

Global Product Strategy (GPS) Safety Summary

Polypropylene

This GPS Safety Summary is a high-level summary intended to provide the general public with an overview of product safety information on this product. It is not intended to provide emergency response, medical or treatment information, or to provide an overview of all safety and health information. This summary is not intended to replace the Safety Data Sheet. For detailed guidance on the use or regulatory status of this product, please consult the Safety Data Sheet, and the Product Stewardship Bulletin (PSB).

Chemical Identity

Chemical name: polypropylene homopolymer

CAS number: 9003-07-0

Molecular formula: $(C_3H_6)_n$

Chemical name: 1-propene, polymer with ethene

CAS number: 9010-79-1

Molecular formula: $(C_3H_6)_n(C_2H_4)_x$

Chemical name: 1-propene polymer with 1-butene

CAS number: 29160-13-2

Molecular formula: $(C_3H_6)_n(C_4H_8)_x$

Chemical name: 1-butene, polymer with ethene and 1-propene

CAS number: 25895-47-0

Molecular formula: $(C_3H_6)_n(C_2H_4)_x(C_4H_8)_y$

Uses and Applications

Polyolefins, such as polypropylene and polyethylene, are thermoplastics and comprise approximately two-thirds of thermoplastics demand worldwide. Since their industrial commercialization, thermoplastics have been used in wide-ranging applications and continue to replace traditional materials such as metal, glass, paper and wood.

Polypropylene (PP) is produced by the catalytic polymerization of propylene. Polypropylene is the single largest polyolefin product produced worldwide. LyondellBasell produces homopolymer, impact copolymer, random copolymer and Metallocene polypropylenes.

Our products are used in consumer, automotive and industrial applications ranging from food and beverage packaging to housewares and construction materials.

LyondellBasell also specializes in specialty product lines including polypropylene (PP) compounds and *Catalloy* resins. Specialty polyolefins and compounds offer a wide range of tailored performance characteristics. Typical properties of such specialty polyolefins and compounds include impact-stiffness balance, scratch resistance, soft touch and heat sealability. PP compounds consist of specialty products produced from blends of polyolefins and additives and are sold mainly to the automotive and home appliance industries.

LyondellBasell is the only manufacturer of *Catalloy* process resins, which are proprietary products. These specialty polyolefins offer a wide range of performance characteristics. *Catalloy* process resins compete with materials such as, flexible PVC, ethylene propylene rubber, acrylonitrile butadiene styrene (ABS), polycarbonate, metals and reinforced polyurethanes.

Polypropylene resins are versatile and can be used in applications such as:

Polypropylene resins

These products are primarily used to manufacture fibers for carpets, rugs and upholstery; food and pharmaceutical packaging; industrial packaging; housewares and beverage cups; appliances; medical products; automotive components; battery cases; bumpers; toys and sporting goods; and bottle caps and closures.

Polypropylene compounds

These products are primarily used to manufacture automotive interior and exterior trims, bumpers and under-hood applications. These resins are used as base materials for products and parts used in appliances; anti-corrosion coatings for steel piping; and in wire and cable applications.

***Catalloy* process resins**

These products are primarily used in modifying polymer properties in film applications and molded products; specialty films; geomembranes and roofing materials; bitumen modification for roofing and asphalt applications; and manufacturing automotive bumpers.

Physical / Chemical Properties

Polypropylene resins are solid polymers that are stable at ambient temperatures. When heated to very high temperatures, the resins may burn or decompose to flammable hydrocarbons. Most polypropylene grades have good chemical resistance.

Common commercial grades of polypropylene have a melting point in the range of 145°C - 165°C (295°F - 330°F). Some specialty resin grades have melting points in the range of 125°C - 140°C (257°F - 284°F).

Polypropylene dust may form explosive mixtures with air.

Health Effects

Health hazards are negligible at ambient temperatures because of the polymers' high molecular weight, minimal toxicity and general inertness. Polypropylene polymers have a low irritation and sensitization potential. Hot material may cause thermal burns.

At processing temperatures, irritating fumes may cause soreness in the nose and throat; coughing may result. If the product is spilled, it may create slipping hazards.

The United States Occupational Safety and Health Administration (OSHA) and European Union (EU) regulations consider polypropylene polymers as non-hazardous with regard to health hazards. The United States Department of Transportation (USDOT) and the United Nations (UN) Model regulations consider polypropylene polymers to be non-hazardous.

Environmental Effects

Polypropylene resins are not expected to be toxic to the environment. Polypropylene is not considered biodegradable as it biodegrades at a slow rate and may persist in the environment.

Exposure

During handling or processing of polypropylene resins, exposure to hot material, fumes and dust may take place. For such activities, exposure should be controlled by selecting and applying the appropriate Risk Management Measures.

Spillage of polypropylene resin may cause exposure to the environment, which can be minimized by proper design of equipment, handling procedures and cleaning-up spilled pellets or granules immediately.

Risk Management Guidance

For detailed guidance on the use of polypropylene polymers and compounds, please consult the Safety Data Sheet.

In general, recommended risk management measures will include, but may not be limited to the following:

- Avoid contact with strong oxidizers, excessive heat, sparks or open flame.
- Clean-up spilled pellets or granules to prevent slipping hazard, or environmental exposure.
- Ventilate area during handling or processing of polypropylene resins to prevent accumulation of dust and fumes.
- Use appropriate Personnel Protective Equipment (PPE) when dust or fumes are present.

In addition, the following measures will help reduce the loss of pellets to the environment:

- Bulk-handling equipment to minimize pellet leakage.
- Screening placed in storm drains.
- Proper emptying and sealing of bulk containers (rail or truck) prior to shipment to prevent loss of residual pellets from unsealed "empty" bulk cars and trucks.

Regulatory Information / Classification and Labeling

For a detailed overview of the regulatory status of these substances, please refer to the Product Stewardship Bulletin (PSB) available on the LyondellBasell corporate website.

For a detailed overview of the classification and labeling of this product, please refer to the regional Safety Data Sheet found on the LyondellBasell corporate website.

Conclusion Statements

- Polypropylene resins are versatile materials with a wide range of uses in consumer and industrial end-use applications.
- Polypropylene is considered non-hazardous to humans and the environment.
- During processing of polypropylene resins, the material can be hot, irritating fumes may be present, and dust can be formed. The use of personal protective equipment and good ventilation is recommended during the processing of these resins.

Contact Information within Company

For further information on this product in general, please consult

Date of issue

Date of issue: 5 June 2015.

Disclaimer

Before using a product sold by a company of the LyondellBasell family of companies, users should make their own independent determination that the product is suitable for the intended use and can be used safely and legally.

SELLER MAKES NO WARRANTY; EXPRESS OR IMPLIED (INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY WARRANTY) OTHER THAN AS SEPARATELY AGREED TO BY THE PARTIES IN A CONTRACT.

This product(s) may not be used in:

- (i) any U.S. FDA Class I, Health Canada Class I, and/or European Union Class I medical devices, without prior notification to Seller for each specific product and application; or
- (ii) the manufacture of any of the following, without prior written approval by Seller for each specific product and application: U.S. FDA Class II Medical Devices; Health Canada Class II or Class III Medical Devices; European Union Class II Medical Devices; film, overwrap and/or product packaging that is considered a part or component of one of the aforementioned medical devices; packaging in direct contact with a pharmaceutical active ingredient and/or dosage form that is intended for inhalation, injection, intravenous, nasal, ophthalmic (eye), digestive, or topical (skin) administration; tobacco related products and applications, electronic cigarettes and similar devices, and pressure pipe or fittings that are considered a part or component of a nuclear reactor.

Additionally, the product(s) may not be used in: (i) U.S. FDA Class III Medical Devices; Health Canada Class IV Medical Devices; European Class III Medical Devices; (ii) applications involving

permanent implantation into the body; (iii) life-sustaining medical applications; and (iv) lead, asbestos or MTBE related applications. All references to U.S. FDA, Health Canada, and European Union regulations include another country's equivalent regulatory classification.

Users should review the applicable Safety Data Sheet before handling the product.

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