PolyArmor® *Warrior™ 260*

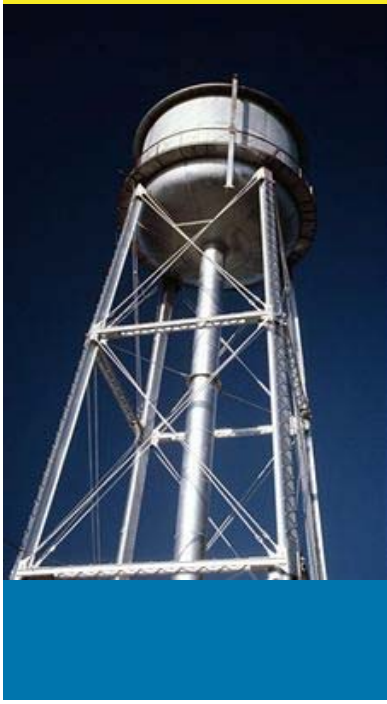
FAST CURE SPRAY ELASTOMER SYSTEM

Product Data

Polyarmor® WARRIOR™ 260 is the next generation phenolic *sm*. 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 ^{o} F to over 400 ^{o} F. “WARRIOR 260” 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™ 260 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, 260% elongation
- Excellent thermal stability
- Shock resistant
- Waterproofs
- Accepts vehicular traffic
- Abrasion resistant
- Low perm rate
- Cures –20 ^{o} F to 400 ^{o} 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

Typical Application Properties

WARRIOR™ 260 is a plural-component, fast cure, spray phenolic co-polymer 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 1200 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	5350
Elongation (%)	D-638	260
Tear Strength (pli)	D-624	730
Shore Hardness ("D" scale)	D-2240	62
Moisture Vapor Transmission	E-96	(perm. In.) 0.015
Abrasion Resistance (wt. Loss-mg.) H-18, 1000g, 1000 rev. CS-17, 1000g, 1000 rev.	 D-6040 D-6040	 43 < 2
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 Gardner impact, in.-lbs. (on 1/32" steel panels) Direct and Indirect	D-2794	> 160
Mandrel Bend: Conical Bend (on 1/32" steel) 1/4 Mandrel, 25°C (free film, 35-50 mils) 1/4 Mandrel, -20°C (free film, 35-50 mils)	 D-522 D-1737 D-1737	 Pass Pass 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 4 mil anchor profile for immersion service, 3 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.

WARRIOR™ 260 is a very high physical property phenolic co-polymer coating system which is tightly crosslinked. It is resistant to being degraded by a wide array of chemicals. It is also very abrasion resistant.

Plural component proportioner size, temperature and pressure ratings must be capable of producing the conditions stated below to satisfactorily spray install WARRIOR systems. Settings for correct installation of WARRIOR systems are higher than the settings used for typical polyurea. There are a few specific conditions that must be met for proper mixing and dispensing of this system.

It is mandatory to follow these recommendations so as to obtain the properties and performance that WARRIOR products are capable of delivering. Deviating from these conditions may decrease the physical properties of the cured polymer and, therefore, result in unacceptable performance of the installation.

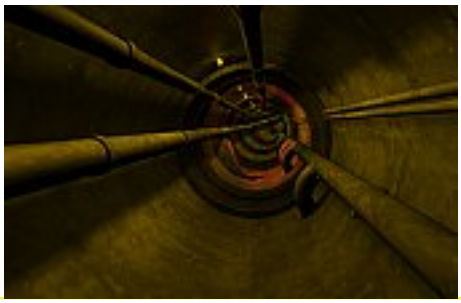
Proportioner Conditions:

- Capacity minimum: 20 lbs. per minute
- Static pressure: 2800-3000 psi
- Spraying pressure: 2500 psi minimum
- Pressure balance: 100 psi variance desirable
  300 psi variance maximum

Temperatures:

- Preheaters & Hose 170 ^{o}F each

Wye strainer screens:: 30 mesh



Spray Gun:

- GUSMER GX7-400:
  Module: 17190-453 (4 port)
  “A” drill @ .026 in.
  “B” drill @ .0225 in.
  P.C.D.: 17192-212 (small fan)
  Screens: 40 mesh

Note: Throughput approx. 8 lbs./min.

Gusmar D.I. Spray Gun: Consult Visuron Technical Service
GRACO Proportioners and GRACO Fusion Gun: Consult Visuron Technical Service
Probler gun not currently approved - DO NOT USE (evaluations underway)

Note: Special attention must be paid to keep the P.C.D. slot clean. WARRIOR systems have very high early green strength. The slot may become obstructed unless cleaned frequently.

“B” Side Agitation: It is necessary to thoroughly agitate prior to use. There may be some settling of several of the raw materials. The recommended procedure is to mix with a collapsible blade through-bung mixer at an active rate for a minimum of 30 minutes. (Note: the “B” side drum pump recirculation kit is not adequate for WARRIOR 260).

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Installation/Surface Preparation

Warning: Spray thin coats! Do not build thickness too rapidly! Warrior develops a high exothermic temperature during initial reaction. Spraying individual coats too thick creates an unacceptably high temperature within the coating. The result may be stress cracks and / or bubbling during initial cooling. Spray larger area than normal per coat, allowing each coat to cool down before application of successive coats. Runs or sagging of vertical surfaces is indication that the coats are too thick! (Recommended thickness per coat: .030 in. max.)

Cleanup: It is recommended to disassemble spray gun and thoroughly clean components when daily spraying is completed. Prompt cleaning of parts is accomplished easily. Delay in cleaning parts makes the procedure more difficult and time consuming. Use an appropriate solvent such as Visuron CS-100 or, preferably, Visuron LAP PREP ™. Flushing gun with "gun service kit" (Gusmer pt. no. OP-206) is very helpful. Flush each screen chamber separately, reassemble and then flush the center mixing chamber.

Edge Trimming Note: The use of wire tape works well with WARRIOR 260 when used promptly. Delayed use of wire tape is not very successful due to the cross link aggressiveness and early high green strength of the coating.

Chemical Resistance/Ratings

The legend below is used to identify which category WARRIOR 260 most accurately fits into when exposed to the test chemicals listed.

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

Criteria used in establishing legend ratings:

R: Test specimen must have maintained a score of "5" for entire seven day soak test
R-8: Test specimen must have maintained a score of "5" for twenty-four hours, not less than "4" for 72 hours and not less than "3" for five days (120 hours).
R-1: Test specimen must have maintained a score of "5" for twelve hours, not less than "4" for 48 hours and not less than "3" for 72 hours.
N: Test specimen must have deteriorated to a score of "3" or less in 24 hours. (normally results in total destruction in 48 hours).

Test Media (CHEMICAL)	Warrior 260	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 360	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
Hydroflouric Acid	N	N
Hydraulic Oil	R	C
Isopropyl Alcohol	R	C
Jet Fuel (JP-4, JP-5, JP-8)	R	N
Lactic Acid	R	R
Liquid Nitrogen Fertilizer (28-0-0)	R	R
Liquid Urea Fertilizer	R	R
Methanol	R	C

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Test Media (CHEMICAL)	Warrior 260	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 260	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
I,I,I Trichloroethane	R-8	C
Trisodium Phosphate	R	R
Vinegar (5% Acetic Acid)	R	R
Water	R	R
Xylene	R	R

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

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: Phenolic Co-Polymer *(patented)*

PROJECT: Waste Water Treatment Clarifier Lining

OWNER: Luprino Foods, Grand Rapids, MI

INSTALLER: RPS

SYSTEM: WARRIOR™ 260 - Phenolic co-polymer

COLOR: Light Gray

AREA: 22,000 sq. ft.

DISCUSSION: Badly eroded eight year old concrete walls and floor of primary clarifier in food processing plant were severely weakened and in danger of failure. The owner had tried epoxy lining which had failed in three years. It was decided to re-line with WARRIOR™ 260 which would stand up to the high concentration of calcium sulfate chemical used.

All surfaces were sand blasted cleaned, followed by sprayed primer coat of Pronto Prime concrete priming lacquer. Topcoat of .080 inch thick WARRIOR™ 260 was applied. Entire job was completed in 24 hours and re-watered in two hours.

CASE STUDY 2: Phenolic Co-Polymer *(patented)*

PROJECT: Chemical Containment (PCB Specifically)

OWNER: AtoFina Chemical Co., Downriver, MI

INSTALLER: I. W. C.

SYSTEM: WARRIOR™ 260 - Phenolic co-polymer

COLOR: Charcoal

AREA: 90,000 sq. ft.

FAST CURE SPRAY ELASTOMER SYSTEM

CASE STUDY 2: Phenolic Co-Polymer *(patented)*

This project consisted of twenty-nine individual containments at the owner's facility where amine products are produced. The containment areas averaged about 3,000 sq. ft. each. Their design was typically poured concrete containment walls with coarse gravel floors (as can be seen in photograph on previous page).

U. S. E. P. A. mandated that the dyked areas all had to be sealed to prohibit PCB migration which was determined to be a serious problem.

The concrete areas were all rehabilitated and sand blasted, followed by spray application of Pronto Prime priming lacquer. The floors were covered first with non-woven geotextile that was lapped 12 inches up the walls. A fully monolithic seal of WARRIOR 260 was spray applied over the geotextile and up the vertical concrete walls.

WARRIOR™ 260 coating was applied over the top of the concrete walls to insure full-depth sealed containment areas. WARRIOR™ 260 was used as an adhesive to connect the lapped areas of the geotextile on both the floor and up the concrete walls.