

PolyArmor® Warrior™ 240

FAST CURE SPRAY ELASTOMER SYSTEM *(patent pending)*

Product Data

Polyarmor® WARRIOR™ 240 is the next generation polyurea. Superior physical properties, 100% solids, highly chemical resistant, extremely abrasion resistant, tough, two part elastomeric spray coating giving rapid and consistent cure in applications ranging from -20° F to over 400° F. "WARRIOR 240" is specifically designed to be used in demanding installations requiring an elastomeric coating with superior physical properties and very high durability in harsh chemical environments. Consult the chemical resistance chart or Visuron for guidance. Applications can normally be reopened to traffic and service in minutes. Severe chemical use should be allowed to cure for eight hours.

WARRIOR™ 240 is the first choice where a tough, flexible, impact resistant, waterproof, chemical resistant, abrasion resistant coating is required in extremely short down times with no VOC's and extremely low odor.

- ◆ Superior resistance to solvents, acids and bases
- ◆ 100% solids, no VOC's
- ◆ Flexible, 240% elongation
- ◆ Excellent thermal stability
- ◆ Shock resistant
- ◆ Waterproofs
- ◆ Accepts vehicular traffic
- ◆ Abrasion resistant
- ◆ Low perm rate
- ◆ Cures -20° F to 400° F
- ◆ Return to service in 60 min.
- ◆ High strength
- ◆ Bridges moving gaps up to 1/16 inch wide

Typical Uses

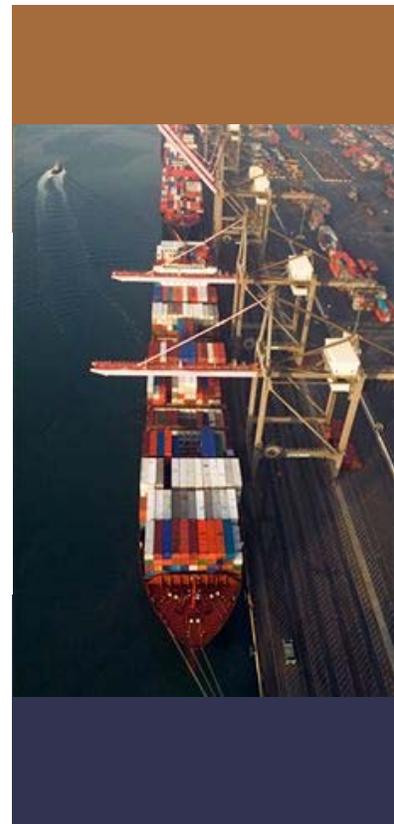
All applications where monolithic chemical resistant membrane is required.

- ◆ Secondary Containment Areas
- ◆ Tank Linings
- ◆ Waster Water Linings
- ◆ Digester Linings
- ◆ Mechanical Rooms
- ◆ Pulp & Paper Mills
- ◆ Fertilizer Plants
- ◆ Petrochemical facilities
- ◆ Pipe Line Coating
- ◆ Cooling Tower Lining
- ◆ Petroleum Prod. & Storage
- ◆ Oil & Gas Transmission
- ◆ Refineries

Typical Application Properties

WARRIOR™ 240 is a plural-component, fast cure, spray polyurea system. Equal volumes of parts "A" and "B" are proportioned and dispensed through high pressure, high temperature spray equipment. Consult Visuron for correct machine conditions.

- ◆ Gel time: 6 sec
- ◆ Tack-free time: 30 sec
- ◆ Open to light traffic: 60 min
- ◆ Open to chemical exposure: 8 hrs
- ◆ Bond Strength (ASTM D-4541)
(primed substrate)
 - ◆ Concrete: 350-400 psi
(concrete failure)
 - ◆ Steel: exceed 1600 psi
 - ◆ Wood: 200-250 psi
(wood failure)



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COLOR AVAILABILITY: black, light gray, dark gray and beige

"Custom colors available at additional charge"



Typical Physical Properties

Typical Physical Properties	Test Method	Value
Tensile Strength (psi)	D-638	5180
Elongation (%)	D-638	240
Tear Strength (pli)	D-624	1395
Shore Hardness ("D" scale)	D-2240	62
Moisture Vapor Transmission	E-96	(perm. in.) 0.019
Abrasion Resistance (wt. Loss-mg.)		
H-18, 1000g, 1000 rev.	D-6040	58
CS-17, 1000g, 1000 rev.	D-6040	< 3
Flash Point, components (°F)		>200
Coefficient of Thermal Expansion (in/in/°C)		approx. 4 x 10 ⁻⁵
Gel Time / Tack Free		6 sec. / 30 sec.
Flame Spread	E-108	Class A (Comparable to UL 790)
Flexibility Test	D-2794	> 160
Gardner impact, in.-lbs. (on 1/32" steel panels)		
Direct and Indirect		
Mandrel Bend:		
Conical Bend (on 1/32" steel)	D-522	Pass
1/4 Mandrel, 25°C (free film, 35-50 mils)	D-1737	Pass
1/4 Mandrel, -20°C (free film, 35-50 mils)	D-1737	Pass

Installation/Surface Preparation

Concrete — Do not apply in wet conditions. Concrete must be structurally sound, free of voids, honeycombs, bug holes and delaminations. Concrete must have at least a 3000 psi minimum compressive strength. An effective vapor barrier must be present for below grade and slab-on-grade projects. Do not apply over unvented steel pan decks or sandwich slab membranes. Maintain all expansion joints. Abrasive blast or tech to remove surface laitance. Emulsifying soaked in contaminants may be required. Consult Visuron Technologies. High degree of cleanliness is necessary. Surface must be dry and sound.

Substrate Repairs — All spalls and delaminations must be rehabilitated per ICRI and ACI standards. Rout and seal all cracks over 1/16" with appropriate joint sealants. Pre-fill all bug holes.

Steel — Do not apply in wet conditions. Any dissolved salts must be removed to current NACE specifications. Steel must be cleaned and blasted to SSPC-SP-10 or NACE 2 "Near White Metal" with a 3 mil anchor profile for immersion service, 2 mil for less severe conditions. All welds must be ground smooth. Immersion service requires a primer. Consult Visuron Technologies.

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Installation/Surface Preparation

General Surface Preparation — Mechanical methods such as shotblasting and sandblasting are preferred. Any weak or damaged existing coatings must be removed. Sound existing coatings can possibly be overcoated following abrading and application of Visuron Lap Prep. Verification trials are recommended.

Chemical Resistance/Ratings

It will quickly become obvious to those interested that the chemical resistance of Warrior™ 240 far exceeds the chemical resistance of any other polyurea available. The exceptionally high performance of Warrior™ 240 in a wide range harsh chemical environments is due to the unique combination of very unusual components, coupled with advanced polymerization technology and a high level of quality assurance.

Information on Chemical Resistance Properties

The chemical resistance property test data shown in this chart is meant to serve as a general guide only. Actual use conditions will vary and may cause different behavior of the coating. Accordingly, no guarantee is made nor can the manufacturer of these coatings assume liability in connection with their use.

The test chemicals in this chart are those commonly found in industry. This list is not all inclusive. Warrior™ 240 is resistant to many additional chemicals. For further information the manufacturer should be consulted.

There are several specific conditions that are essential to know regarding the actual use of Warrior™ 240 before an accurate decision can be made as to whether the product is suitable for use.

1. Commercial name of each reagent used in the installation under consideration.
2. Concentration of each reagent.
3. Temperature of the reagent (reagent blend) as it contacts the coating.
4. Anticipated frequency and conditions of spillage.
5. Maximum elapsed time from spill to completion of cleanup.
6. Any other pertinent conditions that may influence performance of the coating.

It is well known that chemical combinations often result in a synergy that may cause the combination to behave with properties beyond those of single reagents listed. Elevated temperature also activates most reagents and causes them to behave much more actively and aggressively than they do at ambient temperatures.

Visuron Technologies, Inc. strongly recommends that tests of Warrior™ 240 are carried out under actual job conditions whenever there is any question regarding suitability. Consult with the manufacturer where necessary.

Test Procedure

**7 day immersion per ASTM D-1308 @ 72° F (25° C)
(Method no. 3—immersion)**

The seven day immersion version is the most severe of the three methods available under ASTM D-1308. Fifty ml. of the test chemical was placed in 100 mil. Glass beakers. Carefully sized test specimens of both Warrior™ 240 and a high quality standard polyurea (Polyarmor 444-370) were prepared and placed together into the chemical. The entire setup was then covered and sealed inside a glass container, thereby, controlling evaporation. The coating samples were monitored constantly during the prescribed time period. Semi-daily removal, observation and study of each sample was carried out. Coating condition scoring was carried out based on a scale of 1-5.

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Chemical Resistance/Ratings

- 5: No change. No softening or embrittling of coating, no swelling, no coating deterioration.
- 4: Slight softening or swelling, some change in natural shape, good physical properties maintained.
- 3: Increase softening or swelling, decrease of physical properties, not able to tear coating manually
- 2: Continued deterioration, swelling, softening, able to tear manually, but still maintained film shape.
- 1: Destroyed. Soggy or embrittled, Total loss of shape.



CHEMICAL RESISTANCE COMPARISON

Polyarmor® WARRIOR™ 240 vs Typical Polyurea

7 day exposure per ASTM D-1308—immersion @ 25° C

(Warrior Series Polyurea—Patent Pending)

“WARRIOR™ 260” IS UP TO TWENTY-FOUR TIMES MORE RESISTANT TO CHEMICAL ATTACK THAN TYPICAL POLYUREA

This Chart compares the suitability of Polyarmor® WARRIOR™ 240 with typical polyurea for use in secondary containment applications

LEGEND

R: Recommended (no damage)

R-8: Recommended with 8 hour wash down

C: Caution (some swelling, discoloration and cracking)

R-1: Recommended with 1 hour wash down.

N: Not Recommended

Test Media (CHEMICAL)	Warrior 240	Typical Polyurea
Acetic Acid, 10%	R	R
Acetone	R-8	N
Ammonium Hydroxide, 20%	R	R
Ammonium Nitrate	R	R
Ammonium Phosphate	R	R
Antifreeze (50% Ethylene Glycol)	R	N
Battery Acid Sulfuric Acid)	R	N
Benzene	R-8	N
Brine (saturated, 130,000 ppm)	R	R
Brake Fluid	R-1	N
Chlorine (2,000 ppm in water)	R	R
Citric Acid	R	R
Copper Chromate Arsenic (4% working solution)	R	R

Test Media (CHEMICAL)	Warrior 240	Typical Polyurea
Diesel Fuel	R	R
Dimethyl Formamide	R-1	N
Gasoline (unleaded)	R	C
Hexane	R	R
Hydrochloric Acid, 5%, 10%	R	R
Hydrochloric Acid, 25%	R	N
Hydrofluoric Acid	N	N
Hydraulic Oil	R	C
Isopropyl Alcohol	R	C
Lactic Acid	R	R
Liquid Nitrogen Fertilizer (28-0-0)	R	R
Liquid Urea Fertilizer	R	R
Methanol	R	C

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Chemical Resistance/Ratings

CHEMICAL RESISTANCE COMPARISON

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Test Media (CHEMICAL)	Warrior 240	Typical Polyurea
Methyl Ethyl Ketone	R-1	N
Mineral Spirits	R	R
Motor Oil	R	R
Nitric Acid, 10%, 20%	R	N
Nitric Acid, 40%	R-8	N
Nitric Acid, 50%	R-1	N
Phosphoric Acid, 10%	R	R
Phosphoric Acid, 25%, 50%, 85%	R	N
Potassium Hydroxide, 10%	R	R
Potassium Hydroxide, 20%, 50%	R	N
Propylene Carbonate	R	C
Skydrol (aircraft hydraulic oil)	R-1	N
Sodium Chloride	R	R

Test Media (CHEMICAL)	Warrior 240	Typical Polyurea
Sodium Hydroxide, 5%, 10%, 25%	R	R
Sodium Hydroxide, 50%	R	C
Sodium Hypochlorite (household bleach)	R	C
Stearic Acid	R	R
Sulfuric Acid, 5%, 10%, 20%	R	R
Sulfuric Acid, 25%, 50%	R	N
Sulfuric Acid, 98%	R-1	N
Toluene	R-8	C
1,1,1 Trichloroethane	R-8	C
Trisodium Phosphate	R	R
Vinegar (5% Acetic Acid)	R	R
Water	R	R
Xylene	R	R

Shelf Life

Six months in sealed unopened containers. Keep away from extreme heat, freezing and moisture. Never store in direct sunlight.

Clean up with Visuron CS-100 cleaning solvent, MEK, xylene or PGME. Dispose of in accordance with local and federal disposal regulations. See MSDS.

Read and understand the MSDS included with all shipments. Always use products with adequate ventilation and use required PPE. For confined space, use fresh air supply. For open air, use minimum of half-face, twin cartridge respirators approved for MDI. Always adhere to Society of Plastics Industry Safety Standards.

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CASE STUDY 1: Warrior™

PROJECT: NISSAN Motor Manufacturing Corp, Canton, MS

PROJECT COORDINATOR: Malouf Construction Corporation
Mansfield Industrial, Kenny Industrial Services Company

POLYUREA APPLICATOR: Fast Set Coatings, Inc., Austin, Texas
Inspection / Project Monitoring by Primeaux Associates LLC

SYSTEM: WARRIOR™ 240, Visuron Technologies, Inc.
Chemical Containment Systems, Inc. / V-tac Group

AREA: Concrete Wastewater Tank / Pump Room, approx 7,000



DISCUSSION: NISSAN is building a new assembly plant in Canton, MS. Part of the plant required their own waste water treating facility. In order to protect the concrete CIP pits and pump room floor from this highly corrosive environment, WARRIOR™ 240 polyurea system was chosen over a conventional polyurea spray elastomer system. The prepared concrete surface was to first receive 8 to 10 mils of the ProntoPrime (2-part urethane) priming system followed by 80 mils of the WARRIOR™ 240 polyurea system.

The specification called for abrasive blasting of the Cast-In-Place concrete structure followed by a re-surfacer to fill opened bugholes. Unfortunately, a re-surfacing material had not been applied and the WARRIOR™ 240 system had to be installed at a much higher film thickness over the ProntoPrime priming system in order to complete filling of the minor bugholes. The narrow size of the 40 foot deep processing pits also presented a challenge for spray application. Scissor lifts were inserted into the larger of the pits while a Spider Lift was used for access in the smaller pits.



The WARRIOR™ 240 system was applied at an average film thickness of 100 to 120 mils. Within the same day of applying the WARRIOR 240 system, several large mechanical pieces of equipment were installed in the pits. This caused some damage to the applied coating, which was then easily treated and repaired using the WARRIOR 240™ spray system. The application was completed in a timely manner and will give excellent service and corrosion protection for the concrete. The pump room floor was installed with a stipple / non-slip texture.