

Technical Information**VORANATE™ M 229****Isocyanate**

Description VORANATE™ M 229 Polymeric MDI is a brown low viscosity mixture of diphenylmethane-4,4'-diisocyanate with isomers and homologues of higher functionality (polymeric-MDI) with an average functionality of 2.7 for multi-purpose (non-) foamed rigid and flexible applications.

Benefits VORANATE™ M 229 Polymeric MDI offers a balanced viscosity and tailored acidity range making it suitable for a wide range of applications while providing excellent process conditions.

Typical Properties	Nominal Value	Unit	Test Method
Isocyanate (NCO) Content	30.01 to 32.00	wt%	ASTM D5155
Viscosity (Dynamic) (25 °C)	160 to 240	mPa*s	ASTM D4889
Acidity as HCl (Hot)	0 to 250	ppm	Dow method
Specific Gravity (20 °C)	1.23		ASTM D 4659

Notes

These are typical properties only and are not to be construed as specifications. User should confirm results by their own tests. For other physical properties including, but not limited to: Boiling and Melting point, Vapor Pressure, Flash Point and Thermal Expansion, please see section 9 of the material safety data sheet (MSDS). For storage / shelf life information see section 7 of the MSDS and for CAS number see section 3.

Safety Considerations

Before working with SADARA polyurethane materials it is necessary to understand the hazards involved in handling all the components and to establish and follow safe work procedures. Safety Data Sheets (SDS), product literature, and safe handling and storage information are available for the polyurethane materials supplied by SADARA. Recommendation for handling, storage and disposal of any ingredient not furnished by SADARA should be acquired from the supplier

Safety Data Sheets are available from SADARA to help customers to satisfy their own handling, safety and disposal needs, and those required by local applicable by health and safety regulations. SDS are updated regularly. Therefore, please request and review the most current SDS before handling or using any product from the SADARA Sales Office.

Safety Precautions

All SADARA Isocyanates are hazardous or potentially hazardous materials and require care in handling.

All persons who work with these materials must know and follow proper safe handling procedures.

Handling

Avoid contact with eyes, skin, or clothing. Workers should wear appropriate eye protection. Safety glasses are considered a minimum requirement. If there is the possibility of exposure to the eyes, chemical workers' goggles must be worn.

Avoid breathing vapor or mist.

Wear protective clothing impervious to Isocyanates, overalls, boots, apron, and gloves.

If handled indoors, provide mechanical exhaust ventilation. General or local exhaust ventilation should be provided to control airborne levels below the exposure guidelines. During spray operations, airline masks or positive pressure hose mask should be worn because of the high concentration of isocyanate mist in the atmosphere

Always wear chemical goggles. The vapor pressure of all TDI is high at room temperature (see SDS for values); such that respiratory equipment should always be worn whenever adequate ventilation is not provided. Wear a mask or respirator of a type approved by local government and public bodies

Please review the SDS for the specific product and your country for this information

Toxicity

TDI is very toxic by inhalation, irritating to eyes, respiratory system and skin, may cause allergy or asthma symptoms or breathing difficulties if inhaled, may cause sensitization by inhalation and skin contact. (See handling precautions).

Occupational Exposure Limits (OELs) have been set for isocyanates in most countries. The atmospheric levels should be maintained below the exposure guide lines

Fire and Explosion

Isocyanates will burn but do not ignite easily. In the event of a fire, toxic vapors and decomposed materials are likely to be present. Suitable fire extinguished agents include water fog, carbon dioxide or dry chemical powder. All fire fighters should be equipped with protective clothing and positive pressure self-contained breathing apparatus. Drums of isocyanate involved in fire should be sprayed with water to minimize the risk of rupture. However, water contamination in a closed container or a confines area is to be avoided due to exothermic CO₂ evolution upon water contamination

Caution: Polyurethanes or polyisocyanurateds produced from this product may present a fire risk in certain applications if exposed to fire and/or excessive heat, e.g. welding and cutting torches in the presence of oxygen or air

Spills and Disposal

In case of spills, evacuate and ventilate the spill area. Only properly trained and protected personnel should be involved in the spill cleanup and waste disposal operations. A suitable decontaminated solution is described in the SDS section 6. Waste disposal should always be in accordance with national and local regulations.

Spill can be covered with a commercial absorbent or sand, shoveled into open properly labeled containers and removed from the work area for decontamination



Storage

Shipping and storage temperatures are critical. Recommended temperatures should be strictly followed:

Isocyanates are products with limited shelf life. Depending upon the isomer and oligomer composition, specific storage temperature and shelf life must be applied.

If shipping or storage temperature should falls below recommended temperatures, some crystallization could result

Keep container closed as moisture contamination will induce an exothermic reaction with evolution of carbon dioxide CO₂ which may cause dangerous pressure generation. Isocyanates should be stored separately from chemicals that may react with them (i.e. amines, polyols, etc)

Bulk Storage

Construction materials for tanks, lines, pumps, etc. can be mild steel for temperatures up to 35 °C. Series 300 stainless steel or stainless cladding is recommended for temperatures above 35 C. Only low temperature heating media should be used in tank jackets or coils unless adequate circulation or agitation of the isocyanate is maintained. A slight positive pressures using dry inert -40 C (-40 F) dew point nitrogen must be maintained in bulk storage tanks of isocyanate to prevent solids formation from occurring in the presence of atmospheric moisture. If nitrogen is unavailable a pad of -40C (-40 F) dew point air may be used.

For low viscosity isocyanates such as pure TDI and MDI transfer pumps should contain a stainless steel shaft with mechanical seals. Packed glands can leak sufficiently to cause reaction with moisture and subsequent scoring of the pump shaft by the formed urea

Drum Storage

Isocyanates will react when exposed to atmospheric moisture. Where drums are to be partially emptied, it is recommended that a Calcium Chloride-filled dryer tube be used in the air bleed opening. Should the isocyanate be exposed to moisture and a skin will develops in its surface similar to that found on paint. Normally however the remaining liquid under the skin may be used without formulation changes. Filtration should be considered to avoid issues during processing such as restricted filters and injection nozzles.

Due to an exponential change in viscosity at low temperatures, TDI should be store above 18 C to facilitate pouring. At temperature below 15 C a partial crystallization of TDI may occur. The crystallized material can be re-melted at 35 C.

First Aid Procedure

Decreased ventilatory capacity has been associated with exposure to TDI isocyanate, it is also possible that exposure to MDI may also cause impairment of lung function

Inhalation

Remove the affected person to fresh air. If not breathing, give artificial respiration. If breathing is difficult oxygen should be administered by qualified personnel. Call a physician or transport to medical facility. Obtain medical attention immediately. Effects may be delayed.

Eye contact

Flush eyes with water for at least 15 minutes. Obtain prompt medical attention

Skin contact

Remove material from skin immediately

Ingestion

Do not induce vomiting if swallowed. Immediately call a physician who will decide on need and method to empty the stomach. Obtain medical attention.



Product Stewardship

Sadara Chemical Company has a fundamental concern for all who make, distribute, and use its products, and for the environment in which we live. This concern is the basis for our Product Stewardship philosophy by which we assess the safety, health, and environmental information on our products and then take appropriate steps to protect employee and public health and our environment. The success of our Product Stewardship program rests with each and every individual involved with Sadara products – from the initial concept and research, to manufacture, use, sale, disposal, and recycle of each product.

Customer Notice

Sadara strongly encourages its customers to review both their manufacturing processes and their applications of Sadara products from the standpoint of human health and environmental quality to help ensure that Sadara products are not used in ways for which they are not intended or tested. Sadara personnel will assist customers in dealing with ecological and product safety considerations. Sadara product literature, including safety data sheets, should be consulted prior to use of Sadara products. Current safety data sheet are available from Sadara.

Medical Applications Policy

This product is not intended for use in medical applications and should not be used in any such applications.

Sadara request that customers considering use of Sadara products in medical applications notify Sadara so that appropriate assessment may be conducted. Sadara does not endorse or claim suitability of its products for specific medical applications. It is the responsibility of the medical device or pharmaceutical manufacturer to determine that Sadara product is safe, lawful, and technically suitable for the intended use. **SADARA MAKES NO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY EXCLUDED.**

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