

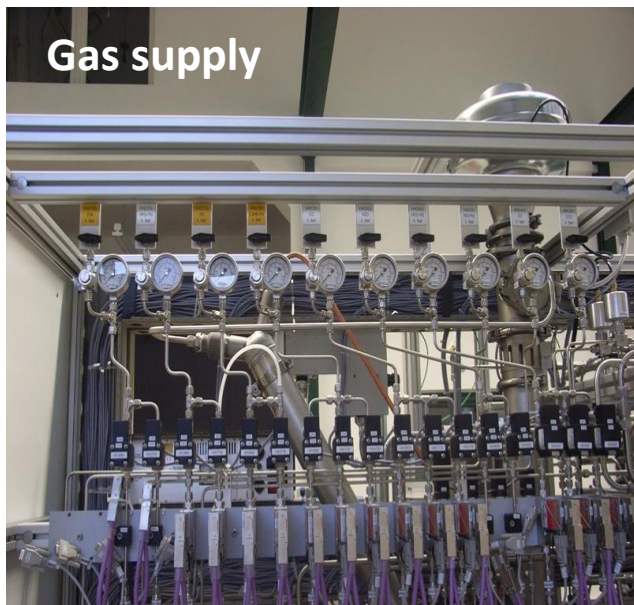
Synthesis gas for testing of monolithic catalyst samples



Catalyst Testing Plant



- Gas supply with fast (pulsed) composition changing
 - Integrated evaporator
- Inert reactor made of Quarz glass with a pressure resistant steel shell
 - Fully automated catalyst testing



Gas supply

Gas supply:

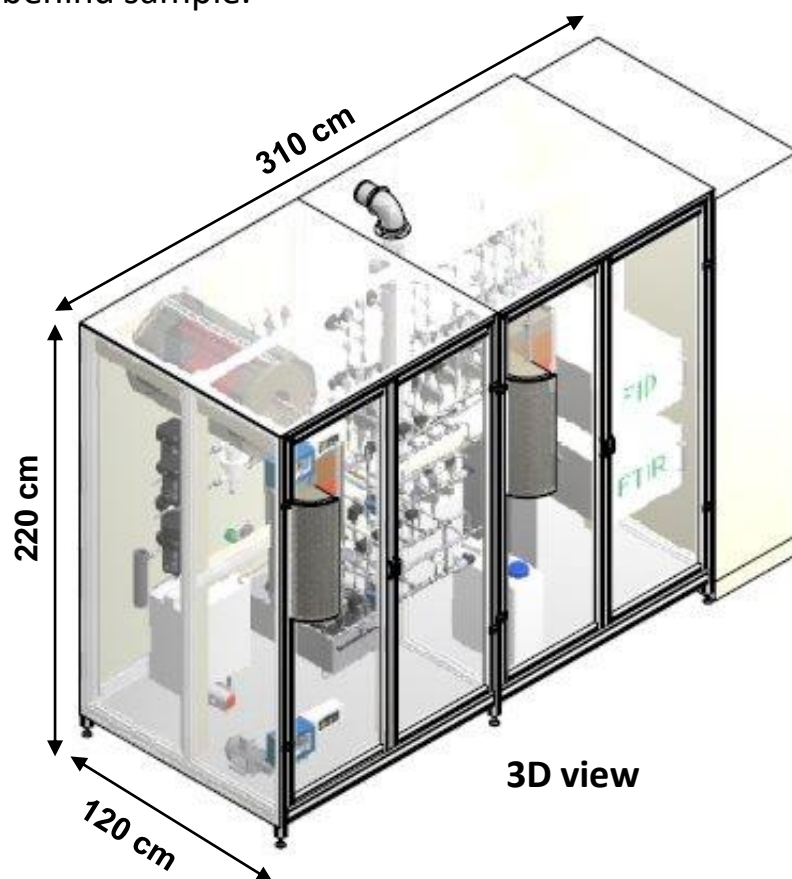
- Total gas stream up to 6000 L/h,
- separate dosing lines for different gas types to prevent undesired reactions,
- *optional: dynamic pulsed swichting between two differente gas mixtures,*
- inlet pressure 3bar (g).

Reactor properties:

- **Pressure resistance** with design pressure of 6 bar,
- **Inert** reaction zone due to quartz glass reactor,
- temperature measurement in front of and behind sample.



reactor with tubular furnace and insulation

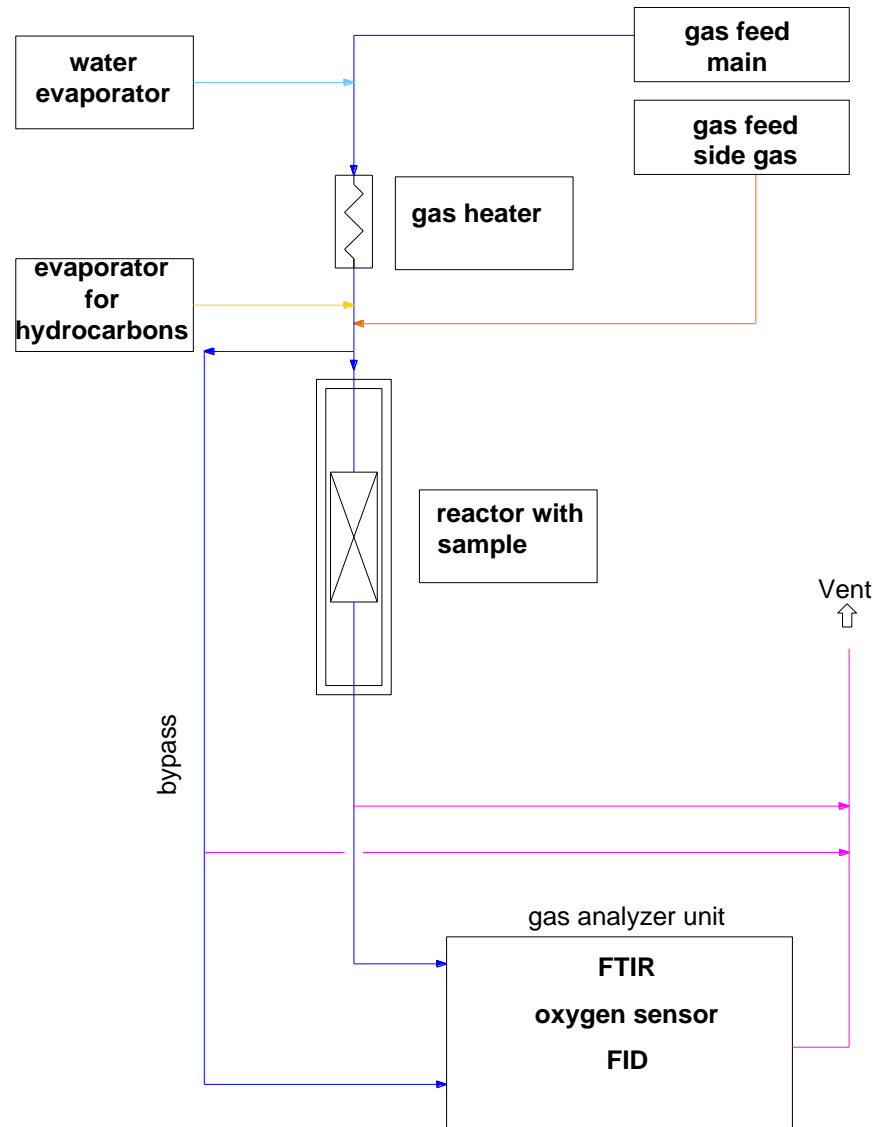


3D view

The fully automated catalyst testing plant comprises different gas feed lines, evaporator for steam supply, a gas heater and reactor unit with vertical furnace and reactor. The main gas feed is heated up to the desired test temperature and mixed with the side gas stream and steam stream afterwards. The composition of the gas stream is controlled using thermal mass flow controllers. Reactive gas is added to the main stream directly before entering the reactor.

The gas analyzer unit typically consists of a FTIR and an oxygen sensor (lambda sensor). The gas composition can be analyzed after the gas has passed the catalyst sample or without passing the reactor unit.

The sample is placed inside a quartz glass tube. The quartz tube is fixed in the tubular stainless steel reactor using graphite sealing. The assembly is located in the middle of a vertical split tube furnace with 3 heating zones.



Technical data

Dimension plant W x D x H	3100 mm x 1200 mm x 2200 mm
Mass of the unit	1300 kg
Electrical supply	400 V, 50 / 60 Hz, 50 A
Ambient conditions	10 to 35 °C, max. humidity < 80 %
Safety	Rupture discs, containment with supervised extraction, supervision of harmful gases.
Pressure conditions	0 – 3 bar (depends on sample geometry)
Temperature conditions	Reactor: 10 – 650 °C, optional – 1000 °C Max. furnace temperature: 1200 °C
Reactor type	Quartz glass reactor embeded in a pressure resistant stainless steel tube (1.4841)
Gas heating unit	Inline gas heater with high dynamics ($T(\text{gas})_{\text{max}} = 640 \text{ °C}$) Higher temperatures on request.
Analytic system	FTIR, oxygen sensor, FID
Gas supplies	N ₂ , O ₂ , NO _x , NH ₃ , H ₂ , N ₂ O, CO, CO ₂ , CH ₄ , SO ₂ Others on request.
Liquid supplies / evaporators	Dosing unit and evaporator for water and hydrocarbon. Optional: Ion exchanger cartridges for water conditioning.
Exhaust gas treatment	Condenser, gas cooling and dilution
Control system	Process control system Simatic™ PCS7 with Box PC, continuous data logging

Product Overview



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