

DURASHIELD™ 310 & 310-61

APPLICATION SPECIFICATION SHEET – GENERAL INDUSTRIAL

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 concrete, ferrous and non-ferrous 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 substrates to be considered by this specification are as follows:
 - 1. Ferrous Metals
 - 2. *Concrete
 - 3. Non-ferrous Metals

II. Definitions

- A. SUBSTRATE – all surface area 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 SUBSTRATES.
- C. MANUFACTURER – the company responsible for the chemical formulation and characteristics of the plural-component coatings applied to SUBSTRATES (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 structure owner.
- F. POLYOL – the three-part component of the urethane system, also referred to as Part A and Resin.
- G. ISO/ISOCYANATE – the one-part component of the urethane system, also referred to as Part B and 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.

* The recommendations for application to concrete in this specification are generally for new, like-new, or mortar rehabbed concrete. Please contact LifeLast technical representative about custom specifications for deteriorated concrete or other unique applications.

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References

ASTM C109	Standard Test Method for Compressive Strength of Hydraulic Cement Mortars
ASTM D4258	Standard Practices for Surface Cleaning Concrete for Coating
ASTM D4259	Standard Practice for Abrading Concrete
ASTM D4263	Standard Test Method for Indication of Moisture in Concrete
ASTM D4414	Standard Practice for Measurement of Wet Film Thickness by Notch Gages
ASTM D6132	Standard Test Method for Nondestructive Measurement of Dry Film Thickness of Applied Organic Coatings Using Ultrasonic Coating Thickness Gauge
ASTM F1869	Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
AWWA C222	Polyurethane Coatings and Linings for Steel Water Pipe and Fittings
ICRI Guideline No. 03732	Technical Guidelines – Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings and Polymer Overlays
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-SP 13/NACE No. 6	Surface Preparation of Concrete
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 substrates shall be visually inspected.
- B. Sharp and rough areas such as welds, slag, edges and other projections shall be ground smooth by the applicator or as designated by the inspector.
- C. Prior to preparation of the substrate, all contaminants such as dirt, dust, oil and/or grease must be removed in accordance with SSPC-SP 1 and ASTM D4258.
- 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 substrate shall be dry and warmed to a temperature at least 3°C (5°F) above the dew point to prevent oxidation of the substrate after cleaning. The applicator shall use a contact thermometer,

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psychrometer, and psychrometric charts, or equipment that provides equivalent accuracy, to monitor these environmental requirements.

- F. All substrates that are not to be prepared shall be adequately protected.
- G. All large surfaces to be coated will be prepared by abrasive blast cleaning or high pressure waterjetting. Smaller surfaces (less than 50 ft²) may be prepared by power tool cleaning using a hand-held angle grinder, scarifier or MBX Bristle Blaster.
- 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 substrate. Accumulation of oil and moisture shall be removed by regular purging.
- I. Substrate profile requirements
 - 1. Ferrous and Non-Ferrous application: an angular 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 SPO287.
 - 2. Concrete application: surface profile should meet ASTM D4259 and ICRI CSP 4 or coarser and at least be comparable to coarse sandpaper.
- J. Preparation Methods
 - 1. Steel Substrates – The applicator shall ensure the proper surface finish is attained by regular checks with the SSPC-VIS 1 Standard.
 - a. Larger substrates (> 50 ft²): the substrate shall be abrasive blasted in accordance with SSPC-SP 10/ NACE No. 2 for steel. All blast media shall be clean and clear of any contaminants, have a maximum of one percent (1%) free silica and meet the requirements of the coating manufacturer.
 - b. Smaller substrates (<50 ft²): may be power tool abraded using an angle grinder with a metal grinding disk (for steel), 24-grit 3M grinding disk (for coating and/or steel), MBX Bristle Blaster or equivalent in accordance with SSPC-SP 11 specification. Grinding should be done in such a way to achieve the roughest surface possible. *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.*
 - 2. Non-Ferrous Substrates – The applicator shall ensure the proper surface finish is attained by regular checks with the SSPC-VIS 1 Standard.
 - a. Larger substrates (> 50 ft²): the substrate shall be abrasive blasted in accordance with SSPC-SP 10/ NACE No. 2. All blast media shall be clean and clear of any contaminants, have a maximum of one percent (1%) free silica and meet the requirements of the coating manufacturer. Steel blast media shall not be used for abrasive blasting non-ferrous substrates. Acceptable media includes: garnet, aluminum oxide, nickel slag (Green Diamond) and copper slag (Black Beauty).
 - b. Smaller substrates (<50 ft²): may be power tool abraded using an angle grinder with a metal grinding disk (for metal), 24-grit 3M grinding disk (for coating and/or metal), MBX Bristle Blaster or equivalent in accordance with SSPC-SP 11 specification. Grinding should be done in such a way to achieve the roughest surface

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possible. *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.*

2. Concrete Substrates – Prepare in accordance with ASTM D4258 and D4259 to remove laitance, curing compounds, sealers and other contaminants and result in the minimum required surface profile (see Section I.2). The applicator shall ensure the proper surface finish is attained by regular checks with the SSPC-SP 13 Standard.
 - a. Larger substrates (> 50 ft²): the substrate shall be abrasive blasted or water blast cleaned in accordance with ASTM D4259. All blast media shall be clean and clear of any contaminants, have a maximum of one percent (1%) free silica and meet the requirements of the coating manufacturer.
 - b. Smaller substrates (<50 ft²): may be power tool cleaned and abraded using an angle grinder, hand-held scarifier, or equivalent.
 - c. A key way cut is recommended when terminating the coating on concrete in an immersion environment. Expansion joints, large cracks (> 1/8" wide) and floor to wall transitions may require special treatment. *Please see LifeLast Technical Specification for Concrete Coating for more details.*
- K. When over-coating existing coating material not manufactured by LifeLast, 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 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.) to 8 cm (3 in.) when coating adjacent substrate. 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. Profile measurements will be taken, at a minimum, at the start of each shift, after a shutdown to refill blasting pot, and after every hour of continuous blasting.
- N. Cleaned surfaces shall be dry air blasted and either brushed off or vacuumed, in a manner to remove dust and debris prior to coating, and shall be coated before any contamination occurs. Any cleaned substrate showing contamination 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. The coating thickness shall be specified by the end user, inspector, 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/inspector.
- 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 (Part A) and ISO (Part B) components are within the recommended product Application Temperatures for

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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. For application of DuraShield 310/310-61 to concrete and masonry, an application of LifeLast Primall-125 or Primall-160 100% solids epoxy primer must be performed prior to applying the DuraShield 310/310-61. Application of the Primall-125 or Primall-160 shall be accomplished as per its respective *Application Instruction Sheet*. Please consult the *LifeLast Technical Specification for Concrete Coating* for additional details.
- G. For application of DuraGard polyurethane to non-ferrous metals, an application of Primall-AP, LifeLast Primall-125 or Primall-160 primers must be performed prior to applying the DuraGard polyurethane. Application of the Primall-AP, Primall-125 or Primall-160 shall be accomplished as per its respective *Application Instruction Sheet*.
- H. Substrate shall be clean, dry and free of any contaminants that may adversely affect the adhesion of the coating system. When coating primed substrates, substrate must be completely coated with Primall-AP, Primall-125 or Primall-160, and the primer must be cured to the level required in its respective *Technical Data Sheet*.
- I. 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 welds, seams and angles, and bugholes. Application shall be accomplished in a manner that achieves as smooth and uniform of a finish as possible.
- J. Should the substrate need to be presurfaced prior to applying the DuraShield 310/310-61 coating – to smooth overly-rough substrates, address excessive bugholing and wormholing, etc. – then the recommended presurfacing methods are as follows:
 - 1. Trowel an approved non-shrink, quick-setting, cementitious grout onto the concrete substrate. The grout must achieve compressive strengths of 2000 psi at 2 hours and 4000 psi at 24 hours per ASTM C109. The patched areas must meet the requirements of this specification prior to application of the primers. Contact LifeLast for a list of approved grouts.
 - 2. Trowel DuraShield 310/310-61 or DuraShield 310/310-61 trowel-grade into the holes. This must be done after the surface has been primed.
 - 3. Fill the holes with DuraShield 310/310-61 during spray application. Use care not to spray too many mils at one time and cause a sag or run. DuraShield 310/310-61 can be applied at up to 80 mils in one coat. This option must be done after the surface has been primed.
- K. 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 re-coat window is exceeded, then follow the instructions in Section IV.J above.
- L. Refer to the *DuraShield 310 and DuraShield 310-61 Technical Data Sheets* for cure time required before placing system into service.

VI. Inspection and Testing

- A. Visual

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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 overcoated with a layer of DuraShield 310 or DuraShield 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. At a minimum, the thickness shall be measured every 50 ft² of sprayed area during application, with a minimum of one measure per section.
 2. **Dry Film (DFT)**
 - a. **Steel/Ferrous Substrates:** performed in accordance with SSPC-PA 2, Level 1.
 - b. **Non-Ferrous Substrates:** performed in accordance SSPC-PA 2, Level 1, using a gauge suitable for non-ferrous metals.
 - c. **Concrete:** performed in accordance with ASTM D6132. Minimum thickness should be in accordance with SSPC-PA 2.
- C. Holiday Testing**
1. Holiday testing shall be conducted using high voltage spark test in accordance with NACE Standard SP0188.
 2. Coating shall have reached its “cured to handle” state prior to holiday testing.
 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	Cure Speed 0	Cure Speed 5
Tack Free	4 hours	50 mins
Recoat Time	72 hours	24 hours
To Handling/Traffic	15 hours	4 hours

VII. Coating Repairs

- A. Coating 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 ¼” diameter spiral tube mixers; Graco Flex Gun or comparable. Acceptable tips and whip lines are as follows:
 - b) Heated Hose Lines: ¾” x ¼””; two 8” long by ¼” diameter spiral tube mixers; Graco Flex Gun or comparable. Acceptable tips and whip lines are as follows:
 - c) Whip lines: maximum ¼” 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 ¼” diameter spiral tube mixers; Graco Flex Gun or comparable. Acceptable tips and whip lines are as follows:
 - b) Heated Hose Lines: ¾” x ¼””; two 8” long by ¼” diameter spiral tube mixers; Graco Flex Gun or comparable. Acceptable tips and whip lines are as follows:
 - c) Whip lines: maximum ¼” 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.