Product Information

VORANATE™ M 229 Low Viscosity Liquid Polymethylene Polyphenylisocyanate

Description

VORANATE™ M 229 Low Viscosity Liquid Polymethylene Polyphenylisocyanate is a dark-brown, low viscosity liquid polymethylene polyphenylisocyanate, MDI, with an average functionality(1) of 2.7.

[1]Not true functionality but typifies expected cross-link densities in end use.

Applications

VORANATE™ M 229 Polymethylene Polyphenylisocyanate has been developed to produce light coloured rigid foams which provide excellent flow into complex shaped molds. As such it is especially useful for rigid PU foams used in appliance insulation and for the manufacture of discontinuous panels. It may also be used in semi-rigid foams.

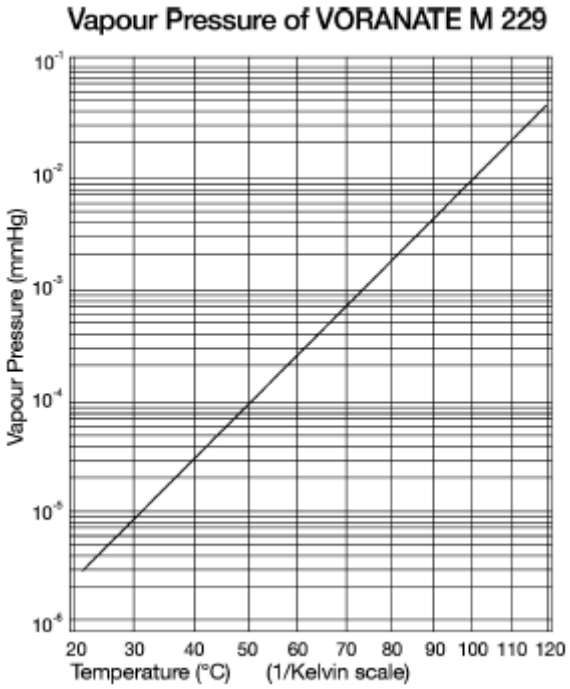
Typical Analysis

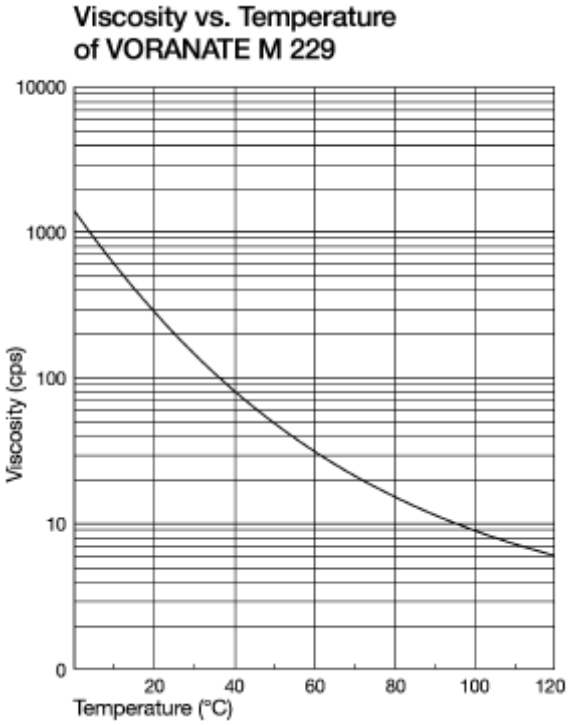
Isocyanate equivalent	135
Isocyanate content, %	31.1
Acidity, % as HCl	0.02
Viscosity at 25°C, mPa.s	190

Typical Physical Properties

Average molecular weight	340–380
Functionality	2.7
Physical state at 25°C	liquid
Color	dark-brown
Density at 25°C, g/ml	1.23
Vapor pressure at 25°C, mmHg	$< 10^{-5}$
Boiling point, °C	polymerises and decomposes at about 230°C with evolution of CO_2
Flash point DIN 51758 (Pensky Martens Closed Cup), °C	220
Specific heat capacity, kJ(kgK)	1.80
Thermal conductivity, W/(m.K)	0.13
Coefficient of cubic expansion, 1/K	0.0008
Shelf life[1]	6 months
Typical viscosity growth, mPa.s/mo, at 20°C	5–10

1. Under recommended handling conditions.





Handling and Storage

Store in a dry place at 15 to 35°C
Keep container closed as moisture contamination will induce an exothermic reaction with evolution of CO_2 which may cause dangerous pressure generation.

Caution
Polyurethanes or polyisocyanurates 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.

Drum Storage
VORANATE™ M 229 Polymethylene Polyphenylisocyanate 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 VORANATE™ M 229 Polymethylene Polyphenylisocyanate be exposed to moisture, a skin will develop on its surface similar to that found on paint. Normally, however, the remaining liquid VORANATE™ M 229 Polymethylene Polyphenylisocyanate under the skin may be used without formulation changes.

Due to an exponential change in viscosity at low temperatures, VORANATE™ M 229 Polymethylene Polyphenylisocyanate should be stored at temperatures above 15°C to facilitate pouring.

At temperatures below 15°C, a partial crystallisation of VORANATE™ M 229 Polymethylene Polyphenylisocyanate may occur. The crystallised material can be remelted at 50°C to 70°C. For detailed procedures consult your nearest Dow sales office.

Bulk Storage
Construction material for tanks, lines, pumps, etc. can be mild steel for storage at temperatures up to 35°C. Series 300 stainless steel or stainless cladding is recommended for storage at temperatures above 35°C.

Handling and Storage (Cont.)

Bulk Storage (Cont.)
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 ureas. Only low temperature heating media should be used in tank jackets or coils unless adequate circulation or agitation of VORANATE™ M 229 Polymethylene Polyphenylisocyanate is maintained. A slight positive pressure using dry inert gas (-40°C dew point) must be maintained over stored VORANATE™ M 229 Polymethylene Polyphenylisocyanate to prevent solids formation that can occur in the presence of atmospheric moisture.

Safety Considerations

Safety Data Sheet [SDS] for VORANATE™ M 229 Polymethylene Polyphenylisocyanate is available from The Dow Chemical Company. SDS is provided to help customers satisfy their own handling, safety and disposal needs, and those that may be required by locally applicable health and safety regulations. SDS sheets are updated regularly. Therefore, please request and review the most current SDS before handling or using any product. Copies of the SDS are available on request through your nearest Dow Sales office.

Toxicity
Harmful by inhalation. Irritating to eyes, respiratory system and skin. May cause sensitization by inhalation and skin contact. Avoid breathing vapor or mist. Use with adequate ventilation. Avoid contact with eyes, skin, or clothing. Always wear chemical goggles. Wear a mask or respirator of a type approved by local government and public bodies. If handled indoors, provide mechanical exhaust ventilation. During spray operations, airline masks or positive pressure hose masks should be worn because of the high concentration of isocyanate mist in the atmosphere. OELs (Occupational Exposure Limits) have been set for MDI in most countries. The atmospheric levels should be maintained below the exposure guidelines. Wear protective clothing, overalls, boots, apron and gloves.

Fire
Isocyanates will burn but do not ignite easily. In the event of a fire, toxic vapors and decomposed material are likely to be present. Suitable fire extinguishing agents include water fog, carbon dioxide, or dry chemical powder. All fire fighters should be equipped with protective clothing and a positive pressure, self-contained breathing apparatus. Drums of isocyanate involved in a fire should be sprayed with water to minimize the risk of rupture. However, water contamination in a closed container or a confined area is to be avoided due to exothermic CO_2 evolution upon water contamination.

Spills
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. Spills can be covered with a commercial absorbent or sand, shoveled into open, properly labeled containers and removed from the work area for decontamination. A suitable decontaminant solution is described in the SDS, section 6. Waste disposal of isocyanates should always be in accordance with national and local regulations.

First Aid Procedures
Inhalation: Remove 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 a medical facility. Obtain medical attention immediately. Effects may be delayed.

Safety Considerations (Cont.)

First Aid Procedures (Cont.)

Skin Contact: Remove material from skin immediately by washing with soap and plenty of water (warm water is preferable if readily available). Remove contaminated clothing and shoes while washing. Seek prompt medical attention if irritation persists.

Eye Contact: Flush eyes with water for at least 15 minutes. Get prompt medical attention.

Ingestion: Do not induce vomiting if swallowed. Immediately call a physician who will decide on need and method for emptying the stomach.

Customer Notice

Dow encourages its customers to review their applications of Dow products from the standpoint of human health and environmental quality. To help ensure that Dow products are not used in ways for which they were not intended or tested, Dow personnel are willing to assist in dealing with ecological and product safety considerations. Your Dow representative can arrange the proper contacts.

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