

SUPERCritical EXTRACTION PILOT PLANT FOR SOLID SAMPLES WITH TWO VESSELS (ONE FOR PRODUCTION)

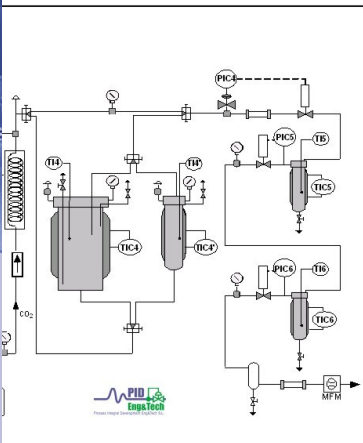
Automated and computerized laboratory-pilot plant for extraction of solid samples by means of supercritical

ular-type built for easy return to factory for service. Each module (feed section, Extractor module and two Separator modules) system and electronic control system. All these systems are supervised for distributed control system PC based. The security ted in each one of these modules.

Feed system

Roy CO₂ pump, 4.7 l/h, 380 bar, SS-316 hydraulic membrane, refrigerated head. Inverter for computerized control. Check-valves, filters and system and bypass for flow measures at high pressure in Co-solvent pump.

Roy Co-solvent pump 0.3 l/h, 100 bar, SS-316 piston head. Inverter for computerized control. Check-valves, filters and system and bypass for flow measures at high pressure in Co-solvent pump.



Two Extractors

- Furnace for CO₂ preheater. Two control actions: heating by electrical power and cooling by furnace opening and closing.
- 350 cc Head Line vessel, 400 bar, easy closure system, for solid sample. Porous plate 20 microns. Quick connectors for agreeable work.
- 2000 cc Autoclave Engineers vessel, 400 bar, Bolted Closure, for solid sample, CE mark.
- Bypass system in order to select the extractor.
- Furnace for control temperature of extraction operation, internal thermocouple. Two control actions: heating by electrical power and cooling by furnace opening and closing.
- Bypass system (two-three way valves) for cleaning procedures.
- Pneumatic security valve put into operation by pressure control system.
- Pressure control system based on micrometric regulation servocontrolled valve. High precision in pressure control and fast response. Maximum pressure 340 bar.

Three Separators

vessel, 400 bar, easy closure system, for extracts collection. Valve for sample. control temperature of separation operation, internal thermocouple. Two control actions: heating by electrical power and cooling by and closing.

l system based on micrometric regulation servocontrolled valve. High precision in pressure control and fast response. Max r in Separator 1, 120 bar in Separator 2.

tmospheric pressure and MFM for CO₂ flow measurement.

Distributed control system

rol systems are linked with PC computer by means of Process@ software for remote control with digital communications. The controlled manually or automatically.

are allows the operator to design automatic procedures for the process run.

al independent safety levels: automatic switch-off in case of any problem, pressure and temperature security systems, all that onic or mechanical devices and independent of PC.

Test

be tested during 24 hours at 360 bar closing (except MFM and rupture discs).

be tested during 4 hours at 340 bar in Extractor, 220 bar in Separator 1 and 120 bar in Separator 2, in operation mode, with 3 c/h ethanol as co-solvent.