A Member of
The Linde Group

KRYOTECHNIK

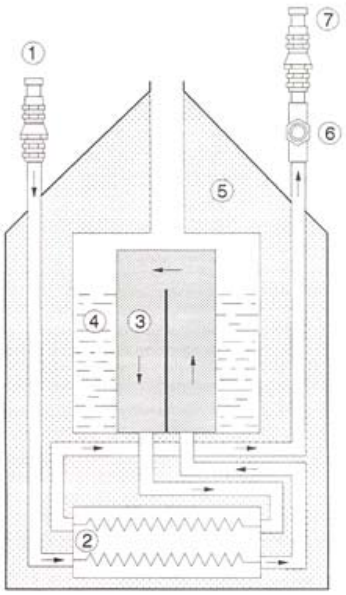
Cryogenic Adsorber.
Model He

Application area

The cryogenic adsorber is recommended for clean-up of the helium gas in a liquefier or refrigerator system, which has been opened to atmosphere. It is especially effective for removal of air and moisture and saves time compared with the usual procedure of pumping and purging.

The most important requirement to obtain continuous operation of a liquefaction / refrigeration system over extended periods of time is the elimination of contaminants from the helium process stream within the system. While solid particles or dirt may plug the system or damage moving parts, gaseous contaminants that can condense and solidify at low temperature must also be removed. Gaseous contaminants could enter the system during installation or from helium gas replenishment sources. Contamination may also result from the introduction of air into the system through small leaks, especially when the system is being operated at sub-atmospheric pressure.
After the system has been decontaminated, the adsorber may serve an alternate purpose, which is to remove impurities from helium gas replenishment sources. The pure helium supply source or make-up gas is to be 99.995% pure; no more than 50 ppm (parts per million) impurities are allowed. However, since control between suppliers over the impurities is difficult, it is recommended that the gas be passed through a Cryogenic Adsorber before introducing it as pure make-up gas to the liquefier / refrigerator.

Description



schematic drawing

1. Helium Inlet
2. Heat Exchanger
3. Activated Charcoal
4. Liquid Nitrogen
5. Powered Insulation
6. Relief Valve, 20.7 bar(g) (300 psi)
7. Helium Outlet

Gas enters the unit with 13 - 17 bar and passes through a heat exchanger, where it is cooled by the outlet gas stream. It then enters a stainless steel, liquid nitrogen cooled vessel, containing adsorbent material, where impurities are adsorbed.
The stream continues through the heat exchanger to the outlet side of the unit. The addition of a liquid nitrogen level control permits unattended operation of the unit for extended periods. Periodically, the unit must be warmed up and regenerated.

Duration

The duty period before regeneration, which is required (four to eight hours), depends on the impurity level in the gas. Liquid nitrogen consumption is one liter per hour (static); two liters per hour (operating), 25 liters required to charge the system. The helium flow rate at 17 bar is 95 Nm^3/h maximum with 2 bar pressure drop. The output gas has reduced impurity level of less than 5 ppm and a dew point less than 211 Kelvin (-62 °C).

Duty period before regeneration	Depends upon impurity level in gas	
Liquid Nitrogen consumption	1 l/h	(static)
	2 l/h	(operation)
	25 liters	required to charge system
Flow rate @ 17 bar (250 psi)	95 Nm^3/h (60 SCFM) maximum with	
	2 bar (30 psi) pressure drop	
Output prity	Reduces impurity level to less than 5 ppm and dew point to less than 211 Kelvin (-62 °C)	

Linde Kryotechnik AG
Daettlikonerstrasse 5, 8422 Pfungen, Switzerland
Phone: +41.52.304-05 55, FAX: +41.52.304-05 50, www.linde-kryotechnik.ch, info@linde-kryotechnik.ch