

Z-Line Aromatic Polyurethane Coatings

LORD Industrial Coatings

Description

Chemglaze* Z-line coatings are single-package, moisture-curing, ASTM Type II, oil-free polyurethanes. They are available in both clear and pigmented versions with varying degrees of film flexibility.

Features and Benefits

- **Excellent corrosion resistance** — Z-line coatings resist corrosion, chemicals, abrasion, and impact.
- **Versatile** — can be used on a wide variety of rigid and flexible substrates. May be applied by brush, lamb's wool applicator pad and conventional air or airless spray coating methods.
- **Aesthetics** — available in a wide range of standard and matched colors and in high and low gloss finishes for interior use.

Uses

They can be used on rigid substrates such as metals, concrete and wood, or on flexible substrates such as rubber, plastics, and leather. Because of their excellent resistance to wear, abrasion and chemicals, they are particularly useful in heavy industrial and aggressive atmospheres where protection is a prime consideration. These coatings are recommended for interior use since loss of gloss, yellowing and chalking will occur when exposed to sunlight.

The key properties of the Chemglaze Z-Line polyurethane coatings which make them particularly suitable for certain high performance applications are shown in the following tables:

- Table I — Physical Properties
- Table II — Impact Resistance
- Table III — Chemical and Solvent Resistance
- Table IV — Electrical Properties
- Table V — Abrasion Resistance
- Table VI — Cure Rates
- Table VII — Suggested Spray Equipment

*Chemglaze is a trademark of Lord Corporation, Erie, PA.

Application

Coverage (estimated): 300 to 400 square feet per gallon for 1.5-2.0 dry mils, depending on porosity, roughness of surface, and product color. For specific coverage for each product, refer to Table I.

Recoat Time: Three to four hours minimum at room temperature 77°F (25°C), with adequate moisture and good air circulation to remove the solvent. For maximum intercoat adhesion, recoat prior to 18-24 hours. Use of heat and catalysts will shorten recoat time. Refer to the Psychrometric Chart (Figure A), for further data relative to moisture requirements based on humidity to cure the Chemglaze polyurethane coatings.

Cure Time: Room temperature cure times of 12 hours permit light traffic. Thirty-six to forty-eight hours permit normal usage, and six to seven days are required for full cure. Refer to the Psychrometric Chart (Figure A) for further data on temperature and humidity requirements to cure Chemglaze Polyurethane coatings. For fast processing, Chemglaze coatings can be catalyzed or baked. Cure times as short as 5 minutes can be obtained using a combination of catalysts and heat. See Bulletin DS10-7076.

Thinners: Chemglaze 9951, 9954, and urethane grades of toluene or xylene are suggested. See Bulletin DS10-7076.

Primers: In order to obtain the long term protection that Chemglaze Z-Line topcoats provide, proper surface preparation and priming are required. Individual primers bulletins describe the epoxy, wash, and urethane primers available.

Shelf Life

All the coatings described in this bulletin carry a one year shelf life when stored at room temperature in unopened containers.

Table I —

| Product Number | Description | (Percent) Weight Solids | (Percent) Volume Solids | Viscosity cps | Viscosity N.s/m ² |
|--------------------------------|-------------------------|-------------------------|-------------------------|---------------|------------------------------|
| <i>For Rigid Substrates</i> | | | | | |
| Z010 | Clear High Build | 43.5 | 38 | 150 | 0.15 |
| Z051 | Clear | 34 | 30 | 30 | 0.03 |
| Z053 | Clear Interior | 34 | 30 | 30 | 0.03 |
| Z151 | Clear Satin | 28.5 | 25 | 50 | 0.05 |
| Z252 | White | 54 | 38 | 150 | 0.15 |
| Z352 | Black | 46 | 35 | 150 | 0.15 |
| Z355 | Black Satin | 34 | 28 | 150 | 0.15 |
| Z451 | Gray | 53 | 38 | 180 | 0.18 |
| Z552 | Brick Red | 56.5 | 40 | 150 | 0.15 |
| Z652 | Tile Green | 50 | 41 | 200 | 0.20 |
| Z752 | Blue | 47 | 38 | 200 | 0.20 |
| Z754 | Medium Pastel Blue | 54 | 41 | 200 | 0.20 |
| Z853 | Medium Yellow | 52 | 33 | 100 | 0.10 |
| Z953 | Chocolate Brown | 49.5 | 38 | 150 | 0.15 |
| Z974 | Tan | 54.2 | 40 | 150 | 0.15 |
| <i>For Flexible Substrates</i> | | | | | |
| Z001 | Clear Flexible | 35 | 29 | 20 | 0.02 |
| Z003 | Clear Fabric Impregnant | 34 | 29 | 25 | 0.02 |
| Z004 | Clear Highly Flexible | 51 | 45 | 70 | 0.07 |
| Z202 | White Flexible | 54.5 | 40 | 120 | 0.12 |
| Z302 | Black Flexible | 34 | 28 | 75 | 0.07 |
| Z306 | Black Flat Flexible | 27 | 23 | 100 | 0.10 |

NOTE: Special colors are available with 100 gallon minimum orders.

Test Methods for Properties

| | |
|---------------|---|
| Solids | — ASTM D2369-81 Modified |
| Viscosity | — Brookfield Viscometer Model LVT at 77°F (25°C) |
| Density | — Pounds per Gallon ASTM D1475-60 |
| Flash Point | — Seta Flash Closed Cup |
| Coverage | — Theoretical coverage in square feet, per gallon, at one mil dry film thickness and in square meters, per liter, at one micrometer dry film thickness. |
| Volume Solids | — Calculated from average weight solids |

Typical Properties

| Density | | Theoretical Coverage | | Cure Time at 77°F 50% rel. humidity | Flash Point Closed Cup | |
|--------------------------------|------|----------------------------|---------------------|--|---------------------------|------|
| lbs./gal. | kg/l | (ft ² /gal/mil) | (m ² /m) | | °F | °C |
| <i>For Rigid Substrates</i> | | | | | | |
| 8.2 | 0.98 | 608 | 379 | Tack Free 3 hrs. | 81 | 27.2 |
| 8.0 | 0.96 | 480 | 299 | Tack Free 2 hrs. | 56 | 13.3 |
| 7.9 | 0.95 | 480 | 299 | Tack Free 3 hrs. | 60 | 15.6 |
| 7.9 | 0.95 | 400 | 250 | Tack Free 3 hrs. | 66 | 18.9 |
| 9.6 | 1.15 | 608 | 379 | Tack Free 2 hrs. | 58 | 14.4 |
| 8.2 | 0.98 | 560 | 349 | Tack Free 2 hrs. | 61 | 16.1 |
| 8.1 | 0.97 | 480 | 299 | Tack Free 2 hrs. | 67 | 19.4 |
| 9.5 | 1.14 | 608 | 379 | Tack Free 2 hrs. | 58 | 14.4 |
| 9.8 | 1.17 | 624 | 399 | Tack Free 3 hrs. | 54 | 12.2 |
| 8.8 | 1.05 | 656 | 409 | Tack Free 2 hrs. | 59 | 15.0 |
| 8.3 | 0.99 | 608 | 379 | Tack Free 2 hrs. | 58 | 14.4 |
| 9.4 | 1.13 | 640 | 400 | Tack Free 2 hrs. | 59 | 15.0 |
| 9.5 | 1.14 | 528 | 329 | Tack Free 2 hrs. | 59 | 15.0 |
| 9.1 | 1.09 | 608 | 379 | Tack Free 2 hrs. | 58 | 14.4 |
| 9.4 | 1.13 | 624 | 399 | Tack Free 3 hrs. | 60 | 15.6 |
| <i>For Flexible Substrates</i> | | | | | | |
| 7.8 | 0.93 | 464 | 289 | Tack Free 5 min. at 300°F | 67 | 19.4 |
| 8.0 | 0.96 | 464 | 289 | Tack Free 1 hr. | 76 | 24.4 |
| 8.0 | 0.96 | 784 | 489 | Tack Free 5 min. at 300°F | 63 | 17.2 |
| 9.6 | 1.15 | 624 | 399 | Tack Free 5 min. at 300°F | 61 | 16.1 |
| 7.8 | 0.93 | 448 | 279 | Tack Free 5 min. at 300°F | 61 | 16.1 |
| 7.9 | 0.95 | 368 | 230 | Tack Free 5 min. at 300°F | 67 | 19.4 |

Application Methods

Chemglaze Z-Line coatings may be applied via most methods of spraying (refer to Table VII for more information), and by lamb's wool applicator. The use of 9974 wetting agent improves flow and leveling, and enables brush and roller application. A level of 0.5 to 1.0 oz. per gallon of clear and 1.5 to 2 oz. per gallon of pigmented coating is suggested.

Table II
Impact Resistance

Z-line coatings are designed to have outstanding impact resistance and flexibility. As these properties are inherent in the basic urethane polymers, the films are not subject to embrittlement with age.

Impact tests are run by striking the direct (coated) side and reverse (uncoated) side of the metal panel and observing the blister formed for cracking or crazing.

The test panels were coated with Chemglaze Wash Primer and one coat of Chemglaze Z451 Gray Coating.

| Test | Substrate | Coating Thickness | Results |
|--|-----------|-------------------|---------------------|
| Gardner Labs Impact (Direct) Range 0-160 in. lbs. | Steel | 1.5 mils | Pass 160 in. lbs. |
| General Electric Elongation Range 0.5 - 60 per cent | Aluminum | 1.5 mils | Pass 60% elongation |

Table III
Chemical and Solvent Resistance

Chemglaze Z-Line coatings show excellent chemical and solvent resistance when used with the correct primer.

These coatings have excellent salt spray resistance when the metal is primed with Chemglaze Epoxy Metal Primer 9965, Wash Primer 9924, or Urethane Primer 9420.

Chemicals which attack urethane coatings are strong oxidizing acids like nitric and chromic as well as some organic acids such as acetic at concentrations of 10% or higher. Also, acids will attack certain pigments in the green, yellow, orange and brown coatings. In these environments, use a Chemglaze clear coating over the color coat for added protection.

Chemglaze coatings are softened on immersion in certain oxygenated solvents but recover when the solvent evaporates, making them suitable for intermittent exposure to these materials. Test panels were 1/4" thick sandblasted cold rolled steel. Panels were primed and spray coated with multiple coats of Chemglaze Z252 White to a total film thickness of 6 ± 1/2 mil.

The tests were run by partially immersing coated steel panels in the various test fluids for a period of 30 days. Resistance for 24 hours was considered adequate for splash or spillage exposure. Fume or vapor resistance was measured by observing the panel above the test fluid during the 30 days immersion.

All data are at room temperature 77°F (25°C) unless otherwise indicated.

| Reagent | Code: | x — suggested | | o — not suggested | |
|---|-------|---------------|--------------------|-------------------|---|
| | | Immersion | Splash or Spillage | Fumes or Vapors | |
| Acids, Inorganic — with Wash or Epoxy Primer ² | | | | | |
| Hydrochloric | 10% | x | x | | x |
| | 35% | o | o | | x |
| Sulfuric | 10% | x | x | | x |
| | 35% | x | x | | x |
| Phosphoric | 10% | x | x | | x |
| | 50% | x | x | | x |
| Chromic | 2% | x | x | | x |
| | 10% | o | o | | x |
| Nitric | 2% | x | x | | x |
| | 10% | o | o | | x |

Continued on next page

