International Process Plants

Continuous Polymerization for PET
(CP3 Line)

35,000 MTPY
Brief Overview

- Capacity: 35,000 metric tons/year
- Technology: Hoechst AG
- Utilities: Steam, De-Ionized Water, Electricity, Dowtherm (350°C), Nitrogen Gas (inertization), Cooling Water
- Shutdown: 2009
- Product: Amorphous PET chips
- Raw Materials: DTM, Glycol, Catalyst

Can also use PTA
CP Facts

- CP plant producing amorphous PET chips for films, fibers and bottles (pre product for SSP) based on DMT technology.

- Molten DMT, glycol and catalyst feeding into esterinterchange tube reactors. The glycol overrun is separate in two “glycol take off” vessels. The polymerization runs in a “Low” and a “High” Polymerizer with horizontal agitators. After cutting and drying, the PET chips are pneumatically conveyed to chip storage.
Major Upgrades

- 1997 – New cutter (change from “ASG” to “USG”)
- 1997-Low melt filter between “Glycol take off” and “Low Polymerizer”
- 2001-New vacuum pump station (Roots pumps)
- 2001-Debottlenecking esterinterchange-additional tube
Major Equipment

- **Esterinterchange**
  - B 925A/B, B921 – 3 Reactor tubes; 1.4541 SS; 1,200 x 4,900 mm; 1,000 x 4,900 mm
  - B 922 - 2 Reactor tubes; 1.4541 SS; 600 x 6,000 mm
  - B 782 - 16 Reactor tubes; 1.4541 SS; 508 x 4,900 mm

- **Low Melt Filtration**
  - F 526 – Gneuss Low melt filter; 1.4571 SS; 60 bar; 350°C; type SFT 250; 8 µm
  - P 524 – Barmag Gear pump; GVK 15H-1-38Z
Major Equipment

- Glycol take off
  - B988 – GAA Glycol take off one; 1.4541 SS; 6.64 m³; 6.2 bar; 350°C
  - W987 – GAA Heater, 1.4541 SS, 16 m² (tube heater)
  - B989/990 – GAA Scrubber; 1.4541 SS; 0.5 m³
  - V798 – GAA Vacuum pump; LPHQ 45326; 1.4410 SS; 180 m³/h; 33 mbar
  - R914 – GAB Glycol take off two; 1.4541 SS; 7.0 m³; 6.2 bar; 350°C; agitator
  - B827/928 – GAB Scrubber; 1.4541 SS; 0.5 m³
  - V796 – GAB Liquid ring pump; LPHQ 45326; 1.4410 SS; 180 m³/h; 33 mbar
Major Equipment

- Polymerization
  - R725 – Low Polymerizer; 1.45671 SS; 1,400 x 4,000 mm; 6.2 bar; 400°C; agitator with Hoechst design (0-15 Rpm)
  - B741/742 – Scrubber; 1.4571 SS; 0.5 m³; 6.2 bar; 350°C
  - V903 – (2) Roots Vacuum pumps (Sterling/Sihi PLW-14000 and WNM-4000); (1) liquid ring pump (Type LPH 55320; 1.4408 SS) up to 1 mbar.
  - P713 – Barmag Gear pump; ZP 254 A; 1.4571 SS; 30 kW
  - R721 – High Polymerizer; 1.45671 SS; 1,400 x 4,000 mm; 6.2 bar; 400°C; agitator with Hoechst design (0-15 Rpm)
  - B731/732 – Scrubber, 1.4571 SS, 0.5 m³, 6.2 bar, 350°C
  - P711 – Barmag Gear pump; GVK 15H; 1.4571 SS; 45 kW
Major Equipment

- Cutter
  - A503/Z511 – Rieter Automatic Cutter; type USG 600 H; 1.4541 SS
  - T515 – Gala Dryer; type 16.3BF/DWH/MOT; 1.4301 SS; 50 m³/h; 6,500 kg/h
Molten DMT and glycol feeds together with catalyst into 21 esterinterchange tubes, heated with 21 bar steam and Dowtherm (the last 8 tubes).

The un-reacted glycol is separated in two glycol take off vessels. “Glycol take off two” has an agitator, because of the increased viscosity.

Next step is a filtration with a low melt filter from Gneuss to separate waste and agglomerations.

After the filtration step the melt goes into a “Low Polymerizer” and finally into the “High Polymerizer”. Both are horizontal reactors with agitators (Hoechst design).

The melt is pumped with a Barmag gear pump to a cutter (Rieter Automatic)

The chips dried in a “Gala” dryer and conveyed into the chip silos.

The Glycol – Methanol mix goes into a separate Methanol Glycol recovery plant.

The Dowtherm for heating the reactors comes as vapor (330°C, 3.7 bar) from a separate Dowtherm plant.
Photos
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