#### SECTION 07 56 63

**FLUID-APPLIED ROOFING**

#### BASED ON DFD MASTER SPECIFICATION DATED (02/06/17)

***This section has been written to cover most (but not all) situations that you will encounter. Depending on the requirements of your specific project, you may have to add materials, delete items, or modify what is currently written. The Division of Facilities Development expects changes and comments from you.***

***Notes to Specifier: Pay special attention to items in the color red and italic typeface. Roof system options are identified within [brackets]* *by the color blue. This language may be deleted or added to as required by the scope of project. Recent changes in the specification are associated with the date by the title and are identified by the color green. Obtain the most current specification section for each project. Section has language for both new construction and re-roofing.***

***Notes to Specifier: DFD Standard Roofing Details for various roof systems including HVAC and Electrical runs, curbs and support, louver, door and windows and State of Wisconsin Guarantee Forms are located on the DFD Website with the Master Roofing Specifications.***

part 1 - GENERAL

Scope

The work under this section includes all labor, material, equipment and related services necessary to install [Polyurea 2-part fluid roof membrane over metal roofing and all associated roofing components, including metal flashing.]

**Note to Contractor:** See GENERAL REQUIREMENT, Article 28. Construction Waste Management. “In accordance with the Department of Administration’s management practice, all contractors shall reduce, reuse, salvage, and/or recycle construction waste to the extent that is feasible.” Roofing materials removed and disposed of by this project are intended to be recycled. Contractor shall make an effort to locate a recycling site nearest the project for delivery of all materials not intended for reuse by this project. See further instructions at: “TECHNICAL SUBMITTALS AND OTHER DOCUMENTS”.

PART 1 - GENERAL

 Scope

 Related Work

 Reference Standards

 Guarantee

 Quality Assurance

 Product Delivery, Storage and Handling

 Technical Submittals and Other Documents

 Site Conditions

PART 2 - PRODUCTS

 System Components

PART 3 - EXECUTION

 Examination

 Preparation for Coating

 Installation of Coating System

 Job Completion

 Cleaning

 Construction Verification

RELATED WORK

Applicable provisions of Division 1 shall govern work under this Section. Contractor shall consult these provisions in detail prior to proceeding with work.

07 08 00 – Commissioning of Thermal and Moisture Protection

[06 10 53 – Miscellaneous Rough Carpentry]

[07 63 00 –Sheet Metal Roofing Specialties]

[26 41 00 – Facility Lightning Protection]

[00 00 00 - Specific Roofing Section]

***Note to Specifier:” Lightning Protection Systems” that must be removed, altered, interrupted or disabled to perform the new work must be upgraded at the roof level. The Contractors qualified lightning protection system Installer shall submit a written statement that the roof level portion of the installation would\* qualify for a UL “Master Label”.***

In the event that the Contractor wishes to make improvements in materials and/or techniques, or is required to make improvements by his material manufacturer in order to obtain guarantees, he shall make written request stating in full the nature of the proposed changes and stating that the changes, if approved, will be accomplished at no increase in cost.

**REFERENCE STANDARDS**

FM ‑ Roof Assembly Classifications.

NRCA ‑ Roofing and Waterproofing Manual.

UL ‑ Fire Hazard Classifications.

ASTM TEST METHOD PHYSICAL PROPERTY

C794 Adhesion-in-Peel

D 412 Tensile Strength

D 412 Elongation

C 661 Shore A Hardness (inst-5 sec.)

D 264 Die C Tear Resistance

**GUARANTEE**

State of Wisconsin Roof System Guarantee: Provide written five (5) year guarantee warranting all roofing and flashing required under contract, to be watertight and free from defects in materials or workmanship for period of time, as stipulated in guarantee form.

**Contractor shall perform a minimum of two (2) roof system inspections during the term of this guarantee with final inspection performed within last 6-months of term. Submit written inspection reports to DFD Project Manager and Agency Representative prior to guarantee expiration.**

It is recommended that the Contractor take digital photos of the finished work for their files and future reference.

A copy of the required State of Wisconsin Roof System Guarantee form is appended hereto.

***Note to Specifier: The following shall apply for existing roof systems covered by State guarantee or manufacturer warranties. DFD Re-Roofing Project Manager and the membrane manufacturer must be notified of intent to penetrate the existing guaranteed and/or warranted roof system prior to approval of final bid documents. DFD shall provide information concerning the original approved roof system Contractor(s), existing guarantees & warranties. If required, the manufacture shall provide alternate approved Contractor information when original Contractor is not available. This information shall be included within the bid documents allowing the State to maintain the existing State Guarantee and/or various manufacturer warranties through their expiration dates.***

***Note to Specifier: The following shall apply for existing roof systems no longer covered by State guarantee or manufacturer warranties. At minimum, request and insert a one (1) year or two (2) year State guarantee for all new construction projects and remodel projects including mechanical and electrical new work including penetrations or abandonment of existing roof penetrations that require minor roof system repair, replacement and/or new roofing material installed into a portion of the existing roof system to seam in to the existing roof system membrane to achieve a watertight condition.***

(Contractors Performance-Payment Bond is only required to apply to this trade section during the construction period and the first year of the guarantee period. Said Bond shall not apply to any extended guarantee period beyond the first year. Such extended guarantees are limited to the applicable Contractor and manufacturer as herein specified.)

***Note to Specifier: No- Dollar-Limit (NDL) and/or Total System Warranties system warranties are preferred. Where those system warranties are required, the manufacturer will require increase performance in the over all applications and at all terminations and provides a site inspection of the finished work prior to issuance of the warranties requested.***

**Liquid Coating Manufacturer State of Wisconsin Guarantee**:  Provide written manufacturer’s (NDL) no-dollar-limit warranty covering Polyurea roof coating installation and all flashing required under contract, to be watertight and free from defects in *materials and workmanship* of the Polyurea coating and other system components supplied by the manufacturer for a period of [ten (10)] [fifteen (15)] [twenty (20)] years from date of installation **as stipulated in Liquid Coating Manufacturer’s State of Wisconsin Guarantee Form.  A copy of the required guarantee form is appended hereto.**

Note: Warranty may not contain clause(s) voiding warranty due to contractor solvency, improper workmanship, contractor error, or contractor failure to follow manufacturer specification(s) and requirements to obtain the warranty requested by this project.

***Note to Specifier: Send one (1) copy each (In PDF/scan format via e-mail) of all Contractor submitted and “signed” roof system State guarantees, manufacturer warranties, manufacturer metal guarantee and other guarantees associated with the roof system to the DFD Project Manager.***

Include the following information on all guarantee and warranty submittals: State of Wisconsin [Owner], Agency/Location/Address where work is performed obtained from the [Architect/Engineer] [Agency Representative listed on page B-1 of this specification], Building Name, Bldg. State Number, Roof Areas, DFD Project Number and total sq. ft. of all roof areas.

Manufacturer material and installation requirements may vary concerning issuance of the NDL (“No-Dollar-Limit”)/”Total System” warranty\*\*.

Contractor quote shall include and provide all product(s), labor and installation methods necessary and as specified herein, including manufacturer requirements not found specified herein, as required by the approved manufacturer to obtain the specified warranty requested herein.

New membrane, insulation, shop fabricated and/or manufacturer fabricated metal flashing, pre-molded and/or factory supplied associated roof system products, their fasteners and/or all products used for adhesive and/or adherence purposes and sealants shall be covered by the manufacturer NDL (“No-Dollar-Limit”)/”Total System” warranty specified herein and the State Guarantee.

Existing re-installed metal flashing and new wood blocking securement shall be covered in the State guarantee but not the manufacturer NDL (“No-Dollar-Limit”)/”Total System” warranty specified herein.

Shop fabricated metal flashing materials as specified in section 07 63 00 and herein or as required for a complete watertight system may be provided in lieu of manufacturer fabricated metal flashing and shall be covered in the manufacturer total system warranty specified.

**QUALITY ASSURANCE**

Roofing Contractor shall be recognized by the manufacturer of the roof membrane system as an “approved” or “authorized” applicator. Within the past five (5) years, the contractor shall be able to document the successful completion of a minimum of three (3) projects of similar size and scope of the work specified in this section.

***Note to Specifier: Roofing Contractor shall submit manufacturer’s current written documentation stating that they are an ”approved applicator” in good standing able to perform quality work on new construction projects, remodel projects including mechanical and electrical new work penetrations or abandonment of existing roof penetrations that require minor system repair, replacement and/or new material installed into a portion of the existing roof system with intension to seam in to the existing roof system membrane to achieve a watertight condition. This requirement shall apply to all work requiring submittal of a State Guarantees and/or manufacturer warranties.***

Submittal: Roofing Contractor shall submit 2 copies of manufacturer’s current written documentation stating the Roofing Contractor is an ”approved applicator” in good standing, for the work specified herein.

Submittal: One (1) copy of the manufacturer’s most current installation and detail manual to be given to the Facility Representative at the preconstruction meeting.

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Roofing Contractor shall perform work required using details provided within the specifications, on the drawings or as required by the manufacturer for a proper watertight installation and to allow issuance of warranties required herein.

All components included in the roof system installed by the work required shall be included in the manufacturer watertight warranty for the duration of such warranty required herein. System components required by the work but otherwise not warranted by the manufacturer shall be upgraded to be manufacturer specific products at the time of bid such that they are covered by the warranty required herein.

All Polyurea component containers required to complete the project shall be on site before the start of the project.

Containers shall be labeled to include Manufacture name, address, phone number, emergency spill and bodily contamination telephone numbers, batch number, batch container in-series numbering, container content, container volume, DFD project number, project name, project location, project address, Contractor name and phone number.

Provide all equipment recommended by the manufacturer for proper installation of the materials specified.

Provide such assistance as may be required by State representative(s) visiting site. Assistance required may include, but not limited to, taking samples of application, repair of sampled areas, access to project areas, presentation of documents listed in project related specification section(s).

 [Roofing installations shall comply with fire resistive rating as defined in the Wisconsin Administrative Code. Required rating on these roofs: U.L. Class A.]

[Any coating applied to the existing U.L. classified roofing system shall retain the existing classification for the substrate(s) in this project.]

[Proof of U.L. classification shall be submitted to DFD upon request. The U.L. classification must identify the type of roof system tested, date of test, manufacture name, specific product and product identification number.]

Manufacture’s using and/or supplying other manufacture U.L. classified products as supplements, or in blending multiple manufacture products shall acquire a U.L. classification rating specific to the altered, new products, for the specific roof system in this project and issued to the manufacture supplying the product.

**Prior to the start of construction, it is required that the Contractor’s superintendent or foreman shall be in attendance at preconstruction/pre-installation meeting(s).**

It is the responsibility of the Roofing Contractor to obtain the services of a competent:

Electrician: For removal and reinstallation of roof curb-mounted exhaust fans and associated covers, ventilators, other electrical equipment and their associated wiring connections at the unit(s), relative to work on this project.

Agency is responsible for disconnect where wiring must be pulled or cut and conduits relocated to allow installation of the new roof system.

Plumber: To re-lead, repair and/or reset the roof drain bowls, relative to work on this project.

[Remove, relocate and support gas or pressurized air piping as directed.]

[Mechanical Contractor] [State Agency]: For removal of belt, chain driven and/or electrical exhaust fans and associated flex connection duct runs/piping and its associated roof curb penetration.]

The Contractor shall raise all existing mechanical and electrical trades’ roof system penetrations to a minimum height above the roof system of 8”.

Contractor shall notify the Agency Representative 24 hours in advance of all Electrical, Plumbing and Mechanical disconnections.

 The Contractor shall raise all existing curbs to a minimum height above the roof system of 8”.

Contractor shall notify the Agency Representative 24 hours in advance of all Electrical, Plumbing and Mechanical disconnections.

[Lightning Protection Contractor: For removal, upgrading and certification of existing cabling, lightning rods, associated products and proper anchoring, fastening and/or adherence of all of cabling and rods and/or rod base plates. Verify that this installation does not interfere with the proper installation of the roofing metal flashing and its clip/cleat fastening point.]

[It is the responsibility of the Agency to perform inspection of the roof areas to be replaced by this project and to provide the following services:

State Agency: Existing Electrical, Plumbing and Mechanical installations and associated equipment pipe and duct runs shall be identified/verified by the State Agency as in use or be spray painted in ORANGE by the Agency if they are abandoned or shall be abandoned and shall be removed by this roofing Contractor, and verify that the electrical run is terminated, prior to start of work by Contractor. Electrical conduct runs lying directly on the existing roof membrane shall be relocated by the Agency prior to start of work.]

**PRODUCT DELIVERY, STORAGE AND HANDLING**

Make no deliveries to the project site until ready to install or approved storage is provided. The State will not accept delivery nor will the State be responsible for any materials or equipment stored on the premises.

Deliver materials in the manufacturer's original, unopened containers and rolls with labels intact and legible.

Deliver materials in sufficient quantity to allow continuity of work.

Materials used on the job must be stored in such a manner as not to create a nuisance or hazard.

Store materials on clean, raised platforms, with breathable, weather protective covering when stored outdoors. [Provide continuous protection from materials against weathering and moisture absorption.]

[Factory applied "shrink-wrapping" is not considered to be an acceptable weather protective covering. Store rolled goods on end; do not double stack rolls. Improper storage practices will be grounds for rejection of questionable materials.]

Store flammable products away from spark or open flame.

Store roofing materials at a minimum of 50°F prior to use or as otherwise recommended by the manufacturer. Protect materials from freezing. Protect materials from prolonged exposure to temperatures exceeding 95°F.

[Contaminated and Damaged Materials: Remove damaged or contaminated materials from site.]

DO NOT store materials in a manner which will overload any portion of the building.

Handle all materials in a manner which will not damage the material. All damaged materials shall be removed from project site.

Select and operate material handling equipment and store materials as not to damage existing construction or applied roofing, and without overloading the building structural system.

**TECHNICAL SUBMITTALS AND OTHER DOCUMENTS**

**At [or before] the preconstruction meeting and prior to start of work,** **submit the following for approval to DFD Project Manager [Architect/Engineer]:**

The following information shall be included on all submitted documents:

Agency/Location/Address where work is performed obtained from the [Architect/Engineer] [Agency Representative listed on page B-1 of this specification], Building Name, Bldg. State Number, Roof Areas, DFD Project Number and total sq. ft. of all roof areas.

**INSTALLATION INSTRUCTIONS:** Provide [one (1) copy] of the manufacturer’s most current installation/instruction and detail manual concerning the installation of the roof system and all associated products that will be used in this project to be turned over to the Agency Representative at the preconstruction meeting.

**RECYCLED MATERIALS:**  Three (3) copies of a Waste Management Plan to DFD for review. Include recycle business name, address, contact, and phone number where all recycled roofing material removed by this project will be delivered.

**SEE QUALITY ASSURANCE:** Three (3) copies of manufacturer’s current written documentation stating the Roofing Contractor is an ”approved applicator” in good standing, for the work specified herein.

**MATERIAL LIST:** Three (3) copies of a list of all materials used on the project identified by manufacturer's name, size, thickness, type or grade. List shall be submitted on Contractor's letterhead stationery.

Contractor shall state the following on the material list submittal:

**“New products installed on this project do not contain asbestos”.**

***Note to Specifier: When removing an existing roof where existing materials might contain asbestos, insert the following paragraph(s):***

**[ASBESTOS TESTING:** Three (3) copies required. Contractor replacing the roof system is required to take a minimum of two (2) samples of existing roof system(s) encountered to be sent to a testing lab. Each test result shall properly identify the DFD Project No., project location, bldg. name, bldg. number & roof area/location where the test sample was taken. Test lab charges shall be the responsibility of the Contractor at no additional cost to the project].

Pre-bid tour Contractors are advised to obtain a small sample of the existing roof system while on site.

**ASBESTOS:** Three (3) copies of the necessary regulatory notifications for asbestos removal or three (3) copies of core sample test results indicating the roofing materials slated for removal do not contain asbestos. (Refer to General Requirements Article “HAZARDOUS SUBSTANCES – ASBESTOS, LEAD AND POLYCHLORINATED BIPHENYLS (PCB’S)” for additional information.)

**Test lab results must be submitted prior to start of work**

**SAFETY REPORT:** One (1) copy of a written report to be given to the Facility Representative at the preconstruction meeting, describing in detail the Contractors implementation of specific OSHA regulations, Contractor’s worker safety program methods/means, roof perimeter safety and identification of the “watch person” required at all roof levels. Identify fire extinguisher and their locations, all equipment/operators on roof/ground in setup/storage area and travel routes used while performing the work.

**[TAPERED INSULATION DRAWING:** Three (3) copies in addition to the number of copies the Contractor needs returned, of insulation supplier's shop drawings showing the layout of the tapered insulation. Shop drawings shall show actual locations and sizes of all roof drains and other pertinent rooftop equipment.]

**MSDS DATA:** One (1) copy of all MSDS paperwork for each products used on this project to be given to the Agency Representative at the preconstruction meeting.

**EMERGENCY AND OFFICE CONTACT PHONE LIST:** One (1) copy of the Contractor’s office superintendent and job foreman daytime, after hours and weekend phone contact numbers to be given to the Agency Representative at the preconstruction meeting.

**Contractor shall maintain at least one (1) copy of the following at the project site throughout construction:**

Specifications, drawings, addenda, value enhancement, change order and all approved submittals.

Latest version of the manufacturer’s handbook including details and technical information concerning application techniques for all primary roofing system materials required by the work.

Material Safety Data Sheets (MSDS) manual for all materials used on this project.

**After the completion of the project, and prior to final payment, submit the following to DFD Project Manager as one (1) package including a cover page listing all documents sent:**

**RECYCLED MATERIALS:**  Three (3) copies of a completed Waste Management Plan to DFD for review. Include recycle business name, address, contact, and phone number where all recycled roofing material removed by this project will be delivered.

Contractor shall submit a final summary of the progress reports, including the percentage of recycled waste (weight or volume) to the quantity of waste that would have been otherwise land filled.

Submit recycler receipt for all deliveries showing all received product their weight and % calculation as described in GENERAL REQUIREMENTS, Article 28.

Material kept for reuse and delivered to the Contractors property or given away at the site by the Contractor shall be identified as well. The total sq. ft/bulk sum of all material shall be recorded and submitted.

**[WASTE MANIFEST:** Two (2) copies of the Waste Manifest Records to DFD Project Manager if required in accordance with General Requirements Article “HAZARDOUS SUBSTANCES – ASBESTOS, LEAD AND POLYCHLORINATED BIPHENYLS (PCB’S)”.]

**[AS-BUILT DRAWING:** One (1) copy of a fully dimensioned as-built roof plan showing all seam and patch locations, actual locations and sizes of roof drains, vents, fans, etc.]

**STATE OF WISCONSIN ROOF GUARANTEE:** One (1) original copy of guarantee as required herein. (Refer to GUARANTEE article in Part 1 of this Section).

**MANUFACTURER ROOF WARRANTY:** One (1) original copy of all membrane warranties as required herein. (Refer to GUARANTEE article in Part 1 of this Section).

**[MISCELLANEOUS METAL WARRANTY:]**  One (1) original copy of manufacturer warranty as required by Specification Section 07 63 00).

**[LIGHTNING PROTECTION CERTIFICATION:]** One (1) original copy of all testing required by Specification Section 26 41 00.1).

**SETTLEMENT CERTIFICATE [AND WAGE RATE AFFIDAVIT]:** One (1) copy of each document.

The following information shall be included on all submittal documents.

**DAILY LOG: One (1) copy of ambient temperature during application, times of application(s), products applied with batch numbers and roof map indicating application areas each day.**

Agency/Location/Address where work is performed obtained from the [Architect/Engineer] [Agency Representative listed on page B-1 of this specification], Building Name, Bldg. State Number, Roof Areas, DFD Project Number and total sq. ft. of all roof areas.

**SITE CONDITIONS**

Proceed with roofing work only when weather conditions comply with Manufacturer recommendations and other current published data and MSDS information. Do not exceed temperature limitations recommended by coating manufacturer.

Owner may occupy the premises during the entire period of the roof retrofit. Cooperate with Owner's Representative during construction operations to minimize conflict, and to facilitate continued use of the facility.

Coordinate scheduling with the Owner in order to relocate or protect vehicles, building occupants and building contents from damage during construction operations.

Existing materials designated to remain, which are damaged or defaced as a result of the work shall be replaced at Contractor's expense to like new condition.

[Reinstall] [Install] all rooftop mounted equipment in a watertight manner and repair any damage to sheet metal or other components related to connection and protection of the roof system.

Prevent materials from entering and clogging roof drains and conductors. Remove roof drain plugs when no work is taking place or when rain is forecast.

Protection of surfaces:

Take every precaution to prevent water leakage, bitumen drippage, debris falling into the building interior, or other such occurrences. Contractor is responsible for any damage to the building interior, or contents, during [reroofing] [construction].

Provide special protection or avoid heavy traffic on completed work. Temporary walkways and work platforms shall be provided as necessary.

Wall surfaces shall be protected with tarpaulins or other suitable cover to prevent damage, staining or discoloration that might result from operations such as removal, disposal, replacement or removing of equipment or materials to the roof surface. Windows, doorways, docks, walkways, etc. may require special protection measures.

Protect building and adjacent area and property within the area from over spray.

Disposal of materials:

All materials to be disposed of shall be loaded directly into trucks by means that will prevent damage to existing or new surfaces and to control pollution. Free-fall of debris from heights over 15’ will not be allowed.

Contractor is responsible for any charges, such as landfill fees, incurred for disposal of materials.

PART 2 - PRODUCTS

**SYSTEM Components**

All products used in this installation shall be compatible with one another and intended for this use.

Where specific manufacturers are named, products by other manufacturers may be considered equal in accordance with the provisions of Article 17 of the General Conditions.

Other manufacturer products shall meet all requirement of this specification section and must be review by DFD prior to bid submittal.

Product specification, warranty and other documentation as required to verify product qualification shall be submitted as requested by DFD.

Submitted bids unable to meet the requirements of prior submittal and/or the requirements of these specifications will be disqualified.

Use new materials only; salvaged or used materials are unacceptable.

**Pre-approved\* Polyurea/Manufacturers:** Volatile Free Inc.; BASF Corp.; Gaco Western Inc. or equal. (Manufacturers must be approved prior to bid opening.)

**\*** Manufacturer and products substitutions not listed within this specification shall be requested and approval receive from DFD Project Manager or Architectural Engineer, in writing, **prior to the bid opening.**

Coatings shall be U.L. Listed to retain existing system UL ratings when applied as specified in this project.

Polyurea: (approved polyurea coating) A two-component 1:1 ratio polyurea-urethane hybrid with excellent strength and weathering characteristics.

Performance Values:

PHYSICAL PROPERTY ASTM TEST METHOD TYPICAL VALUE

Tensile Strength D 412 >1,600 psi

Elongation D 412 >300%

Shore A Hardness (inst-5 sec.) D 2240 85 - 90 Shore A

Tack-Free Time 10 to 30 Seconds

Service Temperature -40°F to 300°F

Application Temperature 40°F to 150°F

Tear Resistance D 264 Die C 125 Pli

Water-Based Epoxy Primer: A two-component, water-based, multi-purpose, easy spreading epoxy primer.

Urethane high build mastic for applications where high performance, all temperature flexibility, and strength is required.

Urethane-based low solids fast drying, penetrating, rust and general-purpose primer.

Highly concentrated, low-sudsing biodegradable cleaner used to remove grease and grime.

Hydrocarbon modified, moisture-cured urethane coating for use over asphalt products and as a basecoat /primer for polyurea coating.

Other products required by coating manufacturer.

Other products, not specifically described, but required for a complete and proper installation of the work in this section shall be selected by the Contractor subject to the approval of the [Project Manager] [Architect/Engineer] [Project Representative].

PART 3 - EXECUTION

**EXAMINATION**

Contractor shall examine substrate for conditions that might detrimentally affect the application and shall report all unsatisfactory conditions to Manufacturer and will not proceed until these conditions have been corrected.

It is the Contractor’s responsibility to isolate the area of work such that no overspray will settle onto the property of others associated or not associated with this project or the facility. The Contractor must notify the Facility if movable equipment or vehicle(s) must be relocated to prevent such over spray. Stationary equipment or other property at the work area shall be the Contractor’s responsibility to protect at all times.

The Contractor must isolate by fencing or other means, the Contractor’s setup/operations area.

Commencing work implies acceptance of existing conditions as satisfactory to the outcome of this work.

Air intake vents, blowers, air conditioning units and evaporative coolers shall be disconnected or otherwise modified to prevent fumes from entering into the building or from contaminating the roof surface with condensate water.

**PREPARATION FOR COATING**

Plan work and take whatever action is necessary to prevent dirt and debris from entering the building during [construction] [removal of existing roofing materials].

***Note to Specifier: If required, insert language relative to removal and disposal of existing roofing system. Include archival information on existing materials, if available.***

Replace deteriorated or structurally unsound decking.

Loose fasteners must be tightened or replaced with oversized fasteners. Add additional fasteners to tighten loose panels or restore original design specifications.

Add fasteners to eliminate seam deflection, particular care shall be taken to eliminate deflection on horizontal seams.

Caulk all seams & fasteners having greater than 1/8'' gap.

Loose coating, paint, and scale shall be removed using: wire brush and scraper; or water-blasting.

Remove loose rust by: water-blasting at minimum 2,400 psi, wire brushing or mechanical or hand sanding.

Sweep or blow dirt and dust from the roof surface and pressure wash with clear water.

Areas containing dirt, chalk, grease, oil, animal fats or other surface contaminants must be cleaned with approved cleaner and high-pressure water-blaster.

Use concentrated chlorine solution to treat areas of mildew, fungus or algae.

New galvanized panels weathered less than 6 months shall be cleaned with 5% hydrochloric or phosphoric acid wash to remove contamination.

After three procedures above, care should be taken to rinse thoroughly with clean water and flush all residue off the roof surface. Allow roof to dry completely before proceeding with priming or coating.

Active asphalts and excessive amounts of cold applied materials shall be removed.

All residual asphalts to be sealed with hydrocarbon modified moisture-cured, urethane coating.

Install new flashing and “crickets” where required. Ponding up slope of penetrations is not acceptable.

Prime rusted metal with rust and general-purpose primer at a rate of 1 gallon/250 sq. ft. (rust and general-purpose primer must be coated the same day as application)

Apply water-based epoxy primer 300 to 400 sq. ft. per gal over the entire roof.

All areas primed with rust and general-purpose primer must be coated the same day with either water-based epoxy primer or approved polyurea coating.

Inspect all flashings and terminations and repair to requirements for warranty issuance.

Replace defective vents, gutters, or skylights before application.

**Caution**: Skylights not capable of supporting foot traffic shall not be coated where there is a danger that someone may step on or through skylight.

Fiberglass skylights, capable of supporting foot traffic, shall have all loose glass fiber “bloom” or “wicking” removed by hand sanding.

Seams with gaps larger than 1/8 inch must be screwed down and/or filled with high build mastic.

Replace missing ridge gaskets and closure strips.

Ridge gaskets shall be a minimum 1.5” from outside lip.

Gaps in the ridge cap larger than 1/8 inch must be sealed before coating is applied.

Weathered but solid flashings, round projections, machine legs, sign posts, guide wire straps, inside and outside corners, and all termination points, may be flashed using polyurea coating.

**INSTALLATION OF COATING SYSTEM**

Do not apply coating when moisture is present on the substrate.

Wind barriers shall be used if wind conditions could affect the quality of the material being applied.

Coating must cover all surfaces completely. An extra pass of coating material may be required at all edges and penetrations.

Base coat(s) and primer(s) shall be allowed to cure before proceeding with subsequent applications.

All coating and primers shall be coated within recommended time period. If application is delayed beyond that time, consult Manufacturer for primer recommendations.

No traffic shall be permitted on the coated roof surface for a minimum of 3 days. Damage to the surface by other trades shall not be the responsibility of the roofing contractor.

Finish coating shall result in an esthetically uniform color and appearance. Additional coating applied after initial finish coating resulting in a non-uniform coating appearance shall be determined non-acceptable and shall require a complete re-coating of the entire surface to achieve a uniform appearance.

Application Thickness:

***(15 YEAR NDL SYSTEM)***

Minimum Application Thickness: Topcoat minimum thickness shall be 32 Minimum TDM (Total Dry Mils)

[Average Application Thickness: Topcoat Average thickness shall be 52 Average TDM, (4.0 gallons per 100 sq. ft. minimum application recommended.)]

Application rates must be checked periodically to assure proper coating thickness. This may be done by checking dry film thickness.

Each contactor should estimate coating requirements based on actual experience and needs to figure losses due to applicator experience, surface texture, wind, waste, and other factors increasing estimated gallons required.

The total dry mil thickness of all coatings, as well as the total dry mil thickness of the topcoat(s) shall meet the minimums required by Manufacturer.

**Application of Approved Polyurea Coating:**

Spray apply in one coat approved Polyurea coating on all seams and fasteners, around all penetrations, at the rate of 1 gallon per 100 sq. ft. to achieve an average of 16 dry mils. Spray pattern shall overlap the previous pass to insure complete coverage.

Spray applied approved Polyurea coating in finish coat to the entire roof area, at the rate of 1½ gallon per 100 sq. ft. to achieve the required TDM (Total Dry Mils). The Top Coat shall completely cover the Base Coat including all seams and fasteners, around all penetrations, expansion joint covers, parapets and flashings.

Spray pattern shall overlap the previous pass to assure complete coverage of the roof area, seams, fasteners, penetrations, and terminations with approved Polyurea coating.

Applicator needs to figure losses due to over-spray, surface texture and wind and increase the gallons as needed to meet specifications.

Care shall be taken not to obstruct weep holes or drain holes in roof mounted ridge vent.

Restrict overspray from creating texture or discoloring adjoining finished sections. Wind direction should conduct overspray away from finished roofing surfaces.

**Repairs to New Polyurea Coating:**

Repairs shall be made using approved Polyurea coating or Manufacturer’s two-component repair material color matched and approved for that purpose.  Repair materials shall be covered by Manufacturer’s warranty.

All off ratio or improperly mix Polyurea shall be removed to the substrate.  The area shall be cleaned and primed per the Manufacturer’s written recommendations.

All blistered or winkled Polyurea shall be removed.  The area shall be cleaned and primed per the Manufacturer’s written recommendations.

Areas having less than the required TDM (Total Dry Mils) shall be cleaned and primed per the Manufacturer’s written recommendations.

The repair areas above shall be recoated at a minimum application rate of 1 gallon per 100 sq. ft. and shall achieve at least the minimum required TDM (Total Dry Mils).

Final repair shall match the surrounding roof area and not be conspicuous when seen from the ground, adjacent windows, building, or roof decks.

Spotted or “calico” appearance is unacceptable and will require the entire roof to be recoated.

Spray Equipment:

This product must be applied with plural component spray equipment. The proportioning pump should be a positive displacement type set up in a 1:1 ratio, capable of maintaining dynamic pressure of 1,500 psi and fluid temperatures of 150º F during the maximum output of the proportioner. Fluid spray hoses should be of the dual heated type with temperature controls capable of maintaining 150º F fluid temperatures the full length to the spray gun. The heated hose assembly must be insulated and be high-pressure type with designed working pressure to handle the maximum pressure delivered by the proportioner. The inside lining of the hose assembly must be of a material that is unaffected by the coating or solvents used for clean up. Contact Manufacturer for specific instructions and spray equipment recommendations.

All vertical surfaces to receive new coating materials shall be thoroughly cleaned of existing adhesives, sealants, bituminous materials, etc.

Verify that wood blocking, curbs and nailers are securely anchored, and that roof openings and penetrations are in place and set and braced. Verify that roof drains are properly clamped into position.

Verify that the substrate is clean, dry and free from sharp projections and depressions and that all surfaces and site conditions are ready to receive new materials.

[Additional Counterflashing:

Provide new like metal counterflashing per DFD detail at all existing roof top units and roof hatches where none exist.]

Complete installation of roof drain assembly on a daily basis. Provide new clamping ring-to-bowl hardware (bolts, clamps, etc.). Replace broken or otherwise unusable clamping rings. Replace broken or missing strainers with new cast iron strainers.

Temporary installation at drain bowl assemble shall not be allowed. Clamping rings and sealant shall be applied to assure a water tight installation.

Contractor shall rod and clean all drain bodies and piping to be clean and free of previous asphalt and coal tar system seepage and all other debris that may impede proper drainage.

All drains shall be made to be fully operable and free flowing and maintained in such condition throughout construction and after final drain bowl strainer re-installation.

Existing strainers are to receive two coats of Polyurea coating or equal after final installation of roof system.

Refasten all mechanical equipment and remount other rooftop equipment as necessary.

Ponding water is defined as standing water on the surface of the roof membrane after 72 hours of reasonable drying weather, after a rain.

**JOB COMPLETION**

Inspect completed roofing system and correct all defects to meet the specification and/or warranty requirements including a visual inspection for:

Transparent or thin areas: if areas appear to be undercoated, recoating may be needed to ensure final thickness to meet the Manufacturer’s specifications.

Delamination- Verify that all coated areas appear to be fully adhered to the substrate. A visual inspection looking for typical signs of poor adhesion such as flaking, blistering etc. should be made. Re-priming and/or recoating will be required if such areas are apparent.

Pin Holing- Certain job or site conditions may result in pin holing or out gassing during curing or pin holes in the substrate. Again, a visual inspection looking for typical signs of out gassing such as excessive pockmarks, pinholes etc. should be done.

Manufacturer representative may also inspect the completed roofing system and notify the Contractor and State of any defects in the application.

Restrict construction traffic and equipment movement on the completed roofing system to only essential personnel.

Provide appropriate protection against traffic and construction activities on completed roofs. Damage to the roof by other trades shall not be the responsibility of the Manufacturer Roofing Applicator.

**CLEANING**

Repair or replace defaced or disfigured finishes caused by work of this Section. In areas where finished surfaces are soiled by application of the Polyurea or any other source of soiling caused by work of this Section, consult manufacturer of surfaces for cleaning advice and conform to their instructions.

Over spray shall be completely removed from all areas to DFD satisfaction and surrounding area original conditions.

Over spray found on movable equipment and other property of those associated or not associated with the Facility, State or this project shall be removed and cleaned such that the property is brought back to its original condition.

Clean up all debris, excess materials, and equipment and remove from site.

**CONSTRUCTION VERIFICATION**

Contractor is responsible for utilizing the construction verification checklists supplied under specification Section 07 08 00 in accordance with the procedures defined for construction verification in Section 01 91 01 or 01 91 02.

\*\*\* END OF SECTION \*\*\*