

# Polyurethane Components for Coating, Adhesive, Sealant & Elastomer (CASE) Applications

**DOW**



# Supplying a range of polyether polyols and aromatic isocyanates for CASE applications

**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.

## Choose the product that's right for you

Dow offers a number of basic and high-performance isocyanates and polyols and for a wide variety of applications.

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 can enable optimal product performance at the right price.

### CASE applications:

- Buildings
- Infrastructure
- Automotive
- Assembly
- Wood working
- Mold making
- Gaskets
- Packaging
- Wood, rubber and foam binding

## Unparalleled expertise

The Dow team has 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.

## Manufacturing capabilities to support your growth

Our prepolymer offering showcases our capabilities to meet a range of NCO, viscosity, and other property requirements. At Dow, we're open to exploring prepolymers outside of these criteria to meet your needs, whether you do not have the manufacturing capability internally or need external support for your growth.

We additionally have polyol and MDI blending capabilities to support unique product properties you require or to help streamline your operations.

Consider Dow for:

- Manufacturing an existing prepolymer or blended product when internal capacity is limited
- Designing and supplying a new prepolymer or blend to meet your formulation needs

## More sustainable materials to achieve your goals

We're committed to reducing our dependence on fossil fuels by using alternative feedstocks from bio, circular and renewable sources. We've invested in third party certification to trace the flow of these alternative feedstocks in our value chain and attribute them in final products.

This means we can offer you polyurethane materials that support your bio, circular, and carbon targets. Reach out to your Dow representative to learn about the options available.



## Polyether Diols

When polyether diols are used to make prepolymers, they enable enhanced stability for one- or two-component CASE formulations as well as consistent processing. The range of functionality, molecular weight and hydroxyl termination can help you meet a range of cure time and mechanical property needs. Diols are typically used in combination with triols to achieve the desired performance.

| Product  | Nominal Functionality | Equivalent Weight (g/eq) | Viscosity at 100°F (cSt) | Applications |   |   |   |
|--|-----------------------|--------------------------|--------------------------|--------------|---|---|---|
| <b>Standard Diols</b>  |                       |                          |                          |              |   |   |   |
|  |                       |                          |                          | C            | A | S | E |
| VORANOL™ 220-028   | 2.0                   | 2000                     | 455                      |              |   | ● |   |
| VORANOL™ 220-056(N)  | 2.0                   | 1000                     | 150                      | ●            | ● | ● | ● |
| VORANOL™ 220-110(N)  | 2.0                   | 500                      | 70                       | ●            | ● |   | ● |
| VORANOL™ 220-260   | 2.0                   | 216                      | 35                       | ●            | ● |   |   |
| <b>Low-monomer Diols</b><br>Improve tensile strength and elongation in the final application compared to standard polyethers |                       |                          |                          |              |   |   |   |
| VORANOL™ 8000LM  | 2.0                   | 4000                     | 1900                     |              |   | ● |   |
| VORANOL™ 4000LM  | 2.0                   | 2000                     | 480                      | ●            | ● | ● | ● |
| VORANOL™ 2000LM  | 2.0                   | 1000                     | 200                      | ●            | ● | ● | ● |
| VORANOL™ 1000LM  | 2.0                   | 500                      | 170 @ 77 °F              | ●            | ● |   | ● |
| <b>EO-capped Diols</b><br>Enhance reactivity and hydrophilicity  |                       |                          |                          |              |   |   |   |
| VORANOL™ 222-029   | 2.0                   | 2000                     | 410                      | ●            | ● | ● | ● |
| VORANOL™ 222-056   | 2.0                   | 1000                     | 170                      | ●            | ● | ● | ● |
| <b>Hydrophobic Diols</b><br>Enhance water resistance   |                       |                          |                          |              |   |   |   |
| VORAPEL™ D3201   | 2.0                   | 1000                     | 470 @ 77 °F              | ●            | ● | ● | ● |

N denotes neutralized grade, and (N) denotes neutralized grade is available. Neutralization can enable enhanced stability in prepolymers.

● Coatings (C) ● Adhesives (A) ● Sealants (S) ● Elastomers (E)



## Polyether Triols

Similar to diols, when triols are used to make prepolymers, they enable enhanced stability for one- or two-component CASE formulations as well as consistent processing. The range of functionality, molecular weight and hydroxyl termination can help you meet a range of cure time and mechanical property needs. Triols are typically used in combination with diols to achieved the desired performance.

| Product  | Nominal Functionality | Equivalent Weight (g/eq) | Viscosity at 100°F (cSt) | Applications |   |   |   |
|--|-----------------------|--------------------------|--------------------------|--------------|---|---|---|
| <b>Standard Triols</b>   |                       |                          |                          |              |   |   |   |
|  |                       |                          |                          | C            | A | S | E |
| VORANOL™ 230-056   | 3.0                   | 1000                     | 475 @ 77 °F              | ●            | ● | ● | ● |
| VORANOL™ 230-112   | 3.0                   | 500                      | 130                      | ●            | ● |   |   |
| VORANOL™ 230-238   | 3.0                   | 235                      | 110                      | ●            | ● |   |   |
| VORANOL™ 230-660   | 3.0                   | 85                       | 300                      | ●            | ● |   |   |
| <b>EO-capped Triols</b><br>Enhance reactivity and hydrophilicity |                       |                          |                          |              |   |   |   |
| VORANOL™ 232-028   | 3.0                   | 2000                     | 640                      | ●            | ● | ● | ● |
| VORANOL™ 231-027N  | 3.0                   | 2000                     | 650                      | ●            | ● | ● |   |
| VORANOL™ 232-034(N)  | 3.0                   | 1650                     | 415                      | ●            | ● | ● | ● |
| VORANOL™ 232-036N  | 3.0                   | 1550                     | 400                      | ●            | ● | ● | ● |
| <b>Hydrophobic Triols</b><br>Enhance water resistance            |                       |                          |                          |              |   |   |   |
| VORAPEL™ T5001   | 3.0                   | 200                      | 330 @ 77 °F              | ●            | ● |   |   |

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## Additional Polyether Polyols

Polyols with a wider range of functionality and curing properties are available to meet unique CASE formulation needs.

| Product   | Nominal Functionality | Equivalent Weight (g/eq) | Viscosity at 100°F (cSt) | Applications |   |   |   | Notes  |
|---|-----------------------|--------------------------|--------------------------|--------------|---|---|---|--|
| <b>Amine Initiated Polyols</b>  |                       |                          |                          |              |   |   |   |  |
| Enables catalytic behavior of the polyol for potential reduction of catalyst loadings |                       |                          |                          |              |   |   |   |  |
|   |                       |                          |                          | C            | A | S | E |  |
| VORANOL™ 220-530  | 2.0                   | 106                      | 6000                     | ●            | ● |   | ● | Compatible with polyBd and other hydrophobic polyols   |
| VORANOL™ 240-800  | 4.0                   | 70                       | 3550                     | ●            | ● |   |   | Aliphatic-amine initiated polyol designed for blending with other polyols. Provides autocatalytic activity |
| VORANOL™ VORACTIVE™ 779   | 4.0                   | 1700                     | 1100 @ 77 °F             | ●            | ● | ● |   | Aliphatic-amine initiated polyol. Provides autocatalytic activity  |
| <b>High Functionality Polyols</b>   |                       |                          |                          |              |   |   |   |  |
| Ideal when triols aren't enough to achieve the rigidity needed in final application   |                       |                          |                          |              |   |   |   |  |
| VORANOL™ 240-490  | 4.3                   | 114                      | 1800                     | ●            | ● |   |   | High functionality polyol for superior crosslinked in adhesives  |
| VORANOL™ 240-360  | 4.5                   | 156                      | 1310                     | ●            | ● |   |   | Low viscosity, sucrose-/glycerin-initiated polyether polyol  |
| VORANOL™ 270-370  | 7.0                   | 152                      | 6550                     | ●            | ● |   |   | Suitable for structural adhesives and binder applications  |

● Coatings (C) ● Adhesives (A) ● Sealants (S) ● Elastomers (E)

## Aromatic Isocyanates

Our isocyanate offering includes monomeric and polymeric MDI along with modified and prepolymer versions to meet a range of application needs. The varied functionality, strength and reactivity can enable your own prepolymer production or be used directly in formulations for CASE applications, whether targeting flexible or rigid characteristics.

| Product   | Approximate functionality | % NCO | Isocyanate equivalent weight (g/eg) | Viscosity at 25°C (cSt) | Applications |   |   |   | Notes  |
|---|---------------------------|-------|-------------------------------------|-------------------------|--------------|---|---|---|--|
|   |                           |       |                                     |                         | C            | A | S | E |  |
| <b>Monomeric MDI</b>  |                           |       |                                     |                         |              |   |   |   |  |
| ISONATE™ 125M   | 2.0                       | 33.5  | 125                                 | Solid                   | ●            | ● | ● | ● | Standard MMDI  |
| ISONATE™ 50 OP  | 2.0                       | 33.5  | 125                                 | 10                      | ●            | ● | ● | ● | Designed to control reactivity and enhance handling, freeze stability and shelf-life   |
| <b>Polymeric MDI</b>  |                           |       |                                     |                         |              |   |   |   |  |
| PAPI™ 23  | 2.3                       | 32.7  | 128                                 | 30                      | ●            | ● |   |   | PMDI with enhanced MMDI content  |
| PAPI™ 94  | 2.3                       | 32.0  | 131                                 | 50                      | ●            | ● |   |   | Standard grade for formulating   |
| PAPI™ 95  | 2.5                       | 31.5  | 133                                 | 85                      | ●            | ● |   |   | Standard grade for formulating   |
| PAPI™ 27  | 2.7                       | 31.4  | 134                                 | 180                     | ●            | ● |   |   | Standard grade for formulating   |
| PAPI™ 580N  | 3.0                       | 30.8  | 136                                 | 700                     |              | ● |   |   | High functionality for rigidity  |
| PAPI™ 20  | 3.2                       | 30.2  | 139                                 | 1800                    |              | ● |   |   | High functionality for rigidity  |
| <b>Modified and Formulated MDI</b>  |                           |       |                                     |                         |              |   |   |   |  |
| ISONATE™ 127  | 2.0                       | 33.2  | 126                                 | 15                      | ●            | ● | ● | ● | A monomeric blend similar to 125M with improved handling and reduced reactivity  |
| ISONATE™ 143L   | 2.1                       | 29.1  | 144                                 | 33                      | ●            | ● | ● | ● | Carbodiimide modified MDI  |
| PAPI™ 128   | 2.2                       | 32.8  | 128                                 | 25                      | ●            | ● |   |   | A polymeric and monomeric blend with low functionality for reduced reactivity  |
| <b>Prepolymers</b><br>Can be used as intermediate products for incorporating additives and enabling a one-component formulation, or as one part of a two-component solution with possible addition of additives if needed |                           |       |                                     |                         |              |   |   |   |  |
| ISONATE™ 181  | 2.0                       | 23.1  | 182                                 | 770                     | ●            | ● |   | ● | Similar to 125M with improved handling form, commonly used by itself in a final formulation vs. in combination with other isos |
| ISONATE™ 240 SH   | 2.0                       | 18.6  | 225                                 | 1400                    |              | ● |   | ● | MDI prepolymer with polyester backbone   |
| HYPERLAST™ LP 5013  | -                         | 26.0  | 162                                 | 150                     |              |   |   | ● | MDI prepolymer for quasi or 1-shot elastomers  |
| VORASTAR™ HB 6724   | -                         | 21.5  | 195                                 | 425                     | ●            | ● |   |   | Specially formulated to provide low temperature stability during storage and transport   |
| HYPERLAST™ LP 5608  | -                         | 19.5  | 215                                 | 1000                    | ●            | ● |   | ● | Common for spray coatings  |
| VORASTAR™ HB 6042   | -                         | 16.0  | 263                                 | 700                     | ●            | ● |   |   | Excellent freeze stability and improves surface finish of polyurea coatings  |
| HYPERLAST™ LP 5601  | -                         | 15.0  | 280                                 | 500                     | ●            | ● |   |   | Common for hybrid and polyurea coatings  |
| HYPERLAST™ LP 5612  | 2.0                       | 12.4  | 350                                 | 1000                    | ●            |   |   | ● | MDI prepolymer with low viscosity to enable roll or spray application  |
| HYPERLAST™ LE 5006  | -                         | 10.0  | 420                                 | 2300                    | ●            | ● |   | ● | Common for spray coatings  |

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For more information and product samples, contact us at your convenience:

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**Safety considerations**

Most VORANOL™ Polyols generally present no significant hazard in use when simple precautions are followed. However, some VORANOL Polyols are hazardous. Before working with VORANOL 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., VORAMER™ MDI and VORANATE™ Polymeric MDI) should always be used in a well ventilated area with appropriate local extraction in such a way that the occupational exposure limits (OEL) for these materials are not exceeded.

Products based on diisocyanates like MDI and TDI are potentially hazardous and require care in handling. All persons who work with these materials must know and follow proper safe handling procedures. 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. SDS are updated regularly; therefore, please request and review the most current SDS before handling or using any product. 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](http://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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