteristics can play a detrimental role in how efficiently the system will run.

In addition, before ordering a pneumatic conveying system, determine the system's importance in the plant's operation. If the system's mission is critical to production, look carefully at the system and its component designs. The system may need to be designed with in-place spares for such components as power units and line filters. These components should also be designed for continuous unattended service — 24 hours a day, 7 days a week.

William Mahoney, division manager, The Young Industries, 570-546-1826

The pumps and blowers that move air in pneumatic conveying systems are one of the largest power consumers in the system. There's a wide range of pump and blower technologies available for these systems with a corresponding efficiency range because of the impeller's working principle. Furthermore, some pumps and blowers can be operated with variable-speed drives that change the pump's rotational speed to correspond to the actual need of the system. This rotational speed reduction will result in power savings and increased efficiency.

Troy Bridges, product engineering manager, Busch, 757-463-7800

Clearly define what the system is expected to do, including establishing what the pickup point is — a bulk bag unloader, a silo, paper bags, drums, or another place. Know the answers to the following questions: What is the minimal distance absolutely required, keeping the sweeps to a minimum? At what rate should the material be delivered to the process? Should it be delivered continuously or batch? If batch, how many batches are required per given time period? What is the process the material is being delivered to? Is it a blender, tank, or feeder? What is the duty cycle? Is it once a day, once an hour, or 24 hours a day, 7 days a week?

When an experienced system design engineer knows all of this information, he or she will be able to offer a system design that fits your requirements. The system won't be so small that it can't meet your process requirements, and it won't be so large that it wastes energy and capital equipment costs for a system with a capacity beyond your needs.

Henry Kadel, vice president of sales, Vac-U-Max, 973-759-4600