



POLYMERIZATION PILOT PLANT

Polymer Design and Development



SERVICES OFFERING

Access Services to a wide range of pre-industrial pilot tools for: :

- Synthesis by mass polycondensation and solid post-condensation: :
 - polyester and copolyester
 - polyamide and copolyamide
 - polyether amide
 - possibility of using liquid or solid monomers, derived from petrochemicals or biobased
- Shaping, drying and packaging of polymeric materials.

Scale: from 7.5L to 250L

EXPERTISE

Since 2020, in partnership with the SOLVAY group, AXEL'ONE has built the AdChem4 platform (Advanced Chemistry Pilot Plant) which provides access to pre-industrial polymerization tools allowing the production, shaping and conditioning of up to a hundred kg of Polymer. This expertise is also part of the development of R&D tools to meet the challenges of the circular economy. The associated expertise is:

- Polycondensation processes
- Heat transfers and agitation of viscous media
- Forming molten products into divided solids
- Industrialization of processes

Polymerization clave 7.5L, inox 316 L (K14000)

- **Reactor K14000 Volume 7.5L**

Operating pressure: 5mbar up to 28bar

Max operating temperature: 320°C

Agitation : Double helical ribbon

Distillation Column: operating pressure: 5mbar up to 9bar

Prepolymerization & Solubilization reactor, inox 316L

- **Prepolymerization reactor (K22300) Volume 250L**

Operating pressure: 5mbar up to 19bar

Max operating temperature 300°C, Heating through jacket and plate coil (Therminol 66)

Agitation : Archimedes screw + recirculation well

Distillation Column: : operating pressure: 5mbar up to 19bar

- **Solubilization reactor / evaporator Volume 50L**

Operating pressure: 0.5bar max

Max operating temperature: 150°C, Heating through internal coil (7b steam)

Agitation : Propeller, Single mechanical sealing

Polymerization clave 200-250L, inox 316 L

- **Polymerization clave K22000 in cascade with K22300**

Volume 200L, Operating pressure: 5mbar up to 23bar, Max operating temperature: 320°C, Heating through jacket and plate coil (Therminol 66)

Agitation : Archimedes screw + recirculation well

- **Polymerization clave K23000 Volume 240L**

Operating pressure: 5mbar up to 23bar

Max operating temperature: 320°C, Heating through jacket and plate coil (Therminol 66)

(Reactor K23000 in cascade with K23300)

Agitation : Archimedes screw + recirculation well



EQUIPMENT

Preparation - conditionning

- Polyvalent weighing station powders and liquid
- Conditioning with thermosealed bags and boxes (20kg)
- Heavy loads crane handling

Drying : Dryer / postcondensation

- Drying of pellets through fixed bed nitrogen sweeping
- 215L Drying hopper
- Superficial gas velocity: 0.5m/s
- Max operating temperature: 215°C
- Dew point regulation: -30°C (nominal)
- Oxygen content monitoring: 5ppm 02 min

Polymer processing

- Mobile pelletizer SHEER (Dry cutting, 40mm knife width (4strands), 45m/min max)
- Mobile pelletizer MAAG PRIMO 120E (Dry cutting, 120mm knife width (12strands), 120m/min max)
- Pelletizing platform Rieter USG200 (Under water cutting, Vertical strand cooling, 200mm knife width (12strands), 150m/min max)
- Conveying belt MAAG STB250 (Air blades / water spray cooling, Stainless steel 1.4401 mesh belt, Length: 3m, Width: 250mm, Speed: 3 - 75m/min)

General services

- Thermal fluid boiler (Fluid: THERMINOL® 66 (Liquid), 4 électric boilers: 192kW, 48kW, 2x10kW, Distribution through primary and secondary loops mitigation)
- Programmable Logic Controller (Central supervision, Control room (3 interchangeable PC), 4 process PLC (Premium Schneider), 1 safety PLC (Himatrix Schneider), Supervision software: Wonderware InTouch, Database software: Wonderware Historian)



CONTACT :
INFO@AXEL-ONE.COM

NEW TOOLS AVAILABLE IN 2022

Polimerization clave high efficiency 60L, Hastelloy

Volume : 60L

Operating pressure: 5mbar up to 50bar

Operating temperature 20°C up to 350°C

Hybrid agitation allowing to deal with both non-viscous solid / liquid media and high viscosity media up to 500Pa.s

Equipment allowing on-line monitoring of polymerization

A complete reactor / utilities / command / control unit allowing the synthesis of pilot batches of high performance polymers.



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