

Technical Information

Definition of Polyurea

A polyurea coating / elastomer is that derived from the reaction product of an isocyanate component and a resin blend component. The isocyanate can be aromatic or aliphatic in nature. It can be monomer, polymer, or any variant reaction of isocyanates, quasi-prepolymer or a prepolymer. The prepolymer, or quasi-prepolymer, can be made of an amine-terminated polymer resin, or a hydroxyl-terminated polymer resin.

The resin blend must be made up of amine-terminated polymer resins, and/or amine-terminated chain extenders. The amine-terminated polymer resins will not have any intentional hydroxyl moieties. Any hydroxyls are the result of incomplete conversion to the amine-terminated polymer resins. The resin blend may also contain additives, or non-primary components. These additives may contain hydroxyls, such as pre-dispersed pigments in a polyol carrier. Normally, the resin blend will not contain a catalyst(s).

Systems Available

Aromatic Based Spray Formulations

- Limited color stability in outdoor applications

Aliphatic Based Spray Formulations

- Excellent color stability in outdoor applications
- More costly than aromatic based systems

Slow Cure Joint Sealants

Brush Grade Systems for Repair

ANSI/NSF 61 Potable Water Approved

Typical Physical Properties

Tensile Strength, psi.....	up to 4000
Shore Hardness.....	A 30 to D 65
Elongation, %.....	up to 1000
Tear Strength, pli.....	250 to 600
100% Modulus, psi.....	500 to 2000
Burst Strength, psi.....	250 to 500
Flex/Crack Bridging.....	> 1/8 inch (-26°C / -15°F)

Adhesion

Substrate	Elcometer Adhesion.(psi)
Concrete, dry.....	400, SF
Concrete, primed.....	> 400, SF
Steel, 2-mil blast profile.....	> 2000
Aluminum, cleaned.....	> 2000
Wood.....	250, SF

SF = Substrate Failure Chart

Corrosion

	System Reactivity.(sec)	
	2.5	3.5
Blistering	Bare steel.....	none
	Urethane primer.....	none
	Epoxy primer.....	F, #2
Corrosion from scribe, mm	Bare steel.....	4.0..... 7.0
	Urethane primer.....	>10..... >10
	Epoxy primer.....	9.5..... 8.0
Elcometer adhesion, psi	Bare steel.....	>2000..... >2000
	Urethane primer.....	500..... 800
	Epoxy primer.....	1200..... 1100

1000 hours ASTM B-117 Salt Fog Exposure

NOTICE: All statements, information and data given herein are believed to be accurate and reliable but are presented without guarantee, warranty or responsibility of any kind expressed or implied. Statements or suggestions concerning physical properties and/or possible use of Polyurea are made without representation or warranty that any such use is free of patent infringement, and are not recommendations to infringe any patent. The user should not assume that all safety measures are indicated or that other measures may not be required.

Polyurea - Now You Know!

PDA POLYUREA DEVELOPMENT ASSOCIATION RESOURCES

To transform our Mission into concrete action plans yielding results that our membership and industry can use, committees have been formed within PDA and are moving forward.

PDA Objectives

- Clearly define Polyurea products
- Develop Polyurea marketing programs for all pertinent market applications
- Serve as a clearing house for dissemination of Polyurea information
- Establish protocol and standards for Polyurea applications
- Determine and respond to training needs
- Organize and host industry trade meetings as a forum for technical reviews and new product introductions, training and member networking opportunities

WHO SHOULD BE A MEMBER OF PDA?

We have members in all of these categories:

- Contractors
- Specifiers
- Formulators
- Raw Material Distributors
- Consultants
- Architects
- Property Managers/Owners
- Concrete Installers
- Applicators
- Manufacturers
- Equipment Suppliers
- Raw Material Suppliers
- Project Engineers
- Roofers
- Environmental Remediation companies
- Independent Sales Representative



TM

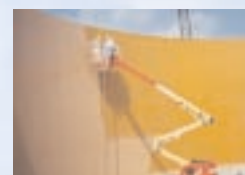
Technical Committee

Provides a wide range of technical support to the Polyurea Development Association membership such as, but not limited to:

- To identify, explore, develop and communicate an understanding of technical issues facing our industry
- Review, research, develop and issue documents concerning new products, systems and services
- Review existing documents and serve as a clearing house to ensure the "Continuity of Value" of technical information published by PDA and others concerning the products and services to our industry

Industry Promotion

Provides promotional and communication tools such as PR campaigns, videos, brochures, and other items of interest to SPF and related industries to support the use Polyurea.



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Annual Conference

Professionals from around the globe gather annually to discuss and learn of current and future trends in the Polyurea Industry.

- Reach Key Buyers in the SPF Industry.
- Meet with your customers and potential customers which include hundreds of Key Decision Makers who are: Contractors, Government Officials, Architects, Consultants, Specifiers, Engineers, Building Owners and Schools/University Administrators.

Product Logo

The PDA has developed a "Pure Polyurea" product certification program for members to use to promote their Pure Polyurea Products. Display or publication of the PDA Product Logo is reserved exclusively in connection with identification of applicant's product as a product or system, which fully meets and complies with the definition of polyurea as currently adopted by the PDA. Visit our web site www.pda-online.org for more details.

Safety

Safety is critical and a subject that gets a lot of attention inside the PDA. Presentations on hazards and better safety practices are made annually at our conference are available for use by our members.



Website / www.pda-online.org

Polyurea Development Association (PDA) is providing as many resources as possible through the association website so you may better understand the business of Polyurea. Your success is important to us and we feel you will find a wealth of information on our website to further your knowledge in this industry.

You can view the frequently asked questions about our association and about technical matters. If your question or answer is not listed, you have the option to email PDA with your question and receive an answer from an expert member panel.

Member Benefits

PDA members receive access to the members-only section of our website, including a searchable member directory, Quarterly "Podium" Newsletter and one free CD-ROM containing technical papers and presentations presented at the most recent annual conference.

POLYUREA ELASTOMERS

How Much Do You Really Know?



About This Remarkable Protective Coating System



Polyurea Development Association

Polyurea is a remarkable protective coating system.

Some have even called it a "miracle" coating system. The truth is, polyureas aren't for everything, but the markets and applications for which polyureas are being successfully used are rapidly growing.

The Polyurea Development Association (PDA) is the trade association for the global polyurea industry. This association was formed in 2000 by leading companies involved in all aspects of polyurea, ranging from raw materials suppliers, systems formulators, equipment suppliers, contractors, end-users and consultants. The PDA quickly adopted the following mission statement, and works hard through its technical, membership, and industry promotion committees to provide you with the technical guidance and product information to identify the truths and myths surrounding this remarkable technology.

MISSION STATEMENT

It is the mission of the Polyurea Development Association to promote market awareness, understanding and acceptance of polyurea technology through the development of education programs, product standards, safety and environmental and use recommendations.

If you currently use, or have interest in polyureas, we encourage you to join our trade association, attend our annual conference, participate on our

committees and begin taking advantage of the many technical, safety, and promotional resources we offer.

History...

Polyureas were first developed in the early 1980's for automotive fascia applications due to their high strength and impact resistance. These systems were fast reacting and utilized an expensive reaction injection molding (RIM) process to make body parts. The first sprayable polyureas hit the market in the late 1980's as a plural-component system that could be applied using less expensive, portable and commercially available equipment.

Today...

Hundreds of companies have developed thousands of formulations with physical properties that rival, and often exceed, those of traditional protective materials such as polyesters, epoxies, vinyl esters and paints. Of particular interest to specifiers, applicators and end-users are the fast set characteristics of polyureas compared to traditional systems. Depending on the formulation used and the application, polyureas are saving thousands of dollars in time and money with their ability to "return the substrate to service" in minutes (often seconds).

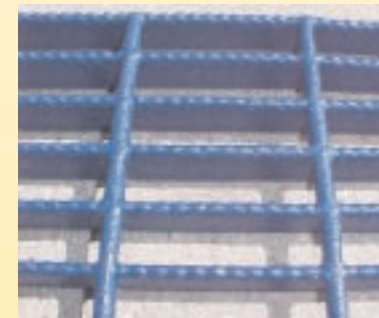
Polyurea...

A remarkable protective coating system with a range of uses limited only to your imagination. With its high strength and adhesion characteristics and its ability to resist abrasion and corrosion, it goes on fast and stays on long. Read on to find out how polyurea can benefit you.



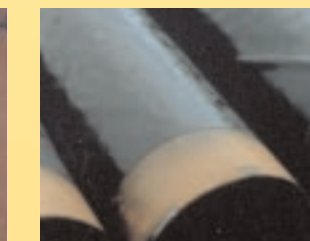
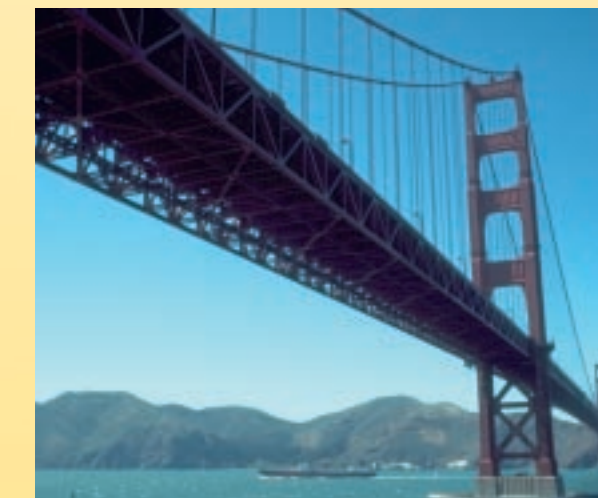
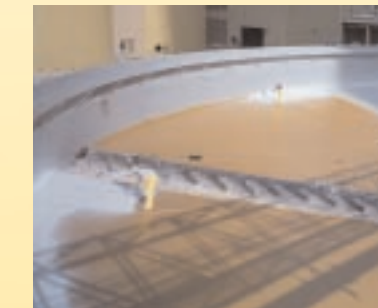
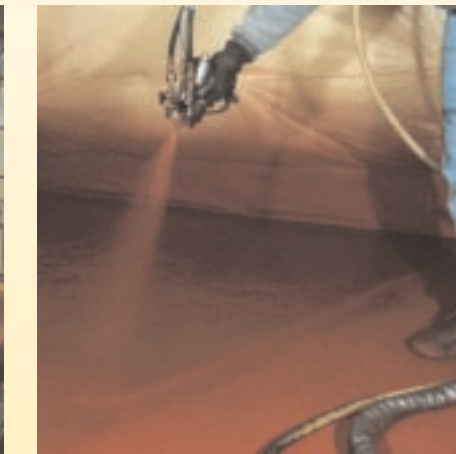
Polyurea Advantages...

- Fast Set. Return to Service in Minutes (Often Seconds)
- No VOC's and Little to No Odor
- Some Systems are USDA and Potable Approved
- Weather Tolerant: Cures at -25°F to >300°F even in High Humidity
- Excellent Resistance to Thermal Shock
- Flexible: Bridges Cracks
- Waterproof, Seamless and Resilient
- Unlimited Mil Thickness in One Application
- Spray, Hand Mix and Caulk Grade Materials
- Excellent Bond Strengths to Properly Prepared Substrates
- Resistant to Various Solvents, Caustics and Mild Acids
- Low Permeability, Excellent Sustainability



Performance Type	Polyurea	Polyurethane	Polyester	Epoxy	Vinyl Ester	Acrylic	Polysulfide
Physical strength	Low-High	Low-Mid	High	High	High	Mid-High	Low-Mid
Elongation	High	High	Low	Low	Low	Low-Mid	High
Impact resistance	High	Mid-High	Mid	Mid	Mid	Mid-High	Mid-High
Abrasion resistance	High	Mid-High	Mid-High	Mid-High	Mid-High	Mid-High	Mid
Adhesion to concrete	Low-High	Low-Mid	Mid	High	Mid	Low-Mid	Low-Mid
Cure shrinkage	Low	Low	High	Low	High	High	Low
Permeability	Low	Mid-High	Low	Low	Low	Low-Mid	Mid-High
UV resistance	Mid-High	Low-High	Mid-High	Low	Mid	High	High
Creep	Low	High	Low-Mid	Low-Mid	Low-Mid	Low-Mid	High
Temperature limit	Low-High	Mid	Low-Mid	Mid-High	Mid-High	Mid	Low-Mid
Chemical Resistance							
Mineral acids	Low-Mid	Low-Mid	Mid-High	Mid-High	Mid-High	Mid	Low-Mid
Organic acids	Mid	Low-Mid	High	Mid	High	Mid	Low-Mid
Alkalis	Mid-High	Low-Mid	Mid	High	High	High	Low-Mid
Chlorinated solvents	Low-Mid	Low-Mid	Low-High	Low-High	Mid-High	Low-Mid	Low-Mid
Oxygenated solvents	Low-Mid	Low-Mid	Low-High	Low-High	Mid-High	Low-Mid	Low-Mid
Hydrocarbon solvents	Low-Mid	Low-Mid	Mid-High	Mid-High	Mid-High	Low-High	Low-Mid
Salts	High	Mid-High	High	High	High	High	Mid-High
Water	High	Low-High	Mid-High	Mid-High	Mid-High	Mid-High	Low-High

Common Applications...



- Waste Water Treatment Linings
- Tank Coatings & Linings
- Pipe / Pipeline Coatings & Linings
- Manhole & Sewer Linings
- Flooring and Parking Decks
- Bridge Coating
- Truck Bed Liners
- Railcar Lining & Track Containment
- Water Parks & Playgrounds
- Landscape & Water Containment
- Fuel Storage & Containment
- Aquarium Lining
- Architectural Design
- Theme Park & Decorative Design
- Roof Coating
- Marine
- Automotive Fascia OEM Molded Parts
- Line Striping
- Joint Fill / Caulk