



PAPI™ 94 Isocyanate

Description PAPI™ 94 Polymeric MDI is a polymethylene polyphenylisocyanate that contains MDI. Low viscosity, low functionality, increased diphenylmethane diisocyanate content and increased percentage of ortho-para isomers make PAPI 94 polymeric MDI highly versatile. It may be used in flexible foam, semi-flexible foam, adhesives, coatings, elastomers, sealants, integral skin foam, high resilience foam, and isocyanate prepolymers.

Benefits PAPI™ 94 Polymeric MDI exhibits delayed gel time and improved mold flow in a variety of polyurethane formulations.

Typical Properties	Nominal Value	Unit	Test Method
Isocyanate (NCO) Content	31.30 to 32.60	wt%	ASTM D5155
Viscosity (Dynamic) (25°C)	40 to 60	mPa·s	ASTM D4889
Acidity, as HCl (Hot)	250	ppm	Dow Method
Specific Gravity (20°C)	1.24		ASTM D4659

Notes

These are typical properties only and are not to be construed as specifications. Users 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 numbers see section 3.

Safety Considerations

Before working with Dow polyurethane materials it is necessary to understand the hazards involved in handling all of 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 Dow. Recommendations for handling, storage and disposal of any ingredient not furnished by Dow should be acquired from the supplier.

Safety Data Sheets are available from The Dow Chemical Company (Dow) to help customers satisfy their own handling, safety and disposal needs, and those required by locally applicable health and safety regulations. SDS 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 Dow Customer Information Group (CIG) CUSTINFOGRP@dow.com or through the nearest Dow Sales office.

Safety Precautions

All Dow 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 masks should be worn because of the high concentration of isocyanate mist in the atmosphere.

The vapor pressure of all MDI is low at room temperature (see SDS for values). However, at temperatures over 40°C (104°F), the vapor pressure increases enough that low functionality MDI products begin to constitute a toxic hazard. Aerosol mists can also be problem.

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

Toxicity

Harmful if inhaled. Causes skin irritation. Causes serious eye irritation. May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause an allergic skin reaction. (See handling precautions).

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

Fire and Explosion

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 evolution upon water contamination .

2

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.

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 decontaminant solution is described in the SDS, section 6.

Waste disposal should always be in accordance with national and local regulations.

Spills 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 for isocyanates 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 fall below recommended temperature, some crystallization could result.

Polymeric and modified pure MDI products that have been frozen will exhibit the same dimerization characteristics as pure MDI. Unless proper action is taken to heat or melt the product, dimerization will proceed rapidly and deteriorate the clarity, shelf life and assay of the product. Crystallized isocyanate can be melted, but dimer cannot be removed by heating.

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.)

For recommended storage temperature and Shelf Life, please refer to Safety Data Sheet section 7.

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. 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 pressure 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 -40°C (-40°F) dew point air may be used.

For low viscosity isocyanates, such as pure MDI and TDI, 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.

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, a skin will develop on 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 filter and injection nozzles.

At temperatures below the recommended low storage temperature limit, crystallization of the isocyanate can occur. Unless proper action is taken to heat or melt the product, dimerization will proceed rapidly and deteriorate both the clarity and assay of the product. Crystallized isocyanate can be melted, but dimer cannot be removed by heating.

Melting Instructions

Crystallized MDI material can be re-melted at 50°C to 70°C. For detailed procedures, consult the Dow Answer center at www.dowpolyurethanes.com or the "ISONATE™ and PAPI™ Pure, Modified and Polymeric MDI Handling & Storage Guide" (Form No. 109-01224) available through Dow Customer Information Group (CIG) CUSTINFOGRP@dow.com or the nearest Dow Sales office.

First Aid Procedure

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

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.

Eye contact

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

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.

Ingestion

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

Product Stewardship

The Dow Chemical Company and its subsidiaries ("Dow") 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 Dow products — from the initial concept and research, to manufacture, use, sale, disposal, and recycle of each product.

Customer Notice

Dow strongly encourages its customers to review both their manufacturing processes and their applications of Dow products from the standpoint of human health and environmental quality to ensure that Dow products are not used in ways for which they are not intended or tested. Dow personnel are available to answer your questions and to provide reasonable technical support. Dow product literature, including safety data sheets, should be consulted prior to use of Dow products. Current safety data sheets are available from Dow.

Medical Applications Policy

NOTICE REGARDING MEDICAL APPLICATION RESTRICTIONS: Dow will not knowingly sell or sample any product or service ("Product") into any commercial or developmental application that is intended for:

- long-term or permanent contact with internal bodily fluids or tissues. "Long-term" is contact which exceeds 72 continuous hours;
- use in cardiac prosthetic devices regardless of the length of time involved ("cardiac prosthetic devices" include, but are not limited to, pacemaker leads and devices, artificial hearts, heart valves, intra-aortic balloons and control systems, and ventricular bypass-assisted devices);
- use as a critical component in medical devices that support or sustain human life; or
- use specifically by pregnant women or in applications designed specifically to promote or interfere with human reproduction.

Dow requests that customers considering use of Dow products in medical applications notify Dow so that appropriate assessments may be conducted. Dow 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 the Dow product is safe, lawful, and technically suitable for the intended use. **DOW MAKES NO WARRANTIES, EXPRESS OR IMPLIED, CONCERNING THE SUITABILITY OF ANY DOW PRODUCT FOR USE IN MEDICAL APPLICATIONS.**

Disclaimer

NOTICE: No freedom from infringement of any patent owned by Dow or others is to be inferred. Because use conditions and applicable laws may differ from one location to another and may change with time, the Customer is responsible for determining whether products and the information in this document are appropriate for the Customer's use and for ensuring that the Customer's workplace and disposal practices are in compliance with applicable laws and other governmental enactments. Dow assumes no obligation or liability for the information in this document. **NO WARRANTIES ARE GIVEN; ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY EXCLUDED.**

NOTICE: If products are described as "experimental" or "developmental": (1) product specifications may not be fully determined; (2) analysis of hazards and caution in handling and use are required; (3) there is greater potential for Dow to change specifications and/or discontinue production; and (4) although Dow may from time to time provide samples of such products, Dow is not obligated to supply or otherwise commercialize such products for any use or application whatsoever.

NOTICE: This data is based on information Dow believes to be reliable, as demonstrated in controlled laboratory testing. They are offered in good faith, but without guarantee, as conditions and method of use of Dow products are beyond Dow's control. Dow recommends that the prospective user determine the suitability of these materials and suggestions before adopting them on a commercial scale.

To the best of our knowledge, the information contained herein is accurate and reliable as of the date of publication, however we do not assume any liability for the accuracy and completeness of such information.

Additional Information

North America		Europe/Middle East	+800-3694-6367
U.S. & Canada:	1-800-441-4369		+31-11567-2626
	1-989-832-1426	Italy:	+800-783-825
Mexico:	+1-800-441-4369		
Latin America		South Africa	+800-99-5078
Argentina:	+54-11-4319-0100		
Brazil:	+55-11-5188-9000		
Colombia:	+57-1-219-6000	Asia Pacific	+800-7776-7776
Mexico:	+52-55-5201-4700		+603-7965-5392

www.dowpolyurethanes.com

This document is intended for use within Latin America, North America

Published: 2007-04-23

© 2019 The Dow Chemical Company

