

CNG Fueling System



HAVAYAR CNG DRYERS

Natural Gas Dryers
for NGV Fueling Stations

CERTIFICATION

The design, manufacturing and performance are certified by the famous inspection & Quality Service Company.



Havayar factory Karaj - Iran



Call No:111(01)

Havayar company has started its activity since July 1998 in order to manufacture industrial compressors and supplementary air equipments in Iran. It's reached to remarkable improvement in a short time and achieved the high quality of its equipments by the help of internal and external counselor. Havayar company according to its educational and practical capabilities is manufacturing industrial compressor (Screw) under licence of Atlas copco and CNG compressors with the cooperation of Kwangshin company.

The major and important objects of Havayar company are as blow:
 1-Customer -satisfaction
 2-Continuous quality improvement
 3-The expansion of after sale service.
 Havayar company is succeed to receive ISO 9001-2000 certificate from TUV NORD company in order to apply aforementioned objects.



9000 cars are fueling in this station daily. Tehran-Iran
 .hr wet gas are dried by Havayar's CNG Dryers Nm³/4500

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What You Need To Know

The natural gas obtained from the ground is saturated with water vapor. The gas is cleaned and dried before it enters the distribution pipes. After this pre-cleaning, the gas may still adsorb moisture on its route to the gas point of use as the result of:

- Water vapor diffusion and out gassing in the pipelines.
- Water residue in the pipelines.

Compression of the natural gas increases the partial pressure of all gas components (including that of the water vapor) in proportion to the overall pressure. The gas which was previously dry may reach the saturation range as the result of compression.

Condensate or, in conjunction with hydrocarbons, hydrates will form in the natural gas depending on the gas humidity. Hydrates and condensates cause problems on the natural gas refueling installation and vehicles.

Liquid water is the precursor to the formation of corrosive compounds through combination with components in natural gas, namely carbon dioxide and hydrogen sulfide. The combination of corrosive agents, and the pressure cycling, caused by fuel storage container, can result in crack growth in metals and ultimately damage and failure. Also, liquid water itself can be detrimental as it may cause blockage, both liquid and solid, in the fuel system.

ISO 15403: 2000(E) States (Paragraph 5.1): "The single most important safety requirement of compressed natural gas (CNG) fuel is a very low water dew point temperature to preclude the formation of liquid water at any time."

The **SAE J1616** recommends drying CNG to 10°F/5-6°C (at pressure) below locations low dry bulb temperature.

Thus, the water dew point of the fuel gas at the fueling station outlet shall be sufficiently below the lowest ambient temperature in which the fueling station and vehicles will operate.

Installing an adsorption dryer can eliminate the water vapor, leaving only an extremely low residual concentration. This process utilizes the property of a porous, high-area adsorbent to selectively adsorb the water vapor molecular sieves as the adsorbent, and these sieves adsorb only water vapor molecules, thus retaining the gas composition unchanged.



General Description of Regeneration Dryer

The skid-mounted twin tower, external-heated, fully automatic, closed-loop regenerative dryer is used for the purpose of dehydrating natural gas and providing dryer and oil-free gas.

Havayar dual tower regenerative natural gas dryer is included the latest technology and safety features.

It's equipped with two desiccant-filled pressure vessels, electric heater, air-cooled heat exchanger, pre-after filter, and can work with two working modes:

- AUTO DEW SWITCHING MODE
- FIXED TIME CYCLE SWITCHING MODE

The package is installed upstream to the compressor and can effectively protect the compressor from oil, water, and dust contaminations.

Standard and Code

All dryers have been designed based on manufacture standard and in conformity with the latest edition of below standard:

- ASME Sec. VIII for pressure vessel design
- ISA standard for instrumentation
- IEC & NFPA 70 standards for electrical components.
- API 661 standard for heat exchangers.
- ASME B31.3 & B31.8 for piping
- GPSA for process
- Can be built to specific requirements such as the Chinese and Malaysian pressure vessel codes

Havayar Dryer Features

- **Maximum Efficiency**
Low running cost, low pressure drop and steady dew point are considered through careful design and manufacture.
- **Easy Installation**
All parts and sub-equipments are completely assembled on the dryer bed and are shipped ready for installation with no assembly work required on the site.
- **Easy Start up, Operation and maintenance**
Completely automated control equipment which starts after pushing operation button, thereafter it can be controlled from a control panel, with all necessary interlocking devices provided to prevent trouble arising from operators or other disturbance.

Routine inspection and maintenance are facilitated by optimum arrangement.

- **Minimum Pressure Drop**
The unique design of the regeneration system ensures the pressure stability during the heating and cooling regeneration processes.

Main Parts Description



- Heater is equipped with sheath temperature control, temperature transmitter and thermocouple. The Flow Switch is installed on the regeneration pipe line to protect heaters and ensure blower operation.



- All filters and water separator are equipped with differential pressure indicator.



- The pipe lines before and after the cooler are equipped with temperature transmitter.



- Desiccant vessels are equipped with pressure and temperature indicators and relief valves.



- The inlet and outlet dew point can be measured with dew point transmitter (optional)



- Actuator valves are equipped with limit switches.



- Gas-Air cooled heat exchanger in accordance to API 661 to achieve best performance & long life requirements.

CONTROL SYSTEMS

- Flexible PLC-based and user-friendly control systems are applied to control and monitor the status of the dryer.

Easy access LCD display versatile function, diagnostics and preventative maintenance, maintenance history, alarm and shutdown history...

