
MSA Gas Detection System: Air-Cooled Sample Conditioner for High Temperature Gas Sampling

Application:

Many extractive gas sampling applications involve very hot samples that must be cooled to instrument temperature before they can be analyzed. As samples cool, moisture may condense from the sample stream that can damage gas detection systems. Disposal of a high volume of water can become a major concern during gas sample transport. A very high solvent vapor content may exist that can react with elastomers or plastic components within the sample stream. To help prevent this situation, MSA has developed an air-cooled conditioner that can drop sample tap temperature and allow condensate to return to the process, ensuring that the analyzer sample remains as a single gas phase.

Solution:

The sample is extracted from the process and enters a finned stainless steel tube assembly. Copper fins on the tube increase the surface area that can transfer heat to the surrounding atmosphere. To enhance the cooling process and to condense as much liquid as possible to drain back to the process, the finned tube is jacketed within a larger tube; air around the fins is cooled below ambient temperature. The finned tube has a wide enough diameter to allow condensed liquids to drip down the tube and back to the process without impeding gas flow. The conditioner assembly must be installed vertically to drain liquids.

Cooling the interstitial volume between the tubes is done with an air-driven device that separates compressed air into warm and cold components. Air from the cold side envelops the finned tube and lowers the sample temperature below ambient. If the procedure is done properly, no further condensation occurs during transport and particulate filtering is all that is required downstream. The resulting sample temperature is a function of sample flow rate and supply air pressure; there are no moving parts to maintain and no electrical requirements that might impact installation.

This conditioning method has been used to reduce water content of samples from process streams that run hotter than instruments. This method has also been used to reduce vapors from samples undergoing oxygen content analysis within a solvent tank head space inerting process.

Specifications

Sample wetted components:	316 Stainless steel
Sample tube connections:	½" O.D. Swagelok
Sample exit temperature:	50° F (approx)
Sample lag time:	<3 sec @ 4cfh
Air line connections:	¼ NPT
Air supply pressure:	25 PSI
Maximum cooling potential:	1500 BTUH @ 25 SCFM



Note: This bulletin contains only a general description of the products shown. While uses and performance capabilities are described, under no circumstances shall the products be used by untrained or unqualified individuals and not until the product instructions including any warnings or cautions provided have been thoroughly read and understood. Only they contain the complete and detailed information concerning proper use and care of these products.



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