

kartago PFHE system

How to develop economic, scalable, robust and safe hydrogenation processes

The new Premex PFHE system has been designed by Premex in collaboration with experts in heterogeneous catalysis and chemical reaction engineering. It allows determining the basic informations needed for the optimization and successful scale up of catalytic hydrogenation reactions from laboratory to plant size. The system unifies state of the art industrial components:

- Robust and easy to handle stirred tank reactor. The reactor cover has 10 bore holes which allows interfacing with many tools such as liquid sampling under pressure and elevated temperature, internal filtration for catalyst recycle experiments, catalyst slurry addition device allowing addition of catalyst to a preheated reaction solution at elevated temperatures. Reactions can be run under isobar conditions or at a constant hydrogen flow rate. Reactions can be carried out under isotherm conditions or with programmable temperature range.
- Efficient heating/cooling unit by Huber Tango via mantle of reactor.
- State of the art data logger allowing to collect all data of the reaction (pressure, temperature, stirring rate,) at a frequency down to 1/s.

The Premex system PFHE has been specially designed to determine:

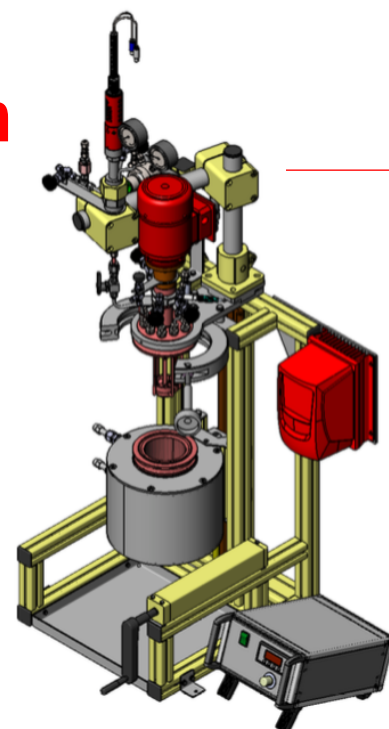
- Kinetic data (micro- and macrokinetics) : In particular it allows injecting a catalyst slurry to a preheated reaction solution against pressure. The hydrogenation can therefore be carried out under isotherm and isobar conditions (from beginning), which much simplifies the determination of kinetic data.
- Reaction pathways: it is possible to take very small samples of liquid from the reaction under pressure and elevated temperature. Interruption of the hydrogenation process is not necessary.

Technical data of the high pressure reactor kartago PFHE

- High pressure reactor kartago PFHE item No. 128810
- Nominal volume 1000 ml
- Design pressure 120 bar
- Operating pressure 100 bar
- Operating temperature 150°C
- Reactor vessel and lid in WNo. 2.4602 (HC22), fittings AISI 316
- Quick clamp
- Double jacket for oil heating, connecting M16x1, covered and isolated in a chromsteel jacket,
- Type kartago is equipped with a hydraulic elevation cylinder which lifts or lowers the vessel by hand
- Dimensions (W x D x H) 530 x 1649 x 500 mm

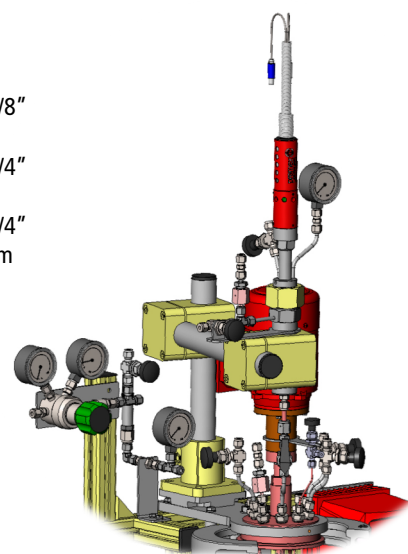
Fittings on the reactor cover

- Magnetic stirrer drive funrun in HC22, a frequency-controlled three-phase current motor 120 Watt 230/420 V
- Speed setting 200-1,500 rpm.
- Torque of the magnetic coupling 60 Ncm, with slide bearings
- Gas stirrer with baffle typ "br" (HC-22)
- Turbine stirrer typ "sr" (HC-22)
- Bore G1/4" needle valve and dip tube 1/8" with filter
- Bore G1/4" needle valve and dip tube 1/4" for pressure release
- Bore G1/4" needle valve and dip tube 1/4" and dip tube with flat filter at the bottom
- 2 Bore G1/4" with plug as spare
- Bore G1/4" with thermowell and thermocouple 1xPt100
- Bore G1/4" with connector 1/4" to the pressure station with pressure gauge 0-160 bar and pressure transmitter 0-160 bar / 4-20 mA
- Bore G1/4" with dip tube (interchangeable) for hydrogen input
- Bore G1/4" for substrate feeding

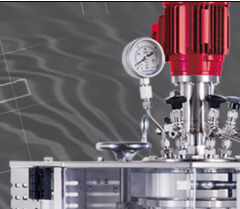
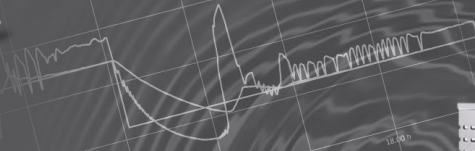


Principle of stirrer catalyst addition device

The catalyst addition device allows the addition of a heterogeneous (or homogeneous) catalyst to a reactor under inert and controlled conditions.



Drawing of stirred catalyst addition device



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The Premex PFHE system is currently used successfully for the optimization and determination of basic data of large scale industrial hydrogenation processes.

