

**Quality values required by legislation in some countries in Europe
 for biomethane injection into natural gas network
 (Revision 5th February 2019)**

	FR	NL ⁴	ES	SE	DE	CH	AT	IT	DK	GB ²	BE	CZ
GCV (kWh/m³)	9.5 – 10.5 (L) 10.7 – 12.8 (H)		10.23-13.23		8.4-13.1	10.7 – 13.1	9.9-12.8	9.71-12.58			9.52 – 10.75 (L) 10.81 – 12.79 (H)	Value ± 1% of average GCV in gas network for last month at the place of injection (general range for gas network is 9.4-11.8)
WI (kWh/m³)	12.5 – 13.06 (L) 13.64 – 15.70 (H)	43.46-44.41 MJ/m ³	13.368-16.016		11.0 – 13.0 (L) 13.6 – 15.7 (H)	13.3 – 15.7	13.5-15.5	13.14-14.54	14.1-15.5	13.82 - 15.05	12.19 – 13.03 (L) 13.65 – 15.78 (H)	
Relative density	0.555-0.70		0.555-0.70	0.555-0.7	0.55-0.75	0.55 – 0.70		0.555-0.7	0.555-0.7		0.555-0.70	
Reference conditions: Combustion / volume	0°C / 0°C, 103.25 kPa	25°C/ 0 °C, 103.25 kPa	0°C/ 0 °C, 103.25 kPa	15°C/ 15 °C, 103.25 kPa	25°C/ 0 °C, 103.25 kPa	?	?	15°C/ 15 °C, 103.25 kPa	25°C/ 0 °C, 103.25 kPa	15°C/ 15 °C, 103.25 kPa	25°C/ 0 °C, 103.25 kPa	15°C/ 15 °C, 101,325 kPa
GCV⁵ (MJ/m³, 15/15)	32.4 – 35.9 (L) 36.5 – 43.7 (H)		34.8 – 45.1		28.7 – 44.7	38.5 – 47.2 ⁶	32.4 – 46.1 ⁶	35.0 – 45.3			32.5 – 36.7 (L) 36.9 – 43.7 (H)	33.8 – 42.5
IW⁵ (MJ/m³, 15/15)	42.7 – 44.6 (L) 46.6 – 53.6 (H)	41.23 – 42.13	45.5 – 54.5		37.6 – 44.4 (L) 46.4 – 53.6 (H)	47.9 – 56.5 ⁶	48.6 – 55.8 ⁶	47.3 – 52.3	48.2 – 55.8	49.8 – 54.18	41.6 – 44.5 (L) 46.6 – 53.9 (H)	

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Water dew point (°C at 70 bar abs)	< -5 At MOP	≤ -8 (High pressure L - HTL) ≤ -8 (Regional L - RTL) ≤ -10 at 8 bar abs (Distribution L - RNB)	<2	≤-8			<-8	≤-5	-8	<-10 for MOP < 7 barg < -10 at MOP	<-8 In transmission grid	≤-7 (40 bar)
Water (mg/m³)					< 50 (MOP > 10bar) < 200 (MOP <10 bar)	< 60					<110 In distribution grid	
HC dew point (°C at 1-70 bar abs)	< -2	≤ 80 (mg/m ³ (n) at 3°C)	<5	<5	< -2		<0	≤0	-2	<-2	<-2 In transmission grid	<0
Total Sulfur (mgS/m³)	< 30	≤ 5.5 (≤ 20) (High pressure L - HTL) (before odorisation) ≤ 5.5 (≤ 20) (Regional L - RTL) (before odorisation) ≤ 5.5 (≤ 20) (Distribution L - RNB) (before odorisation) ≤15.5 (<31) (Regional L - RTL) (after odorisation) ≤15.5 (<31) (Distribution L - RNB) (after odorisation)	< 50	≤ 20 (without odorant) ≤ 30 (with odorant)	< 6 < 8 (after odorisation)	< 30	<1 20	≤ 20 (without odorisation)	< 30	< 50	< 20, before odorisation < 30, after odorisation	< 30
Mercaptan sulfur (mgS/m³)	< 6	≤ 6		≤ 6 (without odorant)	< 6			< 6			< 6, before odorisation	
Mercaptanes (mgS/m³)			< 17				< 16.9		< 6			
H₂S + COS (mgS/m³)	< 5	≤ 5	< 15	≤ 5	< 5		< 6.8		< 5		< 5 mgS/m ³ , before odorisation	

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H₂S (mgS/m³)						< 5		≤ 5		≤ 5		≤ 5
CO₂ (% Mol)	< 2.5 (Exemptions exist for the DSO system: up to 3,5% (H gas) / up to 11,7% (L gas))	≤3 (High pressure L - HTL) ≤10.3 (Regional L - RTL) ≤10.3 (Distribution L - RNB)	< 2.5	≤ 4	< 10 L-gas* < 5 H-gas*	< 4	<2	≤ 2.5	<2.5 transmission <3 distribution	<2.5	<2,5 on transmission grid <4 on distribution grid (<6 on L-gas)	≤ 3 Transmission ≤ 5 distribution
N₂+CO₂ (% Mol)											< 15, only for L-gas	
O₂ (% Mol)	0.01 (exemption: up to 0.7% in the transmission grid / up to 0,75% in the distribution grid)	≤0.0005 (High pressure L - HTL) ≤0.5 (Regional L - RTL) ≤0.5 (Distribution L - RNB)	< <0,3 in transmission grid < 1 in distribution grid ¹	≤ 1	< 0.001 (MOP > 16bar) < 3 (MOP <16 bar)	< 0.5	< 0.02	≤ 0.6	< 0.5	< 0.2 < 1 for MOP< 38 bar	<0,1 on transmission grid < 1 on distribution grid	≤ 0.02 Transmission ≤ 0.5 distribution
Hg (µg/m³)	< 1		< 1								< 1	
Cl (mg/m³)	< 1	≤ 5	< 1	Acc. to CEN/TR (WI 00408007)				< 1		≤ 1.5 ³	< 1	
F (mg/m³)	< 10	≤ 5	< 10	Acc. to CEN/TR (WI 00408007)		< 1		< 3		≤ 5 ³	< 10	
Halogenures (mg/m³)										< 1.5		≤ 1.5
H₂ (% Mol)	< 6	≤0.02 (High pressure L - HTL) ≤0.02 (Regional L - RTL) ≤0.5 (Distribution L - RNB)	< 5	≤ 2	< 2**	< 5		≤ 0.5		< 0.1	< 2 on transmission grid (if not injected in UGS) < 2 on distribution grid	≤ 0.01 Transmission ≤ 0.1 distribution
NH₃ (mg/m³)	< 3		<3	≤ 10	Technically free*			≤ 10	< 3	≤ 20 ³	< 10	
Amines				≤ 10 (mg/m ³)	Technically free*			≤ 10			<10	

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CO (% Mol)	< 2	≤2900 mg/m ³	< 2	≤ 0.1				≤ 0.1			< 0.1	
Cyanides (HCN) ppm												
BTX (mg/m³)			< 500							≤ 100 ³ (Xilene)	< 500 ppm	≤ 10
Siloxanes (mg/m³)		<0.1 as Si		≤ 0.3 as Si	< 5*		< 10	≤ 1	< 1	≤ 0.5 as Si	<1 as Si	≤ 5
Impurities (mg/m³)			Technically free	Technically free	Technically free	Technically free					Technically free	
Dust (mg/m³)		≤ 100 Size > 5µm	Technically free	Technically free	Technically free			Technically free			< 5µm	≤ 3 µm Transmission ≤ 5 µm distribution
Methane			≥ 90		>90 Mol-% (L)* >95 Mol-% (H)*							≥ 95
Propane											< 3, if enrichment	≤ 3
Methane number				≥ 65								
Injection temperature		5-30 °C (High pressure L - HTL) 5-30 °C (Regional L - RTL) 5-20 °C (Distribution L - RNB)									in MD-B : 2°C < T < 25°C in MD-C : 2°C < T < 38°C	0-40 °C (High pressure) 0-20 °C (low pressure) <0,4MPa)
Standard / Reference	GRTgaz Prescriptions Techniques, V3, 1/02/2007 Arrêté du 28/03/1980 Arrêtés du 28/01/1981 GRDF, Prescriptions techniques du distributeur	ISO 6326 ISO 6327 ISO 6570 ISO 6974 ISO 6976 ISO 15970 Richtignen R-16-46, 18/08/2016		EN 16726 EN 16723-1 EN 16723-2	DVGW G260 *DVGW G262 ** DIN 51624			UNI TR 11537		Gas Safety (Management) Regulation, 1996 Network Entry Agreements	Synergrid G8/01	459/2012 Sb. (national law) TPG 902 02 Technical rules for gas industry

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	GRDF, April 2017											
Update at	March 2018	March 2018	December 2018	February 2019	March 2018			March 2018	March 2018	March 2018	February 2019	April 2018

Footnotes:

¹ < whenever that: CO₂ < 2% mol, water dew point < -8°C, biomethane flow in transmission pipelines < 5.000 m³/h.

² additional requirements for other parameters not included in the table.

³ for biomethane derived from waste, biomethane has to comply with the UK Environment Agency's End-of-Waste Quality Protocol.

⁴ at date of emission of this table, biomethane has been injected only in L gas network, although there is regulation for doing it on H gas network.

⁵ properties calculated at reference condition 15°C/ 15 °C, 103.25 kPa, using ISO 13443:2006 Annex A conversion factors. Rounded to 1 decimal.

⁶ due to lack of information on reference condition, direct transformation from kWh to MJ done.