

Phone: +34 918 459 930
FAX: +34 918 486 454

C/ Plomo 15 – Pol. Ind. Sur E-28770
Colmenar Viejo
Madrid – Spain

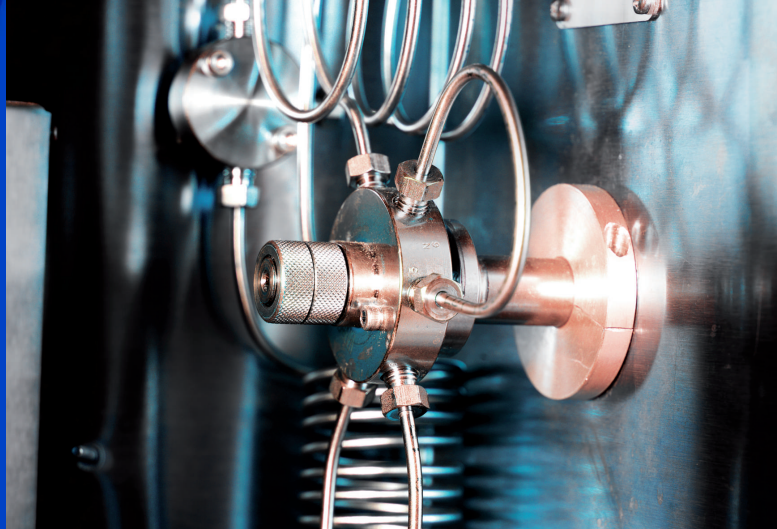


Microactivity Reference

RELIABILITY
REPRODUCIBILITY
INNOVATIVE
VERSATILITY
FLEXIBILITY
SAFETY



Microactivity Reference



The MICROACTIVITY-Reference is an automatic and computerized laboratory reactor for reactions of catalytic microactivity with reactor bypass, preheater evaporator, pressure control valve and other process layouts in hot box, which avoids the possible condensation of volatile products, at the time that preheats the reactants efficiently.

The MICROACTIVITY-Reference consists of an ATMOSPHERIC PRESSURE BASIC UNIT and some series of EXTRA PACKAGES that improve or modify its efficiency. It is a single structure that contains the electronic unit, control and MFC s system and includes the hot box where the reactor and process valves are located. The system has local control and on-line remote control, based on TCP/IP Ethernet communications with distributed control structure. A complete and elaborated security system is integrated in microprocessor, independent of the computer.

For reactions at high pressure that involve separation of gases and liquids, a new system of level control of the condensed liquid is introduced with almost no dead volume (0.3 ml), so that the sample of the liquid outlet is the condensed product mixture formed at the very last minutes of reaction. A wide variety of reactions has been carried out in our reactors: Hydrocracking, Hydrotreating, Isomerization, Hydrogenation, Hydrodesulphurization (HDS), Oxidation, Hydrodenitrogenation (HDN), Polymerization, Reforming (aromatization), steam reforming, etc. Strategic alliances with our customers have induced to some of the most important technological solutions at present for a variety of catalytic processes.

BASIC UNIT FEATURES

- FT touch screen process set-up.
- Hotbox in SS 316 with convector of hot air. Max. recommended temperature $180^{\circ}\text{C} \pm 1^{\circ}\text{C}$.
- Reactor oven in inox 304. Max. temperature 950°C , $\pm 2^{\circ}\text{C}$. Low thermal inertia.
- Tubular reactor AE in inox 316, max. recommended temperature 700°C . i.d.=9,2 mm, L=300 mm, fittings AE SF 562 CX. Porous plate in Hastelloy C-276, 20 microns,
- Thermocouple $\dot{y}=1,5$ mm, incoloy, directly in catalyst bed, without thermowell.
- Valve VICI 6 ports, 2 positions, 280°C , 100 bar, for reactor bypass.
- 3 MFC s Hi-Tec Bronkhorst for a Basic Unit, precision 1% F.S., elastomers compatible with the process.
- 3 shut-off valves, 3 check-valves and a gas-mixer in a Basic Unit, 6 MFC s max.
- Thermoelectric unit for liquids condenser / separator.
- Check-valve for feeding of liquids, cracking pressure 10 psig.
- Spiral layout for liquid evaporator or preheater.
- Spiral layout for gases preheater.
- Pressure transducer in the atmospheric or high-pressure unit.
- 250°C heated line to chromatograph connection.
- The CG unit is not included in this offer. HP or Varian is recommended with software for Windows.
- Furnace & oven powered through 3 SSR proportional control 4/20 mA by phase angle control.
- Security system based on integrated microprocessor RS 485 (detector of flow fail, pressure, temperature, level in separator).
- Max. work pressure 100 bar. Work pressure in a Basic Unit: 1 bar.
- Layout, fittings and valves are in inox 316, with very low dead volume, Hoke-Gyrolok, Swagelok, Autoclave Engineers, VICI-Valco quality.
- Friendly supervision and distributed control software in real time
- Process@ digital communication, Ethernet remote control.
- Includes Pentium IV. 17 TFT. Process@ software for Windows.

EXTRA PACKAGES

MFC: 4th, 5th and/or 6th MFC s with power supply and valves.

PRES: High Pressure Unit includes pressure control system, based on micrometric servo-controlled valve, 100 bar max, ± 0.2 bar, 210 $^{\circ}\text{C}$. PID Eng&Tech patented design. PID loop controller.

PUMP: Gilson HPLC liquid pump, 0.01-5 ml/m, 400 bar. Digital communications.

LEVEL: Liquid/gas separator with level control for operation with liquids and gases at high pressure in continuous mode, zero dead volume, based on micrometric valve servo-controlled and capacitive sensor level with approx. 0.3cc dead volume with precision ± 0.1 cc in level control. 100 bars. PID Eng&Tech patented design.

TWO LIQUID PHASES SEPARATOR: New upgraded application for use in Fisher-Tropsch (GTL) reactions. At real time separation at high pressure is obtained Water + Hydrocarbons + gases.

SCALE: Scale for weighting liquid output in real time. Digital communications module.

MFM: MFM in exit gases line (for on-line and in real time supervising procedures).

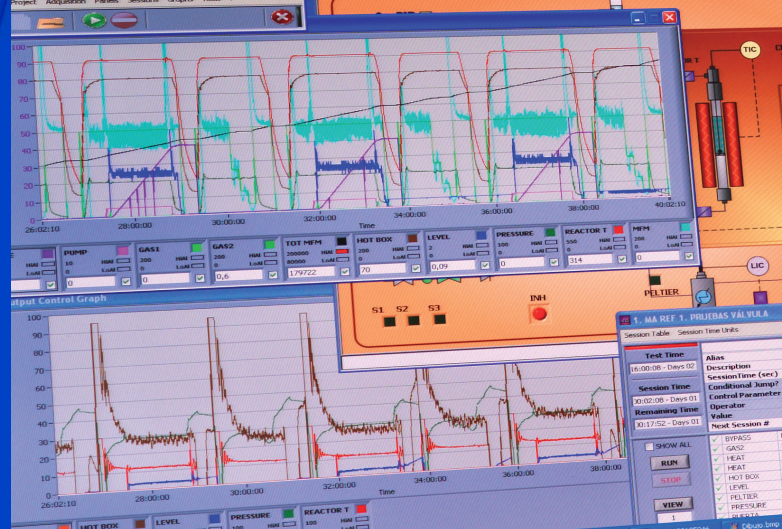
VICI: 2nd VICI valve, 6 ports, 2 positions. Only for special purposes.

REAC: Construction materials of the reactor: Hastelloy C or X, Inconel, Titanium, and special dimensions (id= 5.2 or 13.1 mm).



Microactivity Reference

process@software ▶



ATMOSPHERIC PRESSURE BASIC UNIT

- Tubular reactor Autoclave Engineers 700° C with porous plate
- Thermocouple, directly in catalyst bed
- Hotbox 170° C
- VICI valve 6 ports, for reactor bypass.
- 3 MFC s, Hi-Tech Bronkhorst
- Thermoelectric unit for liquids condenser / separator.
- Microprocessor for security integrated system
- 2 Control loops for temperature
- 6 Control devices for MFC s.
- Work pressure in atmospheric basic unit: 1 bar.
- Design pressure: 100bar
- Layout, fittings and valves in inox 316L, very low dead volume

HIGHT PRESSURE BASIC UNIT

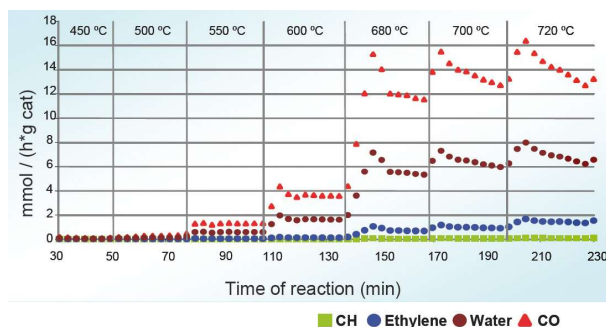
- Atmospheric Pressure Basic Unit &:**
- Pressure control system, based on servocontrolled micrometric valve by 1st precision stepper motor
 - PID Eng&Tech patented design
 - 100 bar max. ± 0.2 bar
 - Control loop and 100 bar pressure transducer
 - Digital communications

HIGH PRESSURE UNIT WITH LIQUID-GAS SEPARATOR

- High Pressure Basic Unit &:**
- Liquid/gas separator with level control, in continuous mode, based on servocontrolled micrometric valve and capacitive sensor level with approx. 0.3cc dead volume
 - PID Eng&Tech patented design
 - Cooling by Peltier thermoelectric effect
 - Control loop and capacitive sensor
 - Digital communications
 - Two models: L1 or L2 (two phases)

EXTRA PACKAGES

- HPLC Gilson pump, 400 bar, 0.01-5 ml/min
- Up to 4, 5 or 6 Mass Flow Controllers
- Scale in liquid outlet
- Mass Flow Meter in gas outlet
- Construction materials or reactor dimensions
- 2nd VICI-Valco valve for special proposals



Phone: +34 918 459 930
FAX: +34 918 486 454

C/ Plomo 15 – Pol. Ind. Sur E-28770
Colmenar Viejo
Madrid – Spain

