CRYOGENIC INDUSTRIES

FROSTBYTE

A newsletter from Cryogenic Industries | Winter 2015

Ammonia, Old Gas - New Requirements

For over five decades, Cryoquip has been a world leader in the Industrial gas and energy field. Not just in the gas processing industry, but also in the chemical processing industry, designing and manufacturing equipment and systems for cryogenic fluids and other gases like LNG, CNG, ethylene, nitrogen, oxygen, argon, hydrogen, helium, CO2, ammonia and other exotic gases.

Ammonia is not a cryogenic gas, since its boiling point is higher than -100C. Ammonia is a compound of nitrogen and hydrogen with the formula NH3. It is a colorless gas with a characteristic pungent smell and it boils at −28 °F (−33 °C) at a pressure of one atmosphere, so the liquid must be stored under pressure or at low temperature. Although widely used, ammonia is both caustic and hazardous and correct material selection for processing equipment is of paramount importance. The design of successful processing equipment requires a certain level of expertise and know-how in gas processing that is second nature to Cryoquip's engineers. Because of our process capabilities, Cryoquip was recently contracted by a chemical company in South America, a subsidiary of a major European chemical giant, to engineer an ammonia processing solution, and manufacture a complete, skid mounted, fully engineered system based on the principals of an existing system operating in the USA.

While it has many different uses, ammonia is used mostly as a precursor to fertilizer, a household and industrial cleaner, for controlling fermentation processes and as an anti-microbial growth agent in a number of processing industries. Despite its toxicity, it is also used as an industrial scale refrigerant, and to control gaseous emissions and pH values. In the application for which Cryoquip designed a process skid, the ammonia is used in a fermentation process for producing animal feed.

This process requires anhydrous ammonia, but the liquid feedstock contains residue of water, oil and other contaminants. These have to be removed before the pure, dry, gaseous ammonia can be supplied to the fermentation process. To produce pure dry gas, the liquid ammonia has to be vaporized, all contaminants removed and separated for further disposal. The gas has to be filtered and, if necessary, warmed to the correct exit temperature for the fermentation process.

A review of the operating principals of the customer's existing system revealed a seriously flawed design, plagued with pressure fluctuation problems. These were caused by inadequate separation and an accumulation of oil and water in the main heat exchanger. This condition is exacerbated in cooler weather conditions because of the higher water content in the liquid ammonia. In severe conditions, the process has to be completely shut-down to allow the oil water and contaminants to be removed from the entire system, and the equipment dried and restarted.

Photo 1

Cryoquip proposed an entirely different engineered solution to solve the current operational problems. This was based around a conventional model VWU shell and tube water circulating vaporizer which has been successfully used in cryogenic applications for many years. The incoming ammonia stream is de-pressurized to enhance vaporization against the available source of cooling tower water. The gas leaving the heat exchanger is passed through a knock-out drum to separate the entrained water from the ammonia stream. The knock-out drum incorporates an automatic level control system and the separated water is collected periodically and transferred off-skid for

Photo 2

further processing. The pure gas stream is heated as required to meet the exit temperature requirement, pressure regulated and dispensed to the process.

Other supporting components were developed to effectively separate the water from the ammonia stream, built in heaters to maintain the temperature inside the knock-out drum to ensure complete separation of the ammonia and water, and to maintain the required exit gas temperature. All process piping was designed to meet strict chemical plant guidelines; electric and electronic components met ATEX and INMETRO requirements; valves, flow and pressure controls, transmitters and full process instrumentation was required to meet strict country codes. An explosion-proof contact panel was provided, enabling the customer to connect the skid to his own DCS to operate and control the functions of the ammonia water separation system.

In addition to these special custom-engineered solutions to process problems, Cryoquip is developing similar heat exchanger skidded equipment for future industrial fuel applications, and we are at the forefront of new equipment innovation, design, and testing.[Photo 2]

For example, LNG represents the greenest alternative energy source currently available. Cryoquip designs and manufactures portable regasification units and fuel skids for all modes of transport that use multiple energy sources, including ocean going LNG carriers, inter coastal ships and barges, trucks, buses, depot based vehicles and trains. Cryoquip's innovations, based on decades of experience in cryogenic engineered solutions, are aimed at resolving fueling problems and providing green solutions to power the industrial LNG revolution.

For further information, visit www.Cryoquip.com.

UPCOMING EVENTS

CRYOGENIC INDUSTRIES
GOLF TOURNAMENT 2015

Cryogenic Industries' 2015 Open House & Golf Tournament
April 15-17, 2015

L-NGV
San Diego, California
April 27-29, 2015
Exhibiting

IWDC
Tampa, FL
April 28-30, 2015
Exhibiting

Offshore Technology Conference (OTC)
Houston, Texas
May 4-7, 2015
Exhibiting – LNG Pumps

Alternative Clean Transportation (ACT) Expo
Dallas, Texas
May 4-7, 2015
Exhibiting – LNG Pumps

World Gas Conference
Paris, France
June 1-5, 2015
Attending

Global Petroleum Show
Calgary, Canada
June 9-10, 2015
Exhibiting

LAGCOE
Lafayette, Louisiana
October 27-29, 2015
Exhibiting

Gastech
Singapore
October 27-30, 2015
Exhibiting