

TECHNOLOGIES

Overview

Petrochemicals Technology

Refining Technology

Catalysts

Gas Processing Technology



About CB&I

Fabrication

Environmental

Novolen Gas-Phase Polypropylene Process Description

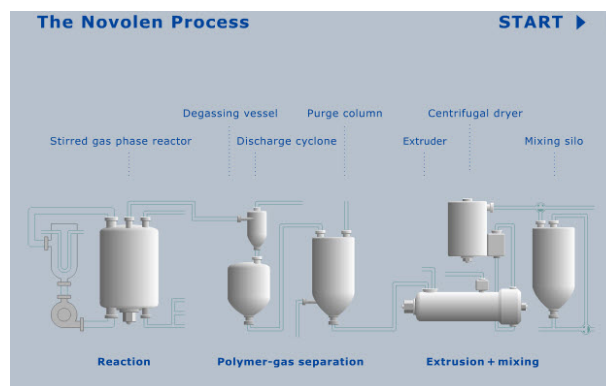


Propylene, ethylene and any other required comonomers are fed into the reactor(s). Hydrogen is added to control the molecular weight. Polymerization conditions (temperature, pressure and reactant concentrations) are set by the polymer grade to be produced. The reaction itself is exothermic. Reactor cooling is achieved by evaporation of liquefied reactor gas, which is injected into the reactor. Flash evaporation of the liquid in the polymer bed ensures the most efficient heat removal.

The polymer powder is discharged from the reactor(s) and separated from the gas in a discharge cyclone at atmospheric pressure. Any unreacted monomer separated from the powder is compressed and either recycled or returned to the upstream olefins unit for recovery. The final degassing of the polymer is done in a purge silo by flushing with nitrogen. The purge offgas is sent to a recovery system. Finally, the powder is converted into pellets that incorporate a full range of well-dispersed additives.

For highly demanding applications, which require extremely low levels for volatiles and odor, the Novolen process offers an optional desorber unit to treat the pellets after extrusion.

Process Animation



Economics

Investment Costs

The Novolen process features an exceptional cost/performance ratio. Due to the simplicity of the gas-phase process, the capital expenditures for inside battery limits (ISBL) of a Novolen process plant are the lowest in the industry.

Officially available reports, specifically evaluating the competitiveness of all commercial PP processes, have concluded that Novolen provides the lowest investment costs for the full range of PP products at lowest operating costs. This investment cost advantage for world-scale plants producing high value products further increases the attractiveness for investors.

Operating and Maintenance Costs

The Novolen process includes standardized packages for high efficiency monomer recovery. Proven reliability and minimized equipment count lead to highly competitive maintenance costs for the Novolen process.

Process Advantages

Process Features

Produces a full range of homopolymers, random and impact copolymers in only two identical reactors with Ziegler-Natta and metallocene catalysts

No dedicated reactor for impact copolymer production

Exclusive vacuum degassing at extruder

Simple, solvent-free gas-phase process

Drop-in metallocene catalyst

Small reactor volume = small gas inventory

No proprietary and no single-vendor equipment

Licensee Benefits

Covers broad range of products for all markets/applications, including ultra-high rubber content (up to 50 %) impact copolymers and terpolymers as well as very high stiffness grades and high clarity random copolymers

Two identical reactors connected in a row allow for impact copolymer production and also for homopolymer production

Products at the lowest edge of volatile content in the marketplace with very low taste and odor level for highly demanding applications (for example, drinking water pipes and food packaging). Can be combined with our exclusive desorber technology

Among the lowest operating and maintenance costs in the industry

Novolen process plants are ready to use Novocene™ without any major plant modifications

New polypropylene grades with outstanding combination of properties

Rapid grade changes

Minimized inventory results in inherently safer process and in reduced capital investment and operating cost

Resulting in a lower TIC

Use the links below to explore the Novolen process.

- [Novolen Technology](#)
- [Metallocene](#)
- [Catalyst Solution](#)
- [Product Range](#)
- [Licensing](#)
- [Research and Development](#)
- [Technical Support](#)