

BiON™ – Robust. Flexible. Ecology-minded.

Synthetic Methane from CO₂ and H₂



Biological methanation by microorganisms

Produce renewable gas and rely on the efficiency of nature. Hydrogen and carbon dioxide are transformed into pure methane in the BiON™ process, which can be fed into the natural gas grid indefinitely. Thus, BiON™ is as all-round process a

- processing technology for CO₂-containing process gases
- power-to-gas application for storing green electricity
- production process for synthetic methane

Technology that has what it takes – robust and flexible

Hydrogen and CO₂ flow into an oxygen-free pressure vessel. In this reactor, specialised microorganisms metabolise the gases and convert them into methane. The anaerobic process is easily scalable and available in various sizes.

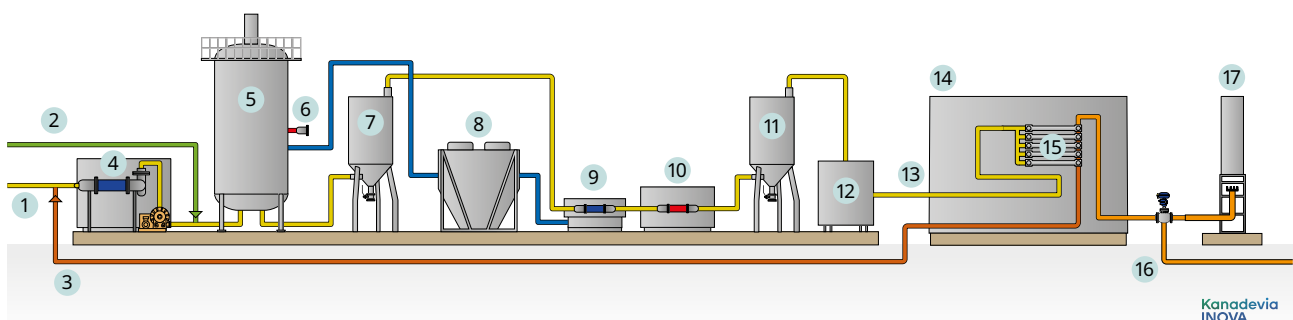
Biological, resource-saving and versatile

We have perfected our biological know-how in process engineering to the extent that microorganisms are stimulated to perform at high levels. Following nature's example, the process conserves resources – after all, microorganisms feel

most comfortable at low temperatures of 65 °C and can easily manage with pressures of only 5 to 10 bar.

Where BiON™ is coupled with a fermentation plant, the process cleverly utilises the available starting substrates – sewage sludge or fermentation residues. This reduces costs for logistics and additives. Through good integration into the existing process flows, BiON™ prevents disposal problems from arising in the first place. At locations without fermentation plants, a simple synthetic medium takes over the nutrient supply.

Whether it's gas processing, utilising green electrical surpluses, or gas injection – we adapt our processes to your individual circumstances and needs.



Pretreatment

- 1 Carbon dioxide
- 2 Hydrogen
- 3 Recirculation
- 4 Drying and compression

Biological methanation

- 5 BION™ reactor
($\text{CO}_2 + 4 \text{H}_2 \rightarrow \text{CH}_4 + 2 \text{H}_2\text{O}$)
- 6 Heat export
- 7 Foam trap/scrubber
- 8 Chiller
- 9 Cooling of product gas

- 10 Economiser
- 11 Activated carbon filter
- 12 Cooler

Upgrading product gas

- 13 Product gas
- 14 Gas upgrading
- 15 Membrane modules
- 16 Substitute natural gas (SNG)/ synthetic methane for further use
- 17 Safety flare

Technical data BION™ 400	
General data	Plant size individually scaleable
Input: H ₂ flow rate	400 Nm ³ /h
Input: CO ₂ flow rate	100 Nm ³ /h
Possible input gases without pre-cleaning	Pure gas, sewage gas, biogas, pyrolysis gas, landfill gas
Nutrient medium for microorganisms	Sludge from sewage treatment and biogas plants, synthetic medium
Operating parameters	up to 10 bar at 65 °C
Operating mode	Continuous or partial load
Overall efficiency	up to 95% (incl. heat utilisation)
Usable produced heat	Up to 350 kW

BION™ 400 basic	
Biological methanation	Increase in methane content in processes
Flow rate product gas	100 Nm ³ /h wet methane with accompanying gases
Methane concentration	Up to 97%
Space requirement	Up to 1.000 m ²

BION™ 400 economic	
Biological methanation with gas purification and gas drying	Injection into the gas network with high H ₂ -tolerance
Flow rate product gas	100 Nm ³ /h treated methane (SNG)
Methane concentration	Up to 97%
Space requirement	Up to 1.200 m ²

BION™ 400 pro	
Biological methanation	Injection into the gas network with low H ₂ -tolerance
Flow rate product gas	100 Nm ³ /h treated methane (SNG)
Methane concentration	Up to 99%
Space requirement	Up to 1.500 m ²

Kanadevia Inova Schmack GmbH

Bayernwerk 8
92421 Schwandorf
Germany
P +49 9431 751-0
info.schmack@kanadevia-inova.com
www.kanadevia-inova.com/schmack-biogas

Kanadevia Inova AG

Hardturmstrasse 127
8005 Zurich
Switzerland
P +41 44 277 11 11
info@kanadevia-inova.com
www.kanadevia-inova.com

