Polyurethanes

Asia Pacific

Taking Quality and Performance to the Next Level

Sustainable Solutions for Coatings, Adhesives, Sealants and Elastomers

Supplying a multitude of products for measurable results

Consistency and reliability. You get both when you work with Dow.

It starts with our strong commitment to quality control – helping provide greater assurance of product purity.

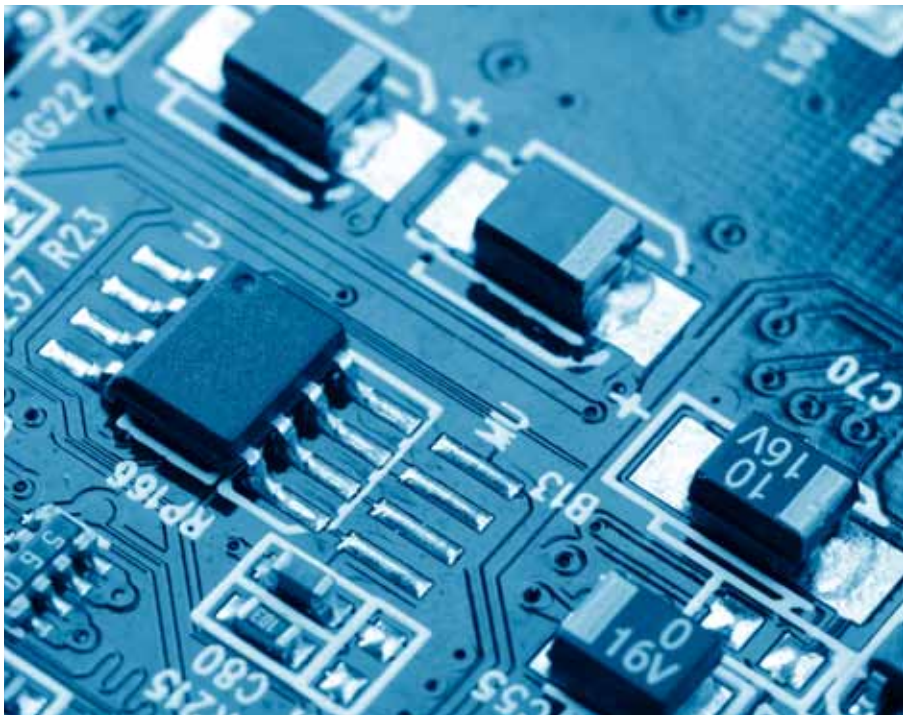
But it also comes from a deep dedication to our customers. We understand the challenges you face each day in producing high-quality products while balancing performance, economics and environmental impact. We recognize that you require different performance characteristics to help you differentiate your applications. Our technical service representatives are always available to answer a question or help you develop a solution to a fabrication or foaming problem.

Unparalleled Expertise
Dow people have an unparalleled expertise in polyurethane chemistry and materials science, coupled with an in-depth knowledge of end-use markets. Our global network of technical service professionals, development scientists, and marketing and sales representatives can help you analyze market intelligence, develop innovative products and troubleshoot issues at your site.

We utilize only responsible, science-based manufacturing practices that safeguard our workplaces, our communities and the environment. And we have accelerated our commitment to sustainable chemistry through new technologies and products.

Choose the Product That's Right for You
Dow offers a number of basic and high-performance polyols and isocyanates, including TDIs and MDIs for a wide variety of applications, including adhesives, appliances, building and construction, coatings, elastomers, furniture and bedding, packaging and sealants.

This guide offers an easy-to-use tool for comparing product features and benefits. Use it to help you select the option that is best for your application. Or talk to your Dow representative about your needs and, together, we can develop a solution that will ensure optimal product performance at the right price.



Polyether Diols and Triols

When these polyols are used to make prepolymers, they create the benefit of enhanced prepolymer stability for one- or two-component coatings, adhesives and sealants, as well as consistent processing. The variety of functionalities, hydroxyl termination and molecular weights allows for adjustment of curing time and mechanical properties of the end product.

Product	Functionality	OH number	Average molecular weight	Viscosity at 25°C (mPas)	Water (% max)	Applications
VORANOL™ WD2104	2	270	410	70	0.05	Low molecular weight polypropylene glycol for use in flexible packaging adhesives, elastomers, thermal breaks, potting compounds and RIM parts such as coatings and adhesives; acidified for enhanced prepolymer stability
VORANOL 2110TB[1]	2	112	1000	150	0.05	Polypropylene glycol for prepolymers and flexible packaging adhesives
VORANOL 2120[1]	2	56	2000	270	0.06	Polypropylene glycol for prepolymers and flexible packaging adhesives
VORANOL WD2130[1]	2	38	3000	545	0.05	Polypropylene glycol for prepolymers and flexible packaging adhesives
VORANOL CP310[1]	3	565	300	650	0.08	Low molecular weight triol for rigid castings encapsulation, coatings and adhesives
VORANOL CP450[1]	3	383	450	330	0.08	Low molecular weight triol for rigid castings encapsulation, coatings and adhesives
VORANOL 2070A/2070[1]	3	238	700	240	0.03	Medium molecular weight triol for rigid and semi-rigid applications
VORATEC™ SD301[1]	3	156	1000	220	0.05	Medium molecular weight triol for rigid and semi-rigid applications
VORANOL 2100[1]	3	56	3000	475	0.03	Storage stable prepolymers for one- or two-component flooring adhesives and sealants
VORANOL 230-042N	3	41	4000	600	0.05	Storage stable prepolymers for either one- or two-component coatings, adhesives and sealants
VORANOL WT5000[1]	3	32	5000	900	0.05	Storage stable prepolymers for either one- or two-component coatings, adhesives and sealants
EO capped polyols						
VORANOL 222-056[1]	2	56	2000	350	0.04	Fast reactivity polyol with high primary hydroxyl content for prepolymer manufacturing; also used in prepolymers designed for PUD and CASE two-component high-performance applications
VORANOL 4240[1]	2	28	4000	410 at 100°F	0.03	Fast reactivity polyol with high primary hydroxyl content for prepolymer manufacturing, sealants applications and two-component high-performance elastomers
VORANOL 2471[1]	3	34	5000	860	0.04	Fast reactivity polyol of high primary content for prepolymer manufacturing and sealants applications
VORANOL CP 6055	3	28	6000	1100	0.06	Fast reactivity polyol of high primary content for prepolymer manufacturing and sealants applications

[1]Non-neutralized polyols; N = acid finished or acid adjusted
Typical properties. Not to be construed as specifications.

Amine-Initiated Polyols

This line of polyols offers fast curing properties, potential for reduced catalyst loadings, and versatility in usage for applications such as rigid castings or rigid adhesives.

Product	Functionality	OH number	Average molecular weight	Viscosity at 25°C (mPas)	Water (% max)	Applications
VORANOL™ 220-530	2	530	212	6000 at 100°F	0.10	Amine-initiated polyol/cross-linker for two-component adhesives, sealants and coatings; compatible with polybutadiene-based polyols
VORANOL 240-800	4	800	278	17500	0.08	Amine-initiated autocatalytic polyol for cross-linking and improved polyol compatibility in high modulus two-component adhesives and coatings; also used in rigid elastomers and electrical potting

Typical properties. Not to be construed as specifications.

High Functionality Polyols

This line of products offers benefits attainable from a wide variety of functionalities, molecular weights and viscosities that allow the user to adjust processing conditions, to obtain a broad range of mechanical properties and to use in electrical cast elastomers.

Product	Functionality	OH number	Average molecular weight	Viscosity at 25°C (mPas)	Water (% max)	Applications
VORANOL™ 240-490	4.3	490	460	5600	0.10	High functionality polyol for cross-linking in coating, adhesive and rigid elastomer applications
VORANOL 240-446	4.5	446	566	6500	0.10	High functionality polyol for cross-linking in coating, adhesive and elastomer applications
VORANOL RN 411A	4.3	410	582	5300	0.10	High functionality polyol for cross-linking in coating, adhesive and elastomer applications
VORANOL 240-360	4.5	360	728	3100	0.10	High functionality polyol for cross-linking in coating, adhesive and elastomer applications
VORANOL 270-370	7	370	1040	23200	0.10	Very high functionality polyol for cross-linking in construction coating, adhesive and elastomer applications

Typical properties. Not to be construed as specifications.

Copolymer Polyols

Dow has developed copolymer polyols (also called polymer or grafted polyols) to enhance foam load-bearing capabilities and firmness, enabling customers to produce foams with improved durability, support and comfort. Additionally, these polyols provide a highly cost-efficient method to improve load-bearing and creep properties for foams and elastomers compared to base polyols. They offer the advantage of "opening" the foam for easy processing and also meet customer demand for low-VOC and low-viscosity options.

Product	Functionality	OH number	Viscosity at 25°C (mPas)	Solids %	Water (% max)	Applications
VORANOL™ 3943A	3	31	3500-7000	43	0.08	High-solids copolymer polyol with all-secondary OH groups for use in elastomers and other CASE applications with improved tensile strength and modulus Offers proprietary finishing for low odor and reduced VOCs
SPECFLEX™ NC701	3	22	4500-6000	40	0.07	High-solids copolymer polyol with high primary hydroxyl content for use in elastomers and other CASE applications with improved elongation and resiliency Can be used to produce high load-bearing products over a wide density range

Typical properties. Not to be construed as specifications.

Low-Monol Polyols

Low-monol polyols have nearly true diol functionality over a broad range of molecular weights, enabling the end user to achieve excellent mechanical properties. They are characterized by excellent consistency in reactivity due to precise control of functionality, OH content, water content and basicity. All products below are diols.

Product	OH number	Average molecular weight	Viscosity at 100°F (mPas)	Water (% max)	Applications
VORANOL™ 2000LM	56	2000	200	0.03	Raw material for the preparation of prepolymers used in coatings, adhesives, sealants and elastomers that require superior dynamic and mechanical properties
VORANOL 4000LM	28	4000	480	0.03	Raw material for the preparation of prepolymers used in adhesives, sealants and elastomers that require superior dynamic and mechanical properties, and a polyol with favorable viscosity
VORANOL 8000LM	14	8000	1900	0.03	Raw material for the preparation of prepolymers used in high-elongation sealants
VORANOL 223-060LM	61	1800	300 at 25°C	0.04	A low-viscosity, high reactivity polyol of low monol content for finished PU products of excellent mechanical and dynamic properties

Typical properties. Not to be construed as specifications.

Isocyanates

Turn to Dow for industry-standard ISONATE™ and PAPI™ isocyanate products in a range of equivalent weights, reactivities and viscosities to help meet specific performance needs. Our product stewardship capabilities include first-class, on-site training on isocyanate safe handling, use and disposal, as well as ongoing consultation and support from our experienced and knowledgeable team. Technical support and service are available around the clock, helping you ensure a safer operation, make a safer product and contribute to a safer environment.

Product	Approximate functionality	% NCO by weight	Isocyanate equivalent weight	Viscosity at 25°C (mPas)	Applications
Modified MDI					
ISONATE™ 143L	2.1	29.2	144.5	40	Carbodiimide modified MDI suitable for general CASE applications, carpet underlayment and shoe soles
Polymeric MDI					
PAPI™ 20	3.2	30.4	138	1800	Higher functionality high-viscosity polymeric MDI for polyisocyanurate foam, laminates and pour-in-place insulation
PAPI 27/135C	2.7	31.4	134	180	General purpose high functionality polymeric MDI for cast elastomers, prepolymers, adhesives and binders
PAPI 2940	2.3	32	131.5	50	Polymeric MDI with moderate 2,4-MDI content and higher acidity suitable for rigid and semi-rigid foams, building panels, coatings and prepolymers for binders and adhesives
PAPI 580N	3.0	30.5	136.5	700	Higher functionality polymeric MDI for polyisocyanurate foam, laminates and pour-in-place insulation
PAPI PB 219	2.2	32.3	130	25	Low-viscosity polymeric MDI with high 2,4-MDI content suitable for general CASE applications and viscoelastic foams

Typical properties. Not to be construed as specifications.

Silane Modified Polymers

VORASIL™ Silane Modified Polymers are a family of moisture-curable hybrid polymers composed of a polyurethane backbone and silane end groups, allowing adhesive and sealant manufacturers to achieve silicone-like performance without the high-end silicone cost. These novel resins are created with a unique, proprietary process that allows for reproducible, tunable final properties, providing manufacturers with unprecedented freedom of design. Silylation of any selected backbone enables tailoring of hydrophobicity, mechanical performance, UV stability and weatherability.

Product	Secant modulus (MPa)	Elongation at break (%)	Tensile strength (MPa)	Curing Speed (h)	Viscosity at 25°C (mPas)	Applications
VORASIL™ 602	0.14-0.21	275-450	0.34-0.59	3-5	21000	Low modulus, high elongation, low-viscosity resin for use in adhesives and sealants for construction and transportation
VORASIL 604	0.45-0.69	100-250	0.69-1.03	1.5-3.5	11000	Medium modulus resin for use in adhesives and sealants for construction and transportation

Typical properties. Not to be construed as specifications.

Safety Considerations

Most VORANOL™, VORALUX™ and SPECFLEX™ Polyols generally present no significant hazard in use when simple precautions are followed. However, some VORANOL, VORALUX and SPECFLEX Polyols may require additional care in handling. Before working with VORANOL, VORALUX and SPECFLEX Polyols, it is necessary to understand the hazards involved in handling all of the components and to establish and follow safe work procedures. Products based on diisocyanates like MDI and TDI (e.g., ISONATE™ Modified MDI and PAPI™ Polymeric MDI) should always be used in a well ventilated area with appropriate local exhaust in such a way that the occupational exposure limits (OEL) for these materials are not exceeded.

Products based on MDI and TDI require care in handling due to the potential health effects associated with diisocyanates. All persons who work with these materials must know and follow proper safe handling procedures. Material Safety Data Sheets (MSDS) or Safety Data Sheets (SDS) are 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. MSDS are updated regularly; therefore, please request and review the most current MSDS before handling or using any product. MSDS, SDS, product literature, and safe handling and storage information for all of these products are available from the nearest Dow sales office and online at www.dow.com.

Customer Notice

Dow encourages its customers to review their applications of Dow products from the standpoint of human health and environmental quality. For further information about safety considerations for your product/application, please contact your Dow sales representative.

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