SECTION 07141 – COLD FLUID-APPLIED WATERPROOFING

PART 1 – GENERAL

1.1 SUMMARY
   A. This Section includes but is not limited to the installation of a reinforced (2-ply) cold fluid-applied rubber modified waterproofing with all the materials, labor and supervision necessary to provide a continuous waterproofing system below grade.

1.2 SUBMITTALS
   A. Product Data: Include manufacturer’s written instructions for evaluating, preparing, and treating substrate, technical data, and tested physical and performance properties of waterproofing.
   B. Shop Drawings: Show locations and extent of waterproofing. Include details for substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions.
   C. Product test reports shall yield the following results:
      1. Liquid Adhesive applied at the rate of two gallons per square
      2. (100 sq. ft.) yields the following test results.
      5. Ductility: ASTM D-113-79; at 1 cm per minute (39.2°F = 4°C) 125% elongation min.
      6. Wind up-lift pull = 150 lbs. using test apparatus.
      7. Water permeability: ASTM E-96-80; 0.005 perms/hr./sq. ft.
      8. Excellent adherence to concrete, metals, glass, insulations, wood, coal tar pitch and felts, rubber sheeting, etc. Exceptions: silicones, certain acrylics and animal fats (tallow).
      9. Dry Film Thickness: 9 mils per gallon per 100 sq. ft. min.

1.3 QUALITY ASSURANCE
   A. Contractor Responsibilities: Contractor is solely responsible for quality assurance and control of waterproofing work.
   B. Guarantee: Sample of special warranties/guarantees
      1. (Insert required project specific warranties/guarantees)
   C. Single Responsibility: Work shall be performed by a single installer having undivided responsibility for providing complete work, including all components and related work, and for performance and quality of waterproofing.
D. Manufacturer Qualifications: Submit certified evidence proving specified materials have been manufactured by same source and successfully installed for a minimum of twenty years on projects of similar extent and complexity.

E. Installer Qualifications: Installer for waterproofing system shall be trained and certified (approved) by the waterproofing manufacturer in the use of the materials and equipment to be employed in the work. Submit the following:
   1. Certification Letter by waterproofing manufacturer as applicator of the proposed products/system.
   2. List of minimum of three projects using specified or similar systems and of similar scope and complexity completed within the past five years.

F. Source Limitations: Obtain waterproofing system from single source from single manufacturer

G. Pre-installation Conference: Conduct a pre-installation meeting at project site prior to delivery of products to review conditions associated with performing the work under this Section. Meeting shall include review of construction conditions, environmental conditions, substrate conditions, and coordination required for proper installation of the work. Meeting participants shall include, but are not limited, Architect, representative of manufacturer, installer of work, and installers of related work. Proceed with installation only when everyone concerned agrees required conditions can be provided and maintained.

H. Manufacturer Representative: Provide services of a trained technical representative of manufacturer to advise on work and to perform other like services at the following intervals:
   1. Representative shall give preparation and installation instructions, examine substrate before installation.
   2. Representative shall perform interim inspections at 25%, 50%, 75% and final inspection prior to placement of protection sheet and overburden.

1.4 QUALITY CONTROL:
   A. General
      1. Owner may employ a knowledgeable Quality Control Service familiar with waterproofing materials and installation procedures to perform quality assurance and control evaluations of materials use in the work, and field quality control work during construction.
      2. Tests, not specifically indicated to be performed at Owners expense, including retesting of rejected materials and installed work, will be performed solely at Contractor expense, with no addition to Contract Sum.

1.5 STORAGE
   A. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by waterproofing manufacturer.
B. Remove and replace liquid materials that cannot be applied within their stated shelf life. Protect stored materials from direct sunlight.

C. Boxes containing the Laurenco Waterproofing Sheet must be stored flat at all times, approximately 5 boxes high, on pallets or other means to keep off the ground.

D. If indoor or trailer storage is not available, tarp in with canvas tarpaulins only.

E. DO NOT USE POLYETHYLENE OR OTHER NON-BREATHING FILMS TO COVER THE BOXES.

F. Remove rolls of Laurenco Waterproofing Sheet from boxes when ready to use.

G. Store in cool places only. If trailer storage is used, it should be well ventilated for summer storage and only a maximum of 60°F heat for winter storage is recommended (for ease of roll out). Shelf life for usual spring, fall and winter is a recommended 3 months. For summer storage shelf life is a recommended limit to 3 to 4 weeks including in transit time. This shelf life applies to on job site storage facilities available. It is usually 4 to 6 months under controlled warehousing conditions.

1.6 PROJECT CONDITIONS
A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended by waterproofing manufacturer. Do not apply waterproofing to a contaminated, soiled and unclean surface or a substrate with standing water, frost or ice.

1.7 WARRANTY
A. Special Warranty: Manufacturer's standard form, signed by manufacturer and installer, and agreeing to repair or replace waterproofing that does not comply with requirements or that does not remain watertight for a period of 20 years after date of Substantial Completion.

PART 2 - PRODUCTS
2.1 MANUFACTURERS
A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

B. Products: Subject to compliance with requirements, provide one of the following:
   1. Single-Component, reinforced cold fluid applied rubber modified asphalt waterproofing:
      i. Laurenco Waterproofing Systems.

2.2 WATERPROOFING MATERIALS
B. Primer: NA.
C. Adhesive: Specially formulated Asphalt modified with compatible rubbers using long fibers and clean aliphatic solvent.
   1. Compatible rubbers are combinations of Neoprene, Butyl and/or N.B.R.
   2. Solid Content 55% min.
   3. Holding power 150 lbs. plus per sq. ft. at 90 degree pull on gypsum deck.
   4. Meets or exceeds ASTM D-2823, Type 1 and Federal Specification SS-A-694D.
   5. Using ASTM Test Method D-1004-70, Tensile Strength and Adhesive shall be 1070 p.s.i. average; using Tear Die C, 77 lbs. per inch average of sheets and adhesive.

D. Sheet Flashing and Reinforcing Sheet: 50-mil-(1.3-mm-) minimum, proprietary chloroprene rubber.
   1. Specially formulated Asphalt modified with Chloroprene Rubber (Neoprene*) plus appropriate fillers, curing agents and plasticizer.
   2. Thickness of Laurenco Sheet is 50 mils. plus or minus 5%.
   5. Two Ply Laurenco System > 450 lbs.
   6. Ductility of Modified Asphalt for use on Laurenco Sheet: (ASTM D-113-69) at 39.2°F. using 1 cm. per min. pull-10% to 12.5% plus, at 75°F. using 5 cm. per min. pull = 100% to 125% plus.
   7. Softening point of modified asphalt used on Laurenco Sheet: (ASTM D 36-70 using distilled water) = 160° degree F. min.
   8. Penetration of Modified Asphalt used on Laurenco Sheet: (ASTM D 5-73) = 30 max. at 77°F using 3 oz. seamless metal container.
   9. Ductility of Sheet: 1.360 degree bend on 1” O.D. bar at 39.2°F. at 5cm. per min. flex. minimum. mesh or polyester fabric.

E. Performance Criteria for Sheet and Adhesive:
   1. Water Permeability-Inverted cup @ 75° degrees F. 25 day duration (ASTM. E96-95 Procedure BW) using Laurenco Sheet and Laurenco Adhesive in System form 0.05grams/hr./sq. ft.
   2. Weather test on Laurenco Sheet and Laurenco Adhesive in System form (ASTM Test Method D 529-73, Daily Cycle B) 25 days. Hardness range of 60 plus or minus 5 pt. variation of a range of 0-99 Shore A hardness and no further changes after 10 cycles-Materials stable with no cracking or crazing. Cycles continued for 25 days.
   3. Pull Test: Using 1” thick concrete slab and Laurenco system (2 plies Sheet and Adhesive) pull at rate of 2 inches per minimum. Results = 26.39 lbs. plus p.s.i. or 3800 lbs. plus per minimum. (slabs all broke under pull test-1” thick were used to accommodate machine) See No. 7, Tensile Strength.
   4. Waterhead Test: Results incomplete as 210 foot limit of machine was reached at end of 28 days with no leakage. (Pictures available showing test set up which incorporated a construction joint).
   5. Mullen Burst Test: (Membrane Sheets and Adhesive) shall attain 160 p.s.i. minimum.
F. Protection Course: Semi-rigid sheets of fiberglass or mineral-reinforced-asphaltic core, pressure laminated between 2 asphalt-saturated fibrous liners and nominal thickness 1/4 inch minimum

2.3 MOLDED-SHEET DRAINAGE PANELS
   A. Molded-Sheet Drainage Panel: Comply with Division 2 Section "Subdrainage."

PART 3 -EXECUTION

3.1 SURFACE PREPARATION
   A. Clean and prepare substrate according to manufacturer's written recommendations. Provide clean, dust-free, and dry substrate for waterproofing application.
      1. Verify that substrate is visibly dry and free of excessive moisture.
   
   B. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.
   
   C. Remove fins, ridges, and other projections and fill honeycomb, aggregate pockets, and other voids.
   
   D. Prepare vertical and horizontal surfaces at terminations and penetrations through waterproofing and at expansion joints, drains, and sleeves according to ASTM C 898 and manufacturer's written instructions.
      1. Apply a double thickness of waterproofing and embed a joint reinforcing strip in preparation coat when recommended by waterproofing manufacturer.
   
   E. Prepare, treat, rout, and fill joints and cracks in substrate according to ASTM C 898 and waterproofing manufacturer's written instructions. Remove dust and dirt from joints and cracks complying with ASTM D 4258 before coating surfaces.
   
   F. Repair damaged or spalling substrates for roughness with repair mortar patches or one component cementitious parge coatings rated for vertical and overhead use that have high early strengths and are resistant to freeze thaw. Provide a finish suitable for waterproofing installation; broom finish minimum.
   
   G. Install sheet flashing and bond to deck and wall substrates where indicated or required according to waterproofing manufacturer's written instructions.
      1. Extend sheet flashings onto perpendicular surfaces and other work penetrating substrate according to ASTM C 898.
   
   H. Surface Preparation:
      1. Remove or grout projections higher than 1/16 inch. i.e., fins.
      2. Grout all tie-wire holes.
3. Grout all honeycombs and voids larger than a U.S. 25 cent coin and deeper than 1/4 inch.
4. Remove all latencies, spatters, dirt, etc., by scraping surfaces to be waterproofed. Do not grind.
5. Scrape off knife-like edges of exterior corners and grout to a continuous smooth surface all exterior and interior corners. Good wood float finish is preferred; good wood screed is acceptable.
6. Remove all dirt and debris. Use A.C.I. 515, 1R-79, Chapter 3, and A.C.I. 301-72 (revised 1975), Chapters 9, 10, 11 (11,8,2 Finished Surfaces) as reference information guide. Water cure only if surface cannot be waterproofed immediately. Propane weed burners or hot air torches may be carefully used to surface dry. Surface dry only.

3.2 WATERPROOFING APPLICATION
A. Apply waterproofing according to ASTM C 898 and manufacturer's written instructions.

B. Horizontal Installation Methods:
1. Apply all horizontal single or multiple plies of waterproofing sheets in a cap sheet pattern with 4 inch wide seal and end laps, plus or minus 1 inch. Install multiple plies with no lap over-lap of previous ply using a side lap to side lap pattern, sealing all laps firmly. Embed sheets in tack to almost dry adhesive. Adhesive top coat should be used to embed specified insulation or asphalt/felt protection board. Seal all laps of overlapped pattern of asphalt/felt protection board when installed over single ply waterproofing system. Use a butt joint pattern to install asphalt/felt protection board for all multiple ply waterproofing systems. Omit top coat of adhesive on waterproofing sheet used as a protection course. Provide membrane tie-ins as necessary to accommodate transitions and laps as required throughout the specifics of the installation.

C. Vertical Installation Methods:
1. Hang all waterproofing sheets in a wallpaper pattern using 5 to 5-1/2 foot lifts with 4 inch side and end laps. Sheets must be imbedded into thin, even coats of adhesive, allowing immediate sheet placement. Each lift length of sheet must cover installed flashing and preceding sheet terminations plus 2 inches each for multiple tie-offs on footer. Seal all laps and terminations firmly with adhesive. Final ply of waterproofing sheet must receive a top coat of adhesive for immediate placement of polystyrene bead board of specified insulations, i.e., Styrofoam, polyisocyanurates urethanes) foamglas, etc., without the use of nails. Provide membrane tie-ins as necessary to accommodate transitions and laps as required throughout the specifics of the installation.

D. Install protection course with butted joints over nominally cured membrane before starting subsequent construction operations.
3.3 MOLDED-SHEET DRAINAGE PANEL INSTALLATION
   A. Place and secure molded-sheet drainage panels to substrate according to manufacturer's written instructions. Protect installed molded-sheet drainage panels during subsequent construction.

3.4 CURING, PROTECTING, AND CLEANING
   A. Cure waterproofing according to manufacturer's written recommendations, taking care to prevent contamination and damage during application stages and curing.
      1. Do not permit foot or vehicular traffic on unprotected membrane.
   B. Protect waterproofing from damage and wear during remainder of construction period.
   C. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.
   D. Protection Methods:
      1. Laurenco Waterproofing Sheet Systems should be protected either by an additional ply waterproofing sheet (protection against concrete pours), polystyrene bead board (1 lb. density, 1 inch x 2 feet x 4 feet panels embedded in wet adhesive) on vertical work, and, 1/8 or 1/4 inch asphalt/felt protection board on horizontal work. Fire protection for crawl space areas, exterior of tunnels, etc., can be obtained by broadcasting dry cement into and adhesive top coat applied to waterproofing sheet protection course. Use of waterproofing sheet as a protection course is required for the Laurenco V-2 Specification. This ply is also used to adhere to underside of the concrete wear surfaces and concrete protection courses by means of the heat generated during the hydration of concrete; particularly applicable in seismic areas. Laurenco Waterproofing Systems do not deteriorate from exposure to weather. See Table 1. Immediate backfill or coverage of flashing, etc., is not required. Coverage of wall installations with the polystyrene bead board is recommended for job site protection during hot weather. Horizontal applications may be used for foot and some vehicular traffic before the installation of the top coat of adhesive and protection board. Good housekeeping is necessary to keep damaging debris off membrane only. Flood testing and inspection are necessary before the application of adhesive top coat and asphalt/felt protection board (A.C.I. 515 1R-79, Chapter 4.42). Severe scuffs and tears must be repaired with 1 or 2 plies of waterproofing sheet patches to extend 4 inches, all sides, past damaged areas and embedded in adhesive firmly. Second ply of patch repair must extend 6 inches, all sides past damaged areas.

END OF SECTION 007141