



# Application Specification for LifeLast *DuraShield 310 & DuraShield 310-61* *Polyurethane Coatings*

## 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 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 – Structure owner
- F. RESIN – the three-part component of the urethane system to be referred to as Part A.
- G. ACTIVATOR – the one-part component of the urethane system to be referred to as Part B

### 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.

Society of Protective Coatings (SSPC)

SSPC-SP10/ NACE No. 2	Near-White Metal Blast Cleaning
SSPC-SP11	Power Tool Cleaning to Bare Metal
ASTM D4263	Standard Test Method for Indication of Moisture in Concrete
ASTM F1869	Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
SSPC-VIS-1-89	Pictorial Surface Preparation Standard

NACE International

RP-0287-87	NACE Standard Recommended Practice for Field Measurement of Abrasive Blast Cleaned Surfaces Using Replica Tape
RP-0274-04	NACE Standard High-Voltage Electrical Inspection of Pipeline Coatings

### IV. Surface Preparation

- A. Prior to commencement of work, all parts 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. 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 hand-held scarifier. All blast media will be clean and clear of any contaminants and will meet the specification of the coating manufacture. A 24-grit 3M grinding disk (recommended for coating or concrete), a metal grinding disk (required for steel) or equivalent should be used with the angle grinder.

APPLICATION SPECIFICATION FOR LIFE<sup>L</sup>AST  
***DURASHIELD 310/DURASHIELD 310-61 POLYURETHANE SYSTEM***

- D. Prior to abrasive blast or power-tool cleaning the substrate, all contaminants such as dirt, dust, salt, oil and/or grease must be removed.
- 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. 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 compressors shall be in good working order and have adequate separators, filters, and drains to ensure contaminants such oil and water are not deposited onto the substrate. Accumulation of oil and moisture shall be removed by regular purging.
- H. Substrate profile requirements
  - 1. Bare steel application – an anchor pattern profile will be produced averaging 0.075 mm (3.0 mils) – 0.10 mm (4.0 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 RP0287-87.
  - 2. Concrete application - surface profile should meet ASTM D4259, ICRI CSP 4-6 or be comparable to coarse sandpaper
- I. Preparation Methods
  - 1. Steel Substrates - the applicator shall ensure the proper surface finish is attained by regular checks with the SSPC-VIS-1-89 Standard. Profile depth shall be check using replica tape and a spring micrometer (NACE RP0287-87).
    - a) Larger substrates (> 50 ft<sup>2</sup>) – the substrate shall be abrasive blasted in accordance with the NACE No. 2/SSPC-SP10 specification for steel.
    - b) 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 and/or steel) or equivalent in accordance with SSPC-SP11 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. Concrete substrates
    - a) Larger substrates (> 50 ft<sup>2</sup>) – shot blast or abrasive blast to remove laitance, curing compounds, sealers and other contaminants and to provide surface profile ASTM D4259, ICRI CSP 4-6
    - b) Smaller surface areas (< 50 ft<sup>2</sup>) – may be power tool abraded using an angle grinder with a 24-grit 3M grinding disk, hand-held scarifier or equivalent
- J. When over-coating existing coating material, the applicator will verify adhesion compatibility with the coating manufacturer before proceeding.

APPLICATION SPECIFICATION FOR LIFE<sup>L</sup>AST  
*DURASHIELD 310/DURASHIELD 310-61 POLYURETHANE SYSTEM*

- 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.
- K. Existing coating shall be feathered 4 cm (1.5 in.) to 8 cm (3 in.) when coating adjacent substrates. 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.
  - L. Profile measurements will be taken, at a minimum, at the start of each shift, after a shut down to refill blasting pot, and after every hour of continuous blasting.
  - M. Cleaned surfaces shall be dry air blasted, brushed off or solvent-wiped, and vacuumed, in a matter to remove dust and debris prior to coating, and shall be coated before any contamination occurs. Any cleaned areas 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 substrate shall be at least 3°C (5°F) higher than the dew point temperature and within the Surface Temperature requirements as listed on the DuraShield 310 and DuraShield 310-61 technical data sheet. The relative humidity and substrate temperature shall not be higher than the recommended maximum according to the technical data sheet (see technical data sheet for DuraShield 310 and DuraShield 310-61). Ensure that the resin (Part A) and activator (Part B) components are within the recommended product Application Temperatures for the chosen application method as listed on the respective technical data sheet or as listed in Appendix 1 of this specification. 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 to concrete, masonry and non-ferrous metal substrates, an application of LifeLast Primall-160 100% epoxy primer must be performed prior to applying the DuraShield 310. Application of Primall-160 shall be accomplished as per the *Primall-160 Application Instructions* sheet.

APPLICATION SPECIFICATION FOR LIFE<sup>L</sup>AST  
***DURASHIELD 310/DURASHIELD 310-61 POLYURETHANE SYSTEM***

- G. 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-160, and the Primall-160 must be cured to the level required in the *Primall-160 Epoxy Primer Technical Data Sheet*.
- H. Application shall be done in a professional manner, mitigating runs and sags and providing complete, seamless coverage on all surfaces, including difficult to spray areas like welds, seams, angles and bugholes. Application shall be accomplished in a manner that achieves as smooth and uniform of a coat as possible.
- I. Should the substrate need to be presurfaced prior to applying the DuraShield 310 coating – to smooth overly-rough substrates, address excessive bugholing, etc. – then the recommended presurfacing methods are as follows:
  - 1. Trowel a non-shrink, quick-setting, cementitious grout into the holes. The grout must achieve compressive strengths of 2000 psi @ 2 hours and 4000 psi @ 24 hours per ASTM C 109. The patched areas must be abrasive blasted and cleaned prior to the priming process.
  - 2. Trowel DuraShield 310 or DuraShield 310 trowel-grade into the holes per the *DuraShield 310 Hand Application Instructions* sheet. This must be done after the surface has been primed.
  - 3. Fill the holes with DuraShield 310 during spray application. Use care not to spray too many mils at one time and cause a sag or run. DuraShield 310 can be applied at up to 80 mils in one coat. This option must be done after the surface has been primed.
- J. 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 above.
- K. For Potable Water applications use only DuraShield 310-61 and allow a minimum of 72 hours of cure before placing system into service. For Non-potable Water applications use DuraShield 310; system may be placed back into service 12 hours (at 75°F) after completion of coating application.

## **VI. Inspection and Testing**

### **A. Visual**

1. 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.

### **B. Coating Thickness**

1. During continuous spray operations, the dry film coating thickness shall be tested using a properly calibrated magnetic pull off or eddy current equipment after completion of each section. If the thickness of the coating is below the minimum specified millage in any location, then adjustments must be made to the spray system to account for this.
2. In field spray and hand applications, the coating thickness shall be measured using a wet film thickness gage. At a minimum, the thickness shall be measured for every 50 ft<sup>2</sup> of sprayed area.

### **C. Holiday Testing**

1. Holiday testing will be conducted on the completed coating after cure or 24 hours, whichever is less, using a high voltage spark test.
2. Coating shall be at 75% or greater of its fully cured hardness value prior to holiday testing.
3. Coating thickness used for holiday detection shall be the minimum specified coating thickness.
4. All holidays shall be plainly marked immediately after detection and shall be repaired according to Section VII in this specification.
5. Holiday testing will be performed in such a way as to mitigate possible damage to the coating by performing as few of passes as required over the coating.

## **VII. Coating Repairs**

- A. Coating repairs may be made with DuraShield 310, DuraShield 310 trowel-grade or the DuraShield 310 JARS (Joint & Repair System) kit. All three systems are available in NSF certified versions.
- B. Please follow the Application Specifications for the particular product chosen for the repairs.

## **Appendix 1: Approved Spray Application Equipment for DuraShield 310 and DuraShield 310-61 Polyurethanes**

### **I. DuraShield 310**

- A. Graco Gusmer Spray Machine – 3:1 (Part A:Part B) volumetric ratio
  - 1. Gusmer H-35 Hydraulic Spray Machine with #120 (resin) and #40 (activator) cylinder setup
  - 2. Transfer Pumps
    - a) Resin: 5:1 Graco Monark or larger
    - b) Activator: 2:1 Graco FastFlo, 5:1 Graco Monark or larger
  - 3. Mixers/Spray Guns
    - a) Static Mixer using two ¼” x 12” Spiral Tube Mixers, Graco Restrictor Manifold (Restrictors – Resin 0.040”, Activator 0.024”) and Graco Flex or Silver Spray Gun
    - b) Impingement-mix – NOT ACCEPTABLE
  - 4. Spray Lines: ¼” high-pressure spray line up to 75’ in length
  - 5. Spray Tips: 0.021” to 0.043” Graco RAC V or equivalent
  - 6. Application Temperatures
    - a) Static Mix Setup
      - (1) Resin: 140°F
      - (2) Activator: 80°F
      - (3) Line Temperature: 140°F
    - b) Impingement-Mix Setup – NOT APPLICABLE
  - 7. Spray pressures: 1800-3000 psi
- B. Graco HydraCat Spray Machine
  - 1. Graco HydraCat Pneumatic Machine – 3:1 ratio (Part A:Part B)
  - 2. Transfer Pumps
    - a) Resin: 5:1 Graco Monark or larger
    - b) Activator: 2:1 Graco FastFlo, 5:1 Graco Monark or larger
  - 3. Mixers/Spray Guns
    - a) Static Mixer using two ¼” x 12” Spiral Tube Mixers, Graco Restrictor Manifold (Restrictors – Resin 0.040”, Activator 0.024”) and Graco Flex or Silver Spray Gun
    - b) Impingement-mix – NOT ACCEPTABLE
  - 4. Spray Lines: ¼” high-pressure spray line up to 75’ in length
  - 5. Spray Tips: 0.021” to 0.043” Graco RAC V or equivalent
  - 6. Application Temperatures
    - a) Static Mix Setup
      - (1) Resin: 140°F
      - (2) Activator: 80°F
      - (3) For remote manifold, set line temperatures to same temperatures as above
    - b) Impingement-Mix Setup – NOT APPLICABLE
  - 7. Spray pressures: 1800-3000 psi