HMC Polymers
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Spherizone

Latest-generation polypropylene technology based on a multi-zone reactor that produces high-performance polypropylene and novel polyolefins.

Technology Description

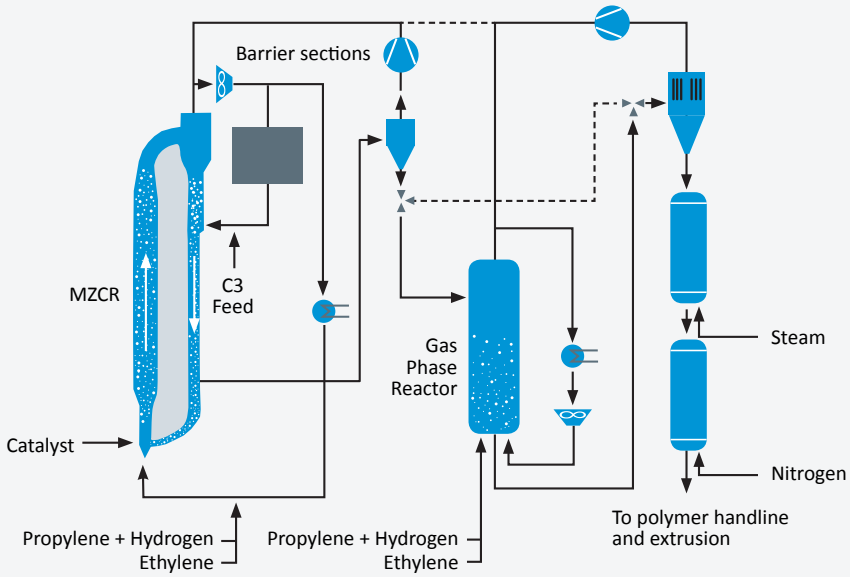
LyondellBasell's breakthrough *Spherizone* multi-zone circulating reactor process provides an economical and efficient method of manufacturing a wide range of high-quality polypropylene and novel, propylene-based polyolefinic resins.

The heart of the *Spherizone* process is the multi-zone circulating reactor (MZCR). The catalyst is continuously fed into the multi-zone circulating reactor. In this specially designed loop-reactor, consisting of two reactor zones, the growing polymeric granules are circulated between the two different zones.

In the so called "riser", the polymer particles are directed upwards in a fast fluidisation regime by the monomer gas flow from a blower. Then, in the top of the reactor, the polymer particles enter the so-called "down-comer". In this section there is a downward dense-phase plug-flow regime under gravity. At the bottom of the reactor, the polymer particles are again fed back into the "riser" section.

The reactor can be operated with different conditions for hydrogen (as the chain transfer agent) and comonomer concentration in the two sections, allowing the development of a bimodal (MFR, comonomer concentration/type) polymer structure at a macro-molecular level. This split between the reaction conditions is achieved by injection of a monomer stream with a different composition than that in the riser section at the barrier between the riser and down-comer sections.

***Spherizone* simplified process diagram**



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Spherizone process – Product properties and performance

The versatility of the *Spherizone* process is demonstrated by the high-quality product range it produces, which includes all standard polypropylene grades as well as unique polyolefin products. The capabilities of the *Spherizone* process to deliver new performance potential across the entire product portfolio is illustrated by the extended product property graphic (right).

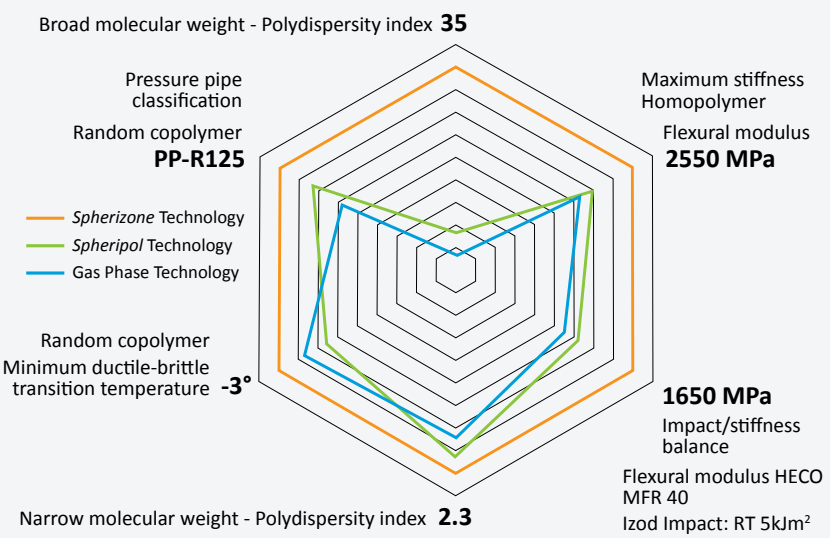
As a result of the "One-Reactor Cascade" reactor, the operating window of the technology is drastically expanded and the product quality is greatly enhanced, resulting in the production of polypropylene resins that can outperform standard polypropylene grades.

Spherizone process products, for example, have surpassed the performance of conventional polypropylene used in pipe applications, including novel random copolymers with PP-R 125 classification and new high-modulus heterophasic copolymers used in sewage and drainage pipe systems.

Spherizone technology also enables the production of novel polyolefins, which are being used in entirely new applications previously the domain of traditional materials and competitive higher priced plastics.

These *Spherizone* process polyolefins replace conventional materials used in rigid packaging and other applications where extremely high melt strength is essential.

***Spherizone* extended product properties**



FOR MORE INFORMATION

HMC Polymers Sales
Email: sales@hmcpolymers.com
Tel.: +66 2614 3700

You can find out more by visiting our website at: www.hmcpolymers.com