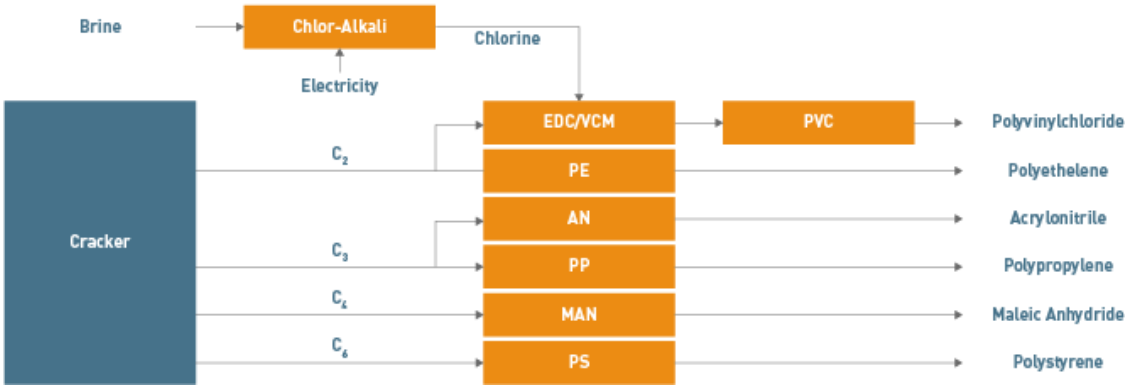
Technologies

INEOS Technologies offers a broad range of world class petrochemical technologies. For several years INEOS Technologies has been the number one non-captive technology licensor for its Polyethylene, Polypropylene, Polystyrene and Vinyls processes.



INEOS Technologies, through its heritage businesses, has over 50 years experience in technology transfer. Through its relationship with INEOS' operating units, it also brings outstanding operating experience and market and product knowledge to its licensing offer and extensive global client base.

While each licence is unique, throughout the project execution, a team of technical specialists supports the licensee from the initial project kick off through to beneficial operation and beyond.

With over 100 years of electrolosis experience and elecrolyser design, INEOS Technologies has been continually developing membrane electrolysers for over 35 years.

BICHLOR™ Technology

With BICHLOR™, INEOS Technologies has effectively re-engineered familiar bipolar principles. This unique construction has resulted in a new generation of state-of-the-art technology with low power consumption, long component lifetimes, improved production quality and enhanced safety performance.

BICHLOR™ is a modular electrolyser comprising a series of discrete modules consisting of anode, membrane and cathode. Any sealed individual module can be removed from the electrolyser without affecting the others. The design allows for maintenance work on the individual modules in workshop controlled conditions, rather than in the main cell room, as required in the electrolyser filter press design. This modular design has a major influence in minimising plant down time.

FM1500™ Technology

In addition to BICHLOR™, INEOS Technologies continues to offer its easy to operate FM1500™ monopolar electrolyser, based on continuous developments in the design of the original FM21™ electrolyser. These low cost yet extremely versatile electrolysers are used in over 45 plants worldwide with a chlorine production capacity in excess of 1 million tonnes per year.

Due to its design and flexible nature The FM1500™ membrane electrolyser is ideally suited to polysilicone production and small sodium hypochlorite plants in the range 1 to 10 t per day of chlorine. It has the capacity to be skid-mounted and shipped anywhere in the world.

The FM1500™ is easy to install into an existing plant and if required has the flexibility to be expanded to cope with increased production needs.

Individual electrodes and membranes can be easily and quickly removed and replaced, thereby optimising maintenance downtime. Electrodes can be recoated without the need to replace the metal substrates.

Cellroom Conversion

INEOS Technologies' membrane electrolysers are suitable for converting either mercury or diaphragm cellrooms to membrane technology. The BICHLOR™ and FM1500™ electrolysers are ideal for the conversion of mercury based cellrooms, as they are designed for all sizes of production capacity.

FM1500™ electrolysers are ideal for converting chlor-alkali diaphragm plants to membrane technology.

CHLORCOAT™

Manufactured in its modern electrode coatings plants, INEOS Technologies offers a range of world leading proprietary titanium and nickel anode and cathode coatings under the brand name CHLORCOAT™ to satisfy the demands of today's chlor-alkali industry. CHLORCOAT™ coatings are available for membrane, mercury and diaphragm cells.

INEOS Technologies also offers a range of CHLORCOAT™coatings for non chlor-alkali applications and has the capability and skills to refurbish and repair used titanium, nickel and stainless steel electrodes.

We offer technical service and unparalleled technical support within the chlor-alkali industry.

Polyvinyl Chloride

Ethylene Dichloride (EDC)

Vinyl Chloride Monomer (VCM)

INEOS Technologies is the largest licensor of polyvinyl chloride (PVC), ethylene dichloride (EDC) and vinyl chloride monomer (VCM) technologies for the PVC and Vinyls industry

Leveraging INEOS' position as the largest PVC producer in Europe; INEOS Technologies delivers a wide range of technologies, products, know-how and expertise that helps customers all over the world to minimize capital investment while maximizing operational performance.

INEOS Technologies services are tailored to meet customer requirements, from assistance during engineering design and construction through to plant commissioning and from research and development support to reliable supply of PVC additives and oxychlorination catalysts, INEOS Technologies delivers the services you need.

Polyvinyl Chloride

For PVC, INEOS Technologies offers large reactor technology with maximum heat recovery and high productivity, optimized for low capital and production cost. Our process is designed to deliver exceptional safety and environmental performance.

Ethylene Dichloride (EDC)

INEOS Technologies provides both low temperature chlorination (LTC) and high temperature chlorination (HTC) EDC technologies that in either stand-alone or integrated modes offer simple design, straightforward operation and low maintenance.

Vinyl Chloride Monomer (VCM)

The VCM technology utilises a two-stage fixed bed oxygen based oxychlorination process that demonstrates high conversion and energy efficient cracking.

The INEOS Technologies fixed bed system provides superior performance to fluid bed systems in all areas, with unparalleled safety, environmental, operational and maintenance performance.

Vinyls Catalysts & Additives

EDC Catalysts

PVC Additives (EVICAS & INOVOL)

Based on over 70 years of chlorvinyls experience, INEOS Technologies' range of PVC additives and EDC catalysts bring real value to PVC and EDC plants. Process economics are improved by using INEOS Technologies' high quality and well-proven additives and catalysts to reduce wastage, increase output, reduce down-time and improve quality and selectivity.

INEOS Technologies supports the entire range of vinyls catalysts and additives with technical support from across the INEOS group, drawing on dedicated people with many years of experience in chemistry, engineering, vinyls technology and vinyls production.

To learn more about PVC and EDC production visit our contacts page.

EDC Catalysts

INEOS Technologies couples innovative products with high quality performance, and offers an extensive range of EDC Oxychlorination catalysts that are the number one choice of customers world-wide.

These include:

- Oxychlorination Fixed-Bed Catalysts (IVOC-P)
- Oxychlorination Fixed-Bed Catalyst Diluents (IVOD)
- Oxychlorination Fluid-Bed Catalysts (IVOC-FB)

INEOS Technologies has committed valuable research effort to design and develop high performance catalysts for both fixed-bed and fluid-bed processes. Tried and tested, the catalysts have been validated through laboratory and pilot plant testing with full proven implementation over several years on INEOS ChlorVinyls production units and are currently in use world-wide.

Its engineers and scientists have practical experience and in-depth knowledge of a wide range of oxychlorination processes and catalysts. Drawing on extensive R&D know-how and facilities, including fixed and fluid bed pilot plants, the performance of the catalysts goes through a rigorous testing programme. This comprehensive process ensures that the products deliver performance characteristics that are recognised by the industry as best-in-class.

INEOS Technologies has the knowledge to provide the most suitable high quality fixed-bed or fluid-bed Catalyst to our customers, supported by vast experience in fixed-bed technology and fluid-bed technology.

View our product range

PVC Additives (EVICAS & INOVOL)

INEOS Technologies' PVC additives are a comprehensive range of products for use in the industrial production of suspension and emulsion PVC.

The PVC additive product range includes:

- EVICAS Build-up Suppressants (Coating agents, anti-fouling agents): a world famous EVICAS range of products used to prevent polymer build-up in reactors and condensers of all the different PVC homopolymer, copolymers and paste/ emulsion manufacturing processes
- INOVOL Suspending agents (Dispersing agents, granulating agents): used in the suspension polymerisation of PVC, to determine particle size, size distribution and other morphological parameters such as porosity
- INOVOL Antifoam (De-foamer): used to reduce foaming that may occur during the de-gassing of slurry inside the reactor, during high-pressure discharge of slurry from a reactor or during the high temperature stripping of PVC slurry
- INOVOL Anti-swelling agent (Reflux condenser antifoam): used to reduce foaming or swelling that may occur during the PVC reaction in reactors using reflux condensers
- INOVOL Inhibitor (Recovered monomer stabiliser): used to inhibit polymerisation in the VC recovery system, preventing build-up in the system and inhibiting the formation of unwanted vinyl chloride polyperoxides

These products have been extensively evaluated and implemented on INEOS' own chlorvinyls plants, which cover a broad range of different technologies routinely producing over 1 million tonnes of PVC each year. Customers can be assured that the products are of consistent quality and well proven. Production is supported by R&D & technical service teams that have been at the forefront of many of the technical innovations developed over the past 70 years.

INEOS Technologies designs its PVC additives for meeting the demanding process requirements of high and efficient output, low cost, and low environmental impact, demanded in today's global PVC market.

View our product range

Polyethylene

Innovene™ G

Innovene™ S

Global Licences

Based on more than fifty years of experience and understanding of the polyethylene market, INEOS Technologies has tailored its Innovene Polyethylene technology to provide our customers Linear Low Density PE (LLDPE), Medium Density PE (MDPE) and High Density PE (HDPE) products that consistently satisfy and exceed the demanding requirements of the market place.

INEOS Technologies offers gas phase Innovene™ G (for LLDPE, MDPE & HDPE) and slurry phase Innovene™ S (for MDPE & HDPE). Both processes have the benefit of low capital cost and low operating cost coupled with the widest product range available.

A unique advantage of a co-investment in Innovene™ G and S technologies is the ability to provide complete coverage across the PE product range. For some investments such an option may prove attractive given that world scale crackers are now capable of manufacturing well in excess of 1 million t per year of ethylene.

INEOS Technologies also offers high value proprietary INcat polyolefin catalysts and services to enhance the Innovene™ polyethylene processes.

With an ongoing research and development program aimed at continually pushing the envelope by extending the product slate and driving down capital and operating costs, INEOS Technologies ensures both Innovene™ G and S technologies will continue to maintain their competitive edge and supplemental value within the world of polyethylene both now and into the future.

Innovene™ G

At the heart of the Innovene™ G gas phase process is the fluidized bed reactor in which polymer particles grow by polymerisation at low temperatures and pressures maintained in a fluidised state by the upward flow of gaseous monomer and co-monomer.

The Innovene™ G process is set apart from other gas phase processes by the unique catalyst systems used and the proprietary design features of the polymerisation loop and post reactor degassing and treatment. The process enjoys C8, C6 and C4 co-monomer flexibility

The process has low capital cost inherent of a low pressure, low temperature gas phase process. In addition, the exclusive Innovene cyclone technology removes the need for regular loop cleaning and reduces grade transition time. These combine to provide high on-stream times with high quality product yield giving Innovene™ G the overall lowest lifetime cost for any gas phase process.

Using INcat Ziegler-Natta catalysts, products include narrow molecular weight resins suitable for blown and cast films, injection and rotational moulding, while INcat HPLL metallocence products included high performance LLDPE films. The process has produced over 150 different grades of products with a portfolio that is being continually expanded by units operated by INEOS as well as licensees of the technology.

With recent advances INEOS Technologies now offers world scale Innovene™ G plants with single trains which can produce in excess of 500 ktpa.

These same advances make debottlenecking existing smaller capacity plant both cheap and straightforward. There are examples of single reactor trains being rapidly expanded up to almost twice the original capacity. The unique Enhanced High Productivity process development allows cost effective expansion of all gas phase polyethylene processes.

Innovene™ S

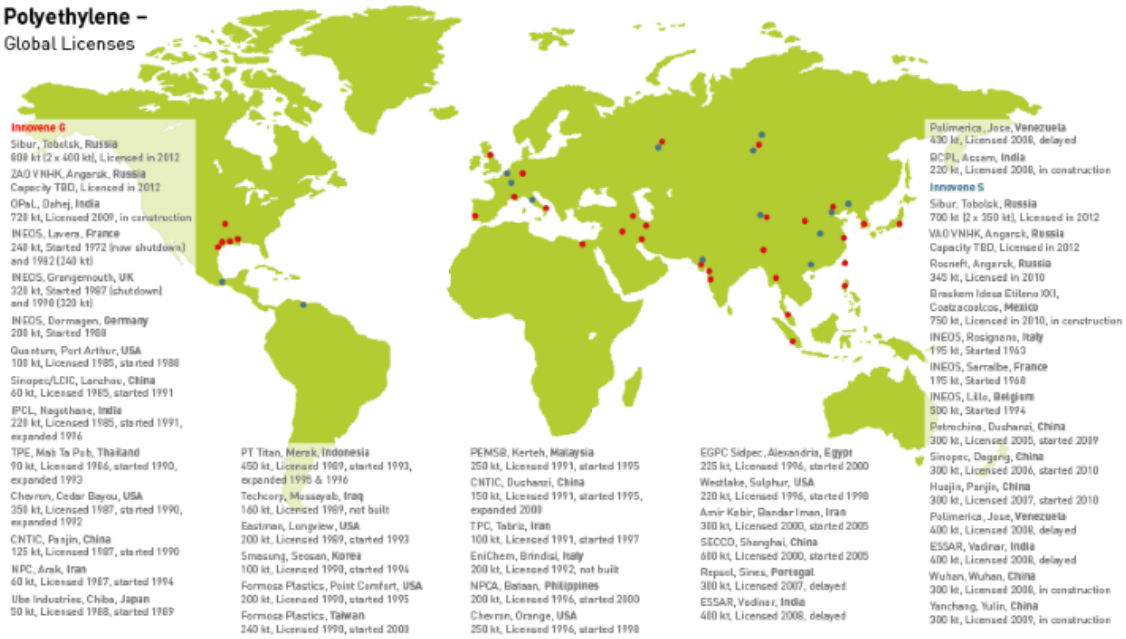
The Innovene™ S process is a simple and robust design enjoying best in class economics with low investment and operating costs. With no reactor fouling and hence no required cleaning, the process has proven high on-stream times.

The process utilises proprietary vertical slurry loop reactors in a two reactor system providing easy and efficient transitions between bimodal and monomodal product operations Simplified degassing, no centrifuges and a robust low energy diluent recycle combine to provide outstanding campaign-to-campaign stability with minimal wide-specification product and no wax or oligomers generation.

The simplicity of the two reactor design combines best-in-class economics with market leading MDPE and HDPE products. This catalyst and the Innovene™ S reactor flexibility allows significant and straightforward grade-slate optimisation in response to market changes, and adds significant incremental value through specialty product areas, such as bimodal PE100 pipe.

Further economies of scale are now achievable with recent advances pushing up plant capacity to 600kt per year and beyond.

Global Licences



Polypropylene

INstage
Products
Global Licences

Polypropylene is one of the world's most widely used petrochemical products. It is used in a wide range of commercial and household applications such as fibres, automotive components and film.

The INEOS Innovene™ PP Polypropylene process offers the widest product range available at the lowest cost. The process uses a simple and robust design with an extremely low equipment count. Resulting low capital cost together with high, on-stream times and rapid grade transitions give Innovene technology the lowest lifetime cost. INEOS Technologies' unique agitated plug flow reactor allows for rapid and efficient transitions between product grades. Furthermore, the process can be easily and economically debottlenecked to produce increased plant capacities.

In the period from 2008 to 2012, the Innovene™ PP process has been the number one third party licensed polypropylene technology in the world.

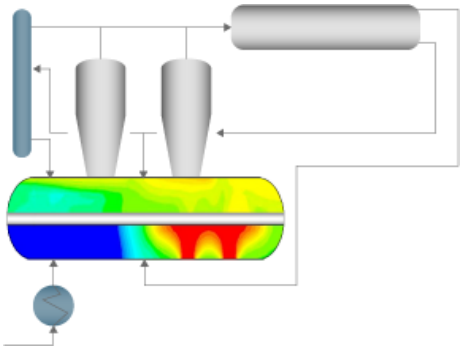
Enhanced products are available by utilising the new INstage process modification, while new catalysts in the INcat family will add even broader molecular weight distribution and higher rubber content products to the Innovene™ PP offer.

INEOS Technologies' commitment to ongoing research and development ensures that Innovene™ PP technology will continue to bring high value to the world of polypropylene, now and into the future.

The Innovene™ PP technology is capable of making all homopolymer, random copolymer and impact copolymer grades, using single or multiple catalysts and producing more than 500 kt per year, thus providing the best polypropylene value in the industry in terms of capital and operating costs.

INstage

Innovene™ PP has continued to advance with the recent development of the INstage process enhancement for the production of advanced broad molecular weight distribution polypropylene products. Available as an addition to new or existing Innovene™ PP plants to deliver a leading process capability for tailored product design.



Products

The combination of Innovene™ PP and INcat high-performance catalysts gives licensors the ability to create a wide range of homopolymers, random copolymers, and impact copolymers including reactor thermoplastic olefins (r-TPOs), and the Innovene™ PP technology covers a broad range of polypropylene fabrication methods to satisfy diversified market needs. This technology can be extended to develop additional product grades that meet local customer requirements as well as emerging market needs.

Global Licences

INEOS Technologies supplies INcat Polyolefin Catalysts worldwide for use in polyethylene and polypropylene processes. The combination of INcat catalysts with the Innovene™ PE and Innovene™ PP processes delivers optimum results with low operating costs.

INcat Polyolefin Catalysts

Focused on economy in use, advanced products and operational simplicity, INEOS Technologies is continually improving the technical capabilities of the INcat portfolio. With a broad selection of catalyst solutions available, commercial and technical representatives regularly meet with customers to discuss the optimum catalyst technology for their present and future product needs.

While the INcat catalyst portfolio has been optimised for performance in the Innovene™ technology platforms, the catalysts may also provide advantages to other polymerization technologies.

Polyethylene Catalysts

INEOS Technologies offers an extensive range of catalyst systems for use in the Innovene™ G and Innovene™ S PE processes.

The INcat polyethylene catalyst portfolio includes:

- INcat SDX and Novacat Ziegler-Natta catalysts for use in gas phase PE reactors. These deliver a wide range of narrow molecular weight LLDPE and HDPE products suitable for blown and cast film, injection moulding and rotational moulding applications.
- INcat MT Ziegler-Natta catalysts for use in slurry phase PE reactors. These enable the manufacture of a wide range of narrow molecular weight HDPE products for blown and cast film, injection moulding and rotational moulding applications.
- INcat HPLL metallocene catalyst for use in gas phase PE reactors. A proprietary gas phase metallocene catalyst for high performance LLDPE blown and cast film market and related products.

These catalysts are used worldwide in both Innovene™ PE processes and are supplied by INEOS Technologies, ready for use. The catalysts can be injected directly into the Innovene™ PE polymerization reactor and do not need a capital-intensive, pre-polymerization step.

A range of chromium catalysts are also available for use in both the Innovene™ G and Innovene™ S PE processes to manufacture broad molecular weight products for blow moulding, pipe and film applications. The catalysts are supplied directly from INEOS Technologies approved manufacturers and are activated on-site, prior to injection into the polymerization reactor, using proprietary technology.

View our product range

Polypropylene Catalysts

INEOS Technologies offers the INcat CDi and INcat P series catalysts for the Innovene™ PP process. Each INcat catalyst has tailored physical properties and chemistry to ensure optimum performance is achieved from your Innovene™ PP reactor.

The INcat polypropylene catalyst portfolio includes:

- INcat CDi, a high performance Ziegler-Natta catalyst CDi, that in combination with a unique set of modifiers, enables the production of a broad range of PP products; blow moulding, injection moulding and extrusion grades for applications including pipe, fibre, raffia, caps & closures, crates and more. INcat CDi, and its predecessor INcat CD catalyst, have been used on Innovene™ PP reactors worldwide creating a combined production of over 3 million tonnes of polypropylene annually.
- INcat P100 is a new catalyst that is targeted as a broad product coverage general purpose PP catalyst for situations where a customer is focusing on minimising introduced cost and seeking operational simplicity.
- INcat P570 and P680 are designed to deliver enhanced product capability using non-phthalate based catalysts. For example, INcat P570 produces broad molecular weight products in the Innovene™ PP process which exhibit increased stiffness, higher melt strength, better sheer thinning and improved dart impact.
- INcat P260 is designed to deliver outstanding rubber incorporation, whilst retaining the easy operability and high performance characteristics synonomous with the INcat brand. Offering an enhanced technical capability particularly suitable for applications such as soft TPO and automotive INcat P260 seeks to further expand the already broad product reach of the Innovene™ PP process using INcat catalysts.

Acrylonitrile

Catalyst

INEOS Technologies acrylonitrile process technology is the established world leader, used in over 95% of the world's acrylonitrile plants. Ineos Technologies licence this technology and also manufactures and markets world leading Acrylonitrile catalysts. The process is recognised as delivering highest conversions of raw materials to useful products, while maintaining on-stream plant reliability factors in excess of 98%. INEOS Technologies sets the standard for safe and low cost production of acrylonitrile and co-products.

Acknowledging the significance of the technology, the American Chemical Society designated INEOS' "Sohio Acrylonitrile Process" a National Historic Chemical Landmark at INEOS' US headquarters in League City, Texas, on November 14, 2007. Indeed our knowledge and technical support is provided by experts drawing upon over 50 years of global industry experience.

This extensive experience and understanding makes INEOS the leader in designing reactor/catalyst systems with better yields, fewer shutdowns, and fewer environmental problems than any other technology supplier.

Catalyst

INEOS Technologies manufactures and markets catalysts used in the production of acrylonitrile; in support of INEOS' licensed acrylonitrile process.

Since the introduction of the revolutionary fluid-bed catalyst system for the manufacture of acrylonitrile in 1960, INEOS has developed and commercialised numerous improved catalyst formulations. These catalyst improvements have improved yields and efficiencies.

INEOS Technologies continues this long and successful history of catalyst research and developments and many licensees have been able to achieve increased plant capacity through a simple catalyst change-out, without the need for reactor or other hardware modifications.

Primary attributes of INEOS Technologies' Acrylonitrile Catalyst technology include:

- High AN yields
- High co-product HCN yield
- High propylene conversion
- Over 50 years of demonstrated R&D success
- New catalyst developments compatible with existing SOHIO-design AN plants
- Stable performance and operational flexibility

Maleic Anhydride

Catalyst

INEOS Technologies is the recognized world leader in fluid-bed reactor technology for the production of maleic anhydride. Since the 1980s, through its Amoco and BP/Sohio parentage, INEOS' maleic anhydride fluid-bed reactor and catalyst technologies have been utilized in plants ranging from 15 ktpa to greater than 80 ktpa; demonstrating safe, stable and efficient operating performance.

The INEOS fluid-bed maleic anhydride technology offers robust, proven technology using extremely efficient catalyst resulting in low cost, high reliability operation. The advantages of INEOS' fluid-bed MAN technology will translate into a process offering the lowest overall operating cost, higher reliability, and premium product purity.

The INEOS Maleic Anhydride Technology is feedstock and energy efficient. It is a net exporter of steam. The process technology allows for a wide variance in operation and/or design. Typical turndown capability is 60% of the design butane feed rate. Accordingly, it may be possible to stage capital investments to respond to expected market demand changes.

As the world's largest and preeminent licensor of petrochemical fluid-bed reactor technology, INEOS maintains world-class research and development efforts in the areas of catalysis, process chemistry, and engineering design.

Catalyst

INEOS Technologies offers both fixed and fluid bed catalysts for the production of maleic anhydride. Today, INEOS Technologies offers FV-200 and FV-300 for fluid-bed producers, and offers MANCAT-VI and MANCAT-VII for fixed-bed maleic anhydride producers.

INEOS produces its maleic anhydride catalysts in its wholly-owned and operated manufacturing facility, and markets the catalysts to producers worldwide.

The catalyst offering includes the following attributes:

- In the case of fluid-bed catalyst, and with the proper addition of make-up catalyst, no need for periodic plant shutdowns

associated with catalyst change-outs and lengthy reactor loading/unloading activities

- High, stable butane-to-MAN yields
- Over 30 years of demonstrated R&D and commercial success in the industry, including ongoing R&D activities to identify improved catalysts that will offer customers enhanced product yields
- Ongoing technical support to customers worldwide

Polystyrene

Products

INEOS Technologies is very proud to market the Styrolution leading PS Technology.

INEOS Technologies has been the number one polystyrene licensor for the last decade, licensing nearly 1.3 Mt of both compact and expandable polystyrene capacity with a worldwide market share of 80%. This success came from excellent economics and outstanding product properties.

At the heart of the GPPS/HIPS technology is the unique reactor design with its plug flow characteristics, excellent temperature control and chemically initiated polymerisation system. This allows exceptional control of product properties through regulating molecular weight and molecular weight distribution.

With the collective experience of commercially proven operation and ongoing process developments, single reactor plant capability has now reached 200 ktpa which is the highest capacity on the market for a single swing line. This provides the ability to deliver an unparalleled return on investment.

Products

GPPS products are designed for a broad range of end applications - from those requiring high heat and high molecular weight properties such as polystyrene sheets and CD jewel boxes through to products requiring high flow characteristics such as medical packaging items. Special grades of also have been specially developed to boost conversion productivity for the fast growing market of XPS applications both in packaging and construction.

The HIPS product range offers medium and high impact grades to cover all major applications, and includes high performance grades for applications which require high heat and very high impact properties that were once limited only to the ABS market, such as electrical equipment parts. These grades are produced with low rubber content compared to the competition thanks to outstanding rubber morphology control.

All major product grades can be tailored to meet local and market specific requirements, including applications involving moulding and extrusion.

Autothermal Cracking

Technology

Autothermal Cracking is a proprietary technology developed by INEOS Technologies for the manufacture of ethylene and propylene which offers lower investment cost (as much as 40% less,) less energy consumption and lower emissions than steam cracking.

Through the use of a very fast (millisecond) oxidative thermal cracking catalyst large steam cracking furnaces are replaced by a number of small catalyst-charged reactors. Operation at elevated pressure removes the need for cracked gas compression and large steam generation systems as there is no need for steam feed to the autothermal cracking process.

The autothermal cracking process has been proven at 5 t per day scale at Grangemouth with wide ranges of real feeds and a full commercial process design has been developed, including a detailed autothermal reactor design. Please contact us for more information.

Technology

Many technical challenges have been addressed throughout the development of autothermal cracking, including:

- Mixing fuel and pure oxygen over a wide range of pressures to achieve good mixing with minimum inventories, and deliver mixed feeds uniformly to the catalyst
- Catalyst design to ensure mechanical robustness and chemical stability
- Designing a commercial scale reactor which can safely handle the mechanical challenges of fast heating and cooling at pressures up to 30 barg
- Rapid gas phase quenching, to avoid secondary products and boost olefin yields
- Product purification, including detailed quench tower design

Ethylene and propylene can be made from a wide range of feedstocks using autothermal cracking. We also have experience with feeds from vacuum residue to ethane. Lighter feeds allow access to elevated pressure operation.

Autothermal cracking gives impressive emissions benefits, with a procees that almost completely eliminates the production of NOx. Our greenhouse gas footprint is also reduced by up to 40%, owing to a lower energy demand.

In contrast to steam cracking, unsaturated hydrocarbon streams may be fed to the autothermal reactor without pre-treatment, and without coke formation problems. This allows a wide range of low cost recycle stream options to be considered with an autothermal cracker.

Expandable Polystyrene

Products

INEOS Technologies offers a state of the art expandable polystyrene (EPS) technology.

The EPS technology combines superior variable costs and low investment costs as well as an excellent portfolio of high quality products well accepted all around the world. The proven operational reliability of the process ensure a notable competitive advantage over other expandable polystyrene producers for future projects.

At the heart of INEOS Technologies' expandable polystyrene suspension technology is the reactor, containing a proprietary agitator and baffle system for ensuring excellent mixing and temperature control. An optimised reduced temperature with chemically initiated polymerisation results in both significantly improved and more consistent polymer properties.

With the collective experience of commercially proven operation and ongoing process developments, single lines featuring up to four reactors have now reached a capacity of 100 kt per year which is the highest capacity on the market for a single swing line producing both FR & Regular polystyrene grades. This provides the ability to deliver an unparalleled return on investment.

The INEOS Technologies' expandable polystyrene process offers the benefit of excellent capital and operating costs coupled with an operationally robust process that produces broad and competitive product ranges accepted on the market worldwide.

Products

The high quality EPS products are widely accepted in the market place. The EPS technology produces a full range of products in the three main application areas including packaging, loose fill and insulation. This broad product line provides the flexibility to offer grades specifically tailored and modified to meet all major product applications.

Packaging applications typically include all forms of containers for shipping, trays, picnic/ice chests, helmet liners, etc. Loose fill applications typically cover consumer products such as bean bag chairs, stuffed animals and toys. The insulation applications target both high mechanical and high insulation properties as used in the construction business. Both regular and flame retardant grades are available.