



Product Safety Assessment

PARALOID™ Acrylic Impact Modifiers

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Names

PARALOID™ acrylic impact modifier
PARALOID impact modifier
ACRYLIGARD™ CS resin

Products include but are not limited to:

PARALOID EXL Series

- PARALOID EXL-2311
- PARALOID EXL-2313
- PARALOID EXL-2314
- PARALOID EXL-2315
- PARALOID EXL-2330
- PARALOID EXL-2330G
- PARALOID EXL-2335
- PARALOID EXL-3330
- PARALOID EXL-3361

PARALOID HIA Series

- PARALOID HIA-15
- PARALOID HIA-28S
- PARALOID HIA-80

PARALOID KM Series

- PARALOID KM-1
- PARALOID KM-318F
- PARALOID KM-330
- PARALOID KM-330 ER
- PARALOID KM-334
- PARALOID KM-336
- PARALOID KM-336P
- PARALOID KM-342B
- PARALOID KM-348
- PARALOID KM-355P
- PARALOID KM-357
- PARALOID KM-357P
- PARALOID KM-361
- PARALOID KM-362
- PARALOID KM-370
- PARALOID KM-377
- PARALOID KM-388
- PARALOID KM-390
- PARALOID KM-399

- PARALOID KM-4400
- PARALOID KM-5000
- PARALOID KM-5450
- PARALOID KM-940
- PARALOID KM-950
- PARALOID KM-X100 PRO

PARALOID MODIFIER A
PARALOID BPM-515
PARALOID K-416
PARALOID LFR-2006

ACRYLIGARD CS-113
ACRYLIGARD CS-114
ACRYLIGARD CS-115
ACRYLIGARD CS-281

POLYMER BLEND 1252

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Product Overview

- PARALOID™ acrylic impact modifiers are additives that improve the ability of plastic parts to absorb blows without breaking. These products have a unique rubbery core/acrylic shell structure and are manufactured as free-flowing white powders or granules.¹ For further details, see [Product Description](#).
- PARALOID acrylic impact modifiers are added to many types of resins, such as polyvinylchloride (PVC), polycarbonate (PC), polyesters, polyacetals, styrene-acrylonitrile, glass-fiber-reinforced nylon, and epoxies. The modified resins are processed into building and automotive products. Some examples include vinyl siding, window frames, pipe, and fencing.^{2,3} For further details, see [Product Uses](#).
- PARALOID acrylic impact modifiers are commercial products for industrial use. Worker exposure is possible during manufacturing. Engineering controls and personal protective equipment reduce the potential for exposure. Consumer products such as vinyl fencing or siding may contain these additives. For further details, see [Exposure Potential](#).
- Eye or skin contact with product particles or dust during manufacturing can cause mechanical irritation (i.e., scratch the eye or skin). Repeated or prolonged inhalation of product dust can cause nausea, headache, or dizziness. Irritation of the respiratory tract is possible. Inhalation of monomer vapors from heated products can cause irritation of the nose, throat, and lungs.⁴ For further details, see [Health Information](#).
- PARALOID™ acrylic impact modifiers are expected to be inert in the environment. They are unlikely to accumulate in the food chain, and are expected to be non-toxic to aquatic organisms on an acute basis. For further details, see [Environmental Information](#).
- PARALOID acrylic impact modifiers are stable under recommended storage and use conditions. PARALOID powders are dust explosion hazards and may form an explosive mixture if dispersed in the air.⁵ For further details, see [Physical Hazard Information](#).

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Manufacture of Product

- **Capacity** – Rohm and Haas Company, a wholly owned subsidiary of The Dow Chemical Company, manufactures PARALOID™ acrylic impact modifiers at facilities in Louisville, Kentucky, USA. Foreign affiliated companies of Dow manufacture these materials in Lauterbourg, France; Gebze, Turkey; and Jurong, Singapore.
- **Process** – PARALOID acrylic impact modifiers are formed by emulsion polymerization, then dried into a powder using proprietary technology.

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Product Description⁶

PARALOID™ acrylic impact modifiers are additives that improve the toughness, durability, and flexibility of plastics and also improve “weatherability” or resistance to the effects hot- and cold-weather. Other product attributes include gloss control, optical clarity (transparency) in clear outdoor applications, anti-yellowing properties, and improved resin rheology (ease of processing). These products are high molecular weight polymers and copolymers (materials produced by the polymerization of two or more dissimilar monomers) with a unique structure consisting of a rubbery core and a hard acrylic shell. They are manufactured as free-flowing white powders or granules.

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Product Uses^{7,8}

PARALOID™ acrylic impact modifiers are added to polyvinylchloride (PVC) and many types of engineering resins, such as polycarbonate (PC), polyesters, PC/polyester blends, polyacetals, styrene-acrylonitrile (SAN), glass-fiber-reinforced nylon, and epoxies. Resins containing

PARALOID acrylic impact modifiers are used in the following outdoor construction applications:

- Vinyl siding
- Window frames
- Pipe
- Fencing
- Fittings and injection-molded parts

PARALOID™ acrylic impact modifiers used in food-contact applications are regulated under U.S. Food and Drug Administration (FDA) regulations 21CFR177.1010 and 21CFR178.3790, and under the European Commission Regulation (EU) No 10/2011. The maximum allowable amount of modifier depends on the number, quantity, and type of modifiers in the formulation, and is controlled by the manufacturer of the end product.

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Exposure Potential^{9,10}

PARALOID™ acrylic impact modifiers are used in the production of industrial and consumer products. Based on the uses for these plastics additives, the public could be exposed through:

- **Workplace exposure** – Exposure can occur either in facilities that manufacture PARALOID resins or in the various industrial or manufacturing facilities that use PARALOID acrylic impact modifiers. Those working with these products in manufacturing, formulating, converting, or fabricating operations could be exposed during maintenance, sampling, testing, or other procedures. Due to the powdery nature of PARALOID products, good housekeeping is important. Each manufacturing facility should have a thorough training program for employees and appropriate work processes, ventilation, and safety equipment in place to limit exposure. See [Health Information](#).
- **Consumer exposure to products containing PARALOID™ acrylic impact modifiers** – Dow does not sell PARALOID impact modifiers for direct consumer use, but they are added to plastic resins, which, in turn, are used to manufacture home maintenance products. PARALOID acrylic impact modifiers used in food-contact applications are regulated under U.S. Food and Drug Administration (FDA) regulations 21CFR177.1010 and 21CFR178.3790, and under the European Commission Regulation (EU) No 10/2011. The maximum allowable amount of modifier depends on the number, quantity, and type of modifiers in the formulation, and is controlled by the manufacturer of the end product. See [Health Information](#).
- **Environmental releases** – Based on the use patterns for these products, the potential for release to the environment is expected to be low. In the event of a spill, the focus is on containing the spill to prevent contamination of soil and surface or ground water. These acrylic resins are not soluble in water. See [Environmental](#), [Health](#), and [Physical Hazard Information](#).
- **Large release** – Industrial spills or releases are infrequent and generally contained. If a large spill does occur, use personal protective equipment and avoid breathing dust. PARALOID powders are combustible and have the potential to create explosive mixtures in air. Eliminate all ignition sources and ensure adequate ventilation. Wear compatible chemically resistant gloves. Use water spray to keep dust to a minimum. Sweep up and shovel spilled product into suitable containers for disposal. Spilled material can create slippery conditions. See [Environmental](#), [Health](#), and [Physical Hazard Information](#).
- **In case of fire** – Isolate the fire and deny unnecessary entry. Do not use a direct stream of water. A solid stream of water directed at these powdered materials may create a potentially

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explosive airborne dust mixture. Fight fire with carbon-dioxide or dry-chemical extinguishers or a fine water spray. Firefighters should wear positive-pressure, self-contained breathing apparatus (SCBA) and protective firefighting clothing. See [Environmental](#), [Health](#), and [Physical Hazard Information](#).

For more information, download the relevant Safety Data Sheet from the [Dow Plastics Additives web site](#) (Impact Modifiers – Acrylic) or request it from the [Dow Customer Information Group](#).

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Health Information^{11,12}

Health information for these products is summarized on the relevant [Safety Data Sheets](#). It is important to note that health risks associated with individual products may vary based on their formulation or intended use. The [Safety Data Sheet](#) is the preferred source for specific health information. These products may also contain minor components or additives that have additional health risks. An overview of health information appears below.

Eye contact – Direct contact with product dust may result in slight eye irritation due to mechanical action (scratches to the eye) rather than chemical irritation.

Skin contact – Prolonged or repeated contact can cause slight irritation; however, testing showed a representative group of 5 products to be non-irritating.

Inhalation – Repeated or prolonged inhalation of product dust can cause nausea, headache, dizziness, and irritation of the respiratory tract. Inhalation of vapors from heated product can cause irritation of the nose, throat, and lungs.

Ingestion – Low toxicity if ingested in small amounts.

Repeated exposure – In animals, this material has been reported to adversely affect the kidneys and liver following repeated, excessive exposures. Prolonged or repeated exposure to high levels of dust from similar products has been reported to cause lung irritation in animal studies.

For more information, download the relevant Safety Data Sheet from the [Dow Plastics Additives web site](#) (Impact Modifiers – Acrylic) or request it from the [Dow Customer Information Group](#).

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Environmental Information^{13,14}

PARALOID™ acrylic impact modifiers are high molecular weight polymers that are non-volatile, insoluble in water, and are expected to be inert in the environment. Although polymers are considered essentially non-biodegradable, they are likely to degrade slowly in the environment, including degradation by physical action or by exposure to sunlight.

PARALOID acrylic impact modifiers are not likely to accumulate in the food chain due to their high molecular weight (bioconcentration potential is low), and are expected to have low environmental toxicity.

For more information, download the relevant Safety Data Sheet from the [Dow Plastics Additives web site](#) (Impact Modifiers – Acrylic) or request it from the [Dow Customer Information Group](#).

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Physical Hazard Information^{15,16}

PARALOID™ acrylic impact modifiers are stable under recommended storage and use conditions. These products can release hazardous vapors during normal processing or if heated above the decomposition temperature of 160°C (320°F). PARALOID powders are dust explosion hazards. Good housekeeping, engineering controls, and proper ventilation are essential for safe handling. These products are combustible dusts. Store and use away from all ignition sources.

Avoid accumulation of product dusts. Prolonged contact with acids, alkalis, or strong oxidizing agents may attack or dissolve these polymers.

For more information, download the relevant Safety Data Sheet from the [Dow Plastics Additives web site](#) (Impact Modifiers – Acrylic) or request it from the [Dow Customer Information Group](#).

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Regulatory Information

Regulations may exist that govern the manufacture, sale, transportation, use, and/or disposal of PARALOID™ acrylic impact modifiers. These regulations may vary by city, state, country, or geographic region. Information may be found by consulting the relevant [Safety Data Sheet](#), [Technical Data Sheet](#), or [Contact Us](#).

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Additional Information

- Download individual Safety Data Sheets by following the appropriate links from the [Dow Plastics Additives web site](#) (select Impact Modifiers – Acrylic), or request them from the [Dow Customer Information Group](#)
- Contact Us (www.dow.com/additives/contact/)
- *Safe Handling of PARALOID™ Impact Modifier and Processing Aid Powders*, Rohm and Haas Company, June 2006 (www.dow.com/assets/attachments/business/pbm/Paraloid_PowderPA_new.pdf)

For more business information about PARALOID acrylic impact modifiers, visit the Dow [Plastics Additives](#) website at www.dow.com/additives/.

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References

- ¹ PARALOID™ KM-370 [Impact Modifier] Safety Data Sheet, Rohm and Haas Company, November 23, 2010, Identification and Composition/Information on Ingredients.
- ² PARALOID™ KM acrylic impact modifiers for vinyl (additives for plastics) web page (www.dow.com/products/product_line_detail.page?product-line=1120012)
- ³ PARALOID™ EXL 2330 (powder)/PARALOID EXL 3330 (pellet) Acrylic Impact Modifier for Polycarbonate, Polyesters, PC/Polyester blends, GF Nylon, SAN and Epoxy, Technical Data Sheet, Rohm and Haas Company, Form No. 874-01801-0810, August 2010, page 1.
- ⁴ PARALOID™ BPM-515 Material Safety Data Sheet, Rohm and Haas Company, January 29, 2009, First Aid Measures and Toxicological Information.
- ⁵ *Safe Handling of PARALOID™ Impact Modifier and Processing Aid Powders*, Rohm and Haas Company, June 2006, pages 1 and 3–5.
- ⁶ PARALOID™ KM-370 [Impact Modifier] Safety Data Sheet, Rohm and Haas Company, November 23, 2010, Identification and Composition/Information on Ingredients.
- ⁷ PARALOID™ KM acrylic impact modifiers for vinyl (additives for plastics) web page (www.dow.com/products/product_line_detail.page?product-line=1120012)
- ⁸ PARALOID™ EXL 2330 (powder)/PARALOID EXL 3330 (pellet) Acrylic Impact Modifier for Polycarbonate, Polyesters, PC/Polyester blends, GF Nylon, SAN, and Epoxy, Technical Data Sheet, Rohm and Haas Company, Form No. 874-01801-0810, August 2010, page 1.

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- ⁹ *Safe Handling of PARALOID™ Impact Modifier and Processing Aid Powders*, Rohm and Haas Company, June 2006, pages 1 and 3–5.
- ¹⁰ *PARALOID™ KM-370 [Impact Modifier] Safety Data Sheet*, Rohm and Haas Company, November 23, 2010, Firefighting Measures, Accidental Release Measures, and Ecological Information.
- ¹¹ *PARALOID™ BPM-515 Material Safety Data Sheet*, Rohm and Haas Company, January 29, 2009, First Aid Measures and Toxicological Information.
- ¹² *Safe Handling of PARALOID™ Impact Modifier and Processing Aid Powders*, Rohm and Haas Company, June 2006, pages 6–7.
- ¹³ *PARALOID™ KM-370 [Impact Modifier] Safety Data Sheet*, Rohm and Haas Company, November 23, 2010, Ecological Information.
- ¹⁴ *Safe Handling of PARALOID™ Impact Modifier and Processing Aid Powders*, Rohm and Haas Company, June 2006, page 3.
- ¹⁵ *Safe Handling of PARALOID™ Impact Modifier and Processing Aid Powders*, Rohm and Haas Company, June 2006, pages 1 and 3–5.
- ¹⁶ *PARALOID™ KM-370 [Impact Modifier] Safety Data Sheet*, Rohm and Haas Company, November 23, 2010, Physical and Chemical Properties and Stability and Reactivity.

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NOTICES:

As part of its 2015 Sustainability Goals, Dow has committed to make publicly available safety assessments for its products globally. This product safety assessment is intended to give general information about the chemical (or categories of chemicals) addressed. It is not intended to provide an in-depth discussion of health and safety information. Additional information is available through the relevant Safety Data Sheet, which should be consulted before use of the chemical. This product safety assessment does not replace required communication documents such as the Safety Data Sheet.

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