

AHT Product Scope - Wet Gas Conditioning



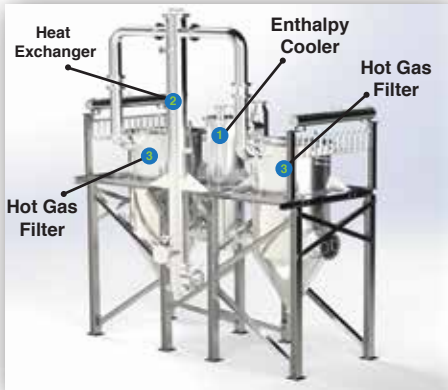
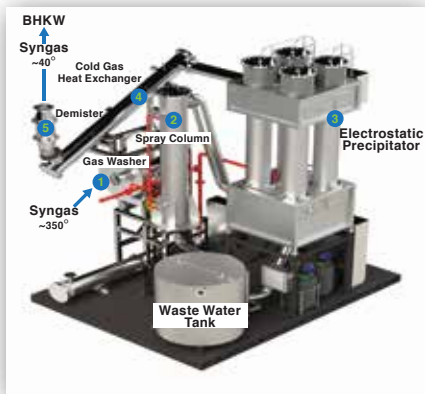
Overview

Inside the gas conditioning unit, the raw syngas generation in the gas generation unit is processed so that it can be utilized efficiently in the subsequent gas utilization step. Depending on the final gas utilization, the gas conditioning involves hot and cold as well as dry & wet gas conditioning steps. Generally, the key parameters of the syngas exiting the gas conditioning unit include pressure, temperature, and gas composition. In addition, particular attention is given to the concentrations of the main permanent gases, as well as dust and tar loading.



Products

AHT CleanTec provides two Gas Conditioning solutions tailored to different reactor specifications, which are Dry Gas Conditioning, and Wet Gas Conditioning. The Wet Gas Conditioning combines both dry and wet treatment stages to achieve a clean syngas suitable for a wide range of end-use (e.g. CHP utilization), and it cannot be separate from the dry treatment.



Dry + Wet Gas Conditioning

Technical Data

	EcoFilter-Wet Compact	EcoFilter-Wet Performance	EcoFilter-Wet Industrial
Wet Gas Conditioning			
Dust Removal	<10 mg/Nm ³		
Tar Removal	<50 mg/Nm ³		
Outlet Pressure	70 mbar		
Outlet Temperature of Syngas	40-50 °C		
Total Extracted Heat from Syngas	~135 kW (at ~70°C) ~15 kW (at ~20°C)	~295 kW (at ~70°C) ~30 kW (at ~20°C)	~590 kW (at ~70°C) ~60 kW (at ~20°C)
Water Consumption	Wash Water: < 17500 kg/h Fresh Water: ~125 kg/h	Foul Water: 35000 kg/h Fresh Water: ~250 kg/h	Foul Water: 70000 kg/h Fresh Water: ~ kg/h

Process Breakdown

- 1** Firstly, high-temperature raw syngas from the gasifier enters the enthalpy cooler, where it is cooled using the enthalpy of water vaporization, reducing the temperature to approximately 500°C for safe downstream handling.
- 2** Next, the syngas then passes through the hot gas filter, where solid particulate matter larger than 2 μm is captured on filter candles at high temperatures, ensuring a clean gas stream and preventing it from contaminating the downstream equipment.
- 3** Thermal energy is then recovered in the hot gas heat exchanger, while the gas is further cooled to enable the removal of heavy tars in liquid form. Following this, the water then enters the spray column where it is introduced in counterflow over a packed bed.
- 4** This increases its contact surface area, removes residual fine dust particles and water-soluble components, while reducing the gas temperature to approximately 40°C. The syngas is then sent to a gas scrubber to remove all dust and particles while also generating pressure, and creating an aerosol that will be further processed.
- 5** Afterwards, the remaining aerosols are removed in an electrostatic precipitator, followed by further cooling in the cold gas heat exchanger using a chilled water circuit to reduce moisture content, and to prepare the gas for downstream use.
- 6** Finally, a demister removes the residual water mist, and the cooled and purified gas is conveyed via the gas blower to its end-use application, such as a CHP gas engine.

Benefits

Through our syngas generation technology, a wide range of benefits can be achieved, including:

01 Automated Filter Cleaning

Our hot gas filter is automatically cleaned periodically through our pressure drop monitoring, which enables an automatic cleaning of the hot gas filter through high-pressure nitrogen back-pulsing.

02 Flexible Gas Utilization

The highly purified and conditioned syngas, is suitable for CHP systems and various industrial applications. As such, this ensures efficient energy conversion and reliable downstream operation.

03 Modular & Customizable Design

Our modular Gas Conditioning system can be configured to project-specific requirements, allowing integration across various different applications

04 Reduced Operating Costs

Effective removal of dust, tar, and aerosols lowers wear on components, reduces cleaning intervals, and decreases overall operating costs.