CHECKING FOR VACUUM LEAKS

Vacuum leaks can affect the vacuum levels for a process. If there are enough leaks in the pipes and process, it can prevent the vacuum system from achieving enough vacuum level for the process to function correctly. Leaks can appear to be capacity issues with the vacuum system when there is actually enough pumping capacity.

There are several methods of testing for vacuum leaks. Perhaps the easiest method is a pressurized soap bubble test. For this type of test, the system and/or the process piping is isolated then put under pressure. While the system/piping is under pressure, use a small brush to apply soapy water to all fittings, threaded areas, or other potential leak sources. Areas that leak will cause the soapy water to bubble. Mark each leak so it can be identified and repaired after pressure is removed from the system/piping.

Care must be taken when pressurizing the vacuum pump or vacuum system. Too much pressure can cause individual components such as seals and O-rings to rupture.

For systems that cannot be pressurized, flexible tape can be used to locate vacuum leaks. While pulling a vacuum on the system and/or piping, use a thin, flexible tape in areas where there are potential leaks. The tape will be deflected in or sucked in where a leak is detected. In applications where PVC is used for inlet piping, the tape can be left in place to repair the leak.

An ultrasonic leak detector can also be used to locate vacuum leaks. The ultrasonic leak detector works by detecting the high-frequency sound associated with the air leak. These sounds are converted down to the audible range where they can be heard in a headset or viewed on a meter. Ultrasonic leak detectors are available commercially by a wide variety of suppliers. The biggest problem with this type of detector is background noise. Background noise can "mask" the sound from the vacuum leak. One of the advantages of an ultrasonic leak detector is that it can also be used to find leaks in compressed air systems/piping.

One of the most accurate methods of vacuum leak detection is the helium leak detector. A sensor is usually placed near the inlet to the vacuum pump to detect any increase in helium concentration in the air stream. Helium is then sprayed on any potential leak points in the system or piping. If there is a leak, the helium is quickly pulled into the vacuum system and identified by the sensor near the vacuum pump inlet which triggers an alarm to indicate a leak is present.

The advantage of the helium detector is that it is sensitive and can locate very small vacuum leaks. The disadvantage of the helium detector is the cost to purchase and maintain the detector.