



System for biogas upgrading to be injected into the grid or to fuel vehicles

Why use DMT Carborex® MS?

- 97 - 99% methane
- $\pm 0.3\%$ methane slip
- $< 0.22 \text{ kWh/Nm}^3$
- 0 - 100% flow flexibility
- 1 minute start-stop
- Highest up-time / reliability
- Modular and compact system

The Basic Process

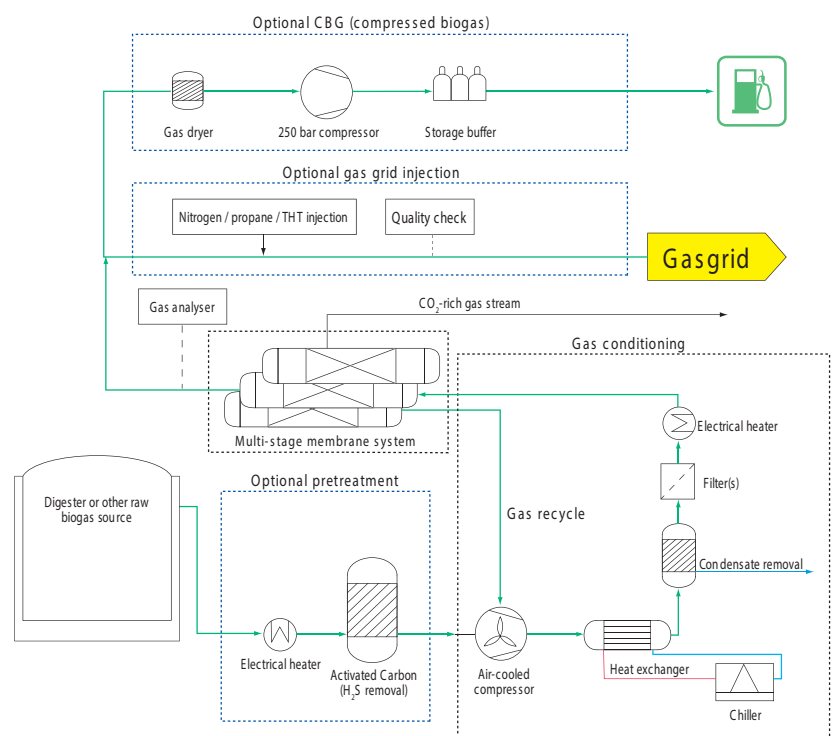
DMT Carborex® MS is a containerized, plug-and-play solution for upgrading biogas. No columns, no water and no chemicals are needed. A simple compression step combined with a multi-stage membrane configuration purifies the biogas to up to 99% biomethane (see PFD below). The biomethane subsequently can be used for grid injection or compressed to 250 bar for use as vehicle fuel.

Total methane recovery is 99.7% on average.

Methane emissions remain lower than 0.5% (guaranteed). The off-gas can be upgraded to food grade CO_2 with an optional liquefaction step. As far as economy is concerned, this is the best the industry has to offer: lowest operating cost and lowest investment cost. Operation can be monitored remotely 24/7 and the simplicity of the design guarantees an uptime of $> 98\%$.

Options

- Propane / nitrogen / THT injection
- Gatekeeper for grid injection
- Vehicle-fuel station
- Heat pump system
- CO_2 liquefaction



Main Raw Flow Inlet (Nm³/h)*

TYPES	50	100	200	300	400	500	600	750
HS	HS-50	HS-100	HS-200	HS-300	HS-400	HS-500	HS-600	HS-750

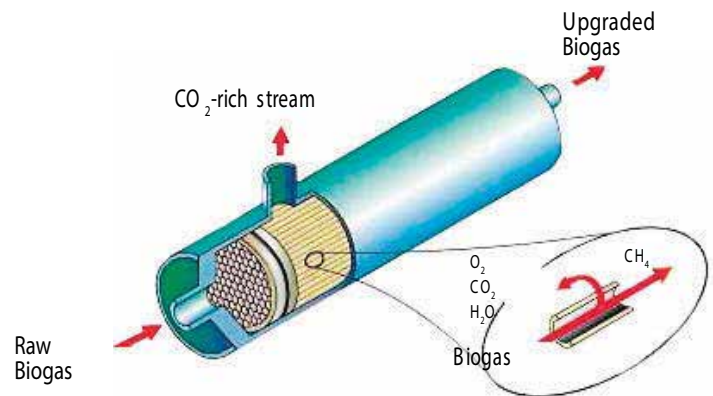
* Higher flows or concentrations on request

Principle of gas separation using the DMT Carborex® MS, multi-stage, high selective membrane system

Membrane separation is based on the diffusion of CO₂ through a polymer film. Methane diffuses at a much slower rate, which results in a methane-rich gas at the outlet of the membrane. Small tubes are coated with the polymer and grouped together in modules. Inside the module the biogas is split into a CO₂-rich and a CH₄-rich gas stream (see picture on the right). Both the CO₂ and CH₄-rich phases are further treated by using a multi-step membrane configuration. This results in an almost pure upgraded methane stream with 1 - 3% CO₂.

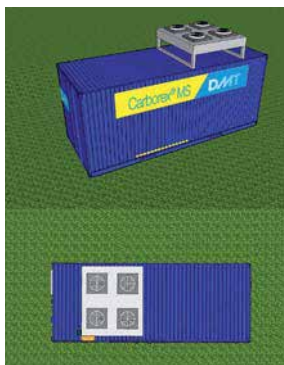
At the same time the biomethane is dried to a dew point of -90 °C at 16 barg. The CO₂-rich stream is also of the highest purity with over 99% CO₂.

The rest consists of water vapour and small traces of methane. In this way a methane recovery of more than 99.7% can be achieved.



DMT Carborex® MS Dimensions

HS-50 to HS-300



HS-400 to HS-750



dimensions (m)

Types	Container(s)	L	W	H
HS-50 to HS 300	1	6	3,5	2,5
HS 400 to HS 750	2	6	8	2,5

DMT Carborex® MS References

PROJECT LOCATION	CONSTRUCTION YEAR	INPUT MATERIALS	BIOGAS PROCESSED	BIOMETHANE DISTRIBUTION
Sweden Valgara	2013	Biogas	500 Nm ³ /h	station/gas cylinders
Norway Hadeland	2013	Biogas	400 Nm ³ /h	vehicle fuel
UK Poundbury	2012	Biogas	650 Nm ³ /h	grid injection
Netherlands Lelystad	2012	Biogas	50 Nm ³ /h	fuel station
UK Andover	2014	Biogas	2000 Nm ³ /h	grid injection
UK London	2014	Biogas	1000 Nm ³ /h	grid injection
UK Champflower	2014	Biogas	1400 Nm ³ /h	grid injection
UK Fraddon	2014	Biogas	1000 Nm ³ /h	grid injection
UK Enfield	2015	Biogas	1000 Nm ³ /h	grid injection

