

DURASHIELD™ 310 & 310-61

APPLICATION SPECIFICATION SHEET – STEEL PIPE

EFFECTIVE: 12/06/19

I. Scope

- A. This specification defines application requirements of DuraShield 310 & DuraShield 310-61 plural-component 100% solids, 3:1 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. Piping components – elbows and tees
 - 3. Girth welds/field joints
 - 4. Valves
 - 5. Repair areas
 - 6. Other parts as directed by the end user

II. Definitions

- A. PARTS – 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 three-part component of the urethane system, also referred to as Resin.
- G. ISO/ISOCYANATE – the one-part component of the urethane system, also referred to as Activator.

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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References

ASTM D4414-2013	Standard Practice for Measurement of Wet Film Thickness by Notch Gages
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
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

IV. Surface Preparation

- A. Prior to commencement of work, all parts shall be visually inspected.
- B. Surface imperfections such as burrs, gouges, protrusions and 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-SP 1.
- 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 warmed to a temperature at least 3°C (5°F) 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 ft²) may be prepared by power tool cleaning using a hand-held angle grinder, MBX Bristle Blaster or hand-held scarifier. 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 manufacturer. 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 0.075 mm (3.0 mils). Individual measurements shall not be less than 0.065 mm (2.5 mils). Profile measurements shall be taken with replica tape and spring micrometer in accordance with NACE SP0287.

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- J. For larger parts and /or structures (> 50 ft²), 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 ft²) 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 and/or steel) or equivalent in accordance with SSPC-SP 11. Grinding 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 or abraded with a grinder 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 4 cm (1.5 in.) 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. Cleaned surfaces shall be dry air blasted and either brushed off or vacuumed in a manner to removes dust and debris prior to coating, and shall be coated before any rust blooming occurs. Any cleaned steel showing contamination shall be re-prepared in accordance with section IV.J above prior to coating.

V. Coating Application

- A. The coating shall be applied according to the proceeding guidelines.
- B. Thinning is not allowed.
- C. The coating thickness shall be specified by the end user, the engineer, or manufacturer. The minimum thickness for DuraShield 310 & DuraShield 310-61 is 20 mils. The applicator shall measure and record coating thickness using a thickness gauge that is acceptable to the end user or engineer.
- D. The relative humidity, dew point and steel surface temperature shall conform to the recommended parameters outlined in the *DuraShield 310 and DuraShield 310-61 Technical Data Sheets*. Ensure that the POLYOL and ISO components are within the recommended product application temperatures for the chosen application method as listed on the respective *Technical Data Sheet*. The applicator shall use a contact thermometer, a psychrometer and psychrometric charts, or equipment that provides equivalent accuracy, to monitor these environmental requirements.
- E. A list of approved application equipment can be found in Appendix 1.
- F. Application of an approved LifeLast priming system is recommended for concrete and masonry substrates. Some non-ferrous substrates may require the use of a LifeLast primer; please contact LifeLast for additional information.
- G. If recoating is required, it must be accomplished prior to the maximum recoat window as listed on the *Technical Data Sheet* for the respective product. If the maximum recoat window is exceeded, then follow the instructions in Section IV.J

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above.

- H. Refer to the *DuraShield 310 or DuraShield 310-61 Technical Data Sheet* for cure time required before placing system into service.

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 and missed areas.
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 110/110-61, DuraShield 210/210-61 or DuraShield 310/310-61, if required.

B. Coating Thickness

1. Wet Film – The coating thickness shall be measured using a wet film thickness gage according to ASTM D4414. The thickness shall be measured during application for every 50 ft² of covered area. A minimum of one measurement per section shall be taken.
2. Dry Film – Performed in accordance with SSPC-PA 2, Level 1.

C. Holiday Testing

1. Holiday testing shall be conducted on the applied DuraShield 310/310-61 once it has reached its “Cure to Handle” state, using a high voltage spark test in accordance with NACE SP0188 and the AWWA C222 Standard.
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 of 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	Standard	Fast Set
Tack Free	4 hours	50 mins
Recoat Time	72 hours	24 hours
To Handling/Traffic	15 hours	4 hours

VII. Coating & Joint Repairs

- A. Coating and joint repairs may be made with DuraShield 110/110-61, DuraShield 210/210-61 or DuraShield 310/310-61 using the spray equipment listed below or the LifeLast Cartridge System. The DuraShield 310/310-61 JARS (Joint & Repair System) kit may also be used. The DuraShield 110-61, DuraShield 210-61 and DuraShield 310-61 are all certified to the NSF/ANSI Standard 61.
- 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 310/310-61 Polyurethanes**

I. DuraShield 310/310-61

- A. Hydraulic Spray Machine – 3:1 (POLYOL:ISO) volumetric ratio
1. Graco Reactor/Reactor 2 H-XP3 Spray Machine with #120 (POLYOL) and #40 (ISO) cylinder setup or comparable/larger.
 2. Transfer Pumps
 - a) POLYOL: 3:1 Graco T3 or larger
 - b) ISO: 2.25:1 Graco T2 or larger
 3. Mixers/Spray Guns
 - a) Graco Remote Mix Manifold with check valves and dual flush or comparable; two 8” long by 1/4” diameter spiral tube mixers; Graco Flex Gun or comparable. Acceptable tips and whip lines are as follows:
 - b) Heated Hose Lines: 3/8” x 1/4”; two 8” long by 1/4” diameter spiral tube mixers; Graco Flex Gun or comparable. Acceptable tips and whip lines are as follows:
 - c) Whip lines: maximum 1/4” high-pressure spray line no more than 75’ in length.
 - d) Spray tips: 0.021” minimum.
 4. Application Temperatures
 - a) POLYOL: 120°F to 160°F
 - b) ISO: 80°F to 160°F
 - c) Line Temperature: 120°F to 160°F
 5. Spray pressures: 2000 psi minimum at the gun.
- B. Pneumatic Spray Machine – 3:1 (POLYOL:ISO) volumetric ratio
1. Graco XP35 Fixed-Ratio Proportioner set up 3:1 (POLYOL:ISO) with 145 cc (POLYOL) and 48 cc (ISO) displacement pumps or comparable/larger
 2. Transfer Pumps
 - a) POLYOL: 3:1 Graco T3 or larger
 - b) ISO: 2.25:1 Graco T2 or larger
 3. Mixers/Spray Guns
 - a) Graco Remote Mix Manifold with check valves and dual flush or comparable; two 8” long by 1/4” diameter spiral tube mixers; Graco Flex Gun or comparable. Acceptable tips and whip lines are as follows:
 - b) Heated Hose Lines: 3/8” x 1/4”; two 8” long by 1/4” diameter spiral tube mixers; Graco Flex Gun or comparable. Acceptable tips and whip lines are as follows:
 - c) Whip lines: maximum 1/4” high-pressure spray line no more than 75’ in length.
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