

AHT Product Scope - Gas Utilization



Overview

Within the gas utilization unit, the conditioned synthesis gas from the gas conditioning system is converted into useful energy. In most applications, the syngas is utilized in Combined Heat and Power (CHP) systems to generate electricity, while simultaneously recovering heat for industrial processes, district heating, or other thermal applications. During this conversion process, the gas is transformed into a flue gas consisting mainly of steam (H₂O) and CO₂.



Products

AHT CleanTec provides a range of CHP systems, allowing solutions to be tailored to the specific requirements of each project, enabling optimized performance depending on the operational needs of your processes. Shown below are the two types of CHP that we can offer.



CHP Unit With Pilot Fuel



CHP Unit Without Pilot Fuel

Technical Data

	CHP with Pilot Fuel	CHP without Pilot Fuel
Electrical Output	260 - 528 kW	275 - 500 kW
Thermal Output	370 - 671 kW	260 - 482 kW
Electrical Efficiency	38.0 - 39.3%	41.9 - 42.5%
Thermal Efficiency	50.0 - 54.0%	39.8 - 40.4%
Voltage	400 V	400 V
Electric Frequency	50 Hz	50 Hz
Exhaust Flow	900 - 2811 kg/h	1268 - 1934 kg/h
Exhaust Temperature	~120 - 210°C	180°C

Process Breakdown

- 1 Firstly, the conditioned syngas from our gas conditioning system is supplied to the CHP unit and mixed with combustion air in the required ratio under controlled conditions.
- 2 Next, the air-syngas mixture is ignited to initiate combustion. Depending on the CHP unit, ignition is achieved either through a small amount of pilot fuel injected into the combustion chamber **(with Pilot Fuel)**, or via a spark ignition system **(without Pilot Fuel)**.
- 3 Following this, the combustion process drives the engine of the CHP unit, converting the chemical energy stored in the syngas into mechanical energy.
- 4 Thereafter, the engine powers a generator where the mechanical energy is converted into electricity for on-site use or export to the electrical grid.
- 5 Simultaneously, heat from the engine cooling circuits and exhaust gases is recovered through heat exchangers, producing useful thermal energy for industrial processes, heating applications, or storage.
- 6 Finally, the CHP system delivers Combined Heat and Power output, providing a reliable and efficient supply of both electricity and heat tailored to the operational requirements of the end user.

Benefits

Listed below are examples of some benefits that our CHP units can provide.

01 Flexible Energy Utilization

The CO₂-neutral heat and electricity from the CHP units can be used for a variety of applications, such as district heating, industrial processes, and more depending on our clients' needs.

02 Base and Part-Load Capability

The CHP is excellent for covering base-load requirements for year-round applications as it requires uninterrupted heat and/or power supply. Furthermore, the heat & power output of the CHP can be tailored to the actual heat and power demand.

03 Reduced Environmental Impact

As our CHP units produce CO₂-neutral electricity through efficient utilization of "green" synthesis gas, the overall carbon footprint of any operation can be lowered, thus allowing compliance with environmental regulations.

04 High Energy Efficiency

As our CHP units achieve an electrical efficiency of over 40%, this high efficiency reduces overall operating costs by lowering feedstock consumption, thus making your energy production more cost effective.