

## PETROCHEMICALS

### Polypropylene

In December 2021, the main construction of a polypropylene plant, which will produce over 65 different polypropylene grades, was completed at KPI Inc.'s petrochemical complex in the Atyrau Region. The plant commissioning is scheduled for March 2022. The project will enable KazMunayGas to expand into a new business area – deeper processing of hydrocarbons. This comes as the new petrochemicals industry is taking shape in Kazakhstan to bring significant economic and social benefits to the Atyrau Region and the country at large. The facility has an annual capacity of 500 thousand tonnes of polypropylene, which is used as feedstock in mechanical engineering, medicine and electrical engineering, production of packaging materials, containers, fibre, pipes and fittings for hot water supply, office equipment, consumer electronics, consumer goods, outdoor and office furniture.

KPI's project relies on modern technology, enabling the company to move ever closer to full digitalisation. The warehouse operations such as packaging, storage, loading onto motor vehicles and rail wagons will be performed by robotic machines without human intervention. There will be specialised IT solutions and corporate accounting systems in place to make accurate record of all data, from planning to sales of finished products to the end consumer.

The plant meets all environmental regulations. It takes in propane free of harmful impurities to turn it into propylene and then polypropylene all through the production chain. The processes are designed in a way that removes the possibility of harmful substances such as hydrogen sulphide, sulphur dioxide and aromatic hydrocarbons being produced.

The facility is sustainable in terms of water consumption, as it uses a circular water system to supply water to its processes. It is integrated with Karabatan Utility Solutions LLP's water treatment facilities, which makes it possible to reduce water consumption through recycling and reusing of almost all wastewater.

## Polyethylene

On 7 October 2021, as part of the second phase of the integrated petrochemical complex construction, KMG and SIBUR signed a Cooperation Agreement for the Polyethylene (PE) Project. The move is in line with KMG's strategy to join forces with a strategic partner which is among Top 5 polymer companies in the world and has a strong track record of successfully delivering large-scale projects. By April 2022, the parties plan to sign binding documents for SIBUR to join the PE project and to progress to the FEED stage. The complex will have a capacity of 1,250 ths tonnes of PE per year. The project is expected to be completed in 2027.

The strategic partner will be required to supply feedstock (ethane) to the Project. To this end, negotiations are ongoing with Tengizchevroil LLP to consider building a gas separation unit with a capacity of 9.7 bln m<sup>3</sup> (the GSU) to create infrastructure for extracting ethane from dry gas.

Polyethylene and ethylene copolymers are widely used in pipes, fittings, sheets, tubular films, flat-slot extrusion films, fibres, nonwoven materials, filaments, film thread, packaging materials, packaging for technical, household and medical items, food, toys, etc.

Polyethylene can be one of the following types depending on its properties and applications:

- depending on density: linear low-density polyethylene (LLDPE), medium density polyethylene

(MDPE) and high density polyethylene (HDPE)

- depending on composition: ethylene homopolymers and ethylene copolymers with various combinations of alpha olefins such as butene, hexene or octene
- depending on structure: bimodal and monomodal grades (with broad, medium and narrow molar mass distribution).

Depending on production technology: high, low and medium pressure polyethylene. Each of these types has its own properties which define their application.

### Chemical properties of polyethylene

Granulated polyethylene is a non-hazardous non-toxic product. It does not produce toxic emissions at room temperature and is not harmful to human health if in contact with skin. No special precautions are required for working with it.

Small polymer dust when breathed in and entering the lungs can cause sluggish fibrotic changes in the lungs.

Due to its low conductivity, polyethylene can generate static electric charges.

When in a stable state, polyethylene is not harmful to the environment as it does not form toxic compounds at ambient temperature when exposed to atmosphere or wastewater where other substances or factors are present. Polyethylene and the additives it contains are known to cause no damage to the ozone layer.

## Rubber, isobutane

On 30 November 2021, JSC NC KazMunayGas and PJSC Tatneft signed an agreement to set up a butadiene rubber joint venture. The facility is expected to have a capacity of 186 ths tonnes of polybutadiene rubber per year – up to 96 ths tonnes of solution styrene-butadiene rubber (SSBR) per year, up to 90 ths tonnes of styrene-butadiene-styrene (SBS) per year and up to 170 ths tonnes of isobutane per year. The project is expected to be completed in 2026.

SSBR (solution styrene-butadiene rubber) is a common component of green tyres, which have high durability, resistance to low temperatures and dynamic strength. It is also used to produce hoses, conveyor belts, footwear and other rubber products.

SBS (styrene-butadiene-styrene) is used to make bitumen blends, adhesives, glues and rubbers. It has high resistance (including resistance to tension) and density.

Isobutane can be converted to isobutylene, which can be then converted to isobutylene-isoprene rubber. It is used in the alkylation reaction and for MTBE production. Isobutane is also a component of high octane fuel for internal combustion engines and a common aerosol propellant.