

# Understanding gas quality requirements

## Gas quality

This section covers the pipeline gas quality specifications for any RNG injection into the gas distribution system.

### 1. Pipeline gas quality specifications for renewable natural gas

To be injected into the utility gas system, the RNG must meet the following specifications.

#### 1.1 Heating value

The specifications are:

- The minimum gross heating value of the RNG delivered must be 36 MJ/m<sup>3</sup>.
- The maximum gross heating value of the RNG delivered must be 41.3 MJ/m<sup>3</sup>.

#### 1.2 Freedom from objectionable matter

The specifications are:

- RNG must not contain any contaminants, particles, or other impurities at a concentration that is known as a threat to the integrity of the system, human health, or the environment.
- RNG must be commercially free\* from bacteria, siloxanes, ammonia, halocarbons, heavy metals, sand, dust, gums, crude oils, lubricating oils, liquids, chemicals, or compounds used in the production, treatment, compression, or dehydration of the gas or any other objectionable substance in sufficient quantity that renders the gas toxic, unmerchantable, or causes damage to or interference with the proper operation of the lines, regulators, meters, or other appliances through which the gas flows.

- \* Internal Enbridge Gas limits to quantify commercially free amounts:
1. 3 mg of ammonia per m<sup>3</sup> of gas.
  2. 1 mg of silicon per m<sup>3</sup> of gas for siloxanes.
  3. 10 mg of fluorine and 1 mg of chlorine per m<sup>3</sup> gas for halocarbons.
  4. 80 µg of mercury and 190 µg of arsenic per m<sup>3</sup> gas for heavy metals.
  5. 50,000,000 total bacteria, 1,000,000 live bacteria and 10,000 spores per 100 ft<sup>3</sup> gas for bacteria.

#### 1.3 Other specifications

The specifications are:

- RNG must have the Wobbe Number from 47.2 MJ/m<sup>3</sup> of gas to 51.2 MJ/m<sup>3</sup> of gas.
- RNG must not contain more than:
  - 2.0 mol % of carbon dioxide in the gas.
  - 0.4 mol % of oxygen in the gas.
  - 0.5 mol % of carbon monoxide in the gas.
  - 4 mol % of total inert gas.
  - 65 mg of water vapour per m<sup>3</sup> of gas.
  - 2 mol % of hydrogen in the gas subject to an engineering assessment for each specific RNG project to identify impacted equipment sensitive to hydrogen, e.g. gas turbines, stationary reciprocating gas engines, steel tanks in CNG vehicles.
  - 7 mg of hydrogen sulphide per m<sup>3</sup> of gas.
  - 6 mg of mercaptan sulphur per m<sup>3</sup> of gas.
  - 100 mg of total sulphur per m<sup>3</sup> of gas.
  - 1.5 mol % of butane plus (C4+) in the gas.
- RNG must not have a cricondenthem hydrocarbon dew point exceeding -8 C (18 F).
- RNG temperature must not exceed 43 C (109 F).
- Enbridge Gas may reduce maximum allowable gas temperature upon its discretion if downstream equipment is sensitive to high temperature.

Table 1: Renewable natural gas – pipeline gas quality specifications

		Value	Unit	Comment
Heating value	HV	36.0 – 41.3	MJ/m <sup>3</sup>	
Wobbe number	WN	47.2 – 51.2	MJ/m <sup>3</sup>	
Carbon dioxide	CO <sub>2</sub>	2	mol %	
Oxygen	O <sub>2</sub>	0.4	mol %	
Carbon monoxide	CO	0.5	mol %	
Total inerts		4	mol %	
Water vapour	H <sub>2</sub> O	65	mg/m <sup>3</sup>	
Hydrogen	H <sub>2</sub>	2	mol %	Subject to an Engineering assessment.
Hydrogen sulphide	H <sub>2</sub> S	7	mg/m <sup>3</sup>	
Mercaptans		6	mg/m <sup>3</sup>	
Total sulphur	S	100	mg/m <sup>3</sup>	
Butane plus	C <sub>4</sub> +	1.5	mol %	
Cricondenthem		-8	C	
Ammonia	NH <sub>3</sub>	3	mg/m <sup>3</sup>	Internal Enbridge Gas limits to quantify commercially free amounts.
Siloxanes	Si	1	mg Si/m <sup>3</sup>	
Halocarbons	F, Cl	F: 10, Cl: 1	mg/m <sup>3</sup>	
Heavy metals	Hg, As	Hg: 80 As: 190	µg/m <sup>3</sup>	
Bacteria	Total, live, spores	Total: 50,000,000 Live: 1,000,000 Spores: 10,000	#/100 ft <sup>3</sup>	