Analyser & Sampling Systems

Power-Pye (Pye-Gas Sampler)

The proven, robust and maintenance-free sample conditioner that prepares a clean sample for further analysis from a complex, heavy contaminated hot hydrocarbon vapor mixture.

Ethylene and propylene are important building blocks for the manufacturing of various basic petrochemicals, intermediates and polymers. These olefins are either produced during fluid catalytic cracking (FCC) of petroleum fractions in refineries or in chemical plants by cracking natural gas liquids like ethane and propane with steam.

To meet stringent environmental regulations and to maximise opperational efficiency it is essential to analyse the process flow on composition and/or physical properties. Sampling is however difficult as typically hot crack gas mixtures are produced containing heavy particulates, free carbon fines (such as soot), liquidised mists and condensables.

For this purpose 360°KAS has developed a Pyrolysis Sampler, the Power-Pye, which is able to prepare a clean sample gas flow from a complex, hot hydrocarbon vapour mixture on-line. The conditioned clean gas stream can be used for further analysis by a gas chromatograph or a continuous gas analyser.

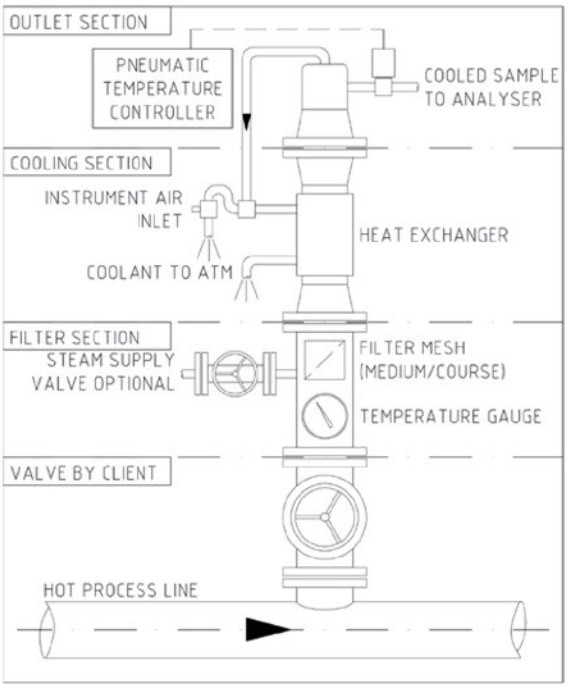
- Ethylene and propylene production units.
- Syngas units.
- Fluidised Catalytic Cracking (FCC) units.
- Decoking operations / coke ovens.
- Acetylene production.
- Naphtha cracker furnace gas.

Functional design

The 360°KAS Power-Pye, or pyrolysis-gas, pye-gas or reflux sampler, is a proven, robust maintenance-free sample precon-ditioner designed to cope with harsh local process conditions and fluctuations.

The Power-Pye is normally mounted vertically on a customer-supplied shut-off vavle on the process line. The sample travels up the sampler column through a filter reflux suction where any particulate heavy matter is filtered out.

The hot vapour sample travels further upward into the cooling section, where the moisture and heavy hydrocarbons are condensed, flowing downward and accumulating on the packing of the filter reflux section. As the condensables increase on the packing, they continue to flow downwards and backwash any particulate in the process line.



Typical pye-gas sampler configuration

Depending on the application, low and medium pressure steam may be periodically be injected into the filter reflux section to provide additional condesables that aid in cleaning the filter packing.

A controlled temperature gradient is set up in the column by conctrolling the cooling of the sample. The Sample temprature is measured at appropriate points and the self-acting control-ler modulates the coolent to obtain a saturated sample at the outlet of the sample conditioner. Provisions to prevent carry-over of condensable during sart-up or upset are included.

As a result of its design, the Power-Pye is totally self-contained, maintenance-free sample conditioner that provides a clean, representative sample for analysis while backwhashing and cleaning the sample conection to eliminate plugging or build-up at the sample tap.

Typically, vortex cooling with instrument air is used as coolant because it is clean, low cost, and virtually trouble free. 360°KAS also designs electromechanical cooling units

(with chilled water or chilled polypropylene) and more accurate temperatur control systems when required.

In some heavy coke-formiing applications or if other plugging conditions appear and the wash-back principle is insufficient to keep the inlet-connection clean for prolonged periods, a linear scraper-device is available to pneamatically rod out th connection. This device is available as an integral part of the Power-Pye with manual or automatic operation.

Specifications	
Line temperatures	+200°C up to +800°C
Pipe line pressures	1 up to 48 barg (standard and pending temperature)
Process Connection	ASME B16.5 Dn50/2"-300# RF (Standard)
Sample flow	1 to 10 lpm (typically)
Ambient temperatures	-20°C to +45°C
Wetted materials	AISL 316L as a standard
Pressure drop	0.5 up to o.8 bar (typically)
Height	~ 1100 mm - excl. instrumentation
Weight	~ 30 kgs - excl. instrumentation
Cooling medium	instrument air (default, 7 barg), chilled water and chilled polypropylene

Options

The following options can be offerd:

- Pneamatic cleaner rod (linear) with connecting piping set.
- Probes.
- DCS/PLC interface.
- Industrial water chiller.
- Outlet gas pump and filter.
- Remote water flow control cabinet with/without pneumatic cleaner rod controls.
- Thermal (pre) insulated coolant lines.
- After-cooler section (for severe thermal duties).
- Inlet manual or air operated high temperature ball valve.
- High temperature sample (safety). shut-off vavle in sample outlet.
- Liquid catcher in sample outlet.
- Thermal insulation (at site and after final installation is preferred).
- Access Platform and installation rack.
- Any other to obtain requested customisation.
- Services such as site installation supervision and spare parts.

Power-Pye equipped with a cleaner rod on the left, as deliverd for an ethylene production facility located in Azerbaijan.

The following Analyser & Sampling product sheets are available:

- Power-Pye (Pye-Gas Sampler)
- Product Sampling (for oil, gas and condensate)

360® KAS

Graanweg 6 a, 4782 PP Moerdijk,
The Netherlands
T +31 (0) 85 303 23 00
info@360KAS.com
www.360KAS.com