

ELASTUFF 160

MASTER GUIDE SPECIFICATION

SECTION 09800

100% Solids Fluid-Applied Elastomeric Polyurethane Coating System

PART I – GENERAL

1.01 SCOPE

This Master Guide Specification has been established as an up-to-date inspection, preparation, repair and membrane coating system installation procedure for interior and exterior concrete and steel surfaces subject to immersion or non-immersion in aqueous environments and/or abrasion conditions.

1.02 SUBMITTALS

- A. Submit Manufacturer's literature, certificates and samples in a single package to the Architect, Engineer or Owner in accordance with requirements specified in General Conditions and Division I, General Requirements.
- B. Literature on the protective coating, as well as related repair materials, primers, sealers, sealant, reinforcement, etc. shall be submitted for review before work is started. Literature shall include material specification, physical properties (including ASTM and other test methods utilized), Manufacturer's estimated application rate for required dry mil thickness, current application instructions, warnings or precautions and Material Safety Data Sheets.
- C. Applicator's Qualifications: Submit a copy of Approved Applicator letter and/or certificate as issued and signed by an Officer of the Manufacturer of the 100% solids elastomeric polyurethane coating system.

1.03 QUALITY ASSURANCE

- A. Qualifications of Contractor
 1. The Contractor shall be approved by the Coatings Manufacturer and shall have a minimum of three (3) years experience in the application of 100% solids elastomeric polyurethane coatings.
 2. The Contractor shall provide a list of project references similar in nature to the one proposed.
- B. Qualifications of Manufacturer
 1. Manufacturer of the fluid-applied 100% solids polyurethane coating system shall have a proven 10-year track record of successful installations utilizing 100% solids elastomeric polyurethane coating technology.
 2. Manufacturer shall submit certification, signed by an Officer, that neither coal tar, highly aromatic hydrocarbons, Moca or fillers such as silica flour are used in the manufacture of any component of the elastomeric coating system.
 3. Other Manufacturer's products shall be considered for use only after submittal of product data files supporting full compliance with specifications herein. The Architect, Engineer or Owner reserves the right to reject substitution proposals should it be determined they do not provide all functions required for application.
 4. Pre-bid Job Walk and Conference: The Contracting Officer shall conduct a pre-bid job walk and conference to review the drawings and specifications, as well as the procedure for on-site inspection and acceptance of the substrate and the coating system. Pertinent structural details that may require special attention shall be reviewed at this time. Contracting Officer's requirements and limitations relating to the Contractor's plan for coordination of the work of the various trades involved with the facility and its personnel shall also be covered.

1.04 PRODUCT DELIVERY, STORAGE & HANDLING

- A. Delivery of Materials: Materials shall be delivered to the jobsite in original, sealed containers with labels legible and intact.
- B. Storage of Materials: Materials shall be stored in an area specifically designated for that purpose, where temperatures will not be less than 50°F (10°C) or higher than 100°F (38°C).
- C. Material Handling: Materials shall be handled and installed per Manufacturer's instructions and all applicable health and safety regulatory agencies.
- D. Damaged Materials: Contaminated, damaged or unsealed materials, or materials not conforming to the specified requirements shall not be used in the installation, and shall be replaced at no additional cost to the Owner.

1.05 ENVIRONMENTAL CONDITIONS

- A. Install all materials in strict accordance with Manufacturer's published safety and weather precautions.
- B. Do not apply elastomeric polyurethane coating system components when the ambient and/or surface temperature is below 40°F (5°C) or above 110°F (43°C), if any surface moisture is present, or when the dew point is within 5°F (3°C) of the surface temperature. Do not apply if weather conditions will not permit complete cure before rain, dew, fog or freezing temperatures occur. Do not apply if wind velocity exceeds 15 MPH (24 KPH) without taking appropriate precautions.
- C. Take all measures necessary to protect unrelated surfaces from coating overspray or spillage.

1.06 FIELD QUALITY CONTROL

- A. The overall weather conditions, including surface temperature, surface moisture, ambient temperature, relative humidity and wind velocity shall be recorded by the Contractor, at designated time intervals, on the Daily Quality Control Report Form if so requested by the Architect, Engineer or Owner.

- B. Verification of Protective Coating Thickness: The quantity of primer used, batch numbers and the area in square feet shall be recorded daily, as shall the wet film thickness, quantity, batch numbers and area in square feet applied of the elastomeric coating, on the Daily Quality Control Form.

PART II – PRODUCTS

2.01 DESCRIPTION

A seamless, fluid-applied 100% polyurethane elastomer membrane system designed for application over concrete and/or steel surfaces. The coating system shall be a 1:1 ratio (A:B), fast set, 2-component hydrophobic polyurethane elastomer, containing no silica fillers or extenders. It shall have been tested and approved by an independent testing laboratory and shown to comply with Department of Health Services (DOHS) and Environmental Protection Agency (EPA) Standards for leachates – the Purgeable Priority Pollutant Analysis. Approved system shall be UNITED COATINGS' **ELASTUFF 160 Concrete or Steel Coating System** consisting of **UNITED CLEANING CONCENTRATE (UCC)**, **UNI-CRETE**, **UNI-TILE SEALER**, **UC-30 JOINT FABRIC** and **ELASTUFF 160** 100% solids polyurethane elastomer.

2.02 MATERIALS

- A. Biodegradable Cleaner: **UNITED CLEANING CONCENTRATE (UCC)**, water-reducible non-phosphate cleaner as supplied by Coating Manufacturer for use in cleaning concrete and other substrates prior to coating.
- B. Concrete Repair Material: **UNI-CRETE**, polymer concrete renovation and repair material as supplied by Coating Manufacturer for use in filling voids and resurfacing spalled or rough concrete surfaces.
- C. Reinforcing Tape: **UC-30 JOINT FABRIC**, low-profile reinforcement tape as supplied by Coating Manufacturer for use over control joints and moving cracks in concrete surfaces.
- D. Concrete Primer and Sealer: **UNI-TILE SEALER**, two-component polyamide penetrating epoxy as supplied by Coating Manufacturer for use in priming and sealing concrete surfaces.
- E. Fluid-Applied Polyurethane Elastomer Topcoat: **ELASTUFF 160**, 100% solids polyurethane as supplied by Coatings Manufacturer for use on concrete and/or steel surfaces. Refer to printed Technical Data sheet for performance properties.

2.03 COLOR

The color of the Part A component shall be Clear. The color of the Part B component shall be Light Gray or Dark Gray. When properly proportioned and mixed, the resulting color shall be a Light or Dark Gray. Any deviation from the standard Gray color shall be recognized as off-ratio material, and shall be removed, cleaned and recoated. Limited custom colors are also available as required.

PART III – EXECUTION

3.01 SURFACE INSPECTION

- A. All surfaces shall be clean and dry, free from any existing coatings, sealers, dirt, grease, oil, pollution fallout, smoke, wax, form release agents, chemical contamination, laitance, etc.
- B. Portland Cement, ASTM Type I concrete shall be allowed to cure for a minimum of 28 days. Portland Cement ASTM Type II shall be allowed to cure for a minimum of 7 days. Shotcrete repairs shall be allowed to cure for a minimum of 28 days.
- C. Inspect surfaces to determine condition of expansion joints, and to identify any severe cracks or other conditions requiring special attention. Use urethane caulk, epoxy injection or other appropriate, approved patching material for repairing the concrete surface. Repair any leaks or other structural details as instructed by the Structural Engineer.
- D. Actual surface preparation procedures that are to be followed on a specific project will vary depending upon service conditions, condition of the substrate, and the presence of existing paints, coatings or other contaminants. The following surface preparation procedures and recommendations are provided for guideline use only.

3.02 SURFACE PREPARATION – CONCRETE

- A. **SCAFFOLDING AND/OR RIGGING:** Shall be constructed as required so as to permit safe, unimpeded access to all surfaces to be prepared, repaired and coated.
- B. **CHEMICAL CLEANING:** Surfaces that are contaminated with oil, grease, dirt, chemicals or other surface contaminants shall be cleaned prior to blasting or acid etching with **United Cleaning Concentrate (UCC)** or other approved biodegradable chemical cleaner and water, as per ASTM D4258 "Surface Cleaning Concrete for Coating". Dilute **UCC** at the rate of 1 part cleaning concentrate to 10 parts water. Apply dilute mixture to the surface under low pressure in accordance with the Manufacturer's printed application instructions. Mechanical scrubbing may be necessary to remove tightly adhering contaminants. After allowing the cleaner to sit a minimum of 15 minutes, thoroughly power rinse using fresh, clean water to remove all traces of the chemical cleaner. Power washer shall be rated at a minimum of 4.5 gallons (17 l) per minute with a minimum operating pressure of 2,500 psi (17,238 KPa), utilizing a 25° or 40° ceramic nozzle.
- C. **ABRASIVE BLAST CLEANING:** All concrete subject to immersion conditions shall be abrasive blast cleaned as per ASTM D4259 "Abrading Concrete", so as to provide a minimum surface height profile of 5 to 8 mils (127 to 203 microns). Blasting must produce an even profile, free of loose aggregate, weak matrix, crusts, dusting and other contaminants. Existing paints or coatings must be completely removed, except for residual areas that resist thorough blast cleaning. Any loose edges of remaining coating must be bevel-cut to sound adhesion.
- D. **ACID ETCH CLEANING:** Concrete subject to non-immersion conditions may be acid-etched as an alternative to blast cleaning, provided that acid etching produces an even profile of 5 to 8 mils (127 to 203 microns). Acid etching shall be accomplished using a 10% Muriatic Acid solution. Following Manufacturer's instructions, the diluted solution shall be sprinkled onto the concrete surface. After the solution has stopped bubbling or foaming (normally 5 to 10 minutes), the area shall be scrubbed thoroughly using mechanical scrubbers. After scrubbing, all surfaces shall be thoroughly rinsed with liberal amounts of fresh water to assure complete acid removal. Surfaces may require additional rinsing or a high pressure rinse to remove all traces of the acid solution.
- E. **SURFACE REPAIR:** All concrete surfaces shall be free from sharp projections, ridges and loose aggregate. Apply a "scratch coat" of UNITED'S **Uni-Crete** or similar polymer concrete to fill any bugholes or voids. Use a trowel to apply the **Uni-Crete** with adequate pressure to completely fill the honeycomb or air pocket, and to achieve a sound, consistent surface. Allow the polymer concrete repair material to cure for a minimum of 24 hours at 75°F (24°C) prior to priming. Allow additional cure time in cooler temperatures. When applying **Uni-Crete** in hot, dry climates, it is helpful to dampen the surface prior to application. When **Uni-Crete** is used to "sack" rough or porous concrete surfaces, it is not necessary to brush-blast the surface prior to application of the primer and subsequent polyurethane topcoat.

3.03 SURFACE PREPARATION – STEEL SURFACES

- A. **SCAFFOLDING AND/OR RIGGING:** Shall be constructed as required so as to permit safe, unimpeded access to all surfaces to be prepared, repaired and coated.
- B. **MECHANICAL CLEANING:** Steel and fabrication defects, such as weld imperfections, delaminations, slivers, etc., shall be corrected prior to starting cleaning operations. All burrs, jagged edges, undercuts, recesses and surface defects shall be ground smooth. Porous welds shall be ground down to pinhole free metal. Excessive rust scale shall be removed by use of a wire brush or wheel, or other mechanical means prior to blast cleaning. All seams and joints must have a continuous, smooth interior weld.
- C. **SOLVENT WASH:** All steel surfaces shall be free of rust scale, pollution fallout, dirt, grease, surface chemicals or other contaminants prior to blast cleaning. Use a solvent wash as per SSPC-SP1 "Solvent Cleaning" to remove these contaminants along with any accumulated oil, smoke, wax or other material that could interfere with maximum adhesion.
- D. **ABRASIVE BLAST CLEANING:** Steel surfaces subject to immersion conditions must be blast cleaned to White Metal as per SSPC-SP5, with a minimum anchor profile of 3.0 mils (76 microns). Steel subject to non-immersion conditions shall be cleaned to Near-White as per SSPC-SP10, with a minimum anchor profile of 2.0 mils (51 microns). All previously applied paints or coatings on the substrate shall be removed, including paints or coatings that are tightly adhered to the surface. Abrasive blast cleaning shall not be performed when the surface temperature is less than 5°F (3°C) above the dew point, when relative humidity exceeds 80%, or when there is a possibility that the blasted surface will become wet before the coating can be applied. The blast-cleaned surface shall be coated by the end of the same work day, but in any event before any visible rusting occurs. If rusting occurs after blast cleaning, the surface shall be reblasted before coating.

3.04 PRIMER APPLICATION

- A. **FINAL CLEANING:** After repairs are completed and adequately cured, and prior to application of primer, all surfaces shall be cleaned using a vacuum or compressed air to remove all loose materials, dirt, dust and other foreign objects.
- B. **CONCRETE SURFACES:** Concrete surfaces shall be primed with one (1) coat of UNITED'S **Uni-Tile Sealer**. **Uni-Tile Sealer** is a two-component material, which is mixed at a 1:1 ratio. After thoroughly blending the components, allow mixture to sit a minimum of 30 minutes for "sweat-in" prior to using. Sealer shall be applied by airless spray or roller at the rate of 250 sq. ft. per gallon (6.1 m²/l). Airless spray is the preferred method. Any airless spray equipment capable of 1,000 psi (6,890 kPa) and ½ gallon per minute (1.9 l/minute) delivery can be used. A reversible, self-cleaning spray tip with orifice size of .017" to .031" (.432 to .787 mm) and minimum 40° fan angle is recommended. For maximum production on large projects, airless spray equipment capable of 2,000 psi (13,790 kPa) and 1 gallon per minute (3.8 l/minute) delivery should be used. Allow a minimum of 30 minutes dry time at 75°F (24°C) between application of **Uni-Tile Sealer** and the application of **ELASTUFF 160**. Colder temperatures will require additional dry time. Sealer should be topcoated within 24 hours, and should under no circumstances be left exposed longer than 48 hours. If primer is not topcoated within 48 hours, the surfaces must be brush-blasted, followed by an additional, thin coat of **Uni-Tile Sealer** applied at the rate of 400 to 500 sq. ft. per gallon (9.8 to 12.2 m²/l).
- C. **STEEL SURFACES:** **ELASTUFF 160** is a primerless system over clean, properly prepared steel surfaces. All prepared metal should be topcoated on the same day. If topcoating cannot be achieved within 24 hours, consult UNITED'S Technical Service Department for recommendations.

3.05 ELASTOMERIC COATING APPLICATION

- A. **ELASTUFF 160** is applied using 1:1 ratio plural component airless spray equipment. Refer to separate literature entitled **Plural Component Spray Equipment** for information on design and operation.
- B. **ELASTUFF 160** shall be applied to concrete surfaces that have been previously primed with **Uni-Tile Sealer** or steel surfaces previously prepared as described above. It can also be applied to fiberglass or wood surfaces previously primed with **Uni-Tile Sealer** or to polyurethane foam or expanded polystyrene (EPS) surfaces with no primer required. All preparation work, including treatment of cracks, surface repairs, etc. must have been completed in accordance with UNITED'S published recommendations. Do not apply **ELASTUFF 160** when the ambient temperature is below 40°F (4°C) or above 110°F (43°C), if rain is anticipated within 2 hours of application or the relative humidity is over 90%.
- C. Flush Methylene Chloride or M.E.K. solvent through the pumps, hoses and spray gun prior to introducing the material components. One of these solvents should also be used to fill the solvent flush system (if utilized), which must be set to achieve a minimum of 800 psi fluid pressure. Set transfer pumps at the minimum pressure required to completely fill the proportioning cylinders as they cycle so that no cavitation occurs. This will typically require 200 to 300 psi fluid pressure. Set main proportioning pump at 2,100 to 2,800 psi fluid pressure to achieve an acceptable spray pattern, depending upon tip size, material temperature and ambient conditions.
- D. Plural component equipment must be equipped with in-line, high-pressure heaters as well as heated, insulated high pressure hose capable of developing and maintaining a minimum of 120°F (49°C) material temperature at the spray gun. In cooler ambient conditions where the material in the drum cannot be maintained at 60°F (16°C) or higher, it is recommended that drum heaters be utilized to facilitate easier pumping of the liquid components by the transfer pumps.
- E. Utilize an approved plural component gun equipped with a static mixer, or a single component gun with a static mixer in conjunction with a manifold and up to a 12' (4 m) whip to assure proper mixing and cure of the liquid components. A spray tip between .025" and .041" with a 40° to 50° fan pattern is recommended. An effective internal mix gun, such as a Gusmer GX7-400 or Grace Fusion, can also be utilized.
- F. Prior to spray application, mix the Part A and B components separately with a clean power-mixer of sufficient size to thoroughly mix the contents of the container.
- G. Coverage rates and dry mils are determined by specific project requirements. The versatility of **ELASTUFF 160** allows the specifying engineer to solve a multitude of protection problems utilizing one coating system at a wide range of dry mil thickness'. **ELASTUFF 160** applied at the rate of one (1) gallon per 100 sq. ft. (.4 l/m²) of the combined Part A and Part B will theoretically yield 16.0 dry mils (406 dry microns). The following dry mil thickness' are provided for guideline use only:
 - 1. Light Abrasion - Dry or Immersion: 32 to 40 mils (813 to 1,016 microns)
 - 2. Medium Abrasion - Dry or Immersion: 45 to 60 mils (1,143 to 1,524 microns)
 - 3. Heavy Abrasion - Dry or Immersion: 80 to 120+ mils (2,032 to 3,048+ microns)

- H. The applicator must periodically check the number of gallons used compared to square feet coated. If adequate gallonage has not been used according to UNITED'S published recommendations or project specifications, adjust accordingly and apply additional material to previously coated areas.
- I. **ELASTUFF 160** is capable of rapid, high film build utilizing multiple-pass application technique. Most required film builds can be achieved in one (1) or two (2) applications using this method. Optimum results will always be achieved by applying a minimum of two (2) separate coats, which helps to eliminate pinholes and thin spots. Ultra-high film builds may require three (3) or more separate coats. Number of coats required to achieve the specified film thickness will vary depending on application method, jobsite and ambient conditions. Allow each coat of **ELASTUFF 160** to dry tack-free prior to applying an additional coat. This will require a minimum of ½ hour at 75°F (24°C).
- J. As an option for achieving higher film builds, **ELASTUFF 120X3** can be used. Because it expands to approximately three (3) times its wet film thickness, it is able to cover rough textured substrates, as well as bridge cracks and build film thickness at corners and edges, control joints, vertical/horizontal seams, transitions between dissimilar substrates and any applications requiring a high film build. **ELASTUFF 120X3** is applied using standard plural component equipment, and is for use as a base coat only. When utilizing **ELASTUFF 120X3** as a base coat, the recommended application rate is 2/3 base coat to 1/3 **ELASTUFF 160**, with a minimum top coat thickness of 30 mils (762 microns). Allow **ELASTUFF 120X3** to cure for 10 to 15 hours prior to topcoating, however, do not exceed 48 hours.
- K. Subsequent coats of **ELASTUFF 160** should be applied within 48 hours, however, as long as the surface remains clean, additional coats can be applied as long as there is chemical cure occurring within the urethane film, which is normally 3 to 5 days.
- L. All surfaces must be uniformly coated and free of voids, pinholes or blisters. When spray applying **ELASTUFF 160** over rough concrete or other highly textured surfaces, it is often helpful to trowel or backroll the material immediately after applying it to the substrate. A void-free, monolithic film can be achieved with less material by using this technique.
- M. Use **UC-30 Joint Tape**, embedded into the first coat of **ELASTUFF 160**, to help cover and reinforce individual cracks, seams or voids. Open time for troweling, backrolling or embedding fabric is approximately thirty (30) seconds.
- N. **ELASTUFF 160** is self-flashing at natural termination points such as expansion joints, corners, edges, counter-flashings, tank wall caps, etc. Coated areas that do not tie into a natural termination must be saw-cut around the perimeter to a minimum of ¼" in width by ¼" in depth (6 mm x 6 mm). The coating shall then be applied so as to flow into and terminate at the saw cut. Tape off the opposite side of the saw cut so that no overspray occurs beyond this point. Cut material at the tape line with a razor knife so as to leave a straight, clean edge.
- O. Inspect the coating installation as soon as practical to ensure that all surfaces have been uniformly coated and are free of holidays. Test as per ASTM D4787 "Continuity Verification of Liquid or Sheet Linings Applied to Concrete Substrates" using high-voltage spark test equipment with variable settings. Any holidays shall be marked and repaired.
- P. Protrusions and non-cementitious fixtures shall be specifically identified by the drawings as to whether or not they are to be coated. The Coating Manufacturer shall recommend the appropriate primer for each different non-cementitious material.
- Q. Control joints shall be inspected and filled with the appropriate sealer and shall be isolated from the coating to ensure that the coating does not bond to the joint sealant.
- R. The finished coating membrane shall be allowed to cure a minimum of 72 hours at 75°F (24°C), (96 hours if ambient temperatures are below 60°F (15°C)) before the coated area is returned to service.

3.06 REPAIR PROCEDURE

- A. Repairs to the coating membrane shall be made with **ELASTUFF 160 Mastic Grade** where small spot repairs require a hand-applied material. Surfaces shall first be roughened using an abrasive brush-blast or by mechanically abrading with a wire wheel, wire brush, coarse sandpaper or other similar means. Coating surface must be roughened so that the repair material is able to achieve a mechanical bond.
- B. Solvent wipe the surface with M.E.K to remove all dust and other contaminants and to soften the existing coating surface.
- C. After thoroughly blending the Part A and B components, apply repair material to the designated area, taking care to maintain a flow edge at least 20 mils (508 microns) thick. Do not feather edges of the repair material.

3.07 CLEANUP

- A. Maintain work and work areas in a clean, safe condition at all times during coating installation. Remove excess materials, trash and debris from the jobsite daily.
- B. At the completion of the project, clean area of any spills, containers and debris, leaving jobsite in a clean condition.

3.08 FINAL INSPECTION

Upon completion of the coating system installation, the Coating Manufacturer's Representative, Owner's Representative, Architect and/or Engineer and Applicator shall make a final inspection to determine the dry film thickness of the fluid-applied, 100% solids polyurethane membrane and to verify that the system is free from voids and/or pinholes. Any defects shall be noted, duly marked and immediately repaired prior to acceptance.



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