

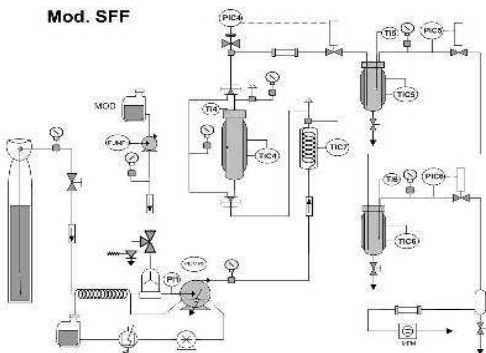
SUPERCritical EXTRACTION PILOT PLANT. SFF model

Automated and computerized laboratory-pilot plant for extraction of solid samples by means of supercritical CO₂.

The system is a modular-type built for easy return to factory for service. Each module (feed section, Extractor module and two Separator modules) includes process system and electronic control system.



Mod. SFF



Feed system

- Dosapro Milton Roy CO₂ pump, 4.7 l/h, 380 bar, SS-316 hydraulic membrane, refrigerated head. Inverter for computerized control. Check-valves, filters and other components.
- Refrigerator unit (-10°C) for cooling CO₂ line feed and CO₂ pump head.
- Dosapro Milton Roy Co-solvent pump 0.3 l/h, 100 bar, SS-316 piston head. Inverter for computerized control.
- Back pressure system and bypass for flow measures at high pressure in Co-solvent pump.

Column System

- 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.
- 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.
- Rupture discs, check valves, filters and other components.

Three Separators

- 40 cc Head Line vessel, 400 bar, easy closure system, for extracts collection. Valve for sample.
- Furnace for control temperature of separation operation, internal thermocouple. Two control actions: heating by electrical power and cooling by furnace opening and closing.
- Pressure control system based on micrometric regulation servocontrolled valve. High precision in pressure control and fast response. Max pressure 220 bar in Separator 1, 120 bar in Separator 2.
- Separator 3 at atmospheric pressure and MFM for CO₂ flow measurement.

Distributed control system

- All module control systems are linked with PC computer by means of Process@ software for remote control with digital communications. The system can be controlled manually or automatically.
- Process@ software allows the operator to design automatic procedures for the process run.
- Plant has several independent safety levels: automatic switch-off in case of any problem, pressure and temperature security systems, all that based on electronic or mechanical devices and independent of PC.

Test

- The system will be tested during 24 hours at 360 bar closing (except MFM and rupture discs).
- The system will 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 l/h CO₂ and 20 cc/h ethanol as co-solvent.