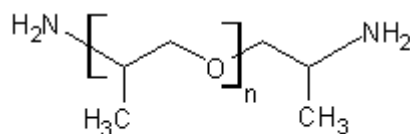


PRODUCT SAFETY SUMMARY:**JEFFAMINE D-230**

This Product Safety Summary is intended to provide a general description of certain Huntsman chemical substances and products containing the chemical substance(s). The information in this Summary is not intended to replace the information included on the Safety Data Sheet (SDS), Product Safety Label, and other safe use and handling literature for the chemical substance(s).

Chemical Identity:

| Name | Other Identifiers |
|-----------------|---|
| Jeffamine D-230 | Reaction products of di-, tri- and tetra-propylated propane-1,2-diol with ammonia; CAS no.: 9046-10-0 |

Structure

$n = 2 - 6$

General Product Overview:

Jeffamine D-230 by Huntsman is used in articles, by professional workers (widespread uses), in formulation or re-packing, at industrial sites and in manufacturing. This substance is used in the processes at workplace such as closed processes, continuous processes with occasional controlled exposure, closed batch processing in synthesis or formulation, transfer of chemicals at dedicated facilities and transfer of substance into small containers.

Applications and Uses:

Jeffamine D-230 is used in the coating products, fillers, putties, plasters, modelling clay and laboratory chemicals and also in municipal supply (e.g., electricity, steam, gas, water) and sewage treatment. This substance is used for the Hardener, manufacture of plastic products and used in liquids/detergents, automotive care products, paints and coating or adhesives.

Physical and Chemical Properties:

Jeffamine D-230 is Colorless liquid.

Certain physical/chemical properties specific to Jeffamine D-230 are summarized below:

| Physical/Chemical Property | Result |
|---|---|
| Molecular weight | 230 |
| pH | 11.7 Concentration: 50 g/l |
| Boiling point (1,013.25 hPa) | 450 °F / 232 °C |
| Relative density | 0.9476 (68 °F / 20 °C) |
| Partition coefficient (Log Kow) | log Pow: 1.34 (77 °F / 25 °C) |
| Water solubility | 100 g/l soluble in cold water (68 °F / 20 °C) |
| Flash point : @ 101.3 kPa | 262 °F / 128 °C |
| Auto-ignition temperature : @ 100.9 - 101.2 kPa | 446 °F / 230 °C |
| Surface tension @ 1 g/L and 20 °C | 62.95 mN/m |
| Vapor pressure | 0.9 hPa (68 °F / 20 °C) |
| Dissociation constant | 9.3 at 20 °C |

Additional physical and chemical property information is available on the product Safety Data Sheet (SDS), which can be requested at SDS@huntsman.com.

Human Health Information:

The probability of experiencing health effects associated with exposure to Jeffamine D-230 is controlled, provided the recommendations stated in the Safety Data Sheet are enforced. Adverse health effects are subject to dose level, route, and duration of exposure.

Jeffamine D-230 is classified as Skin corrosion - category 1, Eye irritation – category 1 and Chronic aquatic toxicity - Category 3 under the GHS classification in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200), so if exposure occurs an individual's susceptibility should also be considered.

Different regulatory classification criteria apply in different geographic regions. These different criteria may result in different human health regulatory classifications for the same product in different geographic regions. Specific regulatory classification information is contained in the Safety Data Sheet for each product in use in a specific geographic region. The acute and chronic health effects information set forth below is based on US GHS. All instructions found on the packaging should be followed. Jeffamine D-230 is safe when used appropriately. The uses identified for the substance have been assessed as safe under several regulatory programs.

Summary- Toxicological data:

| Effect Assessment | Result |
|------------------------------|---|
| Skin irritation | Category 1, Causes severe skin burns |
| Eye irritation | Category 1, Causes serious eye damage. |
| Skin sensitization | Does not cause skin sensitization |
| Genotoxicity | Does not cause genetic defect |
| Reproductive Toxicity | Does not show any effects on fertility. |

Note: For more information on the health hazards of this substance and recommended protective equipment, please refer to the relevant SDS.

Acute Health Effects:

Likelihood/frequency of oral, skin and inhalation exposures are low, if used under strictly recommended conditions and closed process. Jeffamine D-230 has low vapor pressure, high molecular weight, and low partition coefficient, hence expected to have low inhalation and dermal exposure.

Due to the high pH, almost any ocular contact with Jeffamine D-230 may cause irreparable damage, even blindness.

The oral exposure is not expected as this product is manufactured or handled in closed systems. Animal studies in rats have demonstrated low acute toxicity of Jeffamine D-230 by ingestion however falls outside the hazard categories for acute toxicity, and therefore no classification is warranted for the oral/dermal/ inhalation route. While it is noted to cause severe skin burns upon skin contact and serious eye damage upon eye contact.

Chronic Health Effects:

No adverse effects with repeated exposure can be anticipated in humans.

No effects on reproduction or fertility were observed in the rats exposed orally to Jeffamine D-230. Several in vitro and animal studies did not show positive evidence for mutagenicity or genotoxicity.

Summary: Ecotoxicological Data:

| Effect Assessment | Result |
|------------------------------------|---|
| Short term toxicity to fish | Harmful to aquatic life. |
| Chronic aquatic toxicity | Category 3, Harmful to aquatic life with long lasting effects. |

Jeffamine D-230 was found to pose hazard to aquatic species including fish, daphnids, aquatic plants and microorganisms.

Summary: Environmental fate and pathway:

| Effect Assessment | Result |
|--|--------------------------|
| Abiotic degradation - hydrolysis as a function of pH | Hydrolytically stable |
| Ready biodegradability | Non-biodegradable |
| Adsorption on soil and sediment | Low adsorption potential |

Jeffamine D-230 is not considered readily biodegradable but is hydrolytically stable. It is also considered to have low adsorption potential on soil and sediment. However, Jeffamine D-230 was found to be harmful to aquatic life under the US GHS for Hazard Communication. More information can be obtained in the Safety Data Sheet.

The closed process in which the product is used does not lead to direct emissions to soil and air. Procedural and/or control technologies are used to minimize emissions and potential exposure during cleaning and maintenance activities.

Potential Occupational Exposure:

At Huntsman, Jeffamine D-230 is manufactured in closed systems. During normal operating conditions, occupational exposure to Jeffamine D-230 is not expected in the manufacturing process. Procedural and/or control technologies are used to minimize exposure during sampling, cleaning, maintenance, or in open handling systems. Appropriate engineering controls (such as ventilation) and personal protective equipment should be used in accordance with the exposure guidelines and workplace practices identified in the Safety Data Sheet.

Potential Consumer Exposure:

Consumer exposure can result from handling of products that contain Jeffamine D-230. Use of these products are safe if the instructions provided by the manufacturer of the respective product are followed carefully.

Huntsman does not market Jeffamine D-230 directly for consumer use. However, this may be formulate or reacted into products used by professionals and consumers. The substance has been assessed as safe for downstream use when the provisions laid down in the SDS are followed carefully.

Workplace exposure:

Exposure can occur either in a manufacturing facility or in the various industrial facilities that use Jeffamine D-230. Workers in industrial operations could be exposed during maintenance, sampling, testing, or other procedures. Workplace exposure is controlled and minimized by use of proper occupational handling procedures and personal protection and safety equipment. The exposure has been assessed as safe if the substance is used as directed on the label. Huntsman follows and recommends that customers follow workplace exposure guidelines through a variety of industrial hygiene and ventilation measures. The substance has been assessed as safe for professional and industrial use, when the provisions laid down in the SDS are followed carefully.

Potential routes of worker exposure to Jeffamine D-230 are through dermal contact and to a minor extent, through inhalation in spray application. Ingestion is not an anticipated route of exposure. Within this assessment, both industrial workers and trained professionals are evaluated. In general, all the worker situations are controlled to avoid any direct contact with the Jeffamine D-230 through process engineering controls or by use of personal protective equipment (PPE). Likelihood/frequency of skin and inhalation exposure is low, due to its usage under strictly controlled conditions and closed process. However, the use of gloves, safety goggles, and impervious clothing is strongly advised and highlighted in the SDS.

Environmental exposure:

Jeffamine D-230 is not readily biodegradable and its hydrolytically stable. Conclusively, all identified uses are safe for the environment based on the scientific facts and when carried out in compliance with recommended risk management measures and applicable regulations.

EU REACH Status:

Jeffamine D-230 has been registered under the European REACH Regulation EC/1907/2006 and the substance was found to be safe for the uses identified.

Regulatory Information/Classification and Labeling:

Regulations exist that govern manufacture, sales, transportation, use and disposal of Jeffamine D-230. These regulations may vary by city, state, country or geographic region. Information can be found by consulting the relevant SDS.

Under the US GHS for Hazard Communication, substances are classified according to their physical, health, and environmental hazards. The hazards are communicated via specific labels and the Safety Data Sheets. US GHS attempts to standardize hazard communication so that the intended audience (workers, consumers, transport workers, and emergency responders) can better understand the hazards of the chemicals in use.

The hazard statements and symbols presented here refer to the hazard properties of the concentrated substance and are meant to provide a brief overview of the substance's labeling. It is not intended to be comprehensive or to replace information found in the Safety Data Sheet.

Labeling according to US GHS:

| US GHS Classification | |
|----------------------------------|------------|
| Skin corrosion / irritation: | Category 1 |
| Eye Serious damage / irritation: | Category 1 |
| Chronic aquatic toxicity | Category 3 |

Hazard pictogram

GHS05: corrosion

Signal Word

Danger

| Hazard Statements | |
|-------------------|--|
| H314 | Causes severe skin burns and eye damage. |
| H412 | Harmful to aquatic life with long lasting effects. |

Additional Information:

Information on registered substances is available on the European Chemicals Agency (ECHA) website at <https://echa.europa.eu>.

References:

Information on registered substance (ECHA)
[Registration Dossier - ECHA \(europa.eu\)](#)

Disclaimer

The information and recommendations in this publication are, to the best of our knowledge, information and belief, accurate at the date of publication. NOTHING HEREIN IS TO BE CONSTRUED AS A WARRANTY, EXPRESS OR OTHERWISE.

IN ALL CASES, IT IS THE RESPONSIBILITY OF THE USER TO DETERMINE THE APPLICABILITY OF SUCH INFORMATION AND RECOMMENDATIONS AND THE SUITABILITY OF ANY PRODUCT FOR ITS OWN PARTICULAR PURPOSE.

THE PRODUCT MAY PRESENT HAZARDS AND SHOULD BE USED WITH CAUTION. WHILE CERTAIN HAZARDS ARE DESCRIBED IN THIS PUBLICATION, NO GUARANTEE IS MADE THAT THESE ARE THE ONLY HAZARDS THAT EXIST.

Hazards, toxicity, and behavior of the products may differ when used with other materials and are dependent upon the manufacturing circumstances or other processes. Such hazards, toxicity, and behavior should be determined by the user and made known to handlers, processors, and end users.

The trademarks above are the property of Huntsman Corporation or an affiliate thereof.

NO PERSON OR ORGANIZATION EXCEPT A DULY AUTHORIZED HUNTSMAN EMPLOYEE IS AUTHORIZED TO PROVIDE OR MAKE AVAILABLE DATA SHEETS FOR HUNTSMAN PRODUCTS. DATA SHEETS FROM UNAUTHORIZED SOURCES MAY CONTAIN INFORMATION THAT IS NO LONGER CURRENT OR ACCURATE.

Contact:

For further information on this substance or GPS safety summaries in general, please contact: pehs_te@huntsman.com.