

BIOMETHANE QUALITY GUIDELINES

Physical Properties	Reference	Symbol	Upper Content Limit	Units	Comments	Example Test Methods
Heating Value	Published Canadian Tariffs	-	36 to 41.3	MJ/M3		ASTM D1945 or GPA 2261
Wobbe Index	Published Canadian Tariffs	-	47.23 to 51.16	-		
Carbon Dioxide	Published Canadian Tariffs	CO ₂	2	mol%		ASTM D1945/1946
Oxygen	Published Canadian Tariffs	O ₂	0.4	mol%		ASTM D1945/1946
Inerts	Published Canadian Tariffs	-	4	mol%	N, O ₂ , CO ₂ + others	ASTM D1945/1946
Hydrogen Sulphide	Published Canadian Tariffs & CSA Z662	H ₂ S	6 or 7 to 23	mg/M3	7 is Distribution (Z662), 23 is Transmission (Tariffs)	ASTM D4084
Sulphur (in total)	Published Canadian Tariffs	S	115	mg/M3		ASTM D3246, ASTM D5504M
Mercaptans or Methyl Mercaptan	Published Canadian Tariffs	-	6 to 8	mg/M3		
Water Content	Published Canadian Tariffs	H ₂ O	35 to 65	mg/M3		ASTM D1142 or ASTM D5454
Hydrocarbon Dew Point	Published Canadian Tariffs	HCDP	-10	°C		
Gas Interchangeability	Published Canadian Tariffs & CGA NGI Report (2009)	-	IC & YT Indexes		Weaver Incomplete Combustion & AGA Yellow Tipping Indices	
Temperature Steel	Published Canadian Tariffs	-	Max 49 to 50	°C	(Temperature of the injection gas)	
Temperature Plastic	CSA Z662	-	Max 30	°C	(Temperature of the injection gas)	
Particulates	Published Canadian Tariffs	-	Free of ...		0.3 micron filter separator recommended	Similar to EPA Method 5
Biologicals/ Bacteria	Published Canadian Tariffs	-	Free of ...		0.3 micron filter separator recommended	
Hydrogen	TBD	H ₂	TBD		TBD relative to individual pipe material considerations concerning Hydrogen embrittlement and stress cracking. Hydrogen permeability regarding threaded and gasketed joints and non-metallic pipe systems needs to be well understood.	ASTM D1945/1946
Ammonia	MarcoGaz compilation of European specifications (TBC)	NH ₃	3	mg/M3		ASTM D1945/1946, NIOSH 6015
Halocarbons and Organochlorinated Compounds	MarcoGaz (France) compilation of European specifications & AFSSET Reports. Vinyl Chloride based on NIOSH & OSHA	-	10	mg/M3	Limit of 1 mg/M3 for vinyl chlorides within the 10 mg/M3 total	EPA Compendium Method TO-15
Heavy Metals	Laboratory Detection limits for mercury & arsenic	-	Mercury 0.05 Arsenic 30	micrograms/M3	For copper, zinc & other metals; comparison to existing metals in current Natural Gas stream, i.e. metals from biomethane do not substantially contribute to background levels.	NIOSH 6009 (Hg), NIOSH 7300
Siloxanes	Based on end use requirements. Twice the lab detection limit of 0.5.	-	1	ppm		
Volatile and Semi-Volatile Compounds	-	-			Monitor & establish presence in NG stream; must know what's in both Natural Gas & Biomethane streams	EPA Method 8270
Other Considerations: This is not a complete listing of potential trace constituents. Refer to published reports concerning trace constituents that be present in various biogas sources. (see GTI Reports: Pipeline Quality Biogas: Guidance Document for Dairy Waste, Wastewater Treatment Sludge and Landfill Conversion, Pipeline Quality Biomethane: North American Guidance Document for Introduction of Dairy Waste Derived Biomethane into Existing Natural Gas Networks).						
Footnotes: There may be circumstances, based on the judgement of the gas system operator, where specific component limits may differ from the information above.						

NOTE: The GTI Guidance Documents for dairy waste conversion can be found on the GTI website. All cited Guidance Documents can be found at www.reethink.net under Reports.