

NGX SOLUTIONS



Natural Gas Dryers for NGV Fueling Stations



Drying natural gas for today's NGV fueling stations

What you need to know...

ISO 15403:2000 – The single most important safety requirement

ISO 15403:2000 (E) standard 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. Liquid water is the precursor to the formation of corrosive compounds through combination with components in natural gas, namely carbon dioxide and hydrogen sulphide. The combination of corrosive agents, and the pressure cycling, caused by fuel consumption and subsequent refilling of the 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 blockages, both liquid and solid, in the fuel system.

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.”

If you think your gas is dry, you need to read this

As the effects of moisture in natural gas systems are not always immediately evident, some NGV station builders are reluctant to address the importance of installing desiccant dryer systems in CNG fuelling stations. This is despite the fact that there are industry standards and recommended practices for the required dew point of compressed natural gas used for fuelling stations, such as ISO 15403:2000(E).

The most common reason for not installing dryers in NGV stations is the belief that the gas is already dry. However, it should be taken into consideration that although the gas dew point may be as low as -40°C in the pipeline at pipe pressure, the effects of compression will affect the dew point of the gas.

Physical laws dictate that the dew point of a gas increases as its pressure increases. Therefore, although the dew point of the gas in a given pipeline may be very low when it reaches the compressor, it will be significantly higher when the gas leaves the compressor. This is why natural gas desiccant dryers are required in the majority of NGV stations in order to conform to the ISO 15403:2000(E) standard, specifically in areas where lower temperatures are encountered during the colder winter months.

Suction side versus high pressure discharge drying technology

Higher concentration of water vapor per volume of gas, caused by high compressor discharge temperatures, affects the adsorption efficiency of desiccant dryers which are installed on the pressure discharge side. Oil vapor found at the outlet of the oil-lubricated compressor can contaminate the desiccant and cause dew point collapse. Lower temperatures and oil vapor free gas on the suction side result in better dryer performance and lower maintenance cost.

Allowing “wet” gas to enter the compressor is undesirable, as most reciprocating compressors are extremely sensitive to liquid water entering the compression cylinders, which can have catastrophic results on the entire compressor.

Pressure swing dryers use 10 – 15% of the dry gas from their outlet to regenerate the off-line tower. This used gas must then be recovered on the suction side of the compressor, increasing its size and decreasing the output to the storage vessels and dispensers. This is not an economical solution as compared to the suction side dryer which does not utilize any purge gas.

Xebec – World leader in drying natural gas for vehicle fueling stations

- 30 years experience in designing and manufacturing gas dryers
- Complete dehydration and filtration solutions
- Proven engineered solutions for custom applications
- Major installations throughout the world: North America, China, Russia, Australia, South America, Indonesia and the Middle East
- Dedicated CNG team at every level of the process
- Worldwide support, service, replacement parts
- Built to ASME code and National Board certified
- Can be built to specific requirements such as the Chinese and Malaysian pressure vessel codes

Xebec offers treatment solutions for other gases

- Hydrogen
- Biogas
- Industrial gases
- Other natural gas applications



STVNGX – Natural Gas Dryers - Single Tower

Features:

- Low cost, low capacity basic package
- External regeneration or desiccant replacement required
- AutoDew is a highly recommended option

Applications:

- Low to medium flows
- Low to high pressure designs
- Recommended for low throughput (water content) fueling needs



AutoDew option: AutoDew is a precision dew point monitor with digital dew point indication (in °C or °F) installed at the dryer control panel. The AutoDew hygrometer displays the dew point data on a monitor on a NEMA 4 enclosure. The moisture sensor is installed at the dryer outlet to continuously verify the dew point. Two AutoDew hygrometer set points are factory adjusted: the first to signal deteriorating dew point performance, and the second when regeneration is required. A set of form “C” dry contacts are provided for remote signal monitoring. Alarm settings typically conform to SAE J1616 for each installation.

Model No	Connection	Capacity (approx) MMSCF @ 7#H2O/MMSCF (E3Nm ³ @ 112 mg H2O/m ³) ¹	Inlet Gas Flow (approx) scfm (Nm ³ /hr) @ 100 psig (7 bar g) ¹	Approximate Weight & Dimensions			
				Width inches (mm)	Length inches (mm)	Height inches (mm)	Weight lbs (kg)
STV6NGX-0.5	1/2" NPT	0.52 (14)	66 (105)	20 (508)	22 (559)	60 (1524)	515 (232)
STV8NGX-1	1" NPT	0.84 (23)	116 (188)	22 (559)	28 (711)	61 (1549)	685 (308)
STV10NGX-1	1" NPT	1.60 (43)	193 (310)	48 (1219)	48 (1219)	92 (2337)	725 (326)
STV14NGX-1.5	1-1/2" NPT	3.40 (90)	454 (730)	26 (660)	30 (762)	86 (2184)	1000 (450)
STV18NGX-1.5	1-1/2" NPT	5.60 (151)	454 (730)	36 (914)	43 (1092)	91 (2311)	1500 (675)
STV20NGX-2	2" NPT	7.00 (189)	748 (1203)	35 (889)	44 (1118)	89 (2261)	1540 (693)
STV20NGX-3	3" NPT	7.00 (189)	947 (1524)	35 (889)	44 (1118)	89 (2261)	1640 (738)
STV24NGX-2	2" NPT	10.30 (276)	748 (1203)	53 (1353)	63 (1600)	93 (2362)	1970 (887)
STV24NGX-3	3" FLG	10.30 (276)	1369 (2204)	53 (1353)	63 (1600)	93 (2362)	2240 (1008)
STV24NGX-4	4" FLG	10.30 (276)	1369 (2204)	66 (1676)	96 (2438)	93 (2362)	2600 (1170)
STV30NGX-2	2" FLG	16.70 (447)	748 (1203)	59 (1505)	59 (1505)	101 (2565)	2772 (1247)
STV30NGX-3	3" FLG	16.70 (447)	1647 (2651)	56 (1422)	63 (1600)	101 (2565)	2865 (1289)
STV30NGX-4	4" FLG	16.70 (447)	2205 (3550)	66 (1676)	96 (2438)	107 (2718)	2958 (1331)
STV36NGX-3	3" FLG	23.20 (621)	1647 (2651)	72 (1829)	110 (2794)	126 (3200)	7400 (3330)
STV36NGX-4	4" FLG	23.20 (621)	2836 (4566)	72 (1829)	110 (2794)	126 (3200)	7869 (3541)

Maximum operating pressure = 130 psig (5 psig minimum). Higher operating pressures available upon request.

¹ Flow conditions given for reference only. Please consult factory for sizing at different flow pressure conditions.

Standard conditions are 1 ATM at 60 degrees F. Normal conditions are 1 ATM at 0 degrees C.

STRNGX-S Regenerable Natural Gas Dryers - Single Tower

Features:

- Comprehensive range of rugged, skid mounted single tower regenerable natural gas dryers
- Closed loop, operator-initiated heat reactivated regenerated cycles for reliable dryer regeneration control and shutdown
- AutoDew is a standard feature and will signal when regeneration is required

Applications:

- Medium to high flows
- Low to high pressure designs
- Recommended for medium throughput fueling needs
- Minimum downtime



Model No	Connection	Capacity (approx) MMSCF @ 7#H2O/MMSCF (E3Nm ³ @ 112 mg H2O/m ³) ¹	Inlet Gas Flow (approx) scfm (Nm ³ /hr) @ 100 psig (7 bar g) ¹	Approximate Weight & Dimensions			
				Width inches (mm)	Length inches (mm)	Height inches (mm)	Weight lbs (kg)
STR18NGX-1.5S	1-1/2" NPT	5.60 (151)	454 (730)	68 (1724)	85 (2159)	95 (2413)	3195 (675)
STR20NGX-2S	2" NPT	7.00 (189)	748 (1203)	68 (1727)	85 (2159)	95 (2413)	3650 (693)
STR20NGX-3S	3" NPT	7.00 (189)	947 (1524)	68 (1727)	85 (2159)	95 (2413)	3750 (738)
STR24NGX-2S	2" NPT	10.30 (276)	748 (1203)	68 (1727)	86 (2184)	95 (2413)	4310 (887)
STR24NGX-3S	3" FLG	10.30 (276)	1369 (2204)	68 (1727)	85 (2159)	95 (2413)	4819 (1008)
STR24NGX-4S	4" FLG	10.30 (276)	1369 (2204)	68 (1727)	85 (2159)	95 (2413)	4969 (1170)
STR30NGX-2S	2" FLG	16.70 (447)	748 (1203)	71 (1803)	84 (2134)	101 (2565)	4665 (1247)
STR30NGX-3S	3" FLG	16.70 (447)	1647 (2651)	71 (1803)	84 (2134)	101 (2565)	4815 (1289)
STR30NGX-4S	4" FLG	16.70 (447)	2205 (3550)	71 (1803)	84 (2134)	101 (2565)	5315 (1331)
STR36NGX-3S	3" FLG	23.20 (621)	1647 (2651)	99 (2515)	108 (2743)	126 (3200)	8235 (3330)
STR36NGX-4S	4" FLG	23.20 (621)	2836 (4566)	99 (2515)	108 (2743)	126 (3200)	8735 (3541)

Maximum operating pressure = 130 psig (5 psig minimum). Higher operating pressures available upon request.

¹ Flow conditions given for reference only. Please consult factory for sizing at different flow pressure conditions.

Standard conditions are 1 ATM at 60 degrees F. Normal conditions are 1 ATM at 0 degrees C.

STRNGX–D Regenerable Natural Gas Dryers - Double Tower

Features:

- Rugged, skid-mounted double towers
- Closed loop, operator initiated, heat-reactivated regenerated cycles for reliable control and shutdown
- AutoDew is standard and will signal when regen is required
- Manual valve switching between towers
- No downtime

Applications:

- Medium to high flows
- Low to high pressure designs
- Recommended for medium throughput fueling needs



Model No	Connection	Capacity (approx) MMSCF @ 7#H2O/MMSCF (E3Nm ³ @ 112 mg H2O/m ³) ¹	Inlet Gas Flow (approx) scfm (Nm ³ /hr) @ 100 psig (7 barg) ¹	Approximate Weight & Dimensions			
				Width inches (mm)	Length inches (mm)	Height inches (mm)	Weight lbs (kg)
STR18NGX-1.5D	1-1/2" NPT	2 X 5.60 (151)	454 (730)	60 (1524)	88 (2235)	94 (2388)	3680 (1656)
STR20NGX-2D	2" NPT	2 X 7.00 (189)	748 (1203)	70 (1778)	98 (2489)	94 (2388)	4574 (2058)
STR20NGX-3D	3" NPT	2 X 7.00 (189)	947 (1524)	70 (1778)	98 (2489)	94 (2388)	4574 (2058)
STR24NGX-2D	2" NPT	2 X 10.30 (276)	748 (1203)	80 (2032)	108 (2743)	94 (2388)	5400 (2430)
STR24NGX-3D	3" FLG	2 X 10.30 (276)	1369 (2204)	89 (2261)	124 (3150)	94 (2388)	5933 (2670)
STR24NGX-4D	4" FLG	2 X 10.30 (276)	1369 (2204)	89 (2261)	124 (3150)	94 (2388)	7567 (3405)
STR30NGX-2D	2" FLG	2 X 16.70 (447)	748 (1203)	99 (2515)	103 (2616)	102 (2591)	9601 (4321)
STR30NGX-3D	3" FLG	2 X 16.70 (447)	1647 (2651)	99 (2515)	103 (2616)	102 (2591)	9601 (4321)
STR30NGX-4D	4" FLG	2 X 16.70 (447)	2205 (3550)	90 (2286)	160 (4064)	110 (2794)	8732 (3929)
STR36NGX-3D	3" FLG	2 X 23.20 (621)	1647 (2651)	102 (2591)	160 (4064)	126 (3200)	10500 (4725)
STR36NGX-4D	4" FLG	2 X 23.20 (621)	2836 (4566)	102 (2591)	156 (3962)	126 (3200)	11500 (5175)

Maximum operating pressure = 130 psig (5 psig minimum). Higher operating pressures available upon request.

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DTRNGX - Duo Tower Regenerable Natural Gas Dryers

Features:

- Two towers
- Simplified operation - fully automatic regeneration maximizes desiccant performance
- Compact design
- All models complete with regeneration package
- Custom designed to meet all levels of specifications
- AutoDew is standard
- No downtime

Applications:

- Low to high flows
- Low to medium pressure designs
- Recommended for medium throughput fueling needs



Model No	Connection	Capacity (approx) MMSCF @ 7#H2O/MMSCF (E3Nm ³ @ 112 mg H2O/m ³) ¹	Inlet Gas Flow (approx) scfm (Nm ³ /hr) @ 100 psig (7 barg) ¹	Approximate Weight & Dimensions			
				Width inches (mm)	Length inches (mm)	Height inches (mm)	Weight lbs (kg)
DTRA14NGX-1.5	1-1/2" NPT	2 X 3.40 (90)	454 (730)	55 (1397)	83 (2108)	94 (2388)	3376 (1519)
DTRA18NGX-1.5	1-1/2" NPT	2 X 5.60 (151)	454 (730)	88 (2235)	89 (2261)	94 (2388)	4443 (2000)
DTRA20NGX-2	2" NPT	2 X 7.00 (189)	748 (1203)	88 (2235)	103 (2616)	94 (2388)	5524 (2486)
DTRA20NGX-3	3" NPT	2 X 7.00 (189)	947 (1524)	88 (2235)	103 (2616)	94 (2388)	5524 (2486)
DTRA24NGX-2	2" NPT	2 X 10.30 (276)	748 (1203)	95 (2413)	113 (2870)	99 (2515)	6521 (2934)
DTRA24NGX-3	3" FLG	2 X 10.30 (276)	1369 (2204)	95 (2413)	124 (3150)	94 (2388)	7164 (3224)
DTRA24NGX-4	4" FLG	2 X 10.30 (276)	1369 (2204)	95 (2413)	124 (3150)	94 (2388)	9137 (4111)
DTRA30NGX-2	2" FLG	2 X 16.70 (447)	748 (1203)	95 (2413)	124 (3150)	107 (2718)	11594 (5217)
DTRA30NGX-3	3" FLG	2 X 16.70 (447)	1647 (2651)	118 (2997)	130 (3302)	106 (2692)	11594 (5217)
DTRA30NGX-4	4" FLG	2 X 16.70 (447)	2205 (3550)	89 (2248)	124 (3150)	115 (2921)	10544 (4745)
DTRA36NGX-3	3" FLG	2 X 23.20 (621)	1647 (2651)	97 (2464)	141 (3581)	131 (3327)	12679 (5705)
DTRA36NGX-4	4" FLG	2 X 23.20 (621)	2836 (4566)	97 (2464)	141 (3581)	131 (3327)	13886 (6249)

Maximum operating pressure = 130 psig (5 psig minimum). Higher operating pressures available upon request.

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