Cooling of mobile biogas compressors

The continual feeding of biogas into the natural gas network significantly improves the efficiency of biogas facilities. The piston compressor manufacturer NEUMAN & ESSER has developed a mobile biogas system for this purpose and is relying on a Güntner Vario FLAT S-GFH dry cooler for cooling the compressors.

Once treated, biogas can be fed into the natural gas network and be used as reliably and flexibly as fossil natural gas. From an economic perspective, this is of particular interest to biogas producers if the local use of heat is not possible.

In order to be able to feed biomethane into the natural gas network regardless of the location, the piston compressor manufacturer NEUMAN & ESSER (NEA) from Wurzen has developed a mobile system for compressing treated biogas which was designed not only for two- and three-stage feeding but also for recirculation. It is particularly suitable for situations where a stationary system cannot be used.

Two 40 foot containers

The NEA MoBIO 800 consists of two 40 foot containers. Each of these is mounted on an HGV trailer. Once the components have been filled, the containers can be transported by road on a standard HGV with no need for a special permit.

Overview

Business area:	EPC (Energy and Process Cooling)
Application:	Renewable energies
Country/city:	Germany/mobile
Fluid:	Water/glycol
Product:	Güntner Vario FLAT S-GFH fluid cooler

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The Güntner Vario FLAT S-GFH dry cooler has special dimensions and fits perfectly on the container. To ensure safe transport, it was also stiffened and the copper piping was reinforced.

The first container houses two oil-free, gas-tight and thus emissions-free NEA piston compressors which are driven by a 315 kW engine. The second container houses the Güntner Vario FLAT dry cooler (type S-GFH) with 430 kW, the control and regulating system and a wide range of accessories. The system which is optimised in terms of size and weight can be used at external temperatures of between -20 and 35 °C.

The waste heat from the compressors is transferred via a water/glycol mixture to the Güntner Vario FLAT S-GFH dry cooler and then dissipated. The dry cooler has a special size and fits perfectly on the container. In order to ensure safe transport, the cooler was stiffened using a robust base stand and the copper piping was reinforced.

Straightforward mobile start-up

The mobile compressor system can be started up and put into operation on location within a day. This is possible thanks to flexible pipes between the two trailers and various platforms and staircases which mean that all other connections are easily accessible.

The mobile gas compressor is able to compress at least 800 Nm³ of gas per hour even at different pressure ratios. Depending on the biogas production, the suction pressures vary between 1 and 10 bar. The final pressures vary depending on the location and gas network and range from 16 to 85 bar.

The system has an efficient, energy-saving speed controller as well as a bypass and can be uncoupled to allow partial load operation with only one of the two piston compressors being used. As a result, the system can adapt as necessary to different process requirements. The system can also be remotely monitored and warns the operators in the event of fire, leak or break-in.

Biogas for the gas network

The production of biogas fluctuates all the time. This is due to the differing quantities and types of substrate and its varying dry matter content. Both of these factors influence the metabolic activity of the microorganisms and thus the production of biogas.

On the other hand, the maximum amount of gas that can be fed into the network depends on the demand from downstream consumers. Gas consumption also decreases during the night and is much lower in summer. As a result, compressing the biogas is particularly important.

Before the biogas can be fed into the natural gas network, the gas goes through four process steps: desulphurisation, dehumidification, removal of carbon dioxide and, finally, compression. Depending on the quality requirements of the gas network operator, the biogas must be concentrated to have a methane content of 97 to 99 percent. The resulting concentrated biogas is then referred to as bio natural gas or biomethane.

Before it is fed into the network, the biogas is compressed to the pressure level in the gas network to be supplied. The gas which has been treated and conforms to requirements is then fed in via compressors and/or pressure regulating and measuring systems.

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