

Hitachi Zosen  
INOVA

HZI Catalytic Methanation  
Green Methane Production



## Large-Scale Hydrogen and Carbon Dioxide Conversion with Catalytic Methanation

Hitachi Zosen Inova's catalytic methanation solution is designed to convert hydrogen, carbon dioxide and carbon monoxide into synthetic methane and water. Methane is an advanced and CO<sub>2</sub>-neutral gaseous energy carrier, that can be readily stored and transported in existing natural gas infrastructures. Used directly in technology-proven end-devices, synthetic methane plays an essential role in decarbonising a wide range of applications in mobility, energy and industry.

Leveraging our experience as a system integrator, our unique and patented methanation solutions are provided in modular configurations and are fully integrated in customer's infrastructures as a turnkey plant.

Our overall offering for methanation plants also encompasses upstream gas and downstream and polishing to allow compliance with grid specifications.

We are a partner of choice throughout the project life cycle, from feasibility study and permitting support to engineering, execution, commissioning, supervision and O&M service for complex methanation plants. This broad-spectrum coverage allows us to offer a unique and cost-competitive solution to optimise the levelised cost of synthetic methane.

HZI's catalytic methanation technology is available in standardised, modular configurations and provides optimised energy conversion efficiency, versatility and scalability. Our patented and unique plate reactor technology allows us to offer the most robust, compact and efficient catalytic methanation plants available today.

Our patented fixed bed plate-type reactor allows a high gas hour space velocity, leading to consistent methane production with very low power consumption.

HZI's catalytic methanation can handle a broad variety of CO<sub>2</sub> feed gas sources and supplies pure and dry methane at about 7 bar – ideal for further liquefaction, compression or direct use.

### Your Benefits:

- > Optimised production of high-quality gas
- > High conversion efficiency
- > High operational availability
- > High-pressure steam from demineralised water as valuable by-product
- > Carbon monoxide conversion by internal water gas shift reaction
- > Wide range of H<sub>2</sub>/CO<sub>2</sub> ratios accepted
- > Long-term availability of the Ni catalyst
- > Simple reactor control by natural draft water/steam circulation cooling
- > Dynamic operation possible, providing flexibility and balancing energy
- > Compact footprint
- > Advanced control and automation systems
- > High safety standards
- > Environmental friendliness
- > Low power consumption
- > Low operation and maintenance cost
- > Modularised prefabricated design to optimise delivery time schedule
- > Europe-wide service network in cooperation with local partners



Pythia6000: HZI's catalytic methanation reactor series for 6,000 Nm<sup>3</sup>/h feed gas

The internal reactor cooling and control also, produces high-pressure demineralised water steam that can be made available for further use.

HZI's catalytic methanation is available in fully modular containerised units with a feed gas throughput of 2,000 Nm<sup>3</sup>/h and 6,000 Nm<sup>3</sup>/h, ready for outdoor installation. The plants are qualified for full dynamic as well as continuous operation modes. They can operate as stand-alone or as a cluster to

meet required volumes of synthetic methane at a large scale.

The scope of HZI's catalytic methanation technology consists of the power supply, a reactor with steam system, relevant auxiliary aggregates, and downstream gas polishing. Feed gas compression and polishing can be offered as an optional add-on.

		Pythia2000	Pythia6000
<b>General Product Data</b>			
Type		Catalytic methanation	Catalytic methanation
Reactor type		Proprietary fixed bed plate-type reactor	Proprietary fixed bed plate-type reactor
Pressure (CH <sub>4</sub> output)	barg	Up to 7	Up to 7
<b>Output</b>			
Product gas flow at 100% load	Nm <sup>3</sup> /h	400	1,200
Demineralised water at 100% load	kg/h	700	2,100
High-pressure stream at 100%	t/h	1.3 @230°C @ 25–34 barg	3.9 @230°C @ 25–34 barg
<b>Gas Purity</b>			
Methane at 100% load	%	Up to 96	Up to 96
Hydrogen at 100% load	%	Up to 3.5	Up to 3.5
Dew point	°C	Up to -30	Up to -30
<b>Input</b>			
Feed hydrogen flow at 100% load	Nm <sup>3</sup> /h	1,600	4,800
Feed carbon dioxide flow at 100% load	Nm <sup>3</sup> /h	400	1,200
<b>Scope of Supply/Features</b>			
Load range	%	50–100	50–100
Grid connection	V AC	3 x 400	3 x 400
Power consumption at 100% load BOL	kWh/Nm <sup>3</sup> SNG	≤ 0.3 (does not include feedgas compressor)	≤ 0.3 (does not include feedgas compressor)
Total footprint area	m <sup>2</sup>	20 x 25 (depending on required SNG quality)	20 x 25 (depending on required SNG quality)
Temperature range (outdoor)	°C	-20 up to +40	-20 up to +40
Housing		1 x reactor with rack 1 x 40' container (LV distribution and DCS), 1 x 40' container (gas upgrading)	3 x reactors with rack 1 x 40' container (LV distribution and DCS), 1 x 40' container (gas upgrading)
Design standard		CE certificate	CE certificate