

Gas Quality Specifications

TransCanada and other pipelines



TransCanada Pipelines

| Specs | Canadian Mainline | NGTL/ATCO Pipelines | Foothills (BC) Zone 8 | Foothills (Sask.) Zone 9 | GTN | North Baja | ANR |
|----------------------|--|--|--|--|------------------------------|--|--|
| Hydrogen Sulphide | Max 23 mg/m ³ | Max 23 mg/m ³ | Max 23 mg/m ³ | Max 23 mg/m ³ | Max 0.25 grains/Ccf | Max 0.25 grains/Ccf | Max 1 grains/Ccf SE & SW area 1/4 grains/Ccf Mainline area |
| Total Sulphur | Max 115 mg/m ³ | Max 115 mg/m ³ | Max 230 mg/m ³ | Max 230 mg/m ³ | Max 10 grains/Ccf | Max 0.75 grains/Ccf Total, 0.3 grains/Ccf mercaptan | Max 20 grains/Ccf |
| Carbon Dioxide | Max 2% by volume | Max 2% by volume | Max 2% by volume | Max 2% by volume | Max 2% by volume | Max 2% by volume | Max 2% by volume |
| Oxygen | Max 0.4% by volume | Max 0.4% by volume | Max 0.4% by volume | Max 0.4% by volume | Max 0.4% by volume | Max 0.2% by volume | Max 1% by volume |
| Nitrogen | See TCPL Mainline Tariff | Not specified | Not specified | Not specified | Not specified | Max 3% incl. CO ₂ , N ₂ , He, O ₂ | Max 3% by volume |
| Temperature | Max. 50°C | Max. 49°C | Max. 43.3°C | Max. 49°C | Max. 110°F | Max. 105°F or Min. 50°F | Min 40°F Max 120°F |
| Heating Value | Min. 36 MJ/m ³ Max, 41.34 MJ/m ³ | Min. 36 MJ/m ³ | Min. 36 MJ/m ³ | Min. 36 MJ/m ³ | Min. 995 BTU/ft ³ | Min. 990 BTU/ft ³ or Max. 1150 BTU/ft ³ | Min. 967BTU/ft ³ Max. 1200 BTU/ft ³ |
| Water | Max. 65 mg/m ³ | Max. 65 mg/m ³ or Max. dp -10°C at > 8275 kPa | Max. 65 mg/m ³ or Max. dp -10°C at > 8275 kPa | Max. 65 mg/m ³ or Max. dp -10°C at > 8275 kPa | Max. 4 lbs/MMcf | Max. 7 lbs/MMcf | Max. 7 lbs/MMcf |
| Hydrocarbon Dewpoint | Max. -10°C at 5500kPa absolute | Max. -10°C at operating pressure | Max. -10°C at operating pressure | Max. -10°C at operating pressure | Max. 15°F up to 800 psig | Max. 20°F up to 600 psig | Max. 15°F |
| Interchangeability | See TCPL Mainline Tariff | Not Specified | Not Specified | Not Specified | Not Specified | Wobbe Number: Min: 1279 Max: 1385 | Not Specified |

Canadian Pipelines

| Specs | Alliance Canada | Union | Enbridge (Tecumseh Pipeline) | TransGas | West Coast | TQM |
|----------------------|---|---|--|--|---------------------------|----------------------------|
| Hydrogen Sulphide | Max. 23 mg/m ³ | Max. 7 mg/m ³ | Max. 7 mg/m ³ | Max. 6 mg/m ³ | Max. 6 mg/m ³ | Max. 23 mg/m ³ |
| Total Sulphur | Max. 115 mg/m ³ | Max. 460 mg/m ³ | Max. 460 mg/m ³ , 5 mg/m ³ mercaptan | Max. 23 mg/m ³ total, 6 mg/m ³ mercaptan | Max. 23 mg/m ³ | Max. 115 mg/m ³ |
| Carbon Dioxide | Max. 2% by volume | Max. 2% by volume | Max. 2% by volume | Max. 2% by volume | Max. 2% by volume | Max. 2% by volume |
| Oxygen | Max. 0.4% by volume | Max. 0.4% by volume | Max. 0.4% by volume | Max. 0.4% by volume | Max. 0.4% by volume | Max. 0.4% by volume |
| Nitrogen | Max. 4% by volume incl. N ₂ , CO ₂ , O ₂ | Not specified | Not specified | Max. 15 ml/m ³ each (nitric oxide & total oxides of nitrogen) | Not specified | Not specified |
| Temperature | Max. 50°C, Min. 5°C | Max 43°C | Not specified | Max. 50°C | Max. 54°C | Max. 50°C |
| Heating Value | Min. 36 MJ/m ³ , Max. 60 MJ/m ³ | Min. 36 MJ/m ³ Max. 40.2 MJ/m ³ | Min. 36 MJ/m ³ Max. 40.2 MJ/m ³ | Min. 35 MJ/m ³ | Min. 36 MJ/m ³ | Min. 36 MJ/m ³ |
| Water | Max. 65 mg/m ³ | Max. 65 mg/m ³ | Max. 80 mg/m ³ | Max. 65mg/m ³ at 101.325 kPa and 15°C | Max. 65 mg/m ³ | Max. 65 mg/m ³ |
| Hydrocarbon Dewpoint | -5°C at normal opt. conditions | Max. -8°C at operating pressure | Max. -10°C at 5500 kPa | Max. -10°C at opt. Pressure | Max. -9°C at del. pres. | Not specified |
| Interchangeability | Not Specified | Refer to Union Tariff | Refer to Enbridge Tariff | Not Specified | Not Specified | Not Specified |

The Gas Quality Specifications tables are intended to be used for planning purposes only and although TransCanada endeavours to maintain the information in such a way that is accurate and current, it may not provide accurate results. Use of this information is at user's sole risk and TransCanada shall not be liable for user's, or any party's, use of or reliance on any results obtained from it.

Website: <http://www.transcanada.com/customerexpress/index.html>
 E-mail: customer_express@transcanada.com
 The Pipeline: 403.920.PIPE (7473)
 March 2018



Gas Quality Specifications

TransCanada and other pipelines



US Pipelines

| Specs | Alliance USA | Empire | GLGT | Iroquois | Northern Border |
|----------------------|---|---|---|--|---|
| Hydrogen Sulphide | Max. 1 grains/Ccf | Max. 1 grains/Ccf | Max. 1/4 grains/Ccf | Max. 1/4 grains/Ccf | Max. 0.3 grains/Ccf |
| Total Sulphur | Max. 5 grains/Ccf | Max. 20 grains/Ccf | Max. 20 grains/Ccf | Max. 1.25 grains/Ccf | Max. 2 grains/Ccf, (0.3 grains mercaptan/Ccf) |
| Carbon Dioxide | Max. 2% by volume | Max. 2% by volume | Max. 2% by volume | Max. 2% by volume | Max. 2% by volume |
| Oxygen | Max. 0.4% by volume | Max. 1% by volume | Max. 1% by volume | Max. 0.2% by volume | Max. 0.4% by volume |
| Nitrogen | Not specified | Not specified | Max. 3% by volume | Max. 2.75% N ₂ +O ₂ 4% N ₂ + CO ₂ | Not specified |
| Temperature | Max. 122°F | Max. 120°F, Min. 40°F | Max. 120°F, Min. 20°F | Max. 120°F | Min. 32°F Max. 120°F |
| Heating Value | Min. 962 BTU/ft ³ | Min. 950 BTU/ft ³ Max. 1200 BTU/ft ³ | Min. 967 BTU/ft ³ Max. 1069 BTU/ft ³ | Min. 967 BTU/ft ³ Max. 1110 BTU/ft ³ | Min. 967 BTU/ft ³ |
| Water | Max. 4 lbs/MMcf | Max. 7 lbs/MMcf | Max. 4 lbs/MMcf | Max. 4 lbs/MMcf at 14.73 psi & 60°F | Max. 4 lbs/MMcf |
| Hydrocarbon Dewpoint | Max. 23°F at opt. pres. | Not specified | Not specified | Max. 15°F or less | Max. -5°F (800psia), -10°F (1000 psia), -18°F at (1100 psia) |
| Interchangeability | Not specified | Not specified | Not specified | See Iroquois Tariff | Not specified |
| Specs | NWP | PNGTS | SOCAL | Tennessee GP | Viking |
| Hydrogen Sulphide | Max. 0.25 grains/Ccf | Max. 0.25 grains/Ccf | Max. 0.25 grains/Ccf | Max. 0.25 grains/Ccf | Max. 1/4 grains/Ccf |
| Total Sulphur | Max. Non Laplata Facilities 5 grains/Ccf, Laplata Facilities 0.75 grains/Ccf, 0.3 grains mercaptan/Ccf | Max. 20 grains/Ccf | Max. 0.75 grains/Ccf (0.3 grains mercaptan/Ccf) | Max. 10 grains/Ccf | Max. 20 grains/Ccf |
| Carbon Dioxide | Max. 2% by volume | Max. 3% by volume | Max. 3% by volume | Max. 3% by volume | Max. 3% by volume |
| Oxygen | Max 0.2% by volume | Max. 0.2% by volume | Max. 0.2% by volume | Max. 0.2% by volume | Max. 0.2% by volume |
| Nitrogen | Max. 3% incl. O ₂ , CO ₂ | Max. 4% incl. CO ₂ | Max. 4% incl. O ₂ , CO ₂ and inerts | Max. 4% incl. CO ₂ , O ₂ Max 2.75% N ₂ + CO ₂ | Max. 4% incl. CO ₂ |
| Temperature | Non Laplata Facilities Max. 120°F Laplata Min. 40°F, Max. 120°F | Max. 120°F | Min. 50°F, Max. 105°F | Max. 120°F | Max. 120°F |
| Heating Value | Min. 985 BTU/ft ³ | Min. 967 BTU/ft ³ Max. 1100 BTU/ft ³ | Min. 990 BTU/ft ³ Max. 1150 BTU/ft ³ | Min. 967 BTU/ft ³ Max. 1100 BTU/ft ³ | Min. 967 BTU/ft ³ Max. 1100 BTU/ft ³ |
| Water | Max. 7 lbs/MMcf | Max. 7 lbs/MMcf | Max. 7 lbs/MMcf at <800psi or < 20°F at > 800psi | Max. 7 lbs/MMcf at 14.73psi at 60°F | Max. 7 lbs/MMcf at 14.73psi at 60°F |
| Hydrocarbon Dewpoint | Max. 15°F (100-1000psia) | Not specified | See SOCAL Tariff | Max.15°F | Not specified |
| Interchangeability | Not Specified | Not Specified | See SOCAL Tariff | See Tennessee GP Tariff | Not Specified |

The Gas Quality Specifications tables are intended to be used for planning purposes only and although TransCanada endeavours to maintain the information in such a way that is accurate and current, it may not provide accurate results. Use of this information is at user's sole risk and TransCanada shall not be liable for user's, or any party's, use of or reliance on any results obtained from it.

Website: <http://www.transcanada.com/customerexpress/index.html>
 E-mail: customer_express@transcanada.com
 The Pipeline: 403.920.PIPE (7473)
 March 2018

