

# CUSTOM PUMP PROVIDES PERFORMANCE AND SAFETY IN NATURAL GAS SAMPLING APPLICATION



## OVERVIEW

The extraction and collection of natural gas for quality testing has been a fundamental component of the hydrocarbon industry for decades. The overall process is relatively straightforward:

- First, a spot sample of natural gas is extracted from a pipeline wellhead, and stored in a collection cylinder for transport.
- Next, the sample of gas is analyzed to determine the concentration of various compounds including: methane, water, hydrogen sulfide, etc.
- Finally, the energy potential of the representative sample of gas is determined based on the results of the chemical composition analysis.

Since the energy potential of a representative sample of natural gas has significant process and economic implications, companies within the hydrocarbon industry place great emphasis on the collection methods thereof.

Recently, KNF partnered with a reputable firm in the hydrocarbon industry to develop and field test a specialized diaphragm vacuum pump for natural gas spot sample collection. The pump was custom-designed to safely extract samples of natural gas within the specific technical parameters of the application.

## SPEC #1: VACUUM AND PRESSURE REQUIREMENTS

Spot sample extraction occurs at various well heads or access points along a natural gas pipeline.

Depending on the location of sample extraction in relation to the pipeline, the pump used to draw the sample must be able to transfer it from various levels of vacuum on the inlet, to a positive pressure on the outlet, ultimately pressurizing the sample in a collection vessel.

To meet the specific requirements associated with this gas sampling application, KNF process engineers selected an N 035 diaphragm vacuum pump as a starting point. From there, the N 035 pump was configured to include 2 heads, in series. Then, the pump was altered to accommodate the varying vacuum to pressure requirements of the natural gas sampling application — a range which corresponds to variable location of the sample extraction point along the pipeline. With an ultimate vacuum down to 29.5 inHg, and a maximum pressure up to 60 psig, the specialized N 035.3 pump easily met the vacuum and pressure requirements of the natural gas sampling application.

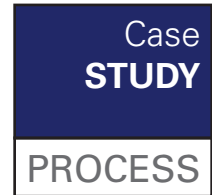


N 035.3 STI Ex vacuum pump

## SPEC #2: SAFE TRANSFER OF HAZAROUS MEDIA

The most obvious challenge associated with transfer of natural gas is the explosive nature of the media. Since natural gas is highly combustible, special precautions must be taken to avoid introducing any variables into the system which could ignite the gas.

With the vacuum and pressure requirements of this application having been achieved with the selection of the N 035.3 double-headed vacuum pump, the next requirement to consider was the safety-critical transfer of a hazardous media. The combustibility of the natural gas being transported in this application immediately led KNF process engineers to consider design modifications which meet NEC compliance standards.



When designed to applicable standards, KNF pumps offer safe transport of flammable or explosive media, making them fully compliant for NEC Class 1: Division 1, Groups C & D, Division 2: Groups A, B, C, D hazardous locations.

### SPEC #3: MODIFIED TO MEET CUSTOMER NEEDS

Gas sample extraction, like most process media applications, requires precise measurement and control. Product modification and testing is often the only way to ensure performance precisely matches specification, while maintaining additional considerations for cost and environmental factors.

In this scenario, KNF Neuberger worked engineer-to-engineer with the customer to develop a diaphragm vacuum pump equipped specifically for natural gas sampling. Ultimate vacuum and pressure were important factors which necessitated specific modifications to the N 035 series diaphragm vacuum pump. Additionally, safe transfer of highly combustible natural gas was an important factor in the selection of an explosion-proof, AC motor. KNF Neuberger, Inc. provides process media pumps for a number of alternative gas sampling applications such as: continuous emissions monitoring, exhaust analysis, etc.

All KNF diaphragm process pumps are underpinned by a modular design concept. This modular concept enables modification via a variety of specialized, cost-effective materials and accessories. In fact, over 80% of the pumps manufactured by KNF Neuberger Inc. are custom-engineered pump solutions developed specifically with the customers' needs in mind. By combining our technical product expertise with the application and system knowledge of our customers, KNF is able to optimize each pump precisely to specific application and safety requirements.

