

VORANATE M 220

Low Viscosity Polymethylene Polyphenylisocyanate

Description

VORANATE* M 220 is a dark-brown, low viscosity polymethylene polyphenylisocyanate of high reactivity, a total isocyanate content of about 31% and an average functionality⁽¹⁾ of 2.7.

Applications

VORANATE M 220 is a general purpose and versatile polymeric MDI whose viscosity, reactivity and molecular weight distribution are ideal for a wide variety of applications. VORANATE M 220 has been developed to produce rigid foams which provide excellent flow and mechanical properties. Typical

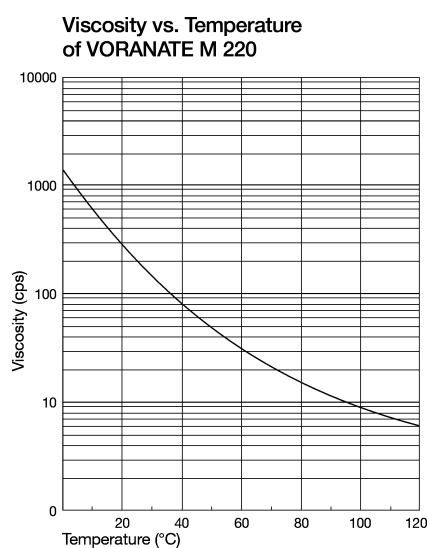
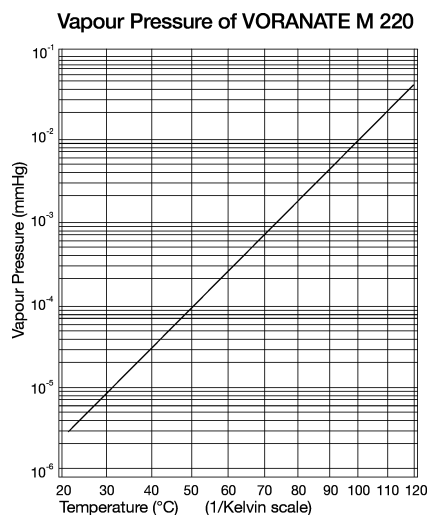
applications include the production of refrigerator cabinets, deep freeze panels, sandwich panels and spray foams. VORANATE M 220 is also excellent for the production of PIR and PUR continuous laminates, and semi-rigid foam mouldings (crash pads) and is widely used in the production of cold cure HR flexible foam mouldings and slab stock.

Typical Analysis	
Isocyanate equivalent	136
Isocyanate content, %	30.9
Acidity, % as HCl	0.02
Viscosity at 25 °C, mPa.s	205
Monomer content, weight %	40

Typical Physical Properties	
Average molecular weight	340-380
Functionality	2.7
Physical state at 25 °C	liquid
Colour	dark-brown
Density at 25 °C, g/ml	1.23
Vapour 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 ⁽²⁾	6 months
Typical viscosity growth, mPa.s/mo, at 20 °C	5-10

(1) Not true functionality, but typifies expected cross-link densities in end use.

(2) 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 CO₂ 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 220 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 220 be exposed to moisture, a skin will develop on its surface similar to that found on paint. Normally, however, the remaining liquid VORANATE M 220 under the skin may be used without formulation changes.

Due to an exponential change in viscosity at low temperatures, VORANATE M 220 should be stored at temperatures above 15 °C to facilitate pouring.

At temperatures below 15 °C, a partial crystallisation of VORANATE M 220 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.

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 220 is maintained. A slight positive pressure using dry inert gas (-40 °C dew point) must be maintained over stored VORANATE M 220 to prevent solids formation that can occur in the presence of atmospheric moisture.

Safety Considerations

Safety Data Sheet [SDS] for VORANATE M 220 isocyanate 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 sensitisation by inhalation and skin contact. Avoid breathing vapour 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 vapours 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 minimise the risk of rupture. However, water contamination in a closed container or a confined area is to be avoided due to exothermic CO₂ 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 clean-up 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 Procedure

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.

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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