



**LIFELAST**<sup>®</sup>  
*Innovation Through Formulation*

## **DURASHIELD**<sup>™</sup> **110**

### **APPLICATION SPECIFICATION SHEET – STEEL PIPE**

EFFECTIVE: 11/1/17

#### **I. Scope**

- A. This specification defines application requirements of DuraShield 110 plural-component 100% solids, 1:1 volumetric mix ratio polyurethane to steel substrates and over-coat areas.
- B. The coating material described in this specification can be applied in either a shop or field environment.
- C. The parts to be considered by this specification are as follows:
  1. Piping
  2. Tanks
  3. Girth welds/field joints
  4. Valves
  5. Repair areas
  6. Other parts as directed by the end user.

#### **II. Definitions**

- A. PART – all service steel that is to be coated under the direction of this specification.
- B. APPLICATOR – the company selected by the END USER to apply plural-component coatings to the internal and external surfaces of PARTS.
- C. MANUFACTURER – the Company responsible for the chemical formulation and characteristics of the plural-component coatings applied to PARTS (LifeLast, Inc. is the Manufacturer that is composed within these specifications).
- D. INSPECTOR – the company or person selected by the END USER to ensure quality control of the work and adherence to this specification, where applicable.
- E. END USER – the pipeline or part owner.
- F. POLYOL – the pigmented component of the polyurethane system, also referred to as Resin.
- G. ISO/ISOCYANATE – the amber component of the polyurethane system.

#### **III. Additional Requirements**

- A. All specifications and standards mentioned in this document form part of this specification. The applicator shall ensure that a copy of this specification is kept at the coating site and shall ensure that their workers fully understand each specification and standard listed below.
- B. The following standards shall be a part of this specification.

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SSPC-PA 2	Determining Compliance to Required DFT
SSPC-SP 1	Solvent Cleaning
SSPC-SP 10/ NACE No. 2	Near-White Metal Blast Cleaning
SSPC-SP 11	Bare Metal Power Tool Cleaning
SSPC-VIS 1	Guide and Reference Photographs for Steel Surfaces Prepared by Dry Abrasive Blast Cleaning
NACE SP0188-2006	Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates
NACE SP0287-2016	Field Measurement of Surface Profile of Abrasive Blast-Cleaned Surfaces Using Replica Tape

**IV. Surface Preparation**

- A. Prior to commencement of work, all parts shall be visually inspected.
- B. Surface imperfections such as burrs, gouges, protrusions, weld splatter shall be removed by filing or grinding.
- C. Prior to abrasive blast or power-tool cleaning the substrate, all contaminants such as dirt, dust, oil and/or grease must be removed in accordance with SSPC-SP1.
- D. The substrate shall not contain soluble salt concentrations in excess of the following values: chloride levels—3 ppm (micrograms per square centimeter), nitrates—5 ppm, sulfates—10 ppm. Surfaces with soluble salt concentrations in excess of these levels shall be treated until satisfactory results are achieved.
- E. Prior to abrasive blasting or grinding, the metal surface shall be dry and at least 5°F (3°C) above the dew point to prevent oxidation of the part after cleaning. The applicator shall use a contact thermometer, psychrometer, and psychrometric charts, or equipment that provides equivalent accuracy, to monitor these environmental requirements.
- F. All parts that are not to be abraded shall be adequately protected.
- G. All large surfaces to be coated will be prepared by abrasive blast cleaning. Smaller surfaces (less than 50 ft<sup>2</sup>) may be prepared by power tool cleaning using a hand-held angle grinder or MBX Bristle Blaster. All blast media will be clean and clear of any contaminants, have a maximum of one percent (1%) free silica, and will meet the specification of the coating manufacture. A 24-grit 3M grinding disk (recommended for coating), a metal grinding disk (required for steel) or equivalent should be used with the angle grinder.
- H. All compressors shall be in good working order and have adequate separators, filters, and drains to ensure contaminants such as oil and water are not deposited onto the steel surface. Accumulation of oil and moisture shall be removed by regular purging.
- I. For bare steel application an anchor pattern profile will be produced with a minimum average of 3.0 mils (0.075 mm). Individual measurements shall not be less than 2.5 mils (0.065 mm). Profile measurements shall be taken with replica tape and spring micrometer in accordance with NACE SP0287.
- J. For larger parts and/or structures (> 50 ft<sup>2</sup>), the substrate shall be abrasive blasted in accordance with SSPC-SP 10 / NACE No. 2 to achieve an anchor pattern that is both sharp and angular. Smaller surface areas (< 50 ft<sup>2</sup>) may be power tool abraded using an angle grinder with either a metal grinding disk (for steel) or 24-grit 3M grinding disk (for coating) or equivalent in accordance with the SSPC-SP 11 standard. Grinding

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should be done in such a way to achieve the roughest surface possible, and the direction of the final grind marks should run perpendicular to the flow of water in the pipe. The applicator shall ensure the proper surface finish is attained by regular checks with the SSPC-VIS 1 Standard. Profile depth shall be checked using replica tape and a spring micrometer (NACE SPO287). *Note: profile, particularly with power-tool preparation, should be deep enough such that it is very noticeable when scraping the end of a fingernail across the profile grooves.*

- K. When over-coating existing coating material, the applicator will verify adhesion compatibility with the coating manufacturer before proceeding. Once compatibility is determined, the existing coating shall be sweep blasted, abraded with a grinder or sanded using minimum 80-grit paper or coarser to remove the gloss and provide a roughened surface suitable for over-coating. This process should remove approximately 1-3 mils of coating.
- L. Existing coating shall be feathered 1.5 in. (4 cm) to 3 in. (8 cm) when coating adjacent bare steel, such as girth welds. Prior to coating, the applicator will tape off, using duct tape, a line between feathered coating and the remaining non-blasted coating prior to application of new coating material, making sure that edge of tape is on the roughened coating.
- M. Prepared surfaces shall be dry air blasted and either brushed off or vacuumed in a matter to remove dust and debris prior to coating and shall be coated before any rust blooming occurs. Any cleaned steel showing rust stains shall be re-prepared prior to coating.

### V. Coating Application

- A. The coating shall be applied according to the proceeding guidelines.
- B. Thinning is not allowed.
- C. Power mix contents of polyol containers, making sure to remove all pigment and settlement from the bottom of the container. Mixing of iso is not required.
- D. The coating thickness shall be specified by the end user or the inspector. The minimum thickness for DuraShield 110 is 20 mils. The applicator shall measure and record coating thickness using a thickness gauge that is acceptable to the end user/inspector.
- E. The relative humidity, dew point, ambient conditions and steel surface temperature shall conform to the recommended parameters outlined below. Ensure that the polyol and iso components are within the recommended product Application Temperatures for the chosen application method as listed in Appendix 1. The applicator shall use a contact thermometer, a psychrometer and psychrometric charts, or equipment that provides equivalent accuracy, to monitor these environmental requirements.
  - 1. Relative humidity: < 85%
  - 2. Ambient conditions: Minimum 0°F, Maximum 120°F; more than 5°F (3°C) above dew point
  - 3. Steel surface temperature: Minimum 40°F, Maximum 140°F; more than 5°F (3°C) above the dew point
- F. A list of approved application equipment can be found in Appendix 1.
- G. Application shall be done in a professional manner, mitigating runs and sags and providing complete coverage on all surfaces, including difficult to spray areas like

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welds, seams and angles. Application shall be accomplished in a manner that achieves as smooth and uniform of a coat as possible.

- H. If recoating is required, it must be accomplished prior to the maximum recoat window as listed in Section VI.C.4 below for the respective product. If the maximum recoat window is exceeded, then follow the instructions in Section IV.K above.

### VI. Inspection and Testing

#### A. Visual

1. Coating shall be uniform in color. The coating shall be visually inspected and found to be free of blisters, cracks, pinholes, missed areas and excessive roughness.
2. Sags and runs shall be kept to a minimum. Excessive runs can be sanded smooth and, if required, overcoated with a layer of DuraShield 110, DuraShield 210 or DuraShield 310.

#### B. Coating Thickness

1. Dry Film—Performed in accordance with SSPC-PA 2, Level 1.

#### C. Holiday Testing

1. Holiday testing will be conducted on the applied DuraShield 110 once it has reached its “Cure to Handle” state as listed below, using a high voltage spark test in accordance with NACE SPO188.
2. Coating thickness used for holiday detection shall be the minimum specified coating thickness.
3. All holidays shall be plainly marked immediately after detection and shall be repaired according to Sections IV and V in this specification.
4. Holiday testing will be performed in such a way as to mitigate possible damage to the coating by performing as few of passes as necessary.

Cure Speed	8	3	1
Tack Free	2-3 mins	8-15 mins	30-45 mins
Recoat Time	< 1 hour	< 2 hours	4 hours
To Immersion	4 hours	6 hours	12 hours
To Handling/Traffic	5-10 mins	20-30 mins	1.5-2 hours

### VII. Coating & Joint Repairs

- A. Coating and joint repairs may be made with DuraShield 110, DuraShield 210, DuraShield 310, or the DuraShield 310 JARS (Joint & Repair System) kit. The DuraShield 210 and DuraShield 310 are available in NSF certified versions.
- B. Please follow the Application Specifications for the particular product chosen for the repairs.

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**Appendix 1: Approved Spray Application Equipment for DuraShield 110 Polyurethane\***

**I. DuraShield 110**

**A. Hydraulic Spray Machine – 1:1 (Polyol:Iso) volumetric ratio**

1. Graco HXP3 Reactor or comparable
2. Transfer Pumps
  - a) Polyol: Graco T2 or larger
  - b) Iso: Graco T2 or larger
3. Mixers/Spray Guns
  - a) Remote manifold with 1:1 heated supply lines ( $\frac{3}{8}$ " x  $\frac{3}{8}$ " or  $\frac{1}{4}$ " x  $\frac{1}{4}$ "); two 8" long by  $\frac{1}{4}$ " diameter spiral tube mixers; Graco Flex Gun or comparable. Acceptable tips and whip lines are as follows:
    - Whip lines:  $\frac{1}{4}$ " high-pressure spray line no more than 15' in length.
    - Spray tips: 0.021" minimum.
  - b) Impingement-mix setup using Graco Fusion Air or Mechanical Purge Gun with 1:1 module. Contact LifeLast for module and tip recommendations.
4. Application Temperatures
  - a) Static-Mix Setup
    - (1) Polyol: 110°F to 150 °F
    - (2) Iso: 80°F to 150 °F
    - (3) Line Temperature: 110°F to 150 °F
  - b) Impingement-Mix Setup
    - (1) Polyol: 130°F to 150 °F
    - (2) Iso: 130°F to 150 °F
    - (3) Line Temperature: 130°F to 150 °F
5. Spray pressures: 2,000 psi minimum at the gun when using impingement-mix setup.

**B. Pneumatic Spray Machine—1:1 (Polyol-Iso) volumetric ratio**

1. Graco Extreme XP50 (minimum) or comparable
2. Transfer Pumps
  - a) Polyol: Graco T2 or larger
  - b) Iso: Graco T2 or larger
3. Mixers/Spray Guns
  - a) Remote manifold with 1:1 heated supply lines ( $\frac{3}{8}$ " x  $\frac{3}{8}$ " or  $\frac{1}{4}$ " x  $\frac{1}{4}$ "); two 8" long by  $\frac{1}{4}$ " diameter spiral tube mixers; Graco Flex Gun or comparable. Acceptable tips and whip lines are as follows:
    - Whip lines:  $\frac{1}{4}$ " high-pressure spray line no more than 15' in length.
    - Spray tips: 0.021" minimum.
  - b) Impingement-mix setup: contact LifeLast

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4. Application Temperatures
  - a) Static Mix Setup
    - (1) Polyol: 110°F to 150 °F
    - (2) Iso: 80°F to 150 °F
    - (3) Line Temperature: 110°F to 150 °F
  - b) Impingement-Mix Setup
    - (1) Polyol: 140°F to 150 °F
    - (2) Iso: 140°F to 150 °F
    - (3) Line Temperature: 140°F to 150 °F
  
5. Spray pressures: 2,300 psi minimum at the gun when using impingement-mix setup.

*\* All spray equipment must be approved by LifeLast. Please contact LifeLast for specific spray equipment setup based on the cure speed of DuraShield 110 being applied.*