DALLAS-FORT WORTH INTERNATIONAL AIRPORT

TERMINAL A ROOFING PROJECT

CONTRACT NO. 9500679
PERMIT NUMBER A18-375B

TECHNICAL SPECIFICATION BOOK
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Date: 09/30/2019

Discipline | Stamp | Signature
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Roof Engineer | [Stamp Image] | [Signature Image]

- END OF SECTION -
Incorporated into the Contract Documents will be the Dallas-Fort Worth International Airport Standard Specification Book Version 2, Published December 07, 2018, and can be found at https://www.dfwairport.com/business/solicitations.

Any Section marked as “Applicable” below is hereby incorporated into the Project Manual by reference. Any Section revised or a new Section to be added to supersede the above published document are as indicated and dated below and are hereby included in the Project Manual. Any Section included in the published book that are not included in the table below are not included in the Project Manual.

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– END OF SECTION –
The following items of the Technical Specification Book are amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

**Article 1.1 WORK COVERED BY CONTRACT DOCUMENTS** is replaced as follows:

1.1 WORK COVERED BY CONTRACT DOCUMENTS

The Work of this Contract comprises of removal of existing roofing and replacement with new roofing of Terminal A and associated work. Construction will be inside and outside the Airport’s Air Operations Area (AOA). The Contractor shall be responsible for reviewing all existing conditions associated with the Work prior to commencement of work activities.

A. **BASE BID**

The Scope of Work consists of removal of existing pavers including disposal as specified while protecting all structures, mechanical equipment, pipes, area dividers, expansion joints, existing roofing, and new roofing.

Remove existing flashings, counterflashings, termination bars, roof membrane, coverboard, insulation to the deck or existing BUR vapor retarder over the concrete deck. Prepare deck to receive new roofing. Remove debris, repair / prepare the deck in preparation for new work.

Repair / prepare, modify, construct, or demolish parapet walls, base flashing substrates, area dividers, expansion joints, unlike structural or architectural transitions, flashing height requirement conditions, taper systems, drain alterations, obstructions, exterior door heights in order to install new roofing system according to specifications, manufacturer requirements, DFW International Airport rules and regulations as specified, and adopted building codes.

Contractor required to make a deposit to DFW Airport (American Airlines) for key access, three (3) each. Refundable security deposit required is $5,000 per key upon return of undamaged keys.

1. The base bid consists of removal of existing roof and replacement with new roofing of Terminal A including work outlined above for areas outlined in Drawing Sheet A-004. Drawing Sheet A-005 lists the new roof systems and components. Drawing Sheet AS-101 lists the construction areas for Base Bid - Phase 1. Drawing Sheet AS-102 identifies Base Bid – Phase 1 Roof Sections.

B. **ALTERNATE #1**

The Scope of Work consists of removal of existing pavers including disposal as specified while protecting all structures, mechanical equipment, pipes, area dividers, expansion joints, existing roofing, and new roofing.

Remove existing flashings, counterflashings, termination bars, roof membrane, coverboard, insulation to the deck or existing BUR vapor retarder over the concrete deck. Prepare deck to receive new roofing. Remove debris, repair / prepare the deck in preparation for new work.
Repair / prepare, modify, construct, or demolish parapet walls, base flashing substrates, area dividers, expansion joints, unlike structural or architectural transitions, flashing height requirement conditions, taper systems, drain alterations, obstructions, exterior door heights in order to install new roofing system according to specifications, manufacturer requirements, DFW International Airport rules and regulations as specified, and adopted building codes.

Contractor required to make a deposit to DFW Airport (American Airlines) for key access, three (3) each. Refundable security deposit required is $5,000 per key upon return of undamaged keys.

1. Alternate #1 consists of removal of existing roof and replacement with new roofing of Terminal A including work outlined above for areas outlined in Drawing Sheet A-004. Drawing Sheet A-005 lists the new roof systems and components. Drawing Sheet AS-101 lists the construction areas for Alternate #1 - Phase 2. Drawing Sheet AS-102 identifies Alternate #1 – Phase 2 Roof Sections.

C. ALTERNATE #2

1. Alternate #2 bid consists of prepping existing specified metal and single ply roof areas to receive an elastomeric membrane roofing system including removal and replacement of wet materials.

D. ALTERNATE #3

1. Alternate #3 bid consists of cleaning and preparing concrete deck areas to receive an elastomeric membrane roofing system.

E. UNIT PRICE ITEMS

1. Unit Price items are items that may occur during the course of the project with immeasurable or uncertain quantity prior to construction. Payment shall be made for the Unit Price bid items listed below on the basis of the work actually performed and completed and approved by Owner, such work including but not limited to, the furnishing of all necessary labor, materials, equipment, tools, transportation, delivery, and disposal of waste and surplus material to complete the construction and installation of the work. Unit Price bid items are identified in Section 01 30 00 Allowances.

Article 1.3 CONTRACT TIME & SCHEDULE MILESTONEs is replaced as follows:

1.3 CONTRACT TIME & SCHEDULE MILESTONEs

A. The Contractor shall sequence and stage the Work in accordance with the requirements of the Contract Documents to meet the following interim requirements and Final Completion date.
1. **Milestone 1 / Phase 1**: This phase includes the completion of Phase 1 Roof as indicated on the plans. Phase 1 must be substantially completed the earlier of 365 days from Notice to Proceed or 01/15/2021.

   **B.** The Owner reserves the right to request the completion of work based on critical Milestones established in the Contract Documents.

   **C.** The Owner reserves the right to apply Liquidated Damages associated with the request for the completion of work based on critical Milestones.

**Article 1.4 HOURS OF WORK is replaced as follows:**

1.4 **HOURS OF WORK**

   **A.** The Work may be performed in all areas up to 24 hours a day, 7 days a week, as necessary to meet the Project completion dates. Construction lighting prohibited from shining on planes and airfield. Exceptions to work hours are as noted below.

   **B.** Exceptions to above work hours:

   1. Any Work within an aircraft parking apron and Object Free Area (OFA) of an active Taxiways or Taxilane will be restricted to the following:
      
      a. From 22:45 hours to 05:15 hours.
      
      b. Work activities within these areas may be canceled and the area reopened in the event of airfield emergencies, late airline complexes, and unforeseen conditions that could create significant delays to the Airport.

   2. There are two types of Holiday Blackout periods. One governs the area within the Air Operations Area (AOA) and the other holiday blackout periods governs the area outside of the Air Operations area. The following construction blackout dates are recognized for the Project:

      a. **Airfield Blackout Dates**
         
         1) No airfield closures or lighting circuit lockouts should be scheduled beginning at 2200 hours on Friday night, November 22, 2019, until 2200 hours on Monday night, December 2, 2019.
         
         2) No airfield closures or lighting circuit lockouts should be scheduled beginning at 2200 hours on Wednesday night, December 18, 2019, until 2200 hours on Thursday night, January 2, 2020.

      b. **Landside Blackout Dates**
         
         The following 2019 dates have been established as construction blackout dates in the landside and customer service areas. During the noted landside Holiday blackout dates any work that impacts ramp level operations, roadways, guests inside the terminals and non-emergency utility outage requests, will normally not be approved. Work and utility outages that do not impact stakeholder operations or have limited impact will be evaluated on a case by case basis during the blackout periods. The dates listed are the primary dates and others may follow:
• Spring Break – Thursday, Feb 28 at 00:00 am – Monday, March 18, 2019 at 11:59 pm

• Memorial Day – Thursday, May 23 at 00:00 am through Tuesday, May 28, 2019 at 11:59 pm

• July 4 – Thursday, June 27 at 00:00 am through Friday, July 5, 2019 at 11:59 pm

• Labor Day – Thursday, August 29 at 00:00 am through Tuesday, September 3, 2019 at 11:59 pm

• Thanksgiving – Thursday, November 21 at 00:00 am through Tuesday, December 3, 2019 at 11:59 pm

• Christmas/New Year – Friday, December 20 at 00:00 am through Thursday, January 2, 2020 at 11:59 pm

c. For all utility outages, a Utility Outage Request form must be submitted seven days in advance to Poweroutage@dfwairport.com. For power outage requests, all impacted panel schedules must be submitted with the request. Operations will review and if needed, coordinate a stakeholder meeting to discuss mitigation plans. One hour prior to all utility outages, the requestor must call the Airport Operations Center at 972-973-3112 one hour prior to the scheduled outage for a final go/no-go. The Utility Outage Request form may be found on https://www.dfwairport.com/operations/ or you may request a form from PowerOutage@dfwairport.com.
The following items of the Technical Specification Book are amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

Article 1.3 Wage Rates is revised to include the below current and applicable wage rate general decision(s):

1.3 WAGE RATES

General Decision Number: TX20190270 04/12/2019 TX270

Superseded General Decision Number: TX20180322

State: Texas

Construction Type: Building

County: Tarrant County in Texas.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.60 for calendar year 2019 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.60 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2019. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

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<th>Modification Number</th>
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<td>02/08/2019</td>
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<td>04/12/2019</td>
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ASBE0021-011 06/01/2016

Rates Fringes
ASBESTOS WORKER/HEAT & FROST INSULATOR (Duct, Pipe and Mechanical System Insulation)........$ 24.32
7.52

BOIL0074-003 01/01/2017

Rates Fringes

BOILERMAKER.................$ 28.00
22.35

CARP1421-002 04/01/2016

Rates Fringes

MILLWRIGHT.....................$ 26.60
8.65

ELEV0021-006 01/01/2019

Rates Fringes

ELEVATOR MECHANIC............$ 41.24
33.705

FOOTNOTES:
A. 6% under 5 years based on regular hourly rate for all hours worked. 8% over 5 years based on regular hourly rate for all hours worked.


ENGI0178-005 06/01/2014

Rates Fringes

POWER EQUIPMENT OPERATOR
(1) Tower Crane...............$ 29.00
10.60
(2) Cranes with Pile Driving or Caisson Attachment and Hydraulic Crane 60 tons and above.....$ 28.75
10.60
(3) Hydraulic cranes 59 Tons and under...............$ 27.50
10.60

IRON0263-005 06/01/2017

Rates Fringes

IRONWORKER (ORNAMENTAL AND STRUCTURAL).........................$ 23.25
7.32

PAIN0053-004 04/01/2014

Rates Fringes
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<tr>
<th>Occupation</th>
<th>Rate</th>
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<tbody>
<tr>
<td>Painter (Brush, Roller, and Spray, Excludes Drywall Finishing/Taping)</td>
<td>$16.40</td>
<td>5.45</td>
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<tr>
<td>Pipefitter (Excludes HVAC Pipe Installation)</td>
<td>$31.08</td>
<td>9.45</td>
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<tr>
<td>Bricklayer</td>
<td>$20.66</td>
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<tr>
<td>Carpenter, Excludes Drywall Hanging, Form Work, and Metal Stud Installation</td>
<td>$15.47</td>
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<td>Cement Mason/Concrete Finisher</td>
<td>$13.44</td>
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<td>Drywall Finisher/Taper</td>
<td>$16.24</td>
<td>3.94</td>
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<td>Drywall Hanger and Metal Stud Installer</td>
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<td>Electrician (Alarm Installation Only)</td>
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<td>Electrician (Low Voltage Wiring Only)</td>
<td>$14.88</td>
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<td>Electrician (Sound and Communication Systems Only)</td>
<td>$17.79</td>
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<td>Form Worker</td>
<td>$12.35</td>
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<td>Glazier</td>
<td>$16.61</td>
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<td>HVAC Mechanic (HVAC Unit Installation Only)</td>
<td>$22.39</td>
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<td>Installer - Siding (Metal/Aluminum/Vinyl)</td>
<td>$15.77</td>
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<td>Ironworker, Reinforcing</td>
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<td>Laborer: Common or General</td>
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<td>Laborer: Mason Tender - Brick</td>
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<td>Occupation</td>
<td>Wage Rate</td>
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<td><strong>LABORER:</strong> Mason Tender - Cement/Concrete</td>
<td>$10.81 0.00</td>
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<td><strong>LABORER:</strong> Pipelayer</td>
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<tr>
<td><strong>LABORER:</strong> Roof Tearoff</td>
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<tr>
<td><strong>LABORER:</strong> Landscape and Irrigation</td>
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<tr>
<td><strong>OPERATOR:</strong> Backhoe/Excavator/Trackhoe</td>
<td>$13.09 0.00</td>
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<tr>
<td><strong>OPERATOR:</strong> Bobcat/Skid Steer/Skid Loader</td>
<td>$13.93 0.00</td>
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<td><strong>OPERATOR:</strong> Bulldozer</td>
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<td><strong>OPERATOR:</strong> Drill</td>
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<td><strong>OPERATOR:</strong> Forklift</td>
<td>$14.20 0.00</td>
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<td><strong>OPERATOR:</strong> Grader/Blade</td>
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<td><strong>OPERATOR:</strong> Loader</td>
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<td><strong>OPERATOR:</strong> Mechanic</td>
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<tr>
<td><strong>OPERATOR:</strong> Paver (Asphalt, Aggregate, and Concrete)</td>
<td>$18.44 0.00</td>
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<td><strong>OPERATOR:</strong> Roller</td>
<td>$15.04 0.00</td>
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<tr>
<td><strong>PIPEFITTER</strong> (HVAC Pipe Installation Only)</td>
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<td><strong>PLASTERER</strong></td>
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<td><strong>PLUMBER, Excludes HVAC Pipe Installation</strong></td>
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<td><strong>ROOFER</strong></td>
<td>$15.70 0.58</td>
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<td><strong>SHEET METAL WORKER, Excludes HVAC Duct Installation</strong></td>
<td>$18.63 0.65</td>
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<tr>
<td><strong>SPRINKLER FITTER</strong> (Fire Sprinklers)</td>
<td>$19.27 3.68</td>
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<td><strong>TILE FINISHER</strong></td>
<td>$11.22 0.00</td>
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<tr>
<td><strong>TILE SETTER</strong></td>
<td>$12.00 0.00</td>
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WAGE RATE REQUIREMENTS
Section: 01 29 85

TRUCK DRIVER: Dump Truck........$ 12.39             1.18
TRUCK DRIVER: Flatbed Truck.....$ 19.65             8.57
TRUCK DRIVER: Semi-Trailer
Truck................................$ 12.50             0.00
TRUCK DRIVER: Water Truck.......$ 12.00             4.11
----------------------------------------------------------------

WELDERS - Receive rate prescribed for craft performing
operation to which welding is incidental.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave
for Federal Contractors applies to all contracts subject to the
Davis-Bacon Act for which the contract is awarded (and any
solicitation was issued) on or after January 1, 2017. If this
contract is covered by the EO, the contractor must provide
employees with 1 hour of paid sick leave for every 30 hours
they work, up to 56 hours of paid sick leave each year.
Employees must be permitted to use paid sick leave for their
own illness, injury or other health-related needs, including
preventive care; to assist a family member (or person who is
like family to the employee) who is ill, injured, or has other
health-related needs, including preventive care; or for reasons
resulting from, or to assist a family member (or person who is
like family to the employee) who is a victim of, domestic
violence, sexual assault, or stalking. Additional information
on contractor requirements and worker protections under the EO
is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within
the scope of the classifications listed may be added after
award only as provided in the labor standards contract clauses
(29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification
and wage rates that have been found to be prevailing for the
cited type(s) of construction in the area covered by the wage
determination. The classifications are listed in alphabetical
order of "identifiers" that indicate whether the particular
rate is a union rate (current union negotiated rate for local),
a survey rate (weighted average rate) or a union average rate
(weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed
in dotted lines beginning with characters other than "SU" or
"UAVG" denotes that the union classification and rate were
prevailing for that classification in the survey. Example:
PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS
1.) Has there been an initial decision in the matter? This can be:

- an existing published wage determination
- a survey underlying a wage determination
- a Wage and Hour Division letter setting forth a position on a wage determination matter
- a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

END OF GENERAL DECISION

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY
A. This Section covers the requirements and procedures if Allowances are included in the Contract.
B. Allowances are not included in the Lump Sum Base Bid for a Lump Sum contract.
C. Allowances have been set aside to complete elements of the Work that are within the general scope of work, but are not shown on the Plans or specified in the Specifications. Any and all unused portions of the stipulated Allowances will not be paid to the Contractor and shall be deducted from the Contract Amount at the Final Completion of the Project.
D. Use of any funds allotted to Allowances is only for the Work of the Project. while Allowances are considered to be within the original Scope of Work, such items could not have been reasonably anticipated based upon the information available at the time the cost estimate was established. Use of such funds is not to be construed as including upgrading or enlarging the Scope of Work of the Project and its use is at the sole discretion of the Owner.
E. All price quotes and scopes of work requested by the Owner through the Owner’s Authorized Representative (OAR) for each Allowance item of work, shall be provided to and approved by the OAR prior to the Contractor proceeding with any such work. The Contractor shall provide a price quote within seven (7) Calendar Days of receipt of request by the OAR.
F. The OAR will approve an Allowance item of work by issuance of a Change Order prior to the Contractor proceeding with such work. The Change Order will clearly define the Allowance item scope and agreed to pay amount.
G. Contract Time extensions may not be executed under this process, but within the Change Order process. Any adjustment to the Contract Time shall be in accordance with Section 01 32 16, Construction Progress Schedule.

1.2 ALLOWANCE SCOPE - GENERAL

OWNER’S ALLOWANCE (GENERAL) is $400,000.00. At the discretion of the Owner, the Owner’s Allowance may be used for the following:
A. Standby Time: This Allowance establishes means to compensate the Contractor for temporary disruptions to his work resulting from airfield operations. Any compensable disruptions, further identified as Standby Time, must be approved by the Owner through the OAR.
B. Differing Site Conditions: This Allowance establishes means to compensate the Contractor for changes in the various work areas/phases or Scope of Work as directed by the OAR to mitigate differing or unforeseen field conditions. The scope and associated compensation under this Allowance includes, but is not limited to:
   1. Additional demolition, relocation, or construction of necessary infrastructure to mitigate miscellaneous unforeseen conditions.
   2. Discovery of abandoned equipment, conduit, drain lines, and similar items above what is called out in the Base Bid.
3. Additional compensation to repair or replace unforeseen deteriorated deck conditions not included in the Contract Documents.

C. Supplemental Safety Measures: This Allowance establishes means to compensate the Contractor for all labor, equipment and material as may be required to procure, place, remove, and/or modify the airfield construction safety plan as deemed necessary by the OAR to make traffic flow and protect aircraft that include, but are not limited to:
   1. Barricades
   2. Haul Road signage and construction
   3. Sweepers

D. Part 139 Measures: When the Work of the Project includes airfield work, this Allowance also includes labor, equipment, and materials as may be required to address FAA Part 139 inspection items, not already included in the Contract Documents.

E. Unit Price Bid Items for Unforeseen Conditions
   1. Fencing on roof requested by the Owner for security purposes per Lineal Foot
   2. Detail A1/A528 - Metal Deck Replacement per Square Foot
   3. Metal Deck Rust Prep & Inhibitor per Square Foot
   4. Wet Materials Removal & Replacement per Square Foot
   5. Wood Nailers 2 x 4 per Board Foot
   6. Wood Nailer 2 x 6 per Board Foot
   7. Wood Nailer 2 x 12 per Board Foot
   8. CDX Plywood 4 x 8 x ½" per Sheet
   9. Cast Iron No-Hub Roof Drain Unit EA
   10. Cast Iron No-Hub Overflow Drain Unit EA
   11. Insulated Roof Drain Plumbing Lines per LF
   12. Situra RedLine Expansion Joint per Lineal Foot
   13. Detail B1/A-503 Vent Stack EA
   14. Detail B3/A-503 Pipe Penetration EA
   15. Detail A1/A-503 Curbed Fresh Air Intake/Exhaust EA
   17. Detail A3/A-503 Equipment Curb EA
   18. Detail B1/A-504 Attic Vent EA
   19. Detail A1/A-504 Conduit/Small Penetration EA
   20. Detail B1/A-506 Hot Pipe EA
   21. Deck Prep & Repair (Master Emaco T 1061) per SF
   22. RTU Demolition and Disposal per Unit, EA
   23. Detail B1/A-528 Walk Pads per LF
   24. Detail A3/A521 Crossover per LF
   25. Detail A2/A518 Non-penetrating Pipe Support w/Walk Pad EA
   26. Detail B1/A518 Non-penetrating Pipe Support w/Walk Pad EA
   27. Detail B3/A518 Non-penetrating Pipe & Conduit Support w/Walk Pad EA
ALLOWANCES
Section: 01 30 00

1.3 ALLOWANCE SCOPE – ASBESTOS MONITORING

OWNER’S ALLOWANCE (MONITORING/TESTING) is $10,000.00
OWNER’S ALLOWANCE (EXISTING CONDITIONS) is $400,000.00

A. This Allowance establishes means to compensate the Contractor for asbestos monitoring and existing conditions in various work areas of the Project as directed by the OAR.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used.

PART 4 – MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

Price quote and scope of work requested by the OAR for each Allowance item, shall be provided to and approved by the OAR prior to the Contractor proceeding with such work.

4.2 PAYMENT

Payment will be made under:

Pay Item 01 30 00-1 Standby Time
Pay Item 01 30 00-2 Unforeseen Field Conditions / Unit Price Bid Items
Pay Item 01 30 00-3 Supplemental Safety Measures
Pay Item 01 30 00-4 Asbestos Monitoring
Pay Item 01 30 00-5 Part 139 Measures

– END OF SECTION –
The following items of the Technical Specification Book are amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

Article 1.4 SAMPLES is replaced as follows:

1.2 SAMPLES

A. Sample Requirements:

1. Samples shall be submitted from the same source, which will supply the actual product on the Project. Provide samples of sufficient size to clearly illustrate quality, functional, finish characteristics of product, with integrally related parts and attachment devices and full range of color, texture and pattern. In no case shall the sample be less than 4 inches x 4 inches.

2. Where possible, all samples required for a particular Specification Section shall be submitted together. Manufactured products that generally degrade with time such as rubber, plastic, etc. shall have a production / assembly date of no more than 18 months prior to installation / assembly on the Project.

3. In the event that a range of variations in texture, graining, color or other characteristics may be anticipated in furnished materials, assemblies, or elements of the Work, a sufficient number of samples of such materials or products shall be submitted to indicate the full range of characteristics which will be present in the materials or products proposed for the Work. Any such materials or products delivered or erected prior to approval of full range samples shall be subject to rejection by the OAR.

4. Samples of materials or products, which are normally furnished in containers or packages, which bear descriptive labels or application or installation instructions, shall be submitted with such labels or instructions.

5. Identification: All samples shall be labeled, tagged, or otherwise clearly identified. Labels or tags shall set forth the Project name, building or buildings for which the sample is being submitted, Contractor, Subcontractor, supplier, the name of the manufacturer, fabricator, or processor, the trade designation, grade and quality of the material or product, the date of submittal, and specific identification of each sample and a precise reference to the Specification Section and paragraph in which the material, product, or element of the Work is specified. Each label or tag shall have sufficient clear space to permit the application of the approval stamps of the Contractor and the OAR or the Architect/Engineer as required.

6. Where appropriate, test data or manufacturers’ certificates shall be referenced in and forwarded with the letter of transmittal. Samples without accompanying certificates or test data will be returned without action.

B. Samples Submittal Procedure

1. The Contractor shall submit at least three (3) sets of each sample required to the Field Office or a site designated by the OAR.

2. Upon completion of review, the OAR will return one (1) sample of each set of samples to the Contractor.
3. Project Record Document Samples:
   a. Items requiring submittal for color, texture or finish selection shall be included in Record Document Finish Manual in accordance with Section 01 78 39.
   b. A sample of selected color, texture or finish shall be provided on sample chip at least 4 inches x 4 inches, suitable for adhering to cardboard page in Record Document Finish Manual.
   c. Record sample shall match actual material installed.
   d. The Contractor shall prepare record samples, assemble on pages, and submit in accordance with Section 01 78 39.
   e. The Contractor shall submit two (2) copies of the Record Document Finish Manual.

Article 1.6 COORDINATION DRAWINGS is replaced as follows:

1.6 COORDINATION DRAWINGS
A. Coordination of Drawing Submittal Procedures:
   1. Coordination drawings for each work area shall be submitted and approved before shop drawings are submitted. Shop Drawings submitted before coordination drawings have been approved will be returned without comment and marked “NOT ACCEPTED”. Any resulting delays will be the responsibility of the Contractor.
   2. A minimum of three (3) weeks before materials are fabricated or work begun, submit complete coordination drawings prepared using 1/4” minimum scale with congested areas at 3/8” minimum scale. Submit total roofing, piping, ductwork, electrical wiring, lighting, plumbing, and HVAC coordination drawings.
   3. The Contractor shall be solely responsible for coordination of the Work. Every Subcontractor shall be responsible for coordination of its portions of the Work with the Contractor and with each affected trade.
   4. The Contractor shall schedule coordination meeting with Subcontractors to coordinate the Work for each work area. After coordination and corrections, each Subcontractor shall sign the originals of the coordination drawings. The Contractor shall submit coordination drawings to OAR for review indicating all conflicts that could not be resolved in coordination meeting. After review and approval by OAR or Architect/Engineer, the Contractor shall prepare shop drawings for each separate discipline, as required.
   5. The Contractor shall prepare coordination drawings from drawings provided by the Subcontractors as follows:
      a. Each Subcontractor shall prepare original drawings showing the respective work, layout, and type of the new and existing systems and lines along with supporting details of the new materials and systems including how the new work is integrated into the existing conditions. The submittal shall include any manufacturer’s specification sheets for any
associated equipment. The Subcontractor shall certify the drawings with the Subcontractor’s signature prior to forwarding to the Contractor.

6. The Contractor shall resolve conflicts between the submittals of the Subcontractors prior to submission.

7. The coordination drawings are for the OAR, Construction Manager (CM), and Contractor’s use during construction and shall not be construed as replacing shop drawings or other Project Record Documents required by Contract Documents.

8. The review of coordination drawings by the OAR, CM, or Architect/Engineer shall not relieve the Contractor from the overall responsibility for coordination of the Work performed pursuant to the Contract.

9. Electronic media copies of CAD architectural or engineering data may be obtained from the Architect/Engineer upon approval of the OAR, for the express purpose of preparation of in-house coordination drawings or to use as the basis for preparing the Contractor and Subcontractor shop drawings by executing the required Release Form.

10. Provision of this CAD data is subject to both the terms described in this Section and on the Release Form.

11. The Contractor shall prepare composite shop drawings and installation layouts when necessary or requested to depict proposed solutions for field conditions. Coordinate in the field and with affected Subcontractors for proper relationship to the work of other Subcontractors based on field conditions.

Article 2.1 GENERAL SUBMITTAL PROCEDURES is replaced as follows:

2.1 GENERAL SUBMITTAL PROCEDURES

A. The Contractor shall provide submittals promptly in accordance with approved schedule of submittals and in such sequence as to cause no delay in the Work. Only the Contractor shall submit submittals to the OAR or Architect/Engineer unless specifically approved by the OAR. The Contractor shall provide submittals using the approved Skire Unifier software application unless otherwise noted or directed by the OAR.

B. The Contractor shall submit and upload shop drawings, and product data for roofing, mechanical, and electrical systems work using the Skire Unifier software application. The submittal shall be provided with a letter of transmittal contained within the approved Skire Unifier software application.

C. The Contractor shall submit product samples for roof materials and related accessories, electrical, and mechanical work in the original packaging to the OAR. The submittal shall be provided with a paper letter of transmittal along with the sample submission.

D. Any deviation from the Contract Documents shall be noted by the Contractor on the submittal with a detailed description of the deviation. Such a notation does not relieve the Contractor from complying with the requirements for a Substitution in accordance with Section 01 25 13.
E. The Contractor shall not be relieved of responsibility for deviations in submittals from requirements of Contract Documents by the review of the OAR or Architect/Engineer unless the response provides specific written acceptance of the specific deviation.

- END OF SECTION -
The following items of the Technical Specification Book are amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

Article 3.1 TESTING COORDINATION is replaced as follows:

3.1 TESTING COORDINATION

A. The Contractor shall provide, on a weekly basis, an anticipated inspection schedule, coordinated with the Construction Schedule, showing the anticipated Quality Assurance inspection needs for the following three (3) weeks to facilitate appropriate coordination and mobilization of required personnel.

B. The Contractor shall provide notice to each party at least two (2) Working Days prior to any Quality Assurance inspection or testing obligation for modifications from the provided schedule.

C. The Contractor shall coordinate the sequence of activities to accommodate required Quality Assurance observation and testing services with a minimum of delay.

D. The Contractor shall coordinate activities to avoid the necessity of removing and replacing construction to accommodate for any inspections and tests.

E. The Contractor shall provide adequate access of the Owner’s personnel and the Testing Laboratory personnel to the Work so that any Quality Assurance inspection, observation, and/or sample may be obtained from the Work area.

F. The Contractor shall cooperate with the CM, the Testing Laboratory, and any other Owner’s personnel to perform any required Quality Assurance inspection, observation, test, or similar service, and shall provide reasonable auxiliary service to such parties as requested.

G. The Contractor shall schedule and coordinate ACM asbestos testing with DFW EAD.

H. Primary roofing materials shall be available at the jobsite a minimum of two (2) weeks prior to project start. The Designer of Record or Owner’s representative may randomly select two (2) rolls each of the specified base and finish plies for empirical confirmation by an independent testing laboratory verifying the products conform to the values listed on manufacturer’s published product data sheet. Substandard test materials not meeting the physical/mechanical properties listed on manufacturer’s published product data sheets shall be considered representative of the entire lot of material provided. At no additional cost to the Owner, the substandard materials shall be marked, then removed from the job site, and replaced by the Contractor with manufacturer’s products meeting the specified requirements.

- END OF SECTION -
The following items of the Technical Specification Book are amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

Article 1.1 is replaced as follows:

1.1 This section includes the requirements of the temporary facilities and controls required on the Project.

A. Temporary utilities:
   1. The temporary utilities include providing electrical service, lighting, heating, cooling and ventilation, telephone, water, and sanitary facilities for the Project.
   2. The temporary facilities may include the use of existing system as applicable.
   3. The Contractor shall be responsible for installation, retrofitting, restoration, operation, and maintenance throughout the Project period and removal of the systems at the end of the Project.

B. The Owner will provide a location, shown on the project plans, for an enclosed space at the project site to be used by the Contractor as an office field for the duration of the project. Location of portable restroom facilities shall be approved by Owner.

C. If the Contractor requires additional office space, the Contractor shall install, remove, and replace temporary construction barricades as required as part of the Work in accordance with the contract documents.

D. The Contractor shall be responsible for the control of dust on the Project site as well as temporary erosion and pollution controls.

Article 1.6 COST OF TEMPORARY FACILITIES is replaced as follows:

1.6 COST OF TEMPORARY FACILITIES

A. The Contractor shall pay for the cost of the following:
   1. Permits and inspections unless otherwise provided for in the Contract.
   2. Installation of temporary utilities, materials, operation, maintenance and removal.
   3. Energy consumed until beneficial occupancy unless provided for in Contract.
   4. Fuel consumed by portable units.
   5. Water used throughout the Contract.

NOTE: The cost for a 2” meter and RPZ will be $2,500.00. The impact fee for a 2” tap is $3,700.00. Water will be billed to Contractor at the rate of $4.45 per
1,000 gallons used for both treated water and reclaimed water. Sewer will be billed to Contractor at the rate of $3.25 per 1,000 gallons.

B. The Owner will pay the cost for the following:

1. Fuel consumed in use of existing systems, except for fuel consumed by portable units.

2. Temporary easements required across property outside the Owner's property.

- END OF SECTION -
The following items of the Technical Specification Book are amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

Article 1.1 SUMMARY is replaced as follows:

1.1 SUMMARY

This Section includes the requirements for the construction signage on the Project site including temporary informational signs, regulatory signs, and warning signs as required for the Project. Project requires only safety and traffic signs as necessary.

- END OF SECTION -
The following items of the Technical Specification Book are amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

Article 3.1 TESTING COORDINATION is replaced as follows:

1.1 GENERAL
This Section covers the requirements for the maintenance and repair of existing Haul Road(s) required for the Project.

3.1 NEW HAUL ROAD – Delete paragraph.

- END OF SECTION -
The following items of the Technical Specification Book are amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

Article 1.2 SUMMARY is replaced as follows:

1.2 SUMMARY
   A. The staging area(s) for the Project shall be assigned by the Airport Environmental Affairs Department (EAD) if shown on the Plans.
   B. The staging area on the Airport shall not be used for the storage of chemicals, materials, and equipment related to any Contractor’s off-site work.
   C. The Contractor shall submit an Erosion Control Plan (ECP) and a Storm Water Pollution Prevention Plan (SWPPP) to the Owner’s Authorized Representative (OAR) if the staging area(s) is/are not already included in the Plans ECP or SWPPP.
   D. The Contractor shall comply with the EAD Administrative Policy Staging Yard Authorization and Utilization procedures, the International Building Code 2015 (IBC), and the International Fire Code 2015 (IFC) and Local Amendments.

Article 3.2 MAINTENANCE OF STAGING AREA is replaced as follows:

3.2 MAINTENANCE OF STAGING AREA
   The Contractor shall maintain the staging area throughout the Project including, but not limited to the following:
   A. Maintain the perimeter fence in good repair and proper alignment.
   B. Comply with IFC Chapter 3 which includes the following general precautions against fire: maintain vegetation, establish designated Smoking Areas, post No Smoking signs, provide orderly storage, and remove construction debris, waste, and packing materials from the staging area before it becomes a nuisance / fire hazard.
   C. Check the staging area daily for spills, standing water, and other sources of contamination. Immediately implement reporting and removal procedures when found in accordance with Section 01 57 19.13.
   D. Properly clean dirt or mud that becomes tracked out of staging area onto paved or surfaced roadways as soon as possible and no later than the same Working Day and eliminate the source of the tracking material.
   E. Maintain all-weather roads to ensure emergency equipment access to structures, equipment, and material storage areas. Repair potholes and ruts as they are identified and no later than 72 hours after identification.

Article 3.3 RESTORATION OF STAGING AREA is replaced as follows:

3.3 RESTORATION OF STAGING AREA
   At the end of the Project, the Contractor shall restore the staging area at Substantial Completion to its pre-existing condition, or as otherwise directed by the OAR, by performing the following:
A. Remove all structures, materials and equipment from within the staging area.
B. Remove all fencing and fence posts completely or as otherwise directed by the OAR.
C. Fill in all holes and depressions.
D. Remove all gravel and apply equal inches of clean top soil and seeding as needed to restore the site to a stabilized condition or as otherwise directed by the OAR.

- END OF SECTION -
The following items of the Technical Specification Book are amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

Article 3.1 FINAL CLEANING is replaced as follows:

3.1 FINAL CLEANING

A. General:
   1. Clean each surface or unit of Work to the condition expected from a commercial building cleaning and maintenance program using experienced workers or professional cleaners and complying with manufacturer's cleaning instructions.
   2. Complete cleaning operations and conduct an examination of all Work areas with the Owner’s Authorized Representative (OAR) before requesting inspection for Substantial Completion.

B. Remove grease, petroleum or chemical spills, mastic, adhesives, dust, dirt, stains, fingerprints, labels, lubricants and other foreign materials from visible interior and exterior surfaces.

C. Remove temporary protection and labels.

D. Clean and polish transparent, reflective, and glossy surfaces to a clear shine.

E. Clean sealed joints.

F. Clean permanent filters of ventilating equipment and replace disposable filters when units have been operated during construction. Clean ducts, blowers, and coils if units have been operated without filters during construction.

G. Maintain clean condition on the Project site until Final Acceptance.

H. Remove waste, foreign matter and debris from roofs, gutters, areaways and drainage systems. Flush roof drainage system with water until clear.

I. Remove waste, debris and surplus materials from the Project site. Clean grounds; remove stains, spills, and foreign substances from paved areas and sweep clean. Rake clean other exterior surfaces.

- END OF SECTION -
The following items of the Technical Specification Book are amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

Article 3.1 PROTECTION OF NEWLY INSTALLED WORK is replaced as follows:

3.1 PROTECTION OF NEWLY INSTALLED WORK

The Contractor shall protect all installed work until Final Acceptance of the Project by the Owner using appropriate and effective means including, but not limited to, the following:

A. Restrict construction workers and traffic from completed and protected areas.

B. Prohibit all unnecessary traffic and storage from surfaces covered by roofing or waterproofing.

C. Provide adequate resilient protection and durable work platforms over all surfaces covered by roofing or waterproofing.

D. Provide clean, smooth plywood, or finished wood boards under all ladders, staging, or scaffolding placed on roofing and waterproofing.

E. Protect all finished surfaces including, but not limited to, door frames, doors, glass, floors, walls, ceilings, soffits, corners, fixtures, furnishings, equipment, and other finished surfaces and work.

1. Provide at least paper or plastic protection. In all locations of frequent traffic and all locations subject to moving objects whether wheeled or not, provide temporary plywood or fiber board walkways. Use only non-marking rubber tired carts, dollies, and wagons. Provide temporary plywood or boards under all materials stored over finished roof surfaces.

2. In addition to other acceptance criteria required by the Contract Documents, all finished surface shall be in acceptable condition at time of Final Acceptance by the Owner. Repair or replace all damaged materials as needed to achieve this requirement at no additional cost to the Owner.

F. Effectively protect all porous materials including, without limitation, gypsum board, insulation, ceiling tiles and panels, and other fibrous and water-susceptible materials from becoming wet or moisture damaged.

1. Remove and replace any portion of the Work which becomes water or moisture damaged.

2. Remove and replace any portion of the Work which shows evidence of biological growth, mold, and mildew.

- END OF SECTION -
The following items of the Technical Specification Book are amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

Article 1.2 SUBMITTALS is replaced as follows:

1.2 SUBMITTALS
   A. The Contractor shall submit a proposed outline and syllabus for each instruction session to the OAR for approval, a maximum of twenty (20) Calendar Days and no less than ten (10) Calendar Days before scheduled date of instruction. Indicate the list of topics to be covered and identify training and visual aids, which will be used.
   B. Submit complete record of instructions as part of Maintenance Data given to Owner. For each instructional period, supply following data:
      1. Date of Training.
      2. Date of Submittal.
      4. Names of instructors and affiliation.
      5. All participants present at the training.

Article 1.3 QUALITY ASSURANCE is replaced as follows:

1.1 QUALITY ASSURANCE
   The Contractor shall arrange for services of qualified manufacturer’s representatives who are knowledgeable about the product to instruct the OAR and other Owner’s personnel on proper maintenance of the roof system(s).

Article 2.1 INSTRUCTION PROGRAM is replaced as follows:

2.1 INSTRUCTION PROGRAM
   A. The Contractor shall furnish a minimum of five (5) draft Maintenance Manuals for the classroom instruction that shall be pertinent to the subject being covered and the approved syllabus.
   B. The Maintenance Manual(s) shall constitute the basis of instruction. Review contents of the manual with the Owner’s personnel in full detail to explain all aspects of maintenance.
      Prepare and insert additional data sheets as required in the Maintenance Manual(s) when it becomes apparent during instruction that it is needed as directed by the OAR.
Article 3.1 INSTRUCTION TO OWNER’S PERSONNEL is replaced as follows:

3.1 INSTRUCTION TO OWNER’S PERSONNEL

A. Prior to the date of Project Substantial Completion, the Contractor shall instruct the OAR and other Owner’s designated operating and maintenance personnel in maintenance of systems at agreed schedule.

- END OF SECTION -
PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes: Selective removal and subsequent disposal of concrete pavers, roofing materials, cover boards, insulation, associated flashing, and wood blocking. Work also includes temporary removal of existing mechanical, electrical equipment, associated piping and conduit as required.

1. Extent of demolition work is indicated on the contract drawings and in the project manual.

2. Coordinate concrete paver disposal with Warehouse Lead Salvage Yard Procurement and Materials Management. Contact Roberto Rodriguez, robrodriguez@dfwairport.com, Telephone (972) 973-5633, Mobile (817) 689-4854, Fax (972) 574-9983, Website www.dfwairport.com

3. Coordinate disconnects of temporary and/or permanent removal of existing mechanical units with the Fire Marshal.

4. Do not block or restrict egress points from the roof. Coordinate egress points with the Fire Marshal.

1.2 RELATED SECTIONS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.3 REFERENCE STANDARDS

A. Code of Federal Regulations (CFR)
   1. 29 CFR part 1910 Occupational Safety and Health Standards.
   2. 29 CFR part 1926 Safety and Health Regulations for Construction.

1.4 SUBMITTALS

A. Record Documents

1. Schedule indicating proposed Sequence of Operations for selective demolition work to the DFW Construction Manager for review prior to start of Work. Include coordination for shutoff, capping, and continuation of utility services as required, together with details for dust and noise control protection.

   a. Provide detailed sequence of demolition and removal work to ensure uninterrupted progress of DFW Airport on-site operations.

   b. Coordinate with the DFW Construction Manager concerning continuing operation and class schedule for interruption of utility services as required.

   c. Contractor to contact Fire Marshal prior to disconnecting mechanical units. Provide documentation of contact and approval to proceed from Fire Marshal.
2. Photographs of existing conditions of structure surfaces, equipment, and adjacent improvements which may be misconstrued as damage related to removal operations. File notice with DFW Construction Manager prior to start of Work. Provide minimum of 72 hours advance notice to Owner and A/E of demolition activities that will affect Owner's normal operations.

3. Spill and Waste Plans
   a. Provide Spill and Waste Plans for demolition operations and debris removal.


1.5 PROJECT CONDITIONS

A. Conduct selective demolition operations and debris removal to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.

1. Do not close, block, or otherwise obstruct streets, walks, airport operation areas or other occupied or used facilities without written permission from the DFW Construction Manager. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

B. Maintain existing utilities in service and protect them against damage during demolition operations. Coordinate with local utilities service providers for any shut-downs and/or disruptions of services prior to any occurrences.

C. Maintain fire protection during selective demolition operations.

D. Use standard methods to limit dust and dirt migration. Comply with governing regulations pertaining to environmental protection.

1. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, and pollution.


PART 2: PRODUCTS

Not Used.

PART 3: EXECUTION

3.1 EXAMINATION

A. Survey existing conditions prior to beginning on-site demolition operations.

1. Provide written survey information to the DFW Construction Manager with pictures showing existing conditions. Note any condition which may be misconstrued as damage attributable to the contractor.
2. Submit plan showing schedule and process for removing existing roof membrane and utilities outages for each area. Plan should account for Owner’s use of site and class schedule.

3.2 INSTALLATION

A. Conduct demolition in a systematic fashion to prevent injury to people and damage to existing systems and new finishes. Provide protection measures to prevent damage.

B. Provide temporary weather protection intervals between demolition and installation of new construction. Protect the interior building envelope to ensure no water leakage and damage.

3.3 DEMOLITION

A. Use such methods as required to complete Work indicated on Drawings in accordance with demolition schedule and governing regulations.

1. Remove roofing in sections where as new roofing membrane can be installed and waterproofed in the same day.

2. Promptly remove debris to avoid imposing excessive loads on supporting roof structure.

B. If unanticipated mechanical, electrical, or structural elements conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to Owner’s Representative in written, accurate detail. Pending receipt of directive from Owner’s Representative, rearrange selective demolition schedule as necessary to continue overall job progress without undue delay.

3.4 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove from building site debris, rubbish, and other materials resulting from demolition operations. Transport and legally dispose off-site.

1. If hazardous materials are encountered during demolition operations, comply with applicable regulations, laws, and ordinances concerning removal, handling, and protection against exposure or environmental pollution.

2. Burning of removed materials is not permitted on the project site.

3.5 CLEANUP AND REPAIR

A. Upon completion of demolition Work, remove tools, equipment, and demolished materials from the Project Site.

B. Repair demolition performed in excess of that required. Return elements of construction and surfaces to remain in condition existing prior to start operations. Repair adjacent construction or surfaces soiled or damaged by selective demolition work.

C. Reposition and reconnect mechanical and electrical equipment and associated piping and conduit to its original working order. Test all reconnected equipment
in the presence of the Owner’s representative. Extend ductwork to accommodate the additional curb height. Flashing height shall measure a minimum of 8” above finished roof membrane surface.

- END OF SECTION -
PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Application of 1-component, shrinkage-compensated, cement-based mortar with extended working time, designed for repairing horizontal concrete surfaces.

B. Related Sections:
   1. Section 06 10 00 – Miscellaneous Carpentry.
   2. Section 07 52 16 – SBS Modified Bituminous Membrane Roofing.

1.2 SUBMITTALS

A. Comply with Section 01 33 23.
B. Product Data: Submit manufacturer's technical data sheets.
C. Submit list of project references as documented in this Specification under Quality Assurance Article. Include contact name and phone number of person charged with oversight of each project.
D. Quality Control Submittals:
   1. Provide protection plan of surrounding areas and non-cementitious surfaces.

1.3 QUALITY ASSURANCE

A. Qualifications
   1. Manufacturer Qualifications: Company with minimum 15 years of experience in manufacturing of specified products.
   3. Applicator Qualifications: Company with minimum of 5 years experience in application of specified products on projects of similar size and scope, and is acceptable to product manufacturer.
      a. Successful completion of a minimum of 5 projects of similar size and complexity to specified Work.

B. Field Sample
   1. Install at Project site or pre-selected area of building an area for field sample, minimum 4 feet by 4 feet (1.2 m by 1.2 m), using specified repair mortar.
   2. Apply material in accordance with manufacturer’s written application instructions.
   3. Manufacturer’s representative or designated representative will review technical aspects, surface preparation, repair, and workmanship.
4. Field sample will be standard for judging workmanship on remainder of Project.
5. Maintain field sample during construction for workmanship comparison.
6. Do not alter, move, or destroy field sample until Work is completed and approved by A/E.
7. Obtain A/E’s written approval of field sample before start of material application, including approval of aesthetics, color, texture, and appearance.

1.4 DELIVERY, STORAGE, AND HANDLING
A. Comply with Section 01 66 00.
B. Comply with manufacturer’s ordering instructions and lead-time requirements to avoid construction delays.
C. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
D. Store tightly sealed materials off ground and away from moisture, direct sunlight, extreme heat, and freezing temperatures.

1.5 PROJECT CONDITIONS
A. Environmental Requirements:
   1. Ensure that substrate surface and ambient air temperature are minimum of 50 degrees F (10 degrees C) and rising at application time and remain above 50 degrees F (10 degrees C) for at least 24 hours after application.
   2. Ensure that frost or frozen surfaces are thawed and dry.
   3. Do not apply material if snow, rain, fog, or mist is anticipated within 12 hours after application.
   4. Allow surfaces to attain temperature and conditions specified before proceeding with mortar application.

PART 2 – PRODUCTS
2.1 MANUFACTURERS
A. Subject to compliance with requirements, provide products from the following manufacturer:
   1. BASF Corporation
      Construction Chemicals
      889 Valley Park Drive
      Shakopee, MN  55379
      Customer Service:  800- 433-9517
      Technical Service:  800-243-6739
      Direct Phone:  952-496-6000
      Internet: www.master-builders-solutions.BASF.us
B. Substitutions: As approved by A/E only.
C. Specifications and Drawings are based on manufacturer’s proprietary literature from BASF. Other manufacturers shall comply with minimum levels of material
and detailing indicated in Specifications or on Drawings. A/E will be sole judge of appropriateness of substitutions.

2.2 MATERIALS

A. One-component, shrinkage-compensated, cement-based mortar with extended working time for repairing horizontal concrete surfaces.
   1. Acceptable Product: MasterEmaco T 1061 – DR by BASF.

B. Performance Requirements: Provide mortar material complying with the following requirements:
   1. Compliance: ASTM C928
   2. Fresh Wet Density, ASTM C138
      a. 130 pounds per cubic foot (2,082 kg/m3).
   4. Compressive Strength, ASTM C109, 2-inch (51-mm) cubes:
      a. 3 Hours: 3,000 psi (21 MPa).
      b. 1 Day: 6,000 psi (41 MPa).
      c. 28 Days: 8,000 psi (55 MPa).
   5. Compressive Strength, ASTM C39, 3-inch by 6-inch (76-mm by 152-mm) cylinders:
      a. 28 Days: 7,400 psi (51 MPa).
   6. Set Time, ASTM C191, 72 degrees F (22 degrees C):
      a. Initial: 50 minutes.
      b. Final: 80 minutes.
   7. Flexural Strength, ASTM C348:
      a. 1 Day: 700 psi (5 MPa).
      b. 28 Days: 850 psi (6 MPa).
   8. Modulus of Elasticity, ASTM C469:
      a. 4.6 x 106 psi (32 GPa).
   9. Splitting Tensile Strength, ASTM C496:
      a. 1 Day: 400 psi (3 MPa).
      b. 28 Days: 450 psi (3 MPa).
   10. Freeze-Thaw Resistance, ASTM C666, Procedure A, at 300 cycles:
      a. 100 percent relative dynamic modulus.
   11. Scaling Resistance, ASTM C672, at 25 cycles:
      a. Zero rating; no scaling.
   12. Slant Shear Bond Strength, ASTM C882, Modified:
      a. 1 Day: 2,300 psi (16 MPa).
b. 28 Days: 2,600 psi (18 MPa).

13. Length Change, ASTM C928:
   a. Drying Shrinkage: Minus 0.05 percent.
   b. Wetting Expansion: Plus 0.03 percent.

14. Rapid Chloride Permeability, ASTM C1202:
   a. Less than 300 Coulombs.

15. Coefficient of Thermal Expansion, CRD C39:
   a. 6.8 x 10^-6 in/in/°F (12.6 x 10^-6 cm/cm/°C).

16. VOC Content:
   a. 0 lbs per gal (0 g/L), less water and exempt solvents.

PART 3 – EXECUTION

3.1 EXAMINATION
   A. Verify concrete substrate is structurally sound and fully cured (28 days).

3.2 SURFACE PREPARATION
   A. Protection: Protect adjacent Work areas and finish surfaces from damage during repair mortar application.
   B. Prepare surfaces in accordance with manufacturer’s instructions. Replace damaged or deteriorated areas of concrete.
   C. Concrete
      1. Ensure concrete is structurally sound and fully cured (28 days).
      2. Saw cut perimeter of area being patched into square with minimum depth of 1/2 inch (13 mm).
      3. Remove unsound concrete and roughen surface to minimum 1/4 inch (6 mm) profile amplitude.
      4. Remove laitance, oil, grease, curing compounds, and other contaminants that could prevent adequate bond.
      5. Saturate concrete substrate to saturated surface-dry (SSD), without standing water, before application.
   D. Reinforcing Steel
      1. Remove oxidation and scale from exposed reinforcing steel per ICRI Technical Guideline No. 03730 “Guide to Surface Preparation for the Repair of Deteriorated Concrete Resulting from Reinforcing Steel Corrosion.”
      2. To prevent future steel corrosion, coat prepared reinforcing steel with MasterProtect P 8100 AP (formerly Zincrich Rebar Primer).

3.3 MIXING
   A. Mix materials in accordance with manufacturer’s instructions.
B. Mix continuously at slow speed to avoid air entrainment.
C. Mix for minimum of 3 minutes until fully homogeneous.
D. Add aggregate extension, if required, in accordance with manufacturer’s instructions.
E. Mix no more material than can be placed in 20 to 30 minutes at 70 degrees F (21 degrees C) and 50 percent relative humidity.

3.4 APPLICATION
A. Place and cure mortar in accordance with manufacturer’s instructions.
B. Placement
   1. Dampen surface with clean water to obtain saturated surface-dry (SSD) with no standing water.
   2. Ensure proper consolidation of mortar and compaction around reinforcing steel.
   3. Apply patching compound in minimum lifts of 1/2 inch (13 mm). For lifts greater than 1/2 inch (13 mm), extend mortar material with washed, graded, 3/8 inch (10 mm), low-absorption, saturated surface-dry aggregate at mortar manufacturer’s recommended rates.
   4. Finish completed repair, as required, taking care not to overwork surface.
   5. Allow maximum of 30 minutes to mix, place, and finish mortar at 70 degrees F (21 degrees C).
C. Curing
   1. Cure mortar immediately after finishing.
   2. Use water-based curing compound that complies with ASTM C309.

3.5 PROTECTION
A. Protect repair mortar from damage during construction.

– END OF SECTION –
PART 1 - GENERAL

1.1 SUMMARY
A. This Section covers furnishing of all labor, materials, equipment, tools, supervision, and incidentals necessary for seeding or sodding. Turf materials must address the elimination and/or mitigation of materials that could attract hazardous wildlife on and/or around an airport.

1.2 REFERENCES
A. Federal Aviation Administration (FAA) Advisory Circular 150/5200-33A, Hazardous wildlife Attractants on or Near Airports
B. FAA Advisory Circular 150/5370-10G, Standards for Specifying Construction of Airports (Specifically Part 10, Turfing)
D. Texas Commission on Environmental Quality (TCEQ) Stormwater Construction General Permit TXR150000 (specifically Final Stabilization criteria)
E. TxDOT approved product list: https://www.txdot.gov/business/resources/erosion-control.html

1.3 DEFINITIONS
A. Adequate Grass Stand (FAA): A good stand of grass of uniform color and density, and when unviable or bare spots are one square foot or less, randomly dispersed, and do not exceed 3% of the area sodded.
B. Airside: The airside consists of all areas within the AOA fence at the completion of the project, all areas extending 20 ft from the AOA fence, and all Runway Protection Zones (RPZ).
C. Cool season: The cool season is October 1st through March 31st.
D. Final Stabilization (TCEQ): All soil disturbing activities at the site have been completed and uniform (evenly distributed without large bare areas) perennial vegetative cover with a density of at least 70% approved vegetative cover for the area has been established on all unpaved areas and areas not covered by permanent structures. In addition, Airside areas have established "Adequate Grass Stand".
E. Non-public area: All non-Airside areas greater than 30 feet from a leased area, not mowed, and not landscaped.

F. Permanent Seed: approved perennial grass species/varieties for final stabilization

G. PLS: Pure Live Seed (Purity x Germination / 100 = PLS)

H. Public area: All non-Airside areas within 30 feet of a leased area, mowed, or landscaped.

I. Sun Area: An area receiving greater than 4 hours of direct sunlight daily.

J. Shade area: An area receiving 4 or less hours of direct sunlight daily.

K. Temporary Seed: approved annual grass species/varieties

L. TxDOT: Texas Department of Transportation

M. Warm season: The warm season is April 1st through September 30th.

1.4 SUBMITTALS

A. Seed/Sod Plan: Submit a seed/sod plan for approval. Plan shall include number of acres/square yards to seed/sod, application method, grass species/varietal latin name, supplier name and location, sod type/quality designation, seed vendor certification, total quantity of seed to be applied, tackifier SDS, mulch selected from TxDOT approved list, soil retention blanket selected from TxDOT approved list, soil retention blanket's manufacturer installation instructions, topsoil source and quantity.

B. Fertilizer Plan: Submit a fertilizer plan for approval. The plan shall include the soil analysis laboratory results, laboratory fertilizer recommendation based on soil results and grass species/varietal, proposed fertilizer mix and application rate.

PART 2 – PRODUCTS

2.1 SEED

A. Provide and install seed as shown on the plans or as directed by OAR. All seed must be from previous season’s crop and meet the requirement of the Texas Seed Law.

B. All seed weight shall be per PLS pounds. Minimum application rate is indicated per acre.
C. Only seed meeting the land use, season, and sun exposure requirements may be applied. Refer to charts below for permanent and temporary seed options. Seed shall be applied at the application rate specified in the table below.

### PERMANENT SEED OPTIONS

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Season During Application</th>
<th>Sun Exposure</th>
<th>Minimum Application Rate</th>
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<tbody>
<tr>
<td></td>
<td>Warm</td>
<td>Cold</td>
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</table>

### TEMPORARY SEED OPTIONS

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Season During Application</th>
<th>Sun Exposure</th>
<th>Application Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Warm</td>
<td>Cold</td>
<td>Sun</td>
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<tr>
<td><strong>Airside</strong></td>
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</table>
2.2 SOD

A. Use grass sod with a healthy root system and dense matted roots throughout the soil of the sod for a minimum thickness of 1in.

B. Keep sod moist from the time it is dug until it is planted. Grass sod with dried roots is unacceptable.

C. Sod shall be relatively free of weeds or other undesirable foreign plants, large stones, roots, or other materials.

D. Sod must be green and have evidence of 99% root establishment to achieve final stabilization. Sod that is placed during the cool season will require an inspection in the warm season to confirm viability.

E. Sod will be considered under warranty for one year after final stabilization is achieved.

F. Approved sod options vary based on season, sunlight, and location on Airport property. Refer to the chart below for sod options. Only sod meeting the land use, season, and sun exposure requirements may be utilized.

<table>
<thead>
<tr>
<th>SOD OPTIONS</th>
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</thead>
<tbody>
<tr>
<td>Land Use</td>
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<tr>
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<td>Airside</td>
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<td>Public</td>
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<td>Non-public</td>
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<tr>
<td>Zoysia Zoysia japonica</td>
</tr>
<tr>
<td>Buffalo Grass Bouteloua dactyloides</td>
</tr>
</tbody>
</table>

2.3 FERTILIZER

A. Provide and distribute fertilizer over all areas to be seeded or sodded.

B. Fertilizer is subject to testing by the Texas A&M Feed and Fertilizer Control Service or another approved lab in accordance with the Texas Fertilizer Law.

2.4 WATER

A. Use water that is clean and free of industrial wastes and other substances harmful to the growth of vegetation.
B. Water may be from a Potable Water source or Reclaimed Water source, but never pumped directly from a creek, stream or pond.
C. The water source and supply location is subject to approval by the OAR prior to use.

2.5 MULCH
A. Mulch is required to cover all seeded areas.
B. See chart below for the approved mulch types and minimum application rates.

<table>
<thead>
<tr>
<th>MULCH OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
</tr>
<tr>
<td>Wheat Straw Mulch</td>
</tr>
<tr>
<td>TxDOT Approved Cellulose Fiber Mulch</td>
</tr>
</tbody>
</table>

C. Wheat straw mulch must be crimped into the soil using an approved Straw Mulch Crimper.
D. Recycled paper based cellulose mulches are prohibited.

2.6 TACKIFIER
A. Use a tacking agent for all hydroseed applications. Apply per manufacturer’s recommendations.

2.7 SOIL RETENTION BLANKET
A. Soil retention blanket is required on all seeded areas with a slope of 3:1 or greater, and in any area where concentrated flow occurs.
B. Use an soil retention blanket from the TxDOT Approved Product List

2.8 TOPSOIL
A. Use easily cultivated, fertile topsoil that is free from objectionable material and resistant to erosion.
B. Utilize existing topsoil from the project site.
C. If necessary to obtain additional topsoil, adhere to the soil transfer requirements in 01 33 29.06.01 Contaminated Media Management Plan.

PART 3 - EXECUTION
3.1 General
A. All seed or sod applications must adhere to all applicable TCEQ or FAA Circulars including most recent versions of 150/5200-33, and 150/5370-10.
B. All seed or sod applications will be considered under warranty for one year after final stabilization is achieved.

3.2 SEED
A. General
1. Submit a seed/sod plan for approval by the OAR prior to application.
2. Seed may be applied by the following methods: broadcast, drill seeding, hydroseeding.
3. All seed applications will require soil prep, top soil, fertilizer, and mulch. Tackifier and soil retention blankets are required based on application method and site conditions.

B. Soil Prep
1. After grading of the area has been completed, thoroughly loosen and work soil to a depth of not less than 5 inches, and break any clods greater than 1” in diameter.
2. The area shall be raked or otherwise cleared of stones, sticks, stumps, and other debris greater than 1” in diameter. The surface shall be prepared in a manner that is loose and level without voids, openings, or pores.

C. Topsoil
1. Complete soil prep prior to placing topsoil.
2. Spread the topsoil to a uniform loose cover with a minimum depth of 4 inches.

D. Inspection
1. Once soil is prepped and top soil is placed, request a DFW environmental inspection.
2. Soil prep and topsoil placement must be inspected and approved by a DFW environmental inspector prior to seed application.

E. Fertilizer
1. Submit a Fertilizer Plan for OAR approval.
2. Fertilizer mix and application rate shall be determined based on a soil laboratory analysis.
3. A soil sample shall be submitted to Texas A&M Agrilife Extension or equivalent laboratory certified in soil analysis. Follow the laboratory’s procedure for collecting a soil sample. Soil sample may be collected at any point post-grading and prior to seed application.

4. Submit the lab results and proposed fertilizer for review and approval by OAR prior to application.

5. Apply fertilizer at the approved application rate.

F. Installation

1. Broadcast Application
   a. If broadcast application method is selected, contractor shall evenly distribute seed across the entire area at the approved application rate.

2. Drill seed Application
   a. If drill seed application is selected, contractor shall evenly distribute seed in rows no further than 7” apart, utilizing an industry approved grass seed drill.

3. Hydroseed Application
   a. If hydroseed application method is selected, contractor must evenly apply seed, and tackifier at approved application rates.
   b. All equipment shall be clean and free of contaminants prior to use.

G. Mulch

1. The Contractor is required to apply an approved mulch at the rates specified over the planted seed bed.

2. If wheat straw mulch is utilized, it must be crimped into the soil using an approved Straw Mulch Crimper.

H. Soil retention Blanket

1. All areas with a slope of 3:1 or greater, and any area where concentrated flow occurs will require soil retention blanket.

2. Install and anchor the soil retention blanket according to the manufacturer’s installation instructions.

I. Water

1. Water as needed until final stabilization is achieved and approved by the OAR.

2. Ponding is not allowed. Do not water to the point of ponding.

J. Mowing

1. Mowing is required when the grass reaches 6” in height.
2. Additional mowing may be required by the OAR until final stabilization is achieved.

K. Reseeding
1. The area may require reseeding to achieve final stabilization. Reseeding is considered incidental to the cost of seeding and will be done at no additional expense to the owner.
2. If final stabilization is not achieved in the warm season, reseeding will be required in the next warm season.
3. At a minimum, reseeding consists of seed, fertilizer, and water application. Mulch, tackifier and soil retention blankets may be utilized.

3.3 SOD
A. General
1. Submit a seed/sod plan for approval by the OAR prior to application.

B. Soil Prep
1. After grading of the area has been completed, thoroughly loosen and work soil to a depth of not less than 5 inches, and break any clods greater than 1” in diameter.
2. The area shall be raked or otherwise cleared of stones, sticks, stumps, and other debris greater than 1” in diameter. The surface shall be prepared in a manner that is loose and level without voids, openings, or pores.

C. Topsoil
1. Complete soil prep prior to placing topsoil.
2. Spread the topsoil to a uniform loose cover with a minimum depth of 4 inches.

D. Inspection
1. Once soil is prepped and top soil is placed request a DFW Environmental Inspection.
2. Soil prep and topsoil placement must be inspected and approved by a DFW Environmental Inspector prior to sod installation.

E. Fertilizer
1. If placing sod in a warm season, submit a fertilizer plan for approval.
2. If placing sod in a cool season, OAR may require fertilizer in the warm season.
3. Fertilizer mix shall contain primarily Nitrogen, and be applied at a rate of 100 lbs. of Nitrogen per acre.

F. Installation
1. Place sod over the prepared area and roll or tamp to create a solid mat.
2. Sod placed on the Airside, in ditches, or on slopes greater than 4:1 will require staples. Use 12” wood staples to secure the sod.
3. Fill all gaps with additional topsoil.

G. Water
1. Water as needed until final stabilization is achieved and approved by the OAR.
2. Ponding is not allowed. Do not water to the point of ponding.

H. Mowing
1. Mowing may be required by the OAR until final stabilization is achieved.
2. Mowing will be conducted within the time frame specified by the OAR.

3.4 FINAL STABILIZATION
A. All areas shall be maintained until final stabilization is achieved.
B. Final stabilization is achieved when the following conditions are met:
   1. All soil disturbing activities at the site have been completed.
   2. Uniform (evenly distributed without large bare areas) perennial vegetative cover with a density of at least 70% approved vegetative cover for the area has been established on all unpaved areas and areas not covered by permanent structures.
   3. All Airside areas achieve a good stand of grass of uniform color and density, and when unviable or bare spots are one square foot or less, randomly dispersed, and do not exceed 3% of the area sodded.
C. Final stabilization will be determined during the warm season (April 1st thru September 31st)
PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. The area to be seeded/sodded is measured by the square yard/acre as indicated by the limits of disturbance on the design plans. Any additional area of disturbance will be seeded/sodded by the contractor at no additional cost to the owner.

B. Seed is measured by the square yard or by the acre.

C. Sod is measured by the square yard in its final position.

D. Fertilizer is measured by the acre of surface area covered or by the ton (2,000 lb.) Measurement by ton will use guaranteed weight of bags or containers as shown by the manufacturer.

E. Hydromulch or straw mulch is measured by the square yard or by the acre.

F. Tackifier is measured by the acre.

G. Soil retention blanket is measured by the square yard of surface area covered.

4.2 PAYMENT

A. The contractor will be paid for 90% of the sod installed during the monthly estimate period based on the actual quantities installed using the unit Price amount for the pay item. The remaining 10% will be paid once the owner has made final acceptance of the sodded areas. The unit price bid is full compensation for securing a source, excavation, loading, hauling, placing, rolling, finishing, furnishing materials, equipment, labor, tools, supplies, and incidentals. Sod is under warranty for one year after final stabilization is achieved. Sod must be green and have evidence of root establishment to achieve final stabilization. Sod that is placed during the cool season will require an inspection in the warm season to confirm viability for final acceptance. Areas where sod has failed to thrive shall be replaced with living green sod at the contractor’s expense.

B. The contractor will be paid for 75% of the seeding installed during the monthly estimate period based on the actual quantities installed using the unit Price amount for the pay item. The remaining 25% will be paid once the owner has made final acceptance of the seeded areas.
C. Fertilizer is considered subsidiary to the seed and sod bid items of the contract. Work performed, materials furnished, equipment, labor, tools and incidentals will not be paid for directly unless otherwise specified in the contract.

D. The contractor will be paid for 100% of Hydromulch or straw mulch installed during the monthly estimate period based on the actual quantities installed using the unit Price amount for the pay item.

E. Tackifier is considered subsidiary to the Hydromulch or straw mulch bid items of the contract. Work performed, materials furnished, equipment, labor, tools and incidentals will not be paid for directly unless otherwise specified in the contract.

F. The contractor will be paid for 100% of the erosion blanket installed during the monthly estimate period based on the actual quantities installed using the unit Price amount for the pay item.

G. Protective barriers, mowing and other maintenance activities are considered subsidiary to the seed or sod unit price. Work performed, materials furnished, equipment, labor, tools and incidentals will not be paid for directly unless otherwise specified in the contract.

- END OF SECTION -
PART 1 - GENERAL
1.1 SECTION INCLUDES
   A. Aluminum Ships Ladders.

1.2 RELATED SECTIONS
   A. Section 06 10 00 – Miscellaneous Carpentry.
   B. Section 07 52 16 – SBS Modified Bituminous Membrane Roofing.
   C. Section 07 92 00 – Joint Sealants.

1.3 SUBMITTALS
   A. Submit under provisions of Section 01 33 23.
   B. Manufacturer's data sheets on each product to be used, including:
      1. Preparation instructions and recommendations.
      2. Storage and handling requirements and recommendations.
      3. Installation methods.
   C. Shop Drawings for Ladders:
      1. Plan and section of ladder installation.

1.4 DELIVERY, STORAGE, AND HANDLING
   A. Store products in manufacturer's unopened packaging until ready for installation.
   B. Store ladder until installation inside under cover. If stored outside, under a tarp or suitable cover.

1.5 WARRANTY
   A. Limited Warranty: Five (5) Years against defective material and workmanship, covering parts only, no labor or freight. Defective parts, if deemed so by the manufacturer, will be replaced at no charge, freight excluded, upon inspection at manufacturer's plant which warrants same.

PART 2 - PRODUCTS
2.1 MANUFACTURERS
   A. Acceptable Manufacturer: Precision Ladders, LLC, which is located at: P. O. Box 2279; Morristown, TN 37816-2279; Toll Free Tel: 800-225-7814; Tel: 423-586-2265; Fax: 423-586-2091; Web: www.PrecisionLadders.com.
   B. Substitution requests will be considered in accordance with provisions of Section 01 25 13.

2.2 ALUMINUM SHIPS LADDER
   A. Aluminum Ships Ladder
      1. Model: SL-** (** = height in vertical inches) Aluminum Ships Ladder as manufactured by Precision Ladders, LLC.
      2. Capacity: Unit shall support a 1000 lb (454 kg) total load without failure.
3. **Degree of Incline:** 60 to 75 degrees.

**B. Components:** Ladder, Mounting Brackets and Handrails on Both Sides

1. **Ladder Stringer:** 5 inch by 2 inch by 3/16 inch (127 mm by 51 mm by 5 mm) extruded 6005-T5 aluminum channel.

2. **Ladder Treads:** 5-3/16 inch by 1-1/8 inch by 1/8 inch (131 mm by 29 mm by 3 mm) extruded 6005-T5 aluminum with serrated slip resistance surface standard. 1-1/4 inch by 1-1/4 by 1-1/4 inch angle welded to underside of treads. Treads shall be welded and bolted to stringer with 1/4” stainless steel bolts.

3. **Ladder Mounting Brackets**
   a. **Floor Brackets:** 2 inch by 3 inch by 1/4 inch (51 mm by 76 mm by 6 mm) aluminum angle.
   b. **Top Bracket:** 4-3/4 inch by 5 inch by 1/4 inch (121 mm by 127 mm by 6 mm) aluminum angle.

4. **Handrails:** 1-1/4 inches (32 mm) Schedule 40, 6005-T5 aluminum pipe provided with internal aluminum fittings.

5. **Platform**
   a. **Surface:** Platforms 9 Sq Ft or less shall be made of standard tread material. Platforms larger than 9 Sq Ft shall have a bar grating surface.
   b. **Toe Boards:** 4 inch by 1/4” 6005 T-5 aluminum.
   c. **Handrails:** 1-1/4 inches (32 mm) Schedule 40, 6005-T5 aluminum pipe provided with internal aluminum fittings.

6. **Finishes**
   a. **Anodized.**

**2.3 FABRICATION**

A. Completely fabricate ladder ready for installation before shipment to the site.

B. Completely fabricate handrail components ready for field assembly to ladder before shipment to site.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

A. If substrate preparation is the responsibility of another installer, notify A/E of unsatisfactory preparation before proceeding.

B. Examine materials upon arrival at site. Notify the carrier and manufacturer of any damage.

**3.2 INSTALLATION**

A. Install in accordance with manufacturer's instructions.

**3.3 PROTECTION**
A. Protect installed products until completion of project.
B. Touch-up, repair or replace damaged products before Substantial Completion.

– END OF SECTION –
PART 1: GENERAL

1.1 SUMMARY

A. Section Description
   1. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

B. Related Sections
   1. Section 02 41 19 – Selective Structure Demolition
   2. Section 07 52 16 – SBS Modified Bituminous Membrane Roofing
   3. Section 07 60 00 – Flashing and Sheet Metal

1.2 REFERENCE STANDARDS


1.3 SUBMITTALS

A. Product Data
   1. Material certificates for dimensional lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use as well as design values approved by the Board of Review of American Lumber Standards Committee.

   2. Research Reports or current IBC Evaluation Reports documenting compliance of wood products with building code in effect at the time of construction.


1.4 DELIVERY, STORAGE, AND HANDLING

A. Delivery
   1. Upon delivery to jobsite, immediately place materials in area protected from weather.

B. Storage
1. Keep materials dry under cover utilizing breathable type canvas tarpaulins. Blue plastic tarpaulins or other plastic or vinyl coverings prohibited. Protect against exposure to weather and contact with damp or wet surfaces. Stack material above ground level on uniformly spaced supports to prevent deformation.

2. Failure to cover materials upon arrival at the job site with canvas tarpaulins will result in a one hundred ($100) a day deduction for each and every day material storage requirements remain in non-compliance.

PART 2: PRODUCTS

2.1 GENERAL

A. Materials shall meet or exceed all applicable federal, state, and local requirements, referenced standards, and conform to codes and ordinances of authorities with jurisdiction. All materials exposed to weather shall be pressure treated.

2.2 LUMBER

A. Furnish lumber that complies with Fire Retardant Treated Wood in any wood product, when tested in accordance with ASTM E84 or UL 723. Must comply with the following:

   1. Lumber: Comply with AWPA U1 UCFA, Type A or ICC-ES ESR 2645.
   2. Plywood: Comply with AWPA U1, UCFA, Type A or ICC-ES ESR 2645.

B. Furnish lumber with each piece factory marked with grade stamp of inspection agency that indicates grading agency, grade, species, and moisture content at time of surfacing including the mill.

C. Inspection Agencies: Inspection agencies and the abbreviations used to reference them with lumber grades and species included the following:

   1. SPIB Southern Pine Inspection Bureau
   2. WWPA Western Wood Products Association.

D. Nominal sizes are indicated, except as shown by detail dimensions. Provide actual sizes as required by PS 20-10, for moisture content specified for each use.

   1. Provide dressed lumber, S4S, unless otherwise indicated.
   2. Provide seasoned lumber with 19 percent maximum moisture content at time of dressing and shipment for sizes 2 inches or less in nominal thickness, unless otherwise indicated.

2.3 DIMENSION LUMBER AND BOARDS FOR CONCEALED CONDITIONS

A. Species: Any wood species listed by PS 20-10.

B. Moisture Content: S DRY, KD 19 or MC 19 (19 percent maximum moisture content).

C. Grade: No. 2, FRTW.
2.4 NAILERS
A. All nailers shall be #2 or better, construction grade lumber, FRTW.
B. Minimum nailer size shall be 2” X 6” (nominal).
C. Minimum nailer thickness shall be 1 ½” (nominal).
D. Nailers shall extend ½” beyond metal flanges.

2.5 PLYWOOD PANELS
   1. Furnish construction panels that are factory marked with APA trademark for grade specified. Waterproof glue is acceptable.
   2. All plywood shall be 5/8” minimum unless otherwise shown on drawings. Refer to drawings for plywood thickness at each detail.
B. Miscellaneous Concealed Panels: APA RATED SHEATHING, Exposure 1, FRTW, span rating to suit framing in each location where specified.

2.6 FASTENERS
A. Fasteners: Corrosion resistant epoxy or fluorocarbon coated fastener approved for the specific use and substrate, FM 4470; installed through minimum 5/8” galvanized steel washers.
   1. Masonry/Concrete Fasteners
      a. FM Approved, corrosion-resistant, threaded fastener with low profile-head.
      b. Minimum 3/16” diameter with 1” minimum embedment.
         1) HeadLok by OMG Flat-Head Phillips with Climaseal Coating or approved equal.
   2. Steel/Wood Fasteners
      a. FM Approved, corrosion-resistant, self-tapping, self-drilling screw with low profile head.
      b. Minimum #12 Fasteners with minimum ¾” penetration into steel and minimum 1” penetration into wood.
         1) Roof Grip by OMG with Climaseal Coating.
   3. Washers
   5. Wall Plug Anchors: "Anchortite" or equivalent, 24 gauge galvanized metal plugs extending 2-1/2 inch minimum into masonry substrate.
PART 3: EXECUTION

3.1 INSTALLATION

A. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.

B. Discard units of material with defects that impair quality of miscellaneous carpentry and in sizes that would require an excessive number or poor arrangement of joints.

C. Do not install wet, damaged, or warped boards.

D. Cut and fit miscellaneous carpentry accurately. Install members plumb and true to line and level.

E. All perimeter nailers shall be of uniform height within a given roof section.

F. Use fasteners of appropriate type and length. Predrill members when necessary to avoid splitting wood.

G. Securely attach carpentry work to substrates by anchoring and fastening as required by recognized standards.

H. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials.

I. Form to shapes, cut as necessary, for true line and level of work for attachment.

J. Attach to substrates to support applied loading.

K. Coordinate wood installation with other work involved.

L. Install nailers with 1/4" gap between ends of adjoin pieces.

M. Offset butt joint minimum 12" between adjacent layers where two or more nailers are stacked.

N. Countersink bolts and nuts flush with surfaces.

3.2 NAILERS, BLOCKING, AND SLEEPERS

A. Provide framing and blocking members as indicated and as required to support roof accessories, fixtures and equipment. Attach wood blocking and perimeter nailers to resist minimum 300 lb. per foot uplift force in any direction. Perimeter wood nailers shall be installed in accordance with ANSI/SPRI ES-1 current code requirements, fastened with approved anchors 6" in from each end and a maximum of 12" o.c. thereafter.

B. Total wood nailer height shall match the total thickness of insulation being used and shall be installed with a 1/8" gap between each length and at each change of
direction. Additional stacked wood nailers, blocking or wood cant strips where required to meet insulation height or detail requirements shall be fastened with corrosion resistant screws approved for use with the type of wood nailer being installed. Pressure treated wood nailers shall be fastened with stainless steel screws or bolts. Fasteners shall be set a maximum of 12" o.c. and staggered with corner regions fastened a maximum of 6" o.c., installed to resist a force of 300 lbs. per foot. Nails are not approved for use to attach wood nailers to substrates or each other.

C. Metal framing, decking, sheet metal flashings and other metals shall be protected from direct contact with treated wood blocking and nailers. Prime structural steel angles, supports, framing, metal decking and flashings where treated wood materials are installed with a protective metal primer. Metal flashings installed above treated wood nailers shall be separated from contact with a separation layer of self-adhered, modified bitumen moisture barrier underlayment complying with ASTM D1970, or heavy duty fiberglass base sheet.

Install where shown for attachment of other work and as required by the manufacturer. Cut and shape to required size. Coordinate location with other involved work and trades.

D. Attach to substrates as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise indicated.

E. Fasten nailers in accordance with following schedule:

1. Nailers shall be anchored to the structural elements to resist a minimum force of 300 pounds per lineal foot (4,500 Newtons per lineal meter) in any direction.

2. Individual nailer lengths shall not be less than 3 feet (0.9 meter) long.

3. Nailer Attachment: Perimeter Fastener Spacing, 12" o.c. maximum, Corner Fastener Spacing, 6" o.c. maximum.

4. Where two or more nailers are installed, fasten each nailer independently.

5. Corner fastener spacing shall extend 8' from all outside building corners, 6" o.c., stagger fastened.

6. Fasten bottom nailer using specified fasteners and 5/8" washers countersinking washers and fasteners level with top of wood. Subsequent nailers shall be fastened independently using specified screws without washers.

7. Existing nailer woodwork to remain shall be firmly anchored in place to resist a minimum force of 300 pounds per lineal foot (4,500 Newtons per lineal meter) in any direction and shall be free of rot, excess moisture, or deterioration. Only woodwork shown to be reused in detail drawings shall be left in place. All other nailer woodwork shall be removed.
3.3 ROOF-RELATED CARPENTRY
   A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.
   B. Provide wood curb at all roof openings except where specifically indicated otherwise. Form corners by alternating lapping side members.

3.4 PLYWOOD
   A. Fasten plywood in a uniform grid pattern with a maximum spacing of 18" o.c. between adjacent fasteners.
   B. Fasten plywood to steel stud framing members at 6" o.c.
   C. Allow 1/8" at end and edge joints of plywood for expansion and contraction.

- End of Section -
PART 1 - GENERAL

1.1 SECTION INCLUDES
A. Evaluation/Preparation of Substrate to Receive Pedestrian Traffic Waterproofing.
B. Poly(methyl methacrylate)-based (PMMA) Pedestrian Traffic Waterproofing Membrane Application.
C. PMMA Roof Pedestrian Traffic Flashing Application.

1.2 RELATED SECTIONS
A. Section 06 10 00 – Miscellaneous Carpentry
B. Section 07 52 16 – SBS Modified Bituminous Membrane Roofing
C. Section 07 71 00 – Flashing and Sheet Metal
D. Section 07 92 00 – Joint Sealants

1.3 REFERENCE STANDARDS
A. NIOSH National Institute for Occupational Safety & Health
   Atlanta, GA
B. OSHA Occupational Safety and Health Administrations
   Washington, DC
C. ICRI International Concrete Repair Institute
   Sterling, VA
D. ACI American Concrete Institute
   Farmington Hills, MI

1.4 SUBMITTALS
A. Submittals Prior to Contract Award Shall Include:
   1. Letter from the proposed primary system manufacturer confirming that
      the bidder is an acceptable Contractor authorized to install the proposed
      system.
   2. Letter from the primary system manufacturer stating that the proposed
      application will comply with the manufacturer's requirements in order to
      qualify the project for the specified guarantee.

1.5 QUALITY ASSURANCE
A. Acceptable Contractor: Contractor shall be certified in writing by the
   waterproofing materials manufacturer to install the primary waterproofing
   products.
B. Product Quality Assurance Program: Primary waterproofing materials shall be
   manufactured under a quality management system that is monitored regularly by
   a third party auditor under the ISO 9001 audit process.
C. Project Acceptance: Submit a completed manufacturer's application for
   waterproofing guarantee form along with shop drawings of areas to receive
waterproofing, showing all dimensions, penetrations, and details. The form shall contain all the technical information applicable to the project. The project must receive approval by the membrane manufacturer, through this process, prior to shipment of materials to the project site.

D. Scope of Work: The work to be performed under this specification section shall include, but is not limited to, the following: Attend necessary job meetings and furnish competent and full time supervision, experienced mechanics, all materials, tools, and equipment necessary to complete, in an acceptable manner, the waterproofing system installation in accordance with this specification. Comply with the latest written application instructions of the manufacturer of the specific waterproofing products.

E. Local Regulations: Conform to regulations of public agencies, including any specific requirements of the city and/or state of jurisdiction.

F. Manufacturer Requirements: The primary materials manufacturer shall provide trained company personnel to attend necessary job meetings, perform periodic inspections as necessary, and conduct a final inspection upon successful completion of the project.

1.6 PRODUCT DELIVERY STORAGE AND HANDLING

A. Delivery: Deliver materials in the manufacturer's original sealed and labeled containers and in quantities required to allow continuity of application.

B. Storage: Store closed containers in a cool, dry, well ventilated area away from heat, direct sunlight, oxidizing agents, strong acids, and strong alkalis. Keep products away from open fire, flame or any ignition source. Store temperature sensitive products at temperatures recommended by the manufacturer. Quartz silica (sand) must be kept dry during storage and handling.

C. Damaged Material: Any materials that are found to be damaged or stored in any manner other than stated above will be rejected, removed and replaced at the Contractor's expense.

D. Handling: Handle all materials in such a manner as to preclude damage and contamination with moisture or foreign matter. Keep away from open fire, flame, or any ignition source. Vapors may form explosive mixtures with air. Avoid skin and eye contact with this material. Avoid breathing fumes. Do not eat, drink, or smoke in the application area. Workers shall wear long sleeve shirts, long pants and work boots. Workers shall wear butyl rubber or nitrile gloves when mixing or applying this product. Safety glasses with side shields shall be used for eye protection. Use local exhaust ventilation to maintain worker exposure below TLV as listed on MSDS for respective products. If the airborne concentration poses a health hazard, becomes irritating or exceeds recommended limits, use a NIOSH approved respirator in accordance with OSHA Respirator Protection requirements under 29 CFR 1910.134. The specific type of respirator will depend on the airborne concentration. A filtering face piece or dust mask is not acceptable for use with this product if TLV filtering levels have been exceeded.

1.7 PROJECT/SITE CONDITIONS

A. Requirements Prior to Job Start
1. Notification: Give a minimum of 5 days notice to the Owner and manufacturer prior to commencing any work and notify both parties on a daily basis of any change in work schedule.

2. Permits: Obtain all permits required by local agencies and pay all fees which may be required for the performance of the work.

3. Safety: Familiarize every member of the application crew with safety regulations recommended by OSHA and other industry or local governmental groups.

4. Disconnect Mechanical Unit Notification: Contractor to contact Fire Marshal prior to disconnecting mechanical units. Provide documentation of contact and approval to proceed from Fire Marshal.

B. Environmental Requirements

1. Precipitation: Do not apply materials during precipitation or in the event there is a probability of precipitation during application. Take adequate precautions to ensure that materials, applied membrane, and building interiors are protected from possible moisture damage or contamination.

2. Temperature Restrictions – PMMA-based Materials: Do not apply catalyzed resin materials if there is a threat of inclement weather. Follow the resin manufacturer's specifications for minimum and maximum ambient, material, and substrate temperatures. Do not apply catalyzed resin materials unless ambient and substrate surface temperatures fall within the resin manufacturer's published range.

C. Protection Requirements

1. Protection: Provide protection against staining and mechanical damage for newly applied waterproofing and adjacent surfaces throughout this project.

2. Limited Access: Prevent access by the public to materials, tools, and equipment during the course of the project.

3. Debris Removal: Remove all debris daily from the project site and take to a legal dumping area authorized to receive such materials.

4. Site Condition: Complete, to the Owner's satisfaction, all job site clean-up including building interior, exterior, and landscaping where affected by the construction.

1.8 GUARANTEE

A. Guarantee – Reinforced Systems: Upon successful completion of the project, and after all post installation procedures have been completed, furnish the Owner with the manufacturer's 10-year, full value, non-pro-rated guarantee offering the labor and materials necessary to ensure that the waterproofing system remains free from leaks.

1. Ten (10) Year Terapro Waterproofing Guarantee.

2. Ten (10) Year Alsan RS Waterproofing Warranty.
PART 2 - PRODUCTS

2.1 DESCRIPTION OF SYSTEMS

A. Liquid-Applied Pedestrian Traffic Waterproofing System: A reinforced fluid-applied, PMMA-based waterproofing system having a pro texture beads texture and a color finish/acrylic chip surfacing selected from the manufacturer’s standard palette of colors.

1. Terapro Reinforced Pedestrian Traffic Waterproofing System by Siplast; Irving, TX
2. Alsan RS Reinforced Pedestrian Traffic Waterproofing System by Soprema; Wadsworth, OH

2.2 MATERIALS

A. Membrane/Flashimg Waterproofing Materials

   a. Pro Primer W by Siplast; Irving, TX
   b. Alsan RS 222 Primer by Soprema; Wadsworth, OH
   a. Pro Primer T by Siplast; Irving, TX
   b. Alsan RS 276 Primer by Soprema; Wadsworth, OH
3. Flashing Resin: A thixotropic, flexible, acrylic, PMMA-based resin for use in combination with a fleece fabric to form a monolithic, reinforced flashing membrane used in conjunction with a reinforced or unreinforced waterproofing system.
   a. Terapro Flashing Resin by Siplast; Irving, TX
   b. Alsan RS 230 Flash by Soprema; Wadsworth, OH
4. Base Resin: A flexible, acrylic PMMA-based resin for use as waterproofing in a reinforced waterproofing system.
   a. Terapro Base Resin by Siplast; Irving, TX
   b. Alsan RS 230 Field by Soprema; Wadsworth, OH
5. Fleece: A non-woven, needle-punched polyester fabric used as a reinforcement in PMMA-based flashing and field membrane systems.
   a. Nominal Thickness: 40 mils (1 mm)
   b. Weight: 110 grams per square meter
   c. Pro Fleece by Siplast; Irving, TX
   d. Alsan RS Fleece by Soprema; Wadsworth, OH
6. Waterproofing/Wearing Layer Resin: A PMMA-based resin combined with aggregate filler to provide a wearing layer in a reinforced system
a. Terapro VTS Resin by Siplast; Irving, TX  
b. Alsan RS 289 Textured Base by Soprema; Wadsworth, OH

7. Aggregate Filler for Waterproofing/Wearing Layer Resin: A quartz  
aggregate blend/filler added to the waterproofing/wearing layer resin to  
produce a PMMA-based resin/aggregate slurry waterproofing/wearing  
layer.
   a. Terapro VTS Aggregate Filler by Siplast; Irving, TX  
   b. Alsan RS 289 Textured Coating by Soprema; Wadsworth, OH

8. Color Finish: A pigmented, multi-component, PMMA-based resin for use  
as both an embedment and finish layer in waterproofing and flashing  
systems.
   a. Pro Color Finish by Siplast; Irving, TX  
   b. Alsan RS 287 Base/Color Pack by Soprema; Wadsworth, OH

2.3 WATERPROOFING ACCESSORIES

A. Cleaning Solution/Solvent: A clear solvent used to clean and prepare transition  
areas of in-place catalyzed resin to receive subsequent coats of resin and to  
clean substrate materials to receive resin.
   1. Pro Prep by Siplast; Irving, TX  
   2. Alsan RS Cleaner by Soprema; Wadsworth, OH

B. Paste: A PMMA-based paste used for remediation of depressions in substrate  
surfaces prior to the application of the waterproofing system.
   1. Pro Paste by Siplast; Irving, TX  
   2. Alsan RS Paste by Soprema; Wadsworth, OH

C. Repair Mortar: A two-component, PMMA-based, aggregate filled mortar used for  
patching concrete substrates.
   1. Pro Repair Mortar by Siplast; Irving, TX  
   2. Alsan RS 233 by Soprema; Wadsworth, OH

D. Catalyst: A peroxide-based reactive agent used to induce curing of PMMA-  
based resins.
   1. Pro Catalyst Liquid by Siplast; Irving, TX  
   2. Alsan RS Catalyst Powder by Soprema; Wadsworth, OH

E. Glass Beads: A natural-colored glass bead for broadcast into the color finish  
layer of the waterproofing system to generate a skid resistant surface. Glass  
beads shall be supplied by the manufacturer of the waterproofing membrane.

F. Chip Surfacing Blend: A blend of flat, angular, pigmented polymer flakes  
broadcast into the color finish layer of the waterproofing system. The chip blend  
shall be supplied by the manufacturer of the waterproofing membrane.
   1. Pro Accent Chips by Siplast; Irving, TX
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2. Alsan RS Deco Flakes by Soprema; Wadsworth, OH

G. Thixotropic Agent: A liquid additive used to increase the viscosity of the PMMA-based resin products, allowing the resins to be applied over vertical or sloped substrates.
1. Pro Thixo by Siplast; Irving, TX
2. Alsan RS Thixo by Soprema; Wadsworth, OH

PART 3 - EXECUTION

3.1 SUBSTRATE EXAMINATION

A. General: Verify that the substrate is suitable to receive work. Notify the general contractor and/or specifier in writing of conditions detrimental to the proper and timely completion of work. Bring substrate deficiencies into an acceptable condition prior to commencing work.

B. Concrete Substrate Requirements: Structural concrete shall be cured a minimum of 28 days in accordance with ACI-308, have a minimum compressive strength of 3,500 psi (24 N/mm²) and have a moisture content that conforms with the waterproofing system manufacturer’s requirements prior to commencement of work.

C. Moisture Content Evaluation: Evaluate the level of moisture in the substrate to determine that the moisture content is acceptable for application of the specified waterproofing system. Concrete substrates shall have a maximum moisture content of 6% by weight and a maximum internal relative humidity of 75%.

D. Adhesion Testing for Concrete Substrates to Receive Resin Materials: Test the concrete substrate using a device conforming to ASTM D 4541 (50 mm dolly) adhered with the specified catalyzed primer. Utilize the same concrete preparation methods as that which will be used prior to application of the waterproofing for areas to be evaluated for adhesion. Ensure that a minimum adhesion value of 220 psi is obtained before application of the PMMA-based primer. If multiple areas or substrates are involved in the scope of work, evaluate each to determine suitability. Maintain testing/evaluation records.

3.2 SURFACE PREPARATION

A. Protection: Provide protection to prevent dust/debris accumulation, spillage and resin overruns.

B. Taping: Utilize masking tape at perimeters and joints of the area to be waterproofed to provide neat terminations.

C. Masonry/Concrete Walls: Shot-blast or grind concrete or masonry wall surfaces to provide a sound substrate free from laitance and all residue from bitumen, coal tar, primer, coatings, adhesives, sealer or any material that may inhibit adhesion of the primer. Following application of the specified primer, but prior to application of the waterproofing system, fill cracks, voids, fractures, depressions, small indentations, and low areas in the substrate using the specified paste. The use of paste or sealant is not an acceptable alternative to repointing mortar joints. Do not apply waterproofing materials over soft or scaling brick or
masonry, faulty mortar joints, or walls with broken, damaged or leaking coping components.

D. Preparation of Newly Placed Concrete Substrates to Receive Resin Materials: Newly placed concrete shall be cured a minimum of 28 days in accordance with ACI-308, and have a minimum compressive strength of 3,500 psi (24 N/mm²). Following evaluation for moisture content and confirmation that the moisture content is at an acceptable level, shot-blast or scarify/shot blast the surface to provide a sound substrate free from laitance and to generate a concrete surface profile of CSP-2 to CSP-4 as defined by the ICRI. Grinding may be used as a preparation method for localized areas that cannot be reached by a shot blasting equipment provided that a surface profile of CSP-2 to CSP 4 can be generated. Repair spalls and voids on vertical or horizontal surfaces using the specified primer and preparation paste.

E. Preparation of Existing Concrete/Masonry Substrates to Receive Resin Materials: Existing concrete substrates shall have a minimum compressive strength of 3,500 psi (24 N/mm²). Following evaluation for moisture content and confirmation that the moisture content is at an acceptable level, shot blast or scarify/shot-blast concrete or masonry surfaces to provide a sound substrate free from laitance, carbonated concrete, residue from bitumen, coal tar, primer, coatings, adhesives, sealer or any material that may inhibit adhesion of the specified primer. Generate a concrete surface profile of CSP-2 to CSP-4 as defined by the ICRI. Grinding may be used as a preparation method for localized areas that cannot be reached by a shot blasting equipment provided that a surface profile of CSP-2 to CSP 4 can be generated. Repair spalls and voids on vertical or horizontal surfaces using the specified primer and preparation paste.

F. Repair and Leveling of Concrete to Receive Resin Materials: Before application of the waterproofing membrane, and after priming, fill all joints, cracks, voids, fractures, depressions, small indentations, and low areas in the substrate using the specified paste or repair mortar.

G. Concrete Substrate Repair: Prime areas of the prepared concrete substrate intended for repair using the specified PMMA-based primer. Fill the areas using the specified paste or repair mortar and allow to cure. Follow the paste or repair mortar manufacturer's published minimum and maximum product thickness limitations per lift.

H. Preparation of Steel/Aluminum Substrates: Grind to generate a "white-metal" surface and remove loose particles. Extend preparation area a minimum of 1/2-inch (13 mm) beyond the termination of the waterproofing/flashing system. Notch steel surfaces to provide a rust-stop where detailed.

I. Rigid Plastic Flashing Substrates: Evaluate the plastic for compatibility with the resin materials. Clean plastic substrates using the specified the cleaner/solvent and allow to dry. Lightly abrade the surface to receive the flashing system. Extend the preparation area a minimum of 1/2 inch (13 mm) beyond the termination of the flashing system.

J. Crack Preparation: Follow manufacturer's details for crack preparation prior to waterproofing system application.
K. Plywood Substrate Preparation: Prime ACX plywood surfaces, including vertical surfaces at joints, using the specified primer prior to the application of the waterproofing membrane. Fill joints using the specified paste and strike flush with the plywood surface. Following cure of the paste, reinforce the joints with a 6 inch (15 cm) wide strip of resin/fleece/resin centered over the joint.

3.3 LIQUID-APPLIED WATERPROOFING INSTALLATION

A. Mixing and Catalyzing of Resins: Thoroughly mix the entire drum of uncatalyzed resins for 2-minutes if pouring the resin into a second container when batch mixing. Catalyze only the amount of material that can be used within its pot life. Add pre-measured catalyst powder to the resin component and stir for 2-minutes using a slow-speed mechanical agitator or mixing stir stick. The amount of catalyst added is based on the weight of the resin used. Refer to the waterproofing system manufacturer’s literature for mixing ratios.

B. Mixing and Catalyzing of Waterproofing Resin/Aggregate Filler Blends: Thoroughly mix the entire drum of uncatalyzed resin and slowly add amount of filler specified by the waterproofing system manufacturer. Once the filler has been mixed into the resin component, add pre-measured catalyst powder to the resin/filler mixture and stir for 2-minutes using a slow-speed mechanical agitator. The amount of catalyst added is based on the weight of the resin used. Refer to the waterproofing system manufacturer’s literature for mixing ratios.

C. Priming: Using the appropriate primer, apply to qualified/prepared masonry, concrete and plywood surfaces that will receive the waterproofing membrane or flashing. Apply primers when ambient and substrate temperatures are falling rather than rising to minimize the potential for pinhole formation. Apply the primer using a roller at the rate specified by the primer manufacturer and allow to cure for a minimum of 45 minutes. Increase application rates over other absorbent substrates. Do not let resin pool or pond. Do not over-apply primers as this may interfere with proper primer catalyzation. When calculating application rates, make allowances for saturation of roller covers and application equipment.

D. Flashing Membrane Application: Complete flashing application prior to the waterproofing membrane application in the field of the roof area. Using masking tape, mask the perimeter of the area to receive the flashing system. Pre-cut fleece to ensure a proper fit at transitions and corners prior to flashing membrane application. Apply a base coat of catalyzed flashing resin to the substrate with a roller or brush at the rate specified by the resin manufacturer. Extend the catalyzed flashing resin 1/8 inch (3 mm) beyond where the fleece reinforcement will be placed. Embed the specified fleece reinforcement into the wet, catalyzed flashing resin base coat using a wet, but not saturated, roller or brush to remove trapped air. Overlap the fleece a minimum of 2 inches (51 mm). Apply an additional coat of catalyzed flashing resin between layers of overlapping fleece. Apply a finish coat of catalyzed flashing resin immediately following the embedment of the fleece with a roller or brush at the rate specified by the resin manufacturer, ensuring full saturation of the fleece reinforcement. Remove the tape before the catalyzed resin sets. Make allowances for saturation of roller covers and application equipment when calculating resin quantities. Allow to cure for a minimum of 45 minutes.
E. Application of Reinforced Glass Bead-Surfaced Waterproofing System over Prepared Substrates:

1. Using cleaner/solvent, wipe flashing membrane and primer surfaces to receive the field membrane. Allow the surface to dry for a minimum 20 minutes before continuing work.

2. Using a roller, apply a layer of catalyzed base resin over the primed substrate at the rate specified by the resin manufacturer. Embed the fleece reinforcement into the wet, catalyzed base resin waterproofing layer using a wet, but not saturated, roller to remove trapped air. Overlap side and end laps of the fleece a minimum of 2 inches (51 mm). Apply an additional coat of catalyzed base resin between layers of overlapping fleece. Apply a second coat of catalyzed resin immediately following the embedment of the fleece with an application roller or brush at the rate specified by the resin manufacturer, ensuring full saturation of the fleece reinforcement. Allow to cure for a minimum of 45 minutes before application of the wearing layer of resin.

3. Apply a layer of catalyzed waterproofing resin/aggregate filler mixture using a trowel or stub roller at the rate specified by the waterproofing system manufacturer. Use a spiked roller to remove trowel marks and to even the application of the waterproofing resin/aggregate filler mixture. Following cure, smooth the surface of the catalyzed waterproofing resin/aggregate filler mixture using the sharp edge of a trowel, sandpaper or a fine-surfaced wheel.

4. Inspect the surface of the cured resin/aggregate filler mixture to identify low or uneven areas. Clean identified areas with cleaner/solvent and allow a minimum of 20 minutes for the solvent to evaporate. Apply paste to level or smooth low or uneven areas. Allow the paste to cure for a minimum of 60 minutes before installation of the color finish layer.

5. Apply a layer of color finish using a prepared roller over the catalyzed resin/aggregate filler mixture at the rate specified by the waterproofing system manufacturer.

6. Immediately broadcast glass beads into the wet color finish using a hopper gun at the rate specified by the waterproofing system manufacturer and backroll to embed the beads.

7. Immediately broadcast accent chips into the wet color finish to achieve the desired aesthetic.

8. Allow the system to cure before exposure to foot or wheeled traffic.

9. Make allowances for saturation of roller covers and application equipment when calculating resin application rates.

10. If work is interrupted for more than 12 hours, or the surface of a catalyzed resin layer becomes dirty or contaminated from exposure to the elements, thoroughly clean the area with cleaner/solvent. Allow a minimum of 20 minutes for the solvent to evaporate before continuing work. Complete the next application procedure within 60 minutes following the evaporation of the cleaner/solvent.
F. Application of Color Finish over Flashings
   
   1. Mask the previously applied horizontal surfaces and install a layer of the specified color finish with a prepared roller over the flashing system on vertical surfaces at the rate specified by the waterproofing system manufacturer.

3.4 FIELD QUALITY CONTROL AND INSPECTIONS

A. Site Condition. All areas around job site shall be free of debris, waterproofing materials, equipment, and related items after completion of job.

B. Notification of Completion: Contractor shall notify manufacturer by means of manufacturer's printed Notification of Completion form of job completion in order to schedule a final inspection date.

C. Final Inspection: Hold a meeting at the completion of the membrane application attended by all parties that were present at the pre-job conference. A punch list of items required for completion shall be compiled by the Contractor and the manufacturer's representative. Complete, sign, and mail the punch list form to the manufacturer's headquarters.

D. Issuance of the Guarantee. Complete all post installation procedures and meet the manufacturer's final endorsement for issuance of the specified guarantee.

– END OF SECTION –
PART 1 GENERAL

1.1 SECTION INCLUDES
   A. Factory-formed metal roofing or soffits, including flashing and accessories

1.2 RELATED SECTIONS
   A. Section 06 10 00 – Miscellaneous Carpentry
   B. Section 07 60 00 - Flashing and Sheet Metal
   C. Section 07 92 00 – Joint Sealants

1.3 REFERENCE STANDARDS
   A. American Society for Testing and Materials (ASTM)
      2. ASTM A653: Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvanized) by the Hot-Dip Process
      3. ASTM E283/1680 - Test Method for Determining the Rate of Air Leakage through Exterior Windows, Curtain Walls and Doors under Specified Pressure Differences across the Specimen
      4. ASTM E331/1646 - Test Method for Water Penetration of Exterior Windows, Curtain Walls and Doors by Uniform Status Air Pressure Difference
   B. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA)
      1. SMACNA Architectural Sheet Metal Manual
   C. Underwriters Laboratories (UL Classified Tests)
      1. UL 263 - Fire Tests of Building Construction and Materials
      2. UL 580 - Test for Wind-Uplift Resistance of Roof Assemblies
      3. UL 790 - Test for Fire Resistance of Roof Covering Materials
      4. UL 2218 - Impact Resistance Test

1.4 SYSTEM DESCRIPTION
   A. Performance Requirements: Provide sheet metal roofing that has been manufactured, fabricated and installed to withstand structural and thermal movement, wind loading and weather exposure to maintain manufacturer’s
performance criteria without defects, damage, and failure of infiltration of water.

1. Wind-Uplift: Roof panel assembly shall test in accordance with ASTM E 1592 for substrates indicated to meet required 110 mph wind exposure and ASCE 7 wind uplift pressures including perimeter and corner enhancements:
   a. Field = -90 psf
   b. UL Classification 580 for UL Classified 90 rated assemblies

2. Static Air Infiltration: Completed roof system shall have a maximum of .06 cfm/sf with 6.24 kPa air pressure differential as per ASTM E283/1680

3. Water Infiltration: No evidence of water penetration at an inward static air pressure differential of not less than 6.24 psf (43 kPa) and not more than 12.0 psf (83 kPa) as per ASTM E331/1646

1.5 SUBMITTALS

A. General: Submit listed submittals in accordance with Section 01 33 23.
   1. Product Data: Submit product data, including manufacturer’s SPEC-DATA product sheet, for specified products.

B. Shop Drawings
   1. Submit complete engineered and sealed shop drawings and erection details, approved by the metal roofing manufacturer, to the A/E for review. Do not proceed with manufacturer of roofing materials prior to review of shop drawings and field verification of all dimensions. Do not use drawings prepared by the A/E for shop or erection drawings.
   2. Shop drawings show roof plans, elevations, methods of erection, and flashing details.

C. Performance Tests
   1. Submit certified test results by a recognized testing laboratory in accordance with specified test methods for each panel system.

D. Samples: Submit selection and verification samples for finishes, colors and textures.

E. Quality Assurance Submittals to be submitted:
   1. Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and physical requirements.
   2. Manufacturer's Instructions: Manufacturer's installation instructions.

F. Closeout Submittals (submit the following)
   1. Operation and Maintenance Data: Operation and maintenance date for installed products in accordance with Division 1 Closeout Submittals, Maintenance Data and Operation Data Section. Include methods for maintaining installed products and precautions against cleaning materials and methods detrimental to finishes and performance.
2. Project Warranty: Warranty documents specified herein are:
   a. Manufacturer’s Warranty: Submit to A/E for review and acceptance, manufactures standard warranty document executed by authorized company official. Manufacturer’s warranty is in addition to and not limited of, other rights the Owner may have under the contract documents.
   b. Warranty Period: **Twenty (20) Year Watertightness NDL Warranty** commencing on Date of Substantial Completion.

3. Record Documents: Project record documents for installed materials in accordance with Division 1 Closeout Submittals, Project Record Documents Section.

1.6 QUALITY ASSURANCE
A. Installer Qualifications: Installer experienced in performing Work of this section who has specialized in the installation of Work similar to that required for this project.
   1. Certificate: Submit certificate indicating qualifications and Manufacturer approval to obtain the specified warranty.
C. Pre-Installation Meetings: Conduct pre-installation meeting to verify project requirements, substrate conditions, Manufacturer’s installation instructions and Owner’s warranty requirements.

1.7 DELIVERY, STORAGE AND HANDLING
A. Deliver materials to the project site in Manufacturer’s original crating, properly labeled for identification and installation purposes. Store materials in accordance with panel Manufacturer’s recommendations. Handle materials carefully to avoid damage to panels and finishes.
   1. Ordering: Comply with Manufacturer’s ordering instructions and lead-time requirements to avoid construction delays.
B. Identify fabricated components with UL 90 Classified label where appropriate.
C. Storage and Protection: Store materials protected from exposure to harmful conditions. Material must be stored in a dry, above ground location.
   1. Stack prefinished material to prevent twisting, bending, abrasion, scratching and denting. Elevate one end of each skid to allow for moisture to run off.
   2. Prevent contact with material that may cause corrosion, discoloration or staining.
   3. Do not expose to direct sunlight or extreme heat trim material with factory applied strippable film.

1.8 PROJECT CONDITIONS
A. Field Measurements: Verify actual measurements/openings by field
measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements, fabrication schedule with construction progress to avoid construction delays.

1.9 WARRANTY

A. Project Warranty: Warranty shall conform to the General Conditions of the contract.

B. Manufacturer’s Warranty: Manufacturer’s non-prorated, NDL Watertightness Warranty in which manufacturer agrees to repair or replace standing seam metal roof panel assemblies that fail to remain weathertight, including leaks, within specified warranty period. Warranty coverage shall include deterioration of the panel finish against color fade, chalking and film integrity.

1. Warranty Period: **Twenty (20) Years** commencing on Date of Substantial Completion.

C. Finish Warranty: Manufacturer’s standard form in which manufacturer agrees to repair finish or replace standing seam metal roof panels that show evidence of deterioration of factory-applied finish within specified warranty period.

1. Exposed Panels Finish – deterioration includes the following:
   a. Color fading more than 5 hunter units when tested according to ASTM D 2244.
   b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
   c. Cracking, checking, peeling or failure of a paint to adhere to a bare metal.

2. Warranty Period: **Twenty (20) Years** from the date of substantial completion.

D. Applicator shall furnish written warranty for a two (2) year period from date of substantial completion of building covering repairs required to maintain roof and flashings in a watertight condition.

PART 2 PRODUCTS

2.1 SHEET METAL ROOFING

A. Manufacturer

1. Petersen Aluminum Corporation, 1005 Tonne Road, Elk Grove Village, IL 60007.

2. No Other Substitutions Permitted.

B. Panel Type

1. PAC-CLAD TITE-LOC PLUS Panels and Trim
   a. Seam Height: 2” (50.8 mm) minimum seam height.
c. Panel Dimension: 12 in (304.8 mm) o.c.
d. Factory applied in-seam sealant.

2. Factory produced Eave Notching for trimmed eave panels.

3. Texture: Smooth.

4. Rating: Wind resistance for the roof assembly including substrate and insulation components as required to meet current ASCE 7 wind design uplift pressures.


6. Fasteners: TITE-LOC PLUS galvanized steel, non-penetrating high performance clips for roofing application and UL Classified 90 rated (wind uplift) assemblies and standard clips for mansard and fascia applications.

7. Sealant Bead: Factory applied sealant bead.

C. Panel Finish – Factory Applied

1. Finish color selected from Manufacturer’s standard colors. Color selected by Owner.

2. Panel Underside: Polyester wash coat with dry film thickness of 0.3 mils.

3. Protective Film: Strippable vinyl film applied during panel fabrication and finishing.

D. Flashing and Trim: Manufacturer’s standard 22 ga. prefinished flashing and trim profiles, factory formed, color and finish to match metal roofing panels.

2.1 RELATED MATERIALS

A. General: Coordinate use of related materials.

B. Roofing Underlayment: Cold applied, self-adhering butyl based moisture barrier with cross laminated polyethylene film suitable for high temperature installations under metal roof panels conforming to ASTM D1970.

1. On all surfaces to be covered with roofing material, furnish, and install a 40 mil “Peel & Stick Membrane”, required as outlined by metal panel manufacturer. Membrane to be a minimum of 40 mil thickness, smooth, non-granular, by one of the following manufacturers:

   a. HT Polystick MTS: Polyglass USA; Fernley, Nevada 89408

   b. HT TW Metal and Tile Underlayment: Tamko; Joplin, MO 64801

   c. A/E approved equal.

2. Underlayment shall be laid in horizontal layers with joints lapped toward the eaves a minimum of 6", and well secured along laps and at ends as necessary to properly hold the felt in place. All underlayment shall be preserved unbroken and whole.

3. Ice and Water Shield shall lap all hips and ridges at least 12" to form double thickness and shall be lapped 6" over the metal of any valley or built-in gutters and shall be installed as required by the Standing Seam Panel Manufacturer to attain the desired Twenty (20) Year Twenty (20) Year
STANDING SEAM METAL ROOF PANELS
Section: 07 41 10

Weathertightness Warranty.

C. Plywood: 4’ x 8’ x 5/8” CDX

D. Bituminous Coating: Cold-applied asphaltic mastic. Provide compound free of asbestos fibers, sulfur components and other harmful impurities.

E. Sealants
   1. Provide two-part polysulfide class B non-sag type for vertical and horizontal joints, or
   2. One part polysulfide not containing pitch or phenolic extenders, or
   3. Exterior grade silicone sealant recommended by roofing manufacturer, or one part non-sag, gun grade exterior type polyurethane recommended by the roofing manufacturer.

2.2 FABRICATION
   A. General
      1. Continuous Length: Fabricate panels 55’ (16.2 m) and less in one continuous length.
      2. Trim and Flashings: Fabricate trim and flashings from same material as roof system.
      3. Portable Roll Former: Panels fabricated by portable roll former shall not be approved.

2.3 FINISHES
   A. Factory Applied Finish
      1. Topside: Full-strength fluoropolymer (70% Kynar® 500 or Hylar® resin) system of 1.0 mil total dry film thickness.
      2. Underside: Wash coat of 0.3 - 0.4 mil dry film thickness.
      3. Texture: Smooth texture, dull matte specular gloss 25 - 35% at 60˚.

PART 3 EXECUTION

3.1 MANUFACTURER’S INSTRUCTIONS
   A. Compliance: Comply with Manufacturer’s product data, recommendations and installations instructions for substrate verification, preparation requirements and installation.
      1. Strippable Film: Remove Manufacturer’s protective film, if any, from surfaces of roofing panels.

3.2 EXAMINATION
   A. Site Verification of Conditions: Verify substrate conditions, which have been previously installed under other sections, are acceptable for project installation in
accordance with Owner’s instructions.

3.3 PREPARATION

A. Coordination: Coordinate metal roofing with other Work (drainage, flashing and trim, deck substrates, parapets, copings, walls) and other adjoining Work to provide a non-corrosive and leak-proof installation.

B. Dissimilar Metals: Prevent galvanic action of dissimilar metals.

C. Tear Off and Deck Repair:
   1. The existing roofing and flashing materials shall be completely removed down to deck. The deck shall be inspected, cleaned, repaired, and otherwise conditioned to conform to the requirements of a new deck.
   2. Deteriorated decking shall be removed and replaced to match existing.
   3. All old flashing must be removed.
   4. All existing composition and metal flashing must be removed and replaced.
   5. All metal counterflashing, metal coping, and other metal work above the roof system must be inspected, and replaced or repaired as shown on drawings to provide a watertight assembly.
   6. All rooftop equipment shall be carefully removed as required and reinstalled per project drawings after completion of the Work. Rooftop equipment scheduled for demolition shall be properly disposed of and new installed. Nailers and curbs shall be removed and replaced with new treated lumber if necessary. Openings shall be covered temporarily with plywood and roof membrane while equipment is stored elsewhere. Air intake and exhaust openings shall not be sealed but shall be hooded to permit flow of air.
   7. All Work shall be coordinated so that all materials removed each day shall be replaced and made watertight the same day.
   8. Contractor to contact Fire Marshal prior to disconnecting mechanical units. Provide documentation of contact and approval to proceed from Fire Marshal.

D. Install one layer 5/8” plywood over the repaired roof deck surface in accordance with manufacturer requirements. Mechanically attached to meet FM 1-90 with perimeter and corner enhancements.

E. Moisture Barrier Underlayment: Install self adhered moisture barrier underlayment directly over the installed plywood decking. Top substrate surface must be clean, dry and smooth. Remove all dust, dirt, debris and protrusions from the surface prior to installation of underlayment.
   1. Apply underlayment only in fair weather when the air, roof deck and membrane are at temperatures of 50 degrees F or higher.
   2. Install membrane in accordance with manufacturer’s specifications. Cut the membrane into 10’ - 15’ lengths and reroll loosely. Peel back 1’ - 2’ of release liner, align the membrane, and continue to peel the release liner.
from the membrane. Press the membrane in place with heavy hand pressure. Side laps must be a minimum of 3 1/2" and end laps must be a minimum of 6" or as required by the manufacturer.

3. For valley and ridge application, peel the release liner, center the sheet over the valley or ridge, drape, and press in place. Work from the center of the valley or ridge outward in each direction and start at the low point and Work up the roof.

4. Install membrane from low point of the roof with laps run to shed water. For steep slope applications, follow manufacturer’s requirements and install underlayment vertically. End laps shall be blind nailed with metal head cap nails to hold the sheet in position.

3.4 INSTALLATION


1. Seams: Provide uniform, neat seams.

2. Fasteners: Conceal fasteners where possible in exposed Work. Cover and seal fasteners and anchors for watertight and leak-proof installation.

3. Sealant-Type Joints: Provide Manufacturer approved sealant-type joint where indicated. Form joints to conceal sealant.

4. Clips: Fasten in-seam clips in accordance with Manufacturer’s approved fastening pattern to meet project wind uplift requirements. Secure clips to the structural deck or members with approved fasteners on centers not to exceed 2-1/2'. Clip spacing shall be reduced at perimeter and corner zones in accordance with Manufacturer’s evaluation / approval report for the tested assembly.

5. Install pipe support clamps in accordance with manufacturer guidelines and spacing. Attach utility piping.

3.5 FIELD QUALITY REQUIREMENTS

A. Site Tests (Post Installation Testing): Owner reserves right to perform post installation testing of installed sheet metal roofing.

B. Manufacturer’s Field Services: Manufacturer technical representative shall provide project field service along with manufacturer’s engineered shop drawings to ensure Contractor compliance with Manufacturer’s warranty requirements. Field service shall include product use recommendations and minimum of two periodic site visits for inspection of product installation in accordance with manufacturer’s instructions.

3.6 CLEANING

A. Cleaning: Remove temporary coverings and protection of adjacent Work areas. Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to Owner’s acceptance. Remove construction debris from project site and legally dispose of debris.
3.7 PROTECTION
   A. Protection: Protect installed product from damage during construction.

- END OF SECTION -
PART 1 - GENERAL

1.1 SECTION INCLUDES
A. Foamed-insulation-core concealed fastener metal wall panels, with related metal trim and accessories.

1.2 RELATED REQUIREMENTS
A. Division 07 52 16 – SBS Modified Bituminous Membrane Roofing
B. Division 07 60 00 – Flashing and Sheet Metal
C. Division 07 92 00 – Joint Sealants

1.3 REFERENCES
A. American Society of Civil Engineers (ASCE): www.asce.org/codes-standards:
B. ASTM International (ASTM): www.astm.org:
   1. ASTM A 653 - Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
   4. ASTM A 240 – Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
   7. ASTM D 1621 - Compressive Properties of Rigid Cellular Plastics.
   11. ASTM D 6226 - Standard Test Method for Open Cell Content of Rigid Cellular Plastics

C. National Fire Protection Association (NFPA)

D. FM Global (FM): www.fmglobal.com:
   1. FM 4880 American National Standard for Evaluating Insulated Wall and Roof/Ceiling Assemblies
   2. FM 4881 Approval Standard for Class 1 Exterior Wall Systems.

E. US Green Building Council (USGBC): www.usgbc.org:
   1. Leadership in Energy and Environmental Design (LEED) Green Building Rating System

1.4 QUALITY ASSURANCE

A. Manufacturer/Source: Provide metal panel assemblies and accessories from a single manufacturer approved under an accredited third-party quality control program

B. Manufacturer Qualifications: Approved manufacturer listed in this Section with minimum ten years’ experience in the manufacturing of similar products and successful use in similar applications.

1. Approval of Comparable Products: Submit the following in accordance with project substitution requirements, within time allowed for substitution review:
   a. Product data, including certified independent test data indicating compliance with requirements.
   b. Samples of each component.
   c. Sample submittal from similar project.
   d. Project references: Minimum of five installations not less than five years old, with Owner and A/E contact information.
e. Sample warranty.
f. Certificate from an accredited third-party Quality Control Program.

2. Substitutions following award of contract are not allowed except as stipulated in Division 01 General Requirements

3. Approved manufacturers must meet separate requirements of Submittals Article.

C. Installer Qualifications: Experienced Installer [certified by metal panel manufacturer] with minimum of five years experience with successfully completed projects of a similar nature and scope.

1. Installer's Field Supervisor: Experienced mechanic [certified by metal panel manufacturer] supervising work on site whenever work is underway.

D. Buy American Compliance: Materials provided under work of this Section shall comply with the following requirements:


1.5 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Prior to erection of framing, conduct preinstallation meeting at site attended by Owner, A/E, metal panel installer, metal panel manufacturer's technical representative, inspection agency and related trade contractors.

1. Coordinate building framing in relation to metal panel system.
2. Coordinate openings and penetrations of metal panel system.

1.6 ACTION SUBMITTALS

A. Product Data: Manufacturer's data sheets for specified products.

B. Shop Drawings: Show layouts of metal panels. Include details of each condition of installation, panel profiles, and attachment to building. Provide details at a minimum scale 1-1/2-inch per foot of edge conditions, joints, fastener and sealant placement, flashings, openings, penetrations, and special details. Make distinctions between factory and field assembled work.

1. Include data indicating compliance with performance requirements.
2. Indicate points of supporting structure that must coordinate with metal panel system installation.
3. Include structural data indicating compliance with performance requirements and requirements of local authorities having jurisdiction.

C. Samples for Initial Selection: For each exposed product specified including sealants. Provide representative color charts of manufacturer's full range of colors.

D. Samples for Verification:
1. Provide 12-inch- (305 mm) long section of each metal panel profile.
2. Provide color chip verifying color selection.

1.7 INFORMATIONAL SUBMITTALS
A. Product Test Results: Indicating compliance of products with requirements.
B. Qualification Information: For Installer
C. Warranty:
   1. Submit Manufacturer’s written Two (2) Year Limited Warranty providing panels to be free from defects in materials and workmanship, beginning from the date of substantial completion excluding coil coatings (paint finishes) that are covered under a separate warranty.
   2. The installation contractor shall issue a separate Two (2) Year Warranty against defects in installed materials and workmanship, beginning from the date of substantial completion of the installation.

1.8 CLOSEOUT SUBMITTALS
A. Maintenance data.
B. Manufacturer’s Warranty: Executed copy of manufacturer’s warranty.

1.9 DELIVERY, STORAGE, AND HANDLING
A. Protect products of metal panel system during shipping, handling, and storage to prevent staining, denting, deterioration of components or other damage. Protect panels and trim bundles during shipping. Protect painted surfaces with a protective covering before shipping.
   1. Deliver, unload, store, and erect metal panels and accessory items without deforming panels or exposing panels to surface damage from weather or construction operations.
   2. Store in accordance with Manufacturer’s written instructions.
   3. Shield foam insulated metal panels from direct sunlight until all components are installed.

1.10 WARRANTY
A. Special Manufacturer’s Warranty: Submit Manufacturer’s two (2) year limited warranty providing panels to be free from defects in materials and workmanship, beginning from the date of substantial completion excluding coil coatings (paint finishes) that are covered under a separate warranty.
B. The installation contractor shall issue a separate two (2) year warranty against defects in installed materials and workmanship, beginning from the date of substantial completion of the installation.
C. Special Panel Finish Warranty: Submit Manufacturer’s twenty (20) year limited warranty on the exterior paint finish for adhesion to the metal substrate and limited warranty on the exterior paint finish for chalk and fade.
   1. Fluoropolymer Two-Coat System:
      a. Failure of adhesion, peeling, checking, or cracking.
PART 2 - PRODUCTS

2.1 MANUFACTURER
   A. Basis of Design Manufacturer: Metl-Span, a Division of NCI Group, Inc.; Lewisville, Texas Tel: 972.221.6656; Email: info@metlspan.com; Web: metlspan.com.
   B. Provide basis of design product Metl-Span CF Architectural Wall Panel.

2.2 PERFORMANCE REQUIREMENTS
   A. General: Provide metal panel system meeting performance requirements as determined by application of specified tests by a qualified testing facility on manufacturer's standard assemblies.
   B. Structural Performance: Provide metal panel assemblies capable of withstanding the effects of indicated loads and stresses within limits and under conditions indicated, as determined by ASTM E 72 or ASTM E 1592 applied in accordance with ICC AC 04, Section 4, Panel Load Test Option or Section 5, Panel Analysis Option:
      1. Wind Loads: Determine loads based on applicable building code, wind speed, importance factor, exposure category, and internal pressure coefficient indicated on drawings.
         a. Wind Negative Pressure: Certify capacity of metal panels by testing of proposed assembly.
   C. FM Approvals Listing: Comply with FM Approval 4881. Provide metal wall panel assembly listed in FM Approvals' "Approval Guide."
   D. Fire Performance Characteristics: Provide metal panel systems with the following fire-test characteristics determined by indicated test standard as applied by testing and inspection agency acceptable to authorities having jurisdiction.
      1. Surface-Burning Characteristics: The insulating core shall have been tested per ASTM E 84. The core shall have:
         a. Flame spread index: 25 or less.
         b. Smoke developed index: 450 or less.
      2. Room Test Performance: FM Global 4880: The panel assembly shall not support a self-propagating fire which reaches any limits of the 50’ (15.24m) high corner test structure as evidenced by flaming or material damage of the ceiling of the assembly.
      3. Fire Propagation: The fire assembly shall meet the requirements of the standard for NFPA 285
      4. Fire Growth: The fire assembly shall meet the requirements of the standard for NFPA 286
      5. Potential Heat: Determined in accordance with NFPA 259
      6. IBC Chapter 26: Panel Performance under the above test methods, shall meet the requirements of IBC, Chapter on foam plastics.
   E. Water Penetration Static Pressure:
1. ASTM E 331 Modified (2 hour duration): No uncontrolled water penetration at a static pressure of 6.24 lbf/sq. ft. (300 Pa).

F. Thermal Movements: Allow for thermal movements from variations in both ambient and internal temperatures. Accommodate movement of support structure caused by thermal expansion and contraction. Allow for deflection and design for thermal stresses caused by temperature differences from one side of the panel to the other.

G. Thermal Performance: When tested in accordance with ASTM C 518, Measurement of Steady State thermal Transmission, the panels shall provide a k factor of 0.14 btu/sf/hr/deg F at a 75°F (24°C) mean temperature, as required by code, or 0.126 btu/sf/hr/deg F at a 40°F (4°C) mean temperature.

2.3 INSULATED METAL WALL PANELS

A. Concealed Fastener, Insulated Metal Panel with foam core: Structural metal panel consisting of flush, smooth exterior metal sheet, and interior metal sheet with a Light Mesa profile, with factory foamed-in-place polyurethane core in thermally-separated profile, with tongue-and-groove panel edges, attached to supports using concealed fasteners.


2. G-90 galvanized coated steel conforming to ASTM A 653 and/or AZ50 aluminum-zinc alloy coated steel, conforming to ASTM A 792/A 792M, minimum grade 33, prepainted by the coil-coating process per ASTM A 755/A 755M.

   a. Exterior Face Sheet: 22 gauge thickness, with unembossed surface and up to 3" reveal as noted in drawings.

      1) Finish: Fluoropolymer two-coat system (Kynar)
      2) Color: Selected by Owner.

   b. Interior Face Sheet: 26 gauge thickness, with stucco embossed surface and a Light Mesa profile.

      1) Finish: Polyester two-coat system
      2) Color: Selected by Owner.

3. Panel Width: 30 inches (762 mm)

4. Panel Thickness: [2 inch (51 mm)]

5. Insulating Core: Polyurethane with zero ozone depletion potential blowing agent

   a. Closed Cell Content: 90% or more as determined by ASTM D 6226

   b. Compressive Strength: As required to meet structural performance requirements and with a minimum of 22 psi as determined by ASTM D 1621

   c. Shear Strength: As required to meet structural performance requirements and with a minimum of 36 psi as determined by ASTM C 273
d. Tensile Strength: As required to meet structural performance requirements and with a minimum of 41 psi ASTM D 1623

e. Minimum Density: 2.0 pcf (32 kg/m3) as determined by ASTM D 1622

2.4 METAL WALL PANEL ACCESSORIES

A. General: Provide complete metal panel assemblies incorporating trim, copings, fasciae, gutters and downspouts, and miscellaneous flashings. Provide required fasteners, closure strips, and sealants as indicated in manufacturer's written instructions.

B. Flashing and Trim: Match material, thickness, and finish of metal panels.

C. Panel Clips: ASTM A 653/A 653M, G90 (Z180) hot-dip galvanized zinc coating, one-piece, configured for concealment in panel joints, and identical to clips utilized in tests demonstrating compliance with performance requirements.

D. Panel Fasteners: Self-drilling or Self-tapping screws and other acceptable fasteners recommended by metal panel manufacturer. Where exposed fasteners cannot be avoided, supply corrosion-resistant fasteners with heads matching color of metal panels by means of factory-applied coating, with weathertight resilient washers.

E. Joint Sealers:
   1. Sealants: Provide Tape Mastic Sealants, Non-skinning sealants, and Urethane Sealants in accordance with manufacturers standards

2.5 FABRICATION

A. General: Provide factory fabricated and finished metal panels, trim, and accessories meeting performance requirements, indicated profiles, and structural requirements.

B. Fabricate metal panel joints configured to accept sealant providing weathertight seal.

C. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's written instructions, approved shop drawings, and project drawings.

2.6 FINISHES

A. Finishes, General: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer’s written instructions.

B. Exterior Face Sheet Coil-Coated Finish System
   1. Fluoropolymer Two-Coat System: 0.2 – 0.3 mil primer with 0.7 - 0.8 mil 70 percent PVDF fluoropolymer color coat, AAMA 621, [meeting solar reflectance index requirements].
      a. Basis of Design: Metl-Span, Fluoropolymer, two-coat system (Kynar).
C. Interior Face Sheet Coil-Coated Finish System
   1. Polyester Two-Coat System: 0.20 – 0.25 mil primer with 0.7 – 0.8 mil color coat
      a. Basis of Design: Metl-Span, Igloo White

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine metal panel system substrate with Installer present. Inspect for erection tolerances and other conditions that would adversely affect installation of metal panels.
   1. Inspect framing that will support insulated metal panels to determine if support components are installed as indicated on approved shop drawings and are within tolerances acceptable to metal panel manufacturer and installer. Confirm presence of acceptable framing members at recommended spacing to match installation requirements of metal panels.
   2. Panel Support Tolerances: Confirm that metal panel supports are within tolerances acceptable to metal panel manufacturer but not greater than the following:
      a. 1/4 inch (6 mm) in 20 foot (6100 mm) in any direction.
      b. 3/8 inch (9 mm) over any single wall plane.
      c. Girt Spacing 8 feet (2438 mm) or more: 1/4 inch (6 mm) out only.
      d. Girt Spacing Less Than 8 feet (2438 mm): 1/8 inch (3 mm) out only.
      e. CF Architectural girt spacing less than 4 feet (1219 mm): 1/16 inch (1.5 mm) inch out only.

B. Correct out-of-tolerance work and other deficient conditions prior to proceeding with insulated metal panel installation.

3.2 METAL PANEL INSTALLATION

A. Concealed-Fastener Insulated Metal Panels with foam core: Install metal panel system in accordance with manufacturer's written instructions, approved shop drawings, and project drawings. Install metal panels in orientation, sizes, and locations indicated. Anchor panels and other components securely in place. Provide for thermal and structural movement.

B. Attach panels to metal framing using screws, fasteners, sealants, and adhesives recommended for application by metal panel manufacturer.
   1. Fasten metal panels to supports with fasteners at each location indicated on approved shop drawings, at spacing and with fasteners recommended by manufacturer.
   2. Cut panels in field where required using manufacturer's recommended methods.
   3. Provide weatherproof jacks for pipe and conduit penetrating metal panels.
4. Dissimilar Materials: Where elements of metal panel system will come into contact with dissimilar materials, treat faces and edges in contact with dissimilar materials as recommended by metal panel manufacturer

C. Attach panel flashing trim pieces to supports using recommended fasteners and joint sealers

D. Joint Sealers: Install sealants where indicated and where required for weatherproof performance of metal panel assemblies

1. Seal panel base assembly, openings, panel head joints, and perimeter joints using sealants indicated in manufacturer's instructions

2. Seal wall panel joints; apply continuously without gaps in accordance with manufacturer's written instructions, approved shop drawings, and project drawings

3. Prepare joints and apply sealants per requirements of Section 07 92 00 – Joint Sealants.

3.3 ACCESSORY INSTALLATION

A. General: Install metal panel accessories with positive anchorage to building and weather tight mounting; provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal panel assembly, including trim, copings, flashings, sealants, closure strips, and similar items.

2. Comply with details of assemblies utilized to establish compliance with performance requirements and manufacturer's written installation instructions.

3. Set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently weather resistant.

3.4 FIELD QUALITY CONTROL

A. Water-Spray Test: After completing portion of metal panel assembly including accessories and trim, test 2-bay area selected by A/E for water penetration, according to AAMA 501.2.

3.5 CLEANING AND PROTECTION

A. Remove temporary protective films immediately in accordance with metal panel manufacturer's instructions. Clean finished surfaces as recommended by metal panel manufacturer.

B. Replace damaged panels and accessories that cannot be repaired to the satisfaction of the A/E.

– END OF SECTION –
PART 1 – GENERAL

1.1 SECTION INCLUDES
A. Preparation of Substrate to Receive Roofing Materials.
B. Vapor Retarder/Temporary Roof Assembly
C. Roof Insulation Application/Taper System to Temporary Roof Assembly Roof Membrane Application.
D. Base Sheet and Cap Sheet Roof Assembly Roof Membrane Application.
E. Roof Flashing Application.
F. Incorporation of Sheet Metal Flashing Components and Roofing Accessories into the Roof System.

1.2 SUMMARY
A. Section Includes: Roofing system consisting of a vapor retarder / temporary roof, flat insulation/taper system, insulation cover board, a two-ply SBS modified bituminous membrane roofing system, base flashing and accessories.

1.3 RELATED SECTIONS
A. Section 03 01 30 – Concrete Repair
B. Section 05 51 33.16 – Inclined Metal Ladders
C. Section 06 10 00 – Miscellaneous Carpentry
D. Section 07 18 13 – Liquid Applied Pedestrian Traffic Waterproofing
E. Section 07 60 00 – Flashing and Sheet Metal
F. Section 07 71 28 – Manufactured Roof Expansion Joints – Flashing Cement
G. Section 07 71 29 – Manufactured Roof Expansion Joints – Epoxy Resin
H. Section 07 92 00 – Joint Sealants

1.4 REFERENCE STANDARDS
A. ASTM - American Society for Testing and Materials
   Philadelphia, PA
B. FM - Factory Mutual Engineering and Research
   Norwood, MA
C. NRCA - National Roofing Contractors Association
   Rosemont, IL
D. OSHA - Occupational Safety and Health Administration
   Washington, DC
E. SMACNA- Sheet Metal and Air Conditioning Contractors National Association
   Chantilly, VA
F. UL - Underwriters Laboratories
   Northbrook, IL
1.5  DEFINITIONS
   A.  Waterproofing Terminology: Refer to ASTM D1079 and the glossary of the National Roofing Contractors Association (NRCA) Roofing and Waterproofing Manual for definitions of waterproofing terms related to this section.

1.6  DESCRIPTION OF WORK
   A.  Structural Concrete Deck Roof Areas: Roof membrane and tapered insulation replacement over structural concrete deck.
      1.  Tear off and replacement of existing roof membrane, flashings, insulation and accessories down to structural concrete deck if no BUR exists, or to existing BUR system over structural concrete deck. Utilize roof removal practices for regulated asbestos containing materials (RACM) during the renovation to prevent triggering coverage under NESHAP. Provide HEPA Filters on all fresh air intakes during the construction phase.
      2.  Preparation and repair of existing substrate(s) as required to meet project and Manufacturer requirements.
      3.  Prime the substrate with asphalt primer.
      4.  Installation of vapor retarder/temporary roof.
      5.  Installation of new rigid thermal tapered roof insulation system.
      6.  Installation of ½” gypsum cover board.
      7.  Installation of Twenty (20) Year NDL two-ply SBS membrane system: cold-applied base ply / cold-applied granule surfaced cap sheet roof membrane.

1.7  DESCRIPTION OF WORK
   A.  Metal Deck Roof Areas: Roof membrane and tapered insulation replacement over metal deck.
      1.  Tear off and replacement of existing roof membrane, flashings, insulation and accessories down to the metal deck
      2.  Preparation and repair of existing metal deck as required to meet project and Manufacturer requirements.
      3.  Installation of ⅝” gypsum board/cover board.
      4.  Installation of vapor retarder/temporary roof.
      5.  Installation of new rigid thermal tapered roof insulation system.
      6.  Installation of ½” gypsum cover board.
      7.  Installation of Twenty (20) Year NDL two-ply SBS membrane system: cold-applied base ply / cold-applied granule surfaced cap sheet roof membrane.

1.8  ACTION SUBMITTALS
   A.  Product and material safety data sheets for each product proposed for use.
B. Samples for Verification
   1. Two 8 ½ inch x 11 inch samples of the primary roofing and flashing materials.

C. Shop Drawings
   1. Base flashings and membrane terminations.
   2. Tapered insulation, including slopes.
   3. Crickets, saddles, and tapered edge strips, including slopes.
   4. Insulation and cover board fastening patterns and insulation adhesive ribbon spacing for corner, perimeter, and field.

D. Spill & Waste Plans
   1. Spill & Waste Plans for Verification

1.9 INFORMATIONAL SUBMITTALS
A. Letter from the roofing manufacturer that the roofing contractor is certified to install the specified products. Contractor shall have a minimum of 5 years experience in successfully installing the same or similar roofing materials.

B. Latest edition of the roofing system manufacturer's specifications and installation instructions.

C. Evidence of Factory Mutual testing.

D. Evidence of Underwriters' Laboratories Class A acceptance of the proposed roofing system.

E. Evidence and description of manufacturers’ quality control/quality assurance program for the primary roofing products supplied. The quality assurance program description shall include all methods of testing for physical and mechanical property values.

F. Evidence the roof system has passed 500 cycles of ASTM D 5849 Resistance to Cyclic Joint Displacement (fatigue) at 14°F (-10°C). Passing results shall show no signs of membrane cracking or interply delamination after 500 cycles.

G. Evidence the roof system has passed 200 cycles of ASTM D 5849 after heat conditioning performed in accordance with ASTM D 5147.

H. Letter from the roofing manufacturer confirming that the membrane manufacturer has been producing SBS products in the United States for a minimum of 10 years without a change in the basic product design or SBS modified blend, e.g. no substantive changes to the product composition, polymer specification, asphalt and filler formulation.

I. Letter from the proposed primary roofing manufacturer confirming the number of years it has directly manufactured the proposed primary roofing system under the trade name and/or trademarks as proposed.

J. Letter from the proposed primary roofing manufacturer confirming that a phased roof application, with only the modified bitumen base ply in place for a period of up to 10 weeks is acceptable and approved for this project.
K. Letter from the proposed primary roofing manufacturer confirming that the filler content in the elastomeric blend of the proposed roof membrane and flashing components does not exceed 35% in weight.

L. Letter from the proposed primary roofing manufacturer confirming that the proposed roof membrane and flashing components meet or exceed the physical and mechanical requirements listed in Part 2 of this specification.

M. Letter from the proposed primary roofing manufacturer confirming that a Certificate of Analysis confirming the physical and mechanical properties of the roofing membrane components will be provided, for each production run of products, at the conclusion of the project.

N. Complete list of material physical and mechanical properties for each sheet including: weights and thicknesses; low temperature flexibility; maximum load; elongation @ 5% maximum load; breaking load; dimensional stability; high temperature stability; and compound stability.

O. Letter from the manufacturer of the proposed roof membrane system confirming that the proposed finish ply carries a UL Environment Claim Validation logo in regard to Air Purification Performance of Photocatalytic Materials.

P. Evidence that the roof membrane base and finish plies are manufactured with radio frequency identification (RFID) chips encapsulated within each roll of modified bitumen material. The RFID chips shall enable wireless, non-contact scanning identification through a standard ultra-high frequency (UHF) scanning device to identify the product name, lot number, and manufacturing date.

Q. Sample copy of the Twenty (20) Year NDL Warranty.

R. Sample copy of installer’s Five (5) Year Labor and Material Warranty.

1.10 SUBMITTAL OF EQUALS

A. Submit roofing systems to be considered as equals to the basis of design as outlined herein no less than 10 days prior to bid date. Primary roofing systems that have been reviewed and accepted as equals to the specified roofing system will be listed in an addendum prior to bid date; only then will equals be accepted at bidding. All submittal packages for equals to be considered shall comply with the submittal requirements outlined herein.

1.11 CLOSE-OUT SUBMITTALS

A. Certificate of Analysis from the testing laboratory of the primary waterproofing materials manufacturer confirming the physical and mechanical properties of the roofing membrane components. Testing shall be in accordance with the parameters published in ASTM D 5147 and ASTM D 7051 and indicate Quality Assurance/Quality Control Data as required to meet the specified properties. A separate Certificate of Analysis for each production run of material shall indicate the following information:

1. Material type
2. Lot number
3. Production date
4. Dimensions and Mass (indicate the lowest values recorded during the production run)
5. Roll length
6. Roll width
7. Selvage width
8. Total thickness
9. Thickness at Selvedge (coating thickness)
10. Weight
11. Physical and Mechanical Properties
12. Low temperature flexibility
13. Peak Load
14. Ultimate Elongation
15. Dimensional stability
16. Compound Stability
17. Granule Embedment

B. Electronic Product Identification: The roof membrane base and finish plies shall have radio frequency identification (RFID) chips encapsulated within each roll. The RFID chips shall enable wireless, non-contact scanning identification through a standard ultra-high frequency (UHF) scanning device to identify information contained in a Certificate of Analysis (COA) from the testing laboratory of the primary roofing materials manufacturer. The COA information shall identify that the physical and mechanical properties of the roofing membrane components. Testing shall be in accordance with the parameters published in ASTM D 5147 and ASTM D 7051 and indicate quality assurance/quality control data as required to meet the specified properties. A separate record for each production run of material shall indicate the following information:

1. Material type
2. Lot number
3. Production date
4. Dimensions and Mass (indicate the lowest values recorded during the production run);
5. Roll length
6. Roll width
7. Selvage width
8. Total thickness
9. Thickness at selvage (coating thickness)
10. Weight
11. Physical and Mechanical Properties;
12. Low temperature flexibility
13. Peak load
14. Ultimate Elongation
15. Dimensional stability
16. Compound Stability
17. Granule embedment
18. Resistance to thermal shock (foil faced products)

C. Repair and Maintenance guide outlining roofing care and maintenance required in order to maintain the guarantee.

D. Guarantee, as specified herein.

1.12 QUALITY ASSURANCE

A. Acceptable Products: Provide primary roofing products, including each type of sheet, all manufactured in the United States, supplied by a single manufacturer which has been successfully producing the specified types of primary products for not less than 10 years. Provide secondary or accessory products which are acceptable to the manufacturer of the primary roofing products.

B. Installer shall be eligible and certified by the manufacturer to provide a 20 Year NDL Warranty prior to the opening of the proposals.

C. Agency Approvals: The proposed roofing system shall conform to the following requirements. No other testing agency approvals will be accepted.

1. Underwriters Laboratories Class A acceptance of the proposed roofing system. The proposed finish ply shall carry a UL Environment Claim Validation logo in regard to Air Purification Performance of Photocatalytic Materials.

2. Structural Concrete Deck - Factory Mutual Approval Standard 4470 listing for the proposed membrane system. The roofing membrane configuration shall be approved by FM Global for Class 1-SH (severe hail) exposure. The roof shall be approved by FM Global for minimum 1-90 wind uplift construction as listed in RoofNav.

3. Metal Deck - Factory Mutual Approval Standard 4470 listing for the proposed membrane system. The roofing membrane configuration shall be approved by FM Global for Class 1-SH (severe hail) exposure. The roof shall be approved by FM Global for minimum 1-90 wind uplift construction as listed in RoofNav.

4. ANSI/SPRI ES-1 Classification – The fascia and coping shall meet the following uplift pressures when tested according to Test Method RE-2 for fascia and RE-3 for coping.

   Horizontal/Outward: 79 psf
   Vertical/Upward: 130 psf
The roof membrane base and finish plies shall have radio frequency identification (RFID) chips encapsulated within each roll of modified bitumen material. The RFID chips shall enable wireless, non-contact scanning identification through a standard ultra-high frequency (UHF) scanning device to identify the product name, lot number, and manufacturing date.

Project Acceptance: Submit a completed manufacturer's application for guarantee form along with shop drawings of the areas to be roofed showing all dimensions, penetrations, and details. The form shall contain all the technical information applicable to the project including deck types, slopes, and manufacturer's membrane assembly proposed for installation. The form shall also contain accurate and complete information requested including proper names, addresses, zip codes and telephone numbers. The project must receive approval, through this process, prior to shipment of materials to the project site.

Attend necessary job meetings and furnish competent and full time supervision, experienced roof mechanics, all materials, tools, and equipment necessary to complete, in an acceptable manner, the roof installation in accordance with this specification. Comply with the latest written application instructions of the manufacturer of the primary roofing products. In addition, application practice shall comply with requirements and recommendations contained in the latest edition of the Handbook of Accepted Roofing Knowledge (HARK) as published by the National Roofing Contractor's Association, amended to include the acceptance of a phased roof system installation.

Local Regulations: Conform to regulations of public agencies, including any specific requirements of the city and/or state of jurisdiction.

Manufacturer Requirements: The primary roofing materials manufacturer shall provide direct trained company personnel to attend necessary job meetings, perform periodic inspections as necessary, and conduct a final inspection upon successful completion of the project.

Single Source Requirements: Products and materials required to complete system shall be either produced directly by manufacturer or approved in writing by primary manufacturer for intended purpose.

Regulatory Requirements: Comply with applicable Volatile Organic Compounds (VOCs) regulations

System Assembly Letter: Manufacturer's certification as follows:

1. List information specific to this project, including owner, contractor, building, and location.
2. List each material required for roofing system.
3. Certification of single source responsibility.
4. Certification of acceptance of secondary products manufactured by others.
5. Certification of acceptance of products specified elsewhere which are installed within or in contact with roofing system.
6. Certification that products and materials comprising roofing system are compatible with each other and with adjacent materials they may contact.

7. Certification that roof systems comply with specified UL and FM requirements.

8. Certification that roof system is eligible for indicated guarantee.

L. Preliminary Conference: As soon as possible after award of roofing work and before initial submittals, meet with installer, A/E, Owner's representative, inspecting agent, and representatives of other entities directly concerned with performance of roofing system.

1. Review requirements, submittals, status of coordinating work, availability of materials, substrate requirements, installation facilities, and establish preliminary installation schedule.

2. Review requirements for inspections, testing, certifications, forecasted weather conditions, governing regulations, insurance requirements, and proposed installation procedures.

3. Discuss roofing system protection requirements for construction period extending beyond roofing installation. Discuss possible need for temporary waterproofing.

4. Confirm that all parties involved are aware of warranty requirements and that a letter of intent to warrant has been submitted and approved.

5. Record discussion, including agreement or disagreement on matters of significance; furnish copy of recorded discussions to each participant. If substantial disagreements exist at conclusion of conference, determine how disagreements will be resolved and set date for reconvening conference.

M. Inspection and Testing: Independent Inspection and Testing services will be required in relation to Work of this Section. Refer to Division 1.

N. Primary roofing materials shall be available at the jobsite a minimum of two (2) weeks prior to project start. The Designer of Record or Owner's representative may randomly select two (2) rolls each of the specified base and finish plies for empirical confirmation by an independent testing laboratory verifying the products conform to the values listed on manufacturer's published product data sheet. Substandard test materials not meeting the physical/mechanical properties listed on manufacturer's published product data sheets shall be considered representative of the entire lot of material provided. At no additional cost to the Owner, the substandard materials shall be marked, then removed from the jobsite, and replaced by the Contractor with manufacturer's products meeting the specified requirements.

O. Coordination: Contractor shall coordinate work specified in other sections and in other contracts affecting roof in any way.
1.13 DELIVERY, HANDLING, STORAGE & DISPOSAL

A. Deliver materials in original unopened containers or packaging clearly labeled with manufacturer's name, brand name, instructions for storage, handling and use, all identifying numbers and labels.

B. Store materials on pallets or other similar raised platform and protected from weather.

C. Do not overload structure by storing large amounts of material in one (1) area.

D. Store materials out of direct exposure to the elements. Store roll goods on a clean, flat and dry surface. All material stored overnight shall be stored on pallets. Rolls of waterproofing must be stored on ends. Store materials in a manner so as to preclude overloading of deck and building structure. Store materials such as solvents, adhesives and asphalt cutback products away from open flames, sparks or excessive heat. **Cover all material using a breathable cover such as a canvas. Polyethylene or other non-breatheable plastic coverings are not acceptable.**

E. Store all pail goods in their original undamaged containers in a clean, dry location, between 60 degrees F and 80 degrees F.

F. Do not store catalyst in direct sunlight or in temperatures below 32 or above 77 degrees F. Always store in a cool, dry location.

G. All combustible materials including, but not limited to catalyst, propane tanks, and cleaning solvents must be removed from the work areas every day. Store per manufacturer's instructions.

H. Do not expose materials to moisture in any form before, during, or after delivery to the site. Reject delivery of materials that show evidence of contact with moisture.

I. **Remove manufacturer supplied plastic covers from materials provided with such. Use “breathable” type covers such as canvas tarpaulins to allow venting and protection from weather and moisture. Cover and protect materials at the end of each work day. Do not remove any protective tarpaulins until immediately before the material will be installed.**

J. Any materials that are found to be damaged or stored in any manner other than stated above will be automatically rejected, removed and replaced at the contractor's expense.

K. Handle all materials in such a manner as to preclude damage and contamination with moisture or foreign matter. Handle rolled goods to prevent damage to edges or ends.

L. All equipment, including rags, which may have been used to apply solvents, cleaners and other flammable material must be disposed of in a fire-safe container that meets OSHA guidelines and is certified by FM Global and UL.

1.14 PROJECT CONDITIONS

A. **Notification:** Give a minimum of 5 days written notice to the Owner and Manufacturer prior to commencing any Work and notify both parties on a daily basis of any change in Work Schedule.
B. Safety: Familiarize every member of the application crew with all fire and safety regulations recommended by OSHA, NRCA, and other industry or local governmental groups.

C. Permits: Obtain all permits required by local agencies and pay all fees which may be required for the performance of the Work.

D. Application of roofing shall not commence or proceed during inclement weather or if precipitation is more than 30 percent likely during next eight (8) hour period per National Weather Service.

E. Application of roofing shall not commence or proceed if ambient temperature is below 0 degrees For temperature is below 10°F and is predicted to fall during next eight (8) hour period per National Weather Service.

F. Comply with manufacturer’s Cold Weather Application Guidelines at all times.

G. Precipitation: Do not apply roofing materials during precipitation or in the event there is a probability of precipitation during application. Take adequate precautions to ensure materials, applied roofing, and building interiors are protected from possible moisture damage or contamination.

H. Temperature Restrictions - cold adhesive: At low temperatures, the specified cold adhesive becomes more viscous, making even distribution more difficult. The optimal temperature of the adhesive at point of application is 70°F (21°C). To facilitate application when ambient temperatures are below 50°F (10°C), store the adhesive and roll goods in a warm place immediately prior to use. Roll or broom the sheets to ensure contact with the underlying adhesive. Suspend application in situations where the adhesive cannot be kept at temperatures allowing for even distribution.

I. Temperature Restrictions – self-adhesive sheets: The minimum required substrate temperature at point of application is 60°F (15°C). Maintain a minimum roof membrane material temperature above 60°F (15°C). In low temperature conditions, materials should be kept warm prior to application. Suspend application in situations where the self-adhered base ply cannot be kept at temperatures allowing for proper adhesion.

1.15 PROTECTION REQUIREMENTS

A. Membrane Protection: Provide protection against staining and mechanical damage for newly applied roofing and adjacent surfaces throughout this project.

B. Limited Access: Prevent access by the public to materials, tools and equipment during the course of the project.

C. Debris Removal: Remove all debris daily from the project site and take to a legal dumping area authorized to receive such materials.

D. Site Condition: Complete, to the Owner’s satisfaction, all job site clean-up including building interior, exterior and landscaping where affected by the construction.
1.16 SEQUENCING

A. Coordinate work to minimize construction traffic required over complete roofing system.

B. Construct and stage the project so that a phased application may be achieved. Phased application maintains a water tight condition with the temporary roof/vapor barrier ply or base ply and reinforcing plies to vertical surfaces without the installation of the cap sheet. The base ply may stay exposed to the elements for a maximum of 10 weeks. When roof top equipment and trades have finished, the application of the cap sheet may begin. The manufacturer shall conduct an inspection of the base sheet prior to the installation of the cap sheet. The contractor must notify the manufacturer five (5) days in advance to schedule this inspection. Provide manufacturer’s written certification that a phased application is acceptable.

1.17 WARRANTIES

A. Assembly Letter: Submit an assembly letter executed by an authorized representative of the roof membrane system manufacturer, indicating that the manufacturer has reviewed drawings and specifications, conditions affecting work and relationship of roof membrane system with related work, and that manufacturer proposes to provide warranty as referenced herein without further stipulation.

B. Manufacturer’s Warranty:

1. Roof Guarantee: Upon successful completion of the project, and after all post installation procedures have been completed, furnish the owner with the Manufacturer’s Twenty (20) Year NDL roof membrane/system labor and materials guarantee. The guarantee shall be a term type, without deductibles or limitations on coverage amount, and shall be issued at no additional cost to the owner.

2. Roof Guarantee Addendum: In addition to the specified roof guarantee, furnish the owner with the roofing manufacturer’s inclusion addendum offering coverage of the roof manufacturer’s factory fabricated extruded edge, gravel stop, coping, and expansion joint systems, under the standard terms of the roof guarantee.

C. Roofing Installer’s Warranty

1. Five (5) Year roofing installer’s labor and material warranty.

D. Owner’s Instructions

1. Care and Maintenance: Provide manufacturer’s written Roof and Maintenance Guide for maintenance of roof system including, inspection schedules, trouble shooting, early signs of a potential problem and temporary emergency repairs.
PART 2 – MATERIALS

2.1 MANUFACTURER

A. Subject to compliance with specified criteria, provide primary membrane system components and accessories as listed below:

1. Siplast, Basis of Design
2. Approved equal - Soprema

B. Roofing Membrane Assembly: A roof membrane assembly consisting of two plies of a prefabricated, reinforced, homogeneous Styrene-Butadiene-Styrene (SBS) block copolymer modified asphalt membrane, applied over a prepared substrate. Reinforcement mats shall be impregnated/saturated and coated each side with SBS modified bitumen blend. The cross sectional area of the sheet material shall contain no oxidized or non-SBS modified bitumen. The roof system shall pass 500 cycles of ASTM D 5849 Resistance to Cyclic Joint Displacement (fatigue) at 14°F (-10°C). Passing results shall show no signs of membrane cracking or interply delamination after 500 cycles. The roof system shall pass 200 cycles of ASTM D 5849 after heat conditioning performed in accordance with ASTM D 5147. The assembly shall possess waterproofing capability, such that a phased roof application, with only the modified bitumen base ply in place, can be achieved for prolonged periods of time without detriment to the watertight integrity of the entire roof system.

C. Roofing manufacturer shall select all products and installation techniques to conform with all requirements herein. Thicknesses and material descriptions included herein are minimums. Provide thicker materials or materials with higher performance values if required by roofing manufacturer to comply with indicated performance requirements. When a manufacturer offers multiple product grades (e.g. basic, optimal, heavy duty) only the top tier of products will be considered for acceptance.

D. The owner and/or the A/E reserve the right to have all submissions tested by an independent laboratory to confirm/dispute manufacturer’s claim.

2.2 PRODUCTS

A. Use primers, adhesives, paints, coatings and sealants that comply with all applicable, and relevant and appropriate VOC limits.

B. Vapor Retarder / Temporary Roof

1. Modified Bitumen Base and Stripping Ply
2. Thickness (avg): 91 mils (2.3 mm) (ASTM D 5147)
3. Thickness (min): 87 mils (2.2 mm) (ASTM D 5147)
4. Weight (min per 100 ft² of coverage): 62 lb (3.0 kg/m²)
5. Maximum filler content in elastomeric blend - 35% by weight
6. Low temperature flexibility @ -15°F (-26°C): PASS (ASTM D 5147)
7. Peak Load (avg) @ 73°F (23°C): 30 lbf/inch (5.3 kN/m) (ASTM D 5147)
8. Peak Load (avg) @ 0°F (-18°C): 70 lbf/inch (12.3 kN/m) (ASTM D 5147)
9. Ultimate Elongation @ @ 73°F (23°C): 50% (ASTM D 5147)
10. Dimensional Stability (max): 0.1% (ASTM D 5147)
11. Compound Stability (min): 250°F (121°C) (ASTM D 5147)
12. Approvals: UL Class listed, FM Approved (products shall bear seals of approval)
13. Reinforcement: Fiberglass mat or other meeting the performance and dimensional stability criteria
14. Product Verification
   a. Siplast Paradiene 20
   b. SOPREMA Elastophene Sanded 2.2

C. Insulation Adhesive
   1. A single component, moisture-cure, solvent-free, polyurethane rigid insulation adhesive dispensed from a portable, disposable pre-pressurized metal container using a flexible dispensing hose with a PVC dispensing wand. Utilize appropriate summer or winter grade.
      a. Para-Stik Insulation Adhesive by Siplast

   2. A fast-acting, two component, low-rise, polyurethane, rigid insulation adhesive that is applied using a specially designed dispenser at temperatures above 40 degrees Fahrenheit.
      a. Parafast Insulation Adhesive by SIPLAST
      b. DUOTACK®365 Adhesive by SOPREMA

D. Insulation Fasteners: Type recommended in writing by membrane manufacturer to meet uplift criteria.
      a. Parafast HD Fasteners by Siplast
      b. Soprafix HD Fasteners by Soprema

E. Rigid Roof Insulation: Roof insulation shall be UL and FM approved. Insulation shall be approved in writing by the insulation manufacturer for intended use and for use with the specified roof assembly. Maintain a maximum panel size of 4 feet by 4 feet where [polyisocyanurate / fiberboard] insulation is specified to be installed in insulation adhesive.
   1. Polyisocyanurate: A closed cell, rigid polyisocyanurate foam core material, integrally laminated between glass fiber facers, in full
1. Polysisocyanurate Tapered Roof Insulation: Tapered panels and standard fill panels composed of a closed cell, rigid polysisocyanurate foam core material, integrally laminated between glass fiber facers, in full compliance with ASTM C 1289, Type II, Class 1, Grade 2. The tapered system shall provide for a roof slope of 1/16", 1/8", or 1/4" as specified on project drawings. Acceptable types are as follows:
   a. Tapered Paratherm by Siplast; Irving, TX
   b. Tapered SOPRA-ISO® by Soprema; Wadsworth, OH

2. Polyisocyanurate Tapered Crickets: Tapered cricket panels and standard fill panels composed of a closed cell, rigid polysisocyanurate foam core material, integrally laminated between glass fiber facers, in full compliance with ASTM C 1289, Type II, Class 1, Grade 2. The crickets shall provide for a minimum roof slope of (1/4") inch per foot when slope is (1/8") inch per foot and (1/2") inch per foot when slope is (1/4") inch per foot. Acceptable types are as follows.
   a. Tapered Paratherm by Siplast
   b. Tapered SOPRA-ISO® by Soprema; Wadsworth, OH

3. Polyisocyanurate Tapered Crickets: Tapered cricket panels and standard fill panels composed of a closed cell, rigid polysisocyanurate foam core material, integrally laminated between glass fiber facers, in full compliance with ASTM C 1289, Type II, Class 1, Grade 2. The crickets shall provide for a minimum roof slope of (1/4") inch per foot when slope is (1/8") inch per foot and (1/2") inch per foot when slope is (1/4") inch per foot. Acceptable types are as follows.
   a. Tapered Paratherm by Siplast
   b. Tapered SOPRA-ISO® by Soprema; Wadsworth, OH

4. Gypsum Cover Board: A panel composed of a gypsum based, non-structural water resistant core material integrally bonded with fiberglass mats on both sides. Provide panels having a nominal thickness of (5/8") inch for installation over metal decks. Provide panels having a nominal thickness of (1/2") inch for installation over polyisocyanurate insulation. Maintain a maximum panel size of 4 feet by 4 feet where insulation is specified to be installed in insulation adhesive and 4 feet by 8 feet when mechanically fastened. Acceptable types are as follows:

F. Modified Bituminous Sheets

1. Modified Bitumen Base and Stripping Ply with RFID
   a. Thickness (avg): 91 mils (2.3 mm) (ASTM D 5147)
   b. Thickness (min): 87 mils (2.2 mm) (ASTM D 5147)
   c. Weight (min per 100 ft² of coverage): 62 lb (3.0 kg/m²)
   d. Maximum filler content in elastomeric blend - 35% by weight
   e. Low temperature flexibility @ -15°F (-26°C): PASS (ASTM D 5147)
f. Peak Load (avg) @ 73°F (23°C): 30 lbf/inch (5.3 kN/m) (ASTM D 5147)
g. Peak Load (avg) @ 0°F (-18°C): 70 lbf/inch (12.3 kN/m) (ASTM D 5147)
h. Ultimate Elongation @ @ 73°F (23°C): 50% (ASTM D 5147)
i. Dimensional Stability (max): 0.1% (ASTM D 5147)
j. Compound Stability (min): 250°F (121°C) (ASTM D 5147)
k. Approvals: UL Class listed, FM Approved (products shall bear seals of approval)
l. Reinforcement: Fiberglass mat or other meeting the performance and dimensional stability criteria
m. Product Verification: Radio Frequency Identification (RFID) Tag
   1) Siplast Paradiene 20 RoofTag
   2) Soprema Elastophene Sanded 2.2

2. Modified Bitumen Edge Detail and Stripping Ply Sheet with RFID
   a. Thickness (avg): 98 mils (2.5 mm) (ASTM D 5147)
   b. Thickness (min): 102 mils (2.6 mm) (ASTM D 5147)
   c. Weight (min per 100 ft² of coverage): 72 lb (3.0 kg/m²)
   d. Low temperature flexibility @ -15°F (-26°C): PASS (ASTM D 5147)
   e. Peak Load (avg) @ 73°F (23°C): 30 lbf/inch (5.3 kN/m) (ASTM D 5147)
   f. Peak Load (avg) @ 0°F (-18°C): 70 lbf/inch (12.3 kN/m) (ASTM D 5147)
   g. Ultimate Elongation @ @ 73°F (23°C): 50% (ASTM D 5147)
   h. Dimensional Stability (max): 0.1% (ASTM D 5147)
   i. Compound Stability (min): 250°F (121°C) (ASTM D 5147)
   j. Approvals: UL Class listed, FM Approved (products shall bear seals of approval)
   k. Reinforcement: A lightweight random fibrous glass mat meeting performance and dimensional stability criteria
   l. Product Verification: Radio Frequency Identification (RFID) Tag
      1) Siplast Paradiene 20 SA RoofTag
      2) Soprema Sopralene 180 Stick (Self-adhered) (polyester for drip edge, strip plies, base ply at flashings)

3. Granulated, De-Polluting Modified Bitumen Cap Sheet with RFID
   a. Thickness (avg): 130 mils (3.3 mm) (ASTM D 5147)
b. Thickness at selvage (coating thickness) (avg): 98 mils (2.5 mm) (ASTM D 5147)

c. Thickness at selvage (coating thickness) (min): 94 mils (2.4 mm) (ASTM D 5147)

d. Weight (min per 100 ft² of coverage): 90 lb (4.4 kg/m²)

e. Maximum filler content in elastomeric blend: 35% by weight

f. Low temperature flexibility @ -15° F (-26° C): PASS (ASTM D 5147)

g. Peak Load (avg) @ 73°F (23°C): 30 lbf/inch (5.3 kN/m) (ASTM D 5147)

h. Peak Load (avg) @ 0°F (-18°C): 75 lbf/inch (13.2 kN/m) (ASTM D 5147)

i. Ultimate Elongation @ 73°F (23°C): 55% (ASTM D 5147)

j. Dimensional Stability (max): 0.1% (ASTM D 5147)

k. Compound Stability (min): 250°F (121° C) (ASTM D 5147)

l. Granule Embedment (max loss): 2.0 grams per sample (ASTM D 5147)

m. Approvals: UL Class listed, FM Approved (products shall bear seals of approval)

n. Reinforcement: Fiberglass mat or other meeting the performance and dimensional stability criteria

o. Product Verification: Radio Frequency Identification (RFID) Tag

p. Surfacing: UL Certified Eco-Activ de-polluting granules

1) Siplast Paradiene 30 FR Eco-Activ RoofTag

2) Soprema Elastophene FR GR ECO3

4. Granulated De-Polluting Modified Bitumen Flashing Sheet

a. Thickness at Selvage (avg): 122 mils (3.1 mm) (ASTM D 5147)

b. Thickness at Selvage (min): 118 mils (3.0 mm) (ASTM D 5147)

c. Weight (min per 100 ft² of coverage): 114 lb (5.5 kg/m²)

d. Maximum filler content in elastomeric blend: 35% by weight

e. Low temperature flexibility @ -15° F (-26° C): PASS (ASTM D 5147)

f. Peak Load (avg) @ 73°F (23°C): 60 lbf/inch (10.5 kN/m) (ASTM D 5147)

g. Peak Load (avg) @ 0°F (-18°C): 115 lbf/inch (20.1 kN/m) (ASTM D 5147)

h. Ultimate Elongation @ 73°F (23°C): 90% (ASTM D 5147)
i. Tear-Strength (avg): 100 lbf (0.45 kN) (ASTM D 5147)

j. Dimensional Stability (max): 0.5% (ASTM D 5147)

k. Compound Stability (min): 250°F (121°C) (ASTM D 5147)

l. Approvals: UL Approved, FM Approved (products shall bear seals of approval)

m. Reinforcement: Fiberglass scrim mat or polyester mat as required to meet the performance warranty criteria

n. Product Verification Radio Frequency Identification (RFID) Tag

o. Surfacing: UL Certified smog-reducing granules
   1) Parafor 30 Eco-Activ by Siplast
   2) Soprema Sopralene 180 FR GR ECO3


1. Products: Subject to compliance with requirements, products which may be incorporated in the Work include the following:
   a. Paradiene 20 SA
   b. Soprema Lastobond Shield HT (*high temp metal underlayment)

H. Catalyzed PMMA Resin Flashing System

1. A specialty flashing system consisting of a liquid-applied, fully reinforced, multi-component acrylic membrane installed over a prepared or primed substrate. The flashing system consists of a catalyzed polymethyl methacrylate (PMMA) primer, basecoat and topcoat, combined with a non-woven polyester fleece. System may require Siplast Pro Paste Resin in conditions as per Manufacturer’s specifications. The use of the specialty flashing system shall be specifically approved in advance by the membrane manufacturer for each application.
   a. Parapro 123 Flashing System by Siplast
   b. Alsan RS Flashing System by Soprema

I. Primers & Mastics:

1. Primer: A high flash, quick drying, asphalt solvent blend which meets or exceeds ASTM D 41 requirements.
   a. Siplast PA-1125 Asphalt Primer by Siplast
   b. Elastocol 500 primer by Soprema

2. Primer for Self-Adhesive Sheets: A quick drying, low-VOC, water-based, high-tack primer specifically designed to promote adhesion of roofing and waterproofing sheets to approved substrates. Primer shall meet South Coast Air Quality District and Ozone Transport Commission requirements.
   a. Siplast TA-119 Primer by Siplast
b. Elastocol Stick Primer by Soprema

3. Mastic: An asphalt cutback mastic, reinforced with non-asbestos fibers, used as a base for setting metal flanges conforming to ASTM D 4586 Type II requirements.
   a. Siplast PA-1021 Plastic Cement by Siplast
   b. SBS Mastic by Soprema

J. Membrane Adhesives & Flashing Cements

1. Membrane Cold Adhesive: A blend of special adhesive asphalts and safe, high-flash, quick drying solvents that meets or exceeds ASTM D 4479, Type II requirements.
   a. Siplast PA-311 R Adhesive by Siplast
   b. Colply Membrane Adhesive by Soprema

2. Solvent-Free Membrane Adhesive: A single component, solvent-free modified asphalt adhesive designed for application of the specified roof membrane system.
   a. Siplast SFT Adhesive by Siplast
   b. Colply EF Membrane Adhesive by Soprema

   a. Siplast SFT Cement by Siplast
   b. Colply EF Flashing Cement by Soprema

4. Flashing Membrane Cement: A non-asbestos containing, refined asphalt flashing cement for use as a roofing membrane base flashing cement for granulated surfaced flashing sheets. Not to be used with foil-faced flashing sheets.
   a. PA 828 Flashing Cement by Siplast
   b. Colply Flashing Cement by Soprema

K. Sealant: A moisture-curing, non-slump elastomeric sealant designed for roofing applications. The sealant shall be approved by the roof membrane manufacturer for use in conjunction with the roof membrane materials. Acceptable types are as follows:

1. Siplast PS-715 NS Elastomeric Sealant by Siplast
2. Siplast PS-209 Elastomeric Sealant by Siplast
3. Sopramastic SP1 Sealant by Soprema
L. Accessory Products

1. Accessory materials shall be as recommended in writing by membrane manufacturer, as required to comply with specified criteria.

2. RedLINE® is a waterproof expansion joint or control joint that accommodates movement (and contraction) while at the same time maintaining water tightness. RedLINE® is developed to be installed at the waterproof membrane level, this provides for a non-obstructive joint, allowing free water drainage across the joint. This product is for use only in conditions where a curbed expansion joint would obstruct the free water drainage of an area. Noxite Granules: Roofing granules treated with Noxite®, a material based on titanium dioxide (TiO²) in anatase form designed for reducing concentrations of airborne pollutants such as volatile organic compounds (VOC’s) and nitrogen oxides by photocatalysis.

3. Walktread: A prefabricated, puncture resistant polyester core reinforced, polymer modified bitumen sheet material topped with a ceramic-coated granule wearing surface.
   a. Thickness: 0.217 in (5.5 mm)
   b. Weight: 1.8 lb/ft² (8.8 kg/m²)
   c. Width: 30 in (76.2 cm)
      1) Paratread Roof Protection Material by Siplast
      2) Soprawalk by Soprema

   a. Cants: 3 inch by 3 inch minimum.
   b. Tapered Edge Strips: 1 1/2 inch by 18 inch.
   c. Tapered Edge Strips: 1 inch by 12 inch.
   d. Tapered Edge Strips: ½ inch by 6 inch.

5. Termination Bar: 3/32 inch thick extruded aluminum or 14 gauge formed galvanized steel or stainless steel channel approximately 1 inch wide and punched with elongated holes approximately 1 inch on center.

6. Flashing Reinforcing Sheet Fasteners: Fasteners shall be approved by the manufacturer of the primary roofing products.
   a. Wood / Plywood Substrates
      1) 12 gauge, spiral or annular threaded shank, zinc coated steel roofing fastener having a minimum 1 inch head.
         a) Square Cap by W.H. Maze Co.
b) 12 Gauge Simplex Nail by the Simplex Nail and Manufacturing Co.

7. Joint Filler and Backer Rod

a. MasterSeal® 920 is a low moisture absorbing closed cell polyethylene foam joint filler and backer rod, compliance with ASTM C 1330, Type C, by Master Builders Solutions by BASF, www.master-builders.solutions.basf.us

1) Sizes ¼” – 1-1/4” wound on reels and packaged in cartons weighing about 15 lbs. per carton.

2) Sizes 1-1/2” – 4” are packaged in lengths and packaged in cartons weighing about 35 lbs. per carton.

8. Pipe, Conduit, Duct, Refrigeration, Air Handlers, Blowers and Split Unit Supports, Crossover Ramps: Pre-manufactured supports with polycarbonate resin bases. Pipe roller supports shall have integral polycarbonate rollers with rods, all threads and metal components constructed from stainless steel.

a. Pipe Supports: PHP System / Design; Houston, TX; or A/E approved equal in accordance with Sections 01 25 13.

1) For pipes up to 3: to 5” O.D., Model RB – 18 with Roller

2) For pipes up to 2½” O.D., Model SS8-R – with Roller

3) For pipes up to 3 ½” O.D., Model PP10 - with Roller

b. Small Refrigeration and air handlers, blowers and exhaust fans - Pre-manufactured supports with polypropylene plastic bases and 12 gauge roll formed galvanized channel: PHP System/ Design; Houston, TX; or DP approved equal in accordance with Section 01 25 13.

1) Roof Equipment Supports – RTU - 20

c. Duct Supports - Pre-manufactured supports with polypropylene plastic bases and 12 gauge roll formed galvanized channel: PHP System/ Design; Houston, TX; or A/E approved equal in accordance with Section 01 25 13.

1) Duct Support – Model PHP-D

d. Crossover Ramps: PHP/Design; Houston, TX; or A/E approved equal in accordance with Section 01 25 13.

1) Bases High Density Polypropylene plastics with additives for UV protection

2) Substructure: 12 gauge back-to-back strut g-1012A, or A/E approved equal supported directly from the bases.
3) Grating: Mill-galvanized carbon steel in accordance with ASTM A525:
   a. Gauge 18-ga. steel.
   b. Section Width: 12 inches (305mm).
   c. Flange Options: FM.
   d. Surface Condition: MG-traction grip.

4) All substructures shall be galvanized steel. Spring nuts and bolts for spring nuts will be electro-plated.

5) PHP Systems/Design, 5534 Harvey Wilson Drive, Houston, TX 77020, or Approved Equal.


N. Metal Flashings: Per Flashing and Sheet Metal: Division 7.

O. Expansion Joint Covers, Metal Curbs, Rails, Hatches and Pipe Curb Assemblies: Per Roof Accessories: Division 7.


Q. Steel Deck: ASTM A 653, galvanized, G-90 deck, manufactured in accordance with the requirements of the Steel Deck Institute, Inc. Thickness: 22 gauge.


S. Industrial Enamel High Solids paint by Sherwin Williams or A/E approved equal.

T. Retrofit Overflow Drain Inserts
   1. A one piece spun aluminum body, cast aluminum strainer dome and compression seal that seals to the inside wall of the existing drain plumbing. Fabricated in stem diameters (3”, 4”, 5”, and 6”) to accommodate most existing drain plumbing pipe dimensions. Only to be utilized at overflow drain pipe without existing drain bowls.
      a. Paraguard Drain, by Siplast
      b. Soprema – provided by contractor, will be covered in Soprema warranty.

PART 3 – EXECUTION

3.1 GENERAL NOTES

A. Preceding the start-up of jobs, the Contractor shall decide to his satisfaction that all the specifications are workable as specified, that there is nothing that would deter the Contractor’s required warranty, and that no existing conditions at the site prevent the contractor from performing the job in a professional and safe
manner. When the job starts, it will be assumed that the contractor approves the existing condition and the specifications.

B. Detailed drawings and dimensions contained in these specifications shall be assumed to be approximate. If work requirements at the jobsite disclose and alteration to the dimensions of this specification, the Contractor shall contact the A/E immediately.

3.2 EXAMINATION

A. Verify deck is supported and secured.

B. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work:

1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.

2. Verify that wood cants, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.

3. Verify that deck is securely fastened with no projecting fasteners and with no adjacent units in excess of 1/16 inch (1.6 mm) out of plane relative to adjoining deck.

4. Verify that minimum concrete drying period recommended by roofing system manufacturer has passed.

5. Verify that concrete substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.

6. Verify that concrete-curing compounds that impair adhesion of roofing components to roof deck have been removed.

7. Proceed with installation only after unsatisfactory conditions have been corrected.

8. Contractor to contact Fire Marshal prior to disconnecting mechanical units. Provide documentation of contact and approval to proceed from Fire Marshal.

3.3 CONCRETE DECK AND/OR BUILT-UP ROOF PREPARATION FOR TEMPORARY ROOF / VAPOR RETARDER

A. Contractor to submit a preventative action plan before demolition utilizing roof removal practices over existing regulated asbestos containing materials (RACM) during the renovation to prevent triggering coverage under NESHAP.

1. Contractor shall follow NESHAP and EPA Guidelines when working in ACM identified areas. Contractor shall not use aggressive methods as defined by OSHA §1926. Aggressive methods means removal or disturbance of building material by sanding, abrading, grinding, or other method that breaks, crumbles, or disintegrates ACM.

B. Protect adjacent surfaces from staining or soiling caused by roofing application. Prevent liquid materials from entering or clogging drains, pipes, conduits or
conductors. Prevent foreign materials from entering or clogging roof drains, stoppers or downspouts.

C. Apply primer to concrete, masonry and built-up roof substrates per manufacturer's written instructions.

D. Priming
   1. Prime metal, concrete, masonry, and BUR surfaces with a uniform coating of the specified asphalt primer per manufacturer’s specifications.

E. Membrane Adhesive Application
   1. Membrane adhesive can be applied by squeegee. Apply cold adhesive in a smooth, even, continuous layer without breaks or voids. Utilize an application rate of 2 to 2 1/2 gal/sq (0.6 to 1.0 l/m²) over irregular or porous substrates. Utilize an application rate of 1 1/2 to 2 gal/sq (0.6 to 0.8 kg/m²) for inter-ply applications. Double the adhesive application rate at the end laps of granule surfaced sheets. In the areas surrounding details that are to receive the catalyzed acrylic resin primer and flashing system, apply membrane plies in a full coating of the specified elastomeric sealant.

F. Vapor Retarder / Temporary Roof Installation
   1. Apply Vapor Retarder / Temporary Roof membrane system.
   2. Apply layer of roofing free of wrinkles, creases or fishmouths. Exert sufficient pressure on roll during application to ensure prevention of air pockets.
   3. For slopes less than 2 1/2 in 12, apply sheets straight, perpendicular to slope and shingled in direction of flow starting from low points.
   4. Apply to the prepared substrate utilizing minimum 3 inch side and end laps. Apply each sheet directly behind adhesive applicator. Stagger end laps minimum 3 feet.
   5. Cut a dog ear angle at the end laps on overlapping selvage edges.
   6. Using a clean trowel, apply pressure to top seal T-Laps immediately following the roll application
   7. Allow temporary roof/vapor retarder adhesive to flash off as specified before installation of insulation.

3.4 METAL DECK AND/OR BUILT-UP ROOF PREPARATION FOR TEMPORARY ROOF / VAPOR RETARDER

A. Protect adjacent surfaces from staining or soiling caused by roofing application. Prevent liquid materials from entering or clogging drains, pipes, conduits or conductors. Prevent foreign materials from entering or clogging roof drains, stoppers or downspouts.

B. Clean debris from all flutes of metal deck. Repair damaged or deteriorated areas of metal deck.
C. Mechanically fasten 5/8” x 4’ x 8’ gypsum coverboard to metal deck using 16 fasteners in field, 24 fasteners at perimeter, and 32 fasteners in corners.

D. Membrane Adhesive Application

1. Membrane adhesive can be applied by squeegee. Apply cold adhesive in a smooth, even, continuous layer without breaks or voids. Utilize an application rate of 2 to 2 1/2 gal/sq (0.6 to 1.0 l/m²) over irregular or porous substrates. Utilize an application rate of 1 1/2 to 2 gal/sq (0.6 to 0.8 kg/m²) for inter-ply applications. Double the adhesive application rate at the end laps of granule surfaced sheets. In the areas surrounding details that are to receive the catalyzed acrylic resin primer and flashing system, apply membrane plies in a full coating of the specified elastomeric sealant.

E. Vapor Retarder / Temporary Roof Installation

1. Apply Vapor Retarder / Temporary Roof membrane system over properly installed coverboard.

2. Apply layer of roofing free of wrinkles, creases or fishmouths. Exert sufficient pressure on roll during application to ensure prevention of air pockets.

3. For slopes less than 2 1/2 in 12, apply sheets straight, perpendicular to slope and shingled in direction of flow starting from low points.

4. Apply to the prepared substrate utilizing minimum 3 inch side and end laps. Apply each sheet directly behind adhesive applicator. Stagger end laps minimum 3 feet.

5. Cut a dog ear angle at the end laps on overlapping selvage edges.

6. Using a clean trowel, apply pressure to top seal T-Laps immediately following the roll application.

7. Allow temporary roof/vapor retarder adhesive to flash off as specified before installation of insulation.

3.5 POLYISOCYANURATE INSULATION INSTALLATION

A. Insulation, Tapered Insulation, and Cover Board Installation

1. General

a. Install insulation panels with end joints offset; edges of the panels shall be in moderate contact without forcing applied in strict accordance with the insulation manufacturer’s requirements and the following instructions.

b. Maintain a maximum panel size of 4 feet by 4 feet for polyisocyanurate and cover panel when applied in insulation adhesive. All insulation shall be installed in insulation adhesive.

c. When insulation is installed in two or more layers, stagger joints between layers by a minimum of 9 inches.
d. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.

e. Install insulation board snug. Gap between board joints must not exceed ¼” (6mm). All gaps in excess of ¼” (6mm) must be filled with like insulation material.

f. Install insulation boards per insulation board manufacturer’s requirements.

g. Lay tapered boards, tapered edge strips, or cut boards to slope to form a minimum 3 feet square by 1 1/2 inch deep sump at roof drains.

h. Apply no more insulation than can be covered with membrane in same day.

i. Install tapered edge strips and cants wherever roofing intersects a vertical surface or a curb, at all penetrations, at perimeter of roof edge and as indicated.

j. Use tapered insulation and tapered edge strips to form crickets to direct water to roof drains. Install crickets behind all roof penetrations or irregularities, for example, roof-mounted equipment, curbs, rails and hatches which cross the down slope flow of water.

k. Insulation cover board shall be top layer of insulation assembly. Cut insulation cover board to follow slope of roof insulation at tapered edge strips, crickets, valleys, ridges and other breaks in slope.

3.6 ROOF MEMBRANE INSTALLATION

A. Two Ply Roof Membrane Installation

1. Apply layers of roofing free of wrinkles, creases or fishmouths. Exert sufficient pressure on roll during application to ensure prevention of air pockets.

a. For slopes less than 2 1/2 in 12, apply sheets straight, perpendicular to slope and shingled in direction of flow starting from low points.

2. Apply base ply to the prepared substrate utilizing minimum 3 inch side and end laps. Apply each sheet directly behind adhesive applicator. Stagger end laps minimum 3 feet.

3. Fully bond the cap sheets to base ply utilizing minimum 3 inch side and end laps. Apply each sheet directly behind adhesive applicator. Stagger side laps in finish ply minimum 12 inches from side laps in underlying base ply. Stagger end laps in cap sheet minimum 3 feet from end laps in underlying base plies.

4. Contact the manufacturer (adhesive application only) of the heat-welding equipment for specific guidelines on operating the equipment. Apply the adhesive in a full coating, extending completely up to the selvage edge of
the adjacent course of roof membrane to be overlapped, taking care to keep the adhesive off of the selvage lap that will be heat welded. Place a straight 2"x6" or larger board adjacent to the modified bitumen sheet overlap to help reduce lifting of the overlapping sheet beyond the selvage area, inhibiting the potential for entrapped air during heat welding. Lay the board such that the hand held welder nozzle does not extend into the overlap beyond the specified lap width. Hand-roll the side laps, head laps, and T-laps of the membrane behind the heat welder.

5. Broadcast granules over all adhesive bleed-outs and squeeze out on finish ply surface while adhesive still wet to ensure a monolithic surface.

6. Flashing Application:
   a. Set the non-combustible cant into place dry prior to installation of the roof membrane base ply. Fully adhere the reinforcing sheet, utilizing minimum 3 inch side laps onto the base ply surface and up the primed wall or curb to the desired flashing height. Apply the each flashing membrane using three foot widths (cut off the end of roll) always lapping the factory selvage edge. Stagger the laps of the flashing membrane layer from lap seams in the reinforcing layer. Extend the flashing sheet a minimum of 4 inches beyond the toe of the cant onto the surface of the finished roof and up the wall or curb to the desired flashing height as shown in the detail drawings and/or manufacturers schematic. Exert pressure on the flashing sheet during application to ensure complete contact with the vertical/horizontal surfaces, preventing air pockets. Check and seal all loose laps and edges. Mechanically fasten the top edge of the flashing on 9 inch centers. (See manufacturer's schematic for visual interpretation).

7. PMMA Flashing Installation
   a. Using masking tape, mask the perimeter of the area to receive the flashing system. Apply resin primer to substrates requiring additional preparation and allow primer to cure.
   b. Pre-cut fleece to ensure a proper fit at transitions and corners prior to membrane application.
   c. Apply an even, generous base coat of flashing resin to prepared surfaces using a roller at the rate specified by the resin manufacturer. Work the fleece into the wet, catalyzed resin using a brush or roller to fully embed the fleece in the resin and remove trapped air. Lap fleece layers a minimum of 2 inch (5 cm) and apply an additional coat of catalyzed resin between layers of overlapping fleece. Again using a roller, apply an even top coat of catalyzed resin immediately following embedment of the fleece at the rate specified by the resin manufacturer, ensuring that the fleece is fully saturated. Ensure that the flashing resin is applied to extend beyond the fleece (maximum ¼-inch (6 mm)). Remove the tape before the catalyzed resin cures. Make allowances for waste, including saturation of roller covers and application equipment.
d. Should work be interrupted for more than 12 hours or the surface of the cured resin becomes dirty or contaminated by the elements, wipe the surface to be lapped with new flashing resin using the specified cleaner/solvent. Allow the surface to dry for a minimum 20 minutes and a maximum 60 minutes before continuing work.

8. Terminations at vertical surfaces including parapets, curbs, pipe curb assemblies and rooftop equipment.
   a. Siplast System: Flash per Siplast approved details and project details.
   b. Soprema System: Flash per Soprema approved details and project details.

9. Terminations at Roof Edges:
   a. Siplast System: Flash per Siplast approved details and project details.
   b. Soprema System: Flash per Soprema approved details and project details.

10. Miscellaneous Roof Penetrations: Treat as described above for vertical termination or PMMA flashing membrane, prefabricated flashing boot or formed lead flashing. No pitch pockets allowed.

11. Roof Drain:
   a. Flash using Siplast Parapro 123 PMMA resin or other approved Siplast details
   b. Flash using Soprema Alsan RS Flashing System or other approved Soprema details

12. Walkway Protection Boards: Install boards using cold adhesive in locations shown on drawings.

   a. Prep, prime and paint 2 coats minimum of enamel based safety yellow paint to all gas lines.
   b. Prep, prime, and paint 2 coats minimum of enamel based safety red paint to all cast iron clamping rings and strainer caps.
   c. Prep, prime, and paint 2 coats minimum of enamel base paint to all galvanized counter flashing receivers that are left in place (color chosen by owner).
   d. Prep, prime, and paint 2 coats of enamel base paint to all existing galvanized vents and new galvanized vents (color chosen by owner).
e. Application of primers, paints, stains or coatings, by the Contractor, will serve as acceptance that surfaces were properly prepared in accordance with the manufacturer's recommendation.

f. Apply each coat to uniform coating thickness in accordance with manufacturer's instructions, not exceeding manufacturer's specified maximum spread rate for indicated surface; thins, brush marks, roller marks, orange-peel, or other application imperfections are not permitted.

g. Allow manufacturer's specified drying time, and ensure correct coating adhesion, for each coat before applying next coat.

h. Inspect each coat before applying next coat; touch-up surface imperfections with coating material, feathering, and sanding if required; touch-up areas to achieve flat, uniform surface without surface defects visible from 5 feet (1.5 m).

i. Remove dust and other foreign materials from substrate immediately prior to applying each coat.

3.7 PIPE, CONDUIT, DUCT, REFRIGERATION, AIR HANDLERS, BLOWERS AND SPLIT UNITS.

A. Replace all pipe supports in Area 25. Provide spacing as required by the 2015 International Mechanical Code.

B. All water, gas lines, and in service electrical conduits to remain. Raise pipes to 8” minimum above finished roof surface. Provide new supports as required. Pipe supports are to be spaced according to the pipe support spacing Table 305.4 in the 2015 International Mechanical Code.

3.8 FIELD QUALITY CONTROL AND INSPECTIONS

A. Manufacturer's Representative: Manufacturer’s Field Technical Representative shall inspect construction activities, at start of work, minimum two (1) hours per week during work and at completion of each area of work. Representative shall attend meetings concerning roofing when indicated or as scheduled to coordinate work. Representative shall submit a written report after each inspection noting as a minimum weather conditions, condition of stored materials, work in progress, condition of substrates, number of workers and which workers have completed manufacturers’ training programs, temperature of liquid membrane in kettle (if applicable) and at point of application and all other pertinent data. Services of manufacturer’s field representative are not intended to supersede manufacturer's written requirements for inspection and testing to issue warranty.

B. Leave all areas around job site free of debris, roofing materials, equipment and related items after completion of job.

C. Notification of Completion: Notify the Manufacturer by means of Manufacturer's printed Notification of Completion form of job completion in order to schedule a final inspection date.

D. Final Inspection
1. Post-Installation Meeting: Hold a meeting at the completion of the project, attended by all parties that were present at the pre-job conference. A punch list of items required for completion shall be compiled by the Contractor and the Manufacturer’s representative. Complete, sign, and mail the punch list form to the Manufacturer’s headquarters.

E. Issuance of the Guarantee: Complete all post installation procedures and meet the Manufacturer requirements.

3.9 CLEANING
A. Clean roof areas of all roofing tools and unused materials.
B. Clean spilled membrane or other materials from exposed surfaces which were not to receive roofing.

3.10 PROTECTION
A. Aesthetic Considerations: An aesthetically pleasing overall appearance of the finished roof application is a standard requirement for this project. Make necessary preparations, utilize recommended application techniques, apply the specified materials including granules, and exercise care in ensuring that the finished application is acceptable to the Owner. Sequence Work to avoid construction traffic over completed roof areas and prevent tracking of cold adhesives.

3.11 ROOFING INSTALLER'S WARRANTY
A. WHEREAS _______________________________ of ________________________, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:

1. Owner: ____________________________
2. Address: ____________________________
3. Building Name/Type: _________________
4. Address: ____________________________
5. Area of Work: _______________________
6. Acceptance Date: ____________________
7. Warranty Period: ____________________
8. Expiration Date: ____________________

B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,

C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost
and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.

D. This Warranty is made subject to the following terms and conditions:

1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:
   a. Lightning;
   b. Peak gust wind speed exceeding 120 mph (54 m/s);
   c. Fire;
   d. Failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
   e. Faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
   f. Vapor condensation on bottom of roofing; and
   g. Activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.

2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.

3. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.

4. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.

5. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer or Manufacturer Approved Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.

6. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe
than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.

7. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.

8. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed this _________ day of __________________, ________________.

1. Authorized Signature:____________________________________________________

2. Name:________________________________________________________________

3. Title:________________________________________________________________

– END OF SECTION –
PART 1  GENERAL

1.1  SUMMARY
A. This section includes elastomeric membrane roofing for installation over single ply PVC roofing membrane (Alternate 1) or structural concrete (Alternate 2).
B. Manufacturer detail drawings, site-specific drawings and general provisions of the contract, including general, supplementary and special conditions found in the Division 1 specification section apply to the work addressed in this section.

1.2  DEFINITIONS
A. Roofing Terminology: Refer to ASTM D1079 and the glossary of the National Roofing Contractors Association (NRCA) Roofing and Waterproofing Manual for definitions of roofing terms related to this section.

1.3  SYSTEM DESCRIPTION
A. The roofing work includes roofing, flashing and reinforcing of joints and junctions, and roof accessories integrally related to roof installation.
B. Provide an installed roofing membrane and base flashing system that does not permit the passage of water, and will withstand the design pressures calculated in accordance with the applicable revision of ASCE 7.
C. Manufacturer shall provide all primary roofing materials that are physically and chemically compatible when installed in accordance with Manufacturers current application requirements.

1.4  SUBMITTALS
A. Submit under provisions of Section 01 33 23.
B. Product Data
   1. Provide Product Data Sheets for each type of product indicated in this section.
C. Shop Drawings
   1. Provide Manufacturers standard details and approved shop drawings for the system specified.

1.5  QUALITY ASSURANCE
A. Manufacturer Qualifications: Provide a roofing system that meets or exceeds the criteria listed in this section.
B. Installer Qualifications: A single installer or firm shall perform all work addressed in this section, and shall possess written certification from Manufacturer which confirms their approval for installation of the HydroStop® PremiumCoat® Roofing System or A/E approved equal.
C. Source Limitations: Components listed shall be provided by a single Manufacturer or approved by the primary roofing Manufacturer.
D. A moisture survey shall be performed on the roof system. The moisture survey shall be provided to Owner prior to commencement of work. Any wet or
deteriorated areas shall be removed and replaced. If the moisture survey reveals more than 20% of the roof area is wet, notify A/E.

1.6 REGULATORY REQUIREMENTS

A. Work shall be performed in a safe, professional manner, conforming to federal, state and local codes.

B. UL Listing: Provide HydroStop® PremiumCoat® Roofing System and component materials which have been evaluated by Underwriters Laboratories for flame-spread, and are listed in the "Underwriters Laboratory Roofing Materials and Systems Directory" for Class A construction over existing metal or other non-combustible roofing (Flame-spread shall pass ASTM E-108 and/or UL 790). Provide roof covering materials bearing UL approval marking on the container. This indicates that the material has been subjected to UL's examination, test procedures and follow-up inspection service.

1.7 PRE-INSTALLATION CONFERENCE

A. Prior to scheduled commencement of the roofing installation and associated work, conduct a meeting at the project site with the installer, A/E, Owner, Manufacturer representative and any other persons directly involved with the performance of the work.

1. Tour representative areas of roofing substrates to inspect and discuss conditions of substrate, penetrations and other preparatory work to be performed.

2. Review roofing system requirements, specifications, detail drawings and the Contract Documents.

3. Review required submittals, both completed and in progress.

4. Review and finalize the construction schedule related to roofing work, and verify availability of materials, installer's personnel, equipment and facilities needed to consistently make progress and avoid delays.

5. Review required inspection(s), testing, and certifying, and material usage accounting procedures. Review forecasted weather conditions.

6. Establish procedures for coping with unfavorable conditions, including the possibility of temporary roofing work.

1.8 DELIVERY, STORAGE AND PROTECTION

A. Store and handle materials in a manner that will ensure there is no possibility of contamination.

B. Store in a dry, well ventilated, weather tight location at temperatures between 50°F (10 °C) and 80°F (27°C) until the products are ready to be applied (keep from freezing). Do not stack material pallets more than two (2) high.

C. Do not subject existing roof to unnecessary loading of stockpiled materials.

D. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.
1.9 PROJECT CONDITIONS

A. Weather

1. Proceed with roofing only when existing and forecasted weather conditions permit.

2. Ambient temperatures shall be above 50°F (10°C).

**CAUTION:** Other weather and environmental conditions to consider are mist, dew, condensation and relative humidity. These factors may increase drying times. If various coating products are exposed to rain before they are completely dry, product may “wash-off” the roof.

B. Proceed with roofing work only when existing and forecasted weather conditions will permit work to be performed in accordance with Manufacturer’s recommendations and guarantee requirements as follows:

1. Do not begin work if precipitation is expected within twenty-four hours of application, or if temperatures are expected to fall below 50°F (10°C) during the duration of the job.
   
   a. FlexSeal™ Sealant may be used in temperatures lower than 42°F (6°C), if approved by Manufacturer.

2. Upper temperature restriction (both air and substrate) for application of coating products is 105°F (40°C). If substrate temperatures exceed 105°F (40°C), coating products shall be applied during cooler periods of the day. If this is not practical, the substrate shall be cooled with water, and then coating products applied just after the water has flashed-off.

3. No moisture may be present when applying coating products. Take into consideration to allow for sufficient daylight hours necessary for curing of materials.

1.10 SUBSTRATE CONDITIONS

A. If any questions arise regarding the compatibility of coating products with an existing substrate, installer shall prepare test patches to check adhesion. Contact A/E concerning questionable substrates.

B. The bonding surface must be free of ponding water, ice, and snow, and should have a horse hair or semi coarse finish.

C. Contractor shall perform a moisture survey on the roof system. Any wet or deteriorated areas shall be removed and replaced. If the moisture survey reveals more than 20% of the roof area is wet, notify A/E. Provide a copy of the moisture survey to A/E.

1.11 WARRANTY

A. Liquid Applied Diamond Pledge™ NDL Roof Guarantee: Manufacturer’s standard form, without money limitation, in which Manufacturer agrees to repair leaks through the coating products on the roof caused by manufacturing defects, natural deterioration of, or workmanship in applying, the coating roofing system.

1. Warranty Duration
ELASTOMERIC MEMBRANE ROOFING (HYDROSTOP OVER PVC / STRUCTURAL CONCRETE)
Section: 07 56 00

a. Twenty (20) Years Labor and Material

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Basis of Design - HydroStop® PremiumCoat®, GAF, Commercial Roofing Products Division, 1 Campus Drive; Parsippany, NJ 07054; Toll Free Tel: 800-ROOF-411; Tel: 973-628-3000; Fax: 973-628-3451; Email: technicalquestions@gaf.com; Web: www.gaf.com or A/E approved equal.

2.2 COATINGS

(Note: Drying Times: Listed drying times for various coating products are directly affected by environmental conditions and thickness of application. Additional drying time must be allowed when experiencing high relative humidity, low temperatures and/or very thick product application to prevent improper curing and/or product “wash-off”.)

A. HydroStop® PremiumCoat® Finish Coat: An acrylic, permanently flexible, highly UV-resistant, chemical-resistant elastomeric compound fully reinforced with a tough stitch-bonded polyester fabric designed for roofing and flashing applications of all types or A/E approved equal.
   1. Application Rate: 0.75 gal per 100 sf (3.05 L/10 sqm) per coat.
   2. Application Method: Roof brush or 1” (25.4 mm) nap roller.
   3. Application Temperature (air, surface): 50 degrees (10 degrees C) - 105 degrees F (40 degrees C).
   4. Dry time: (touch dry) 1-4 hours at 77°F (25°C), 40% R.H. (full cure): 7 days.

B. HydroStop® PremiumCoat® Foundation Coat: An acrylic, permanently flexible, highly UV-resistant, chemical-resistant elastomeric compound fully reinforced with a tough stitch-bonded polyester fabric designed for roofing and flashing applications of all types or A/E approved equal.
   1. Application Rate: 0.75 gal per 100 sf (3.05 L/10 sqm) per coat.
   3. Application Temperature (air, surface): 50 degrees (10 degrees C) - 105 degrees F (40 degrees C).
   4. Dry time: (touch dry) 1-4 hours at 77°F (25°C), 40% R.H. (full cure): 7 days.

2.3 FLASHINGS, FABRIC AND BULKING AGENTS

A. HydroStop® PremiumCoat® Butter Grade Flashing: A high volume solids for low shrinkage providing increased tensile strength and elongation on problem roof areas. It is ideally suited for sealing mechanical fasteners and horizontal seams on metal roofs, as well as around flashings, drains and protrusions or A/E approved equal.
   1. Application Rate: apply up to ¼” (6.4 mm) thickness.

3. Application Temperature (ambient): minimum 50 degrees (10 degrees C).

4. Dry Time: 1-4 hours depending on application thickness.

5. Clean-up: Water before curing.

B. HydroStop® PremiumCoat® Fabric: Tough, non-woven, stitch-bonded, heat-set polyester designed for roofing and flashing applications of all types. Available in 300ft rolls and varying widths or A/E approved equal.

1. Length: 300ft. (91 m), Width: 4” (102 mm), 6” (152 mm), 8” (203 mm), 12” (305 mm), 16” (406 mm), 20” (508 mm), 24” (610 mm)

2. Length: 336ft. (102 m), Width: 40” (1.02 m)

2.4 PRIMERS AND SEALANTS FOR STRUCTURAL CONCRETE APPLICATIONS

A. Epoxy Primer: A clear, single-component epoxy primer sealer incorporating state of the art water-based technology to produce an extremely versatile product that penetrates and seals porous substrates. It is effective at increasing the bond of acrylic polyurethane, butyl, and epoxy topcoats to a variety of surfaces. It will also help to “solidify” chalky surfaces. It is safe to use, has very little odor, and is easy to clean up.

1. Application Rate: 100 to 400 SF (9.29 to 37.1 sqm) per gallon depending on substrate, surface, and porosity.

2. Application Method: Brush, roller, or sprayer.


2.5 EQUIPMENT

A. Airless Sprayer and Accessories: As recommended by Manufacturer’s Technical Services.

PART 3 EXECUTION

3.1 PREPARATION OF SUBSTRATE

A. Moisture Survey: Contractor shall perform a moisture survey on the roof system. Any wet or deteriorated areas shall be removed and replaced.

B. Preparation: Preparation of the roof substrate is the responsibility of the installer, who shall address and correct all of the conditions listed in this section. Examine substrates to receive new roofing. Do not proceed with the installation of the HydroStop® PremiumCoat® roofing system until unsatisfactory conditions have been corrected in a manner acceptable to the Manufacturer.

C. Treatment of Ponding Water Areas: Installer shall make every effort to mechanically eliminate all ponding water areas on the roof prior to application of HydroStop® PremiumCoat® products. Ponding water is defined as water that does not properly drain and remains on the roof for more than 48 hours after precipitation stops. Ponding water areas that cannot be eliminated shall be
treated with FlexSeal™ Sealant prior to application of other HydroStop®
PremiumCoat® products.

D. Deteriorated Seams: Repair all delaminated or open seams using method
acceptable to the Manufacturer.

E. Pitch Pans: Pitch pans shall be capped with sheet metal so they may be sealed
with HydroStop® PremiumCoat® products.

F. Condensate Lines: Condensate lines shall be installed from HVAC units to
gutters as part of the overall drainage system. The type of piping used for
condensate lines may vary depending on local building codes.

G. Power wash roof with United Cleaning Concentrate and allow to dry.

H. Perform adhesion testing prior to installing any new materials.

I. Additional Substrate Preparation for Structural Concrete

1. Thorough cleaning / removal of existing paints and coatings:
   a. The substrate shall be pressure-washed with water. **Power washing permitted during the hours of 11:00 p.m. to 5:00 a.m. only.** A minimal pressure of 2,000 psi (13MPa) shall be used to remove all delaminating paint and coatings, dirt, dust, and waste products (oil, oil-based roof cements, solvents, grease, animal fats, etc.).

   b. All existing silicone-based sealants shall be completely removed from the roof substrate prior to application of Hydrostop®
   PremiumCoat® products.

   c. The operator of the pressure washing equipment shall take special care in avoiding the introduction of water into the existing roof membrane. When encountering roof substrates that have living organisms such as algae, mold, or fungus, a bleach solution shall be used to kill and remove these organisms during the roof cleaning.

3.2 FLASHING APPLICATION AND INSPECTION INFORMATION

A. Preliminary work consists of substrate preparation and all flashing details. After
completion of substrate preparation, all flashing details, penetrations and curbs
shall be flashed with either 6 inches (152 mm) or 12 inches (305 mm)
HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Foundation
Coat in accordance with HydroStop® PremiumCoat® Detail Drawings
HydroStop® PremiumCoat® Foundation Coat shall be feathered at the edges (see
current GAF Detail Drawings) so that water may flow over the various flashing
details.

B. Parapet Walls: All parapet wall details within the roof system shall be secured
and sealed with a 6 inches (152 mm) minimum width of HydroStop®
PremiumCoat® Foundation Coat and HydroStop® PremiumCoat® Fabric. All
voids and open areas shall be filled with polyurethane foam prior to application of
HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Foundation Coat.

C. Curb Flashings: All curb flashings, including cricket details, shall be flashed with at least a 6 inches (152 mm) width of HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Foundation Coat. Encapsulate all fasteners using HydroStop® PremiumCoat® Foundation Coat. Do not bridge fasteners. HydroStop® PremiumCoat® Fabric shall be cut around all fasteners so fabric lies flat.

D. Penetrations HydroStop® PremiumCoat® Foundation Coat shall be applied around the base of the penetration, extending at least 4 inches (101 mm) onto the vertical and 4 inches (101 mm) onto the base. Embed a 6 inches (152 mm) width of HydroStop® PremiumCoat® Fabric using additional HydroStop® PremiumCoat® Foundation Coat, as necessary. Cut HydroStop® PremiumCoat® Fabric to accommodate the shape of the penetration. Both the top and bottom of neoprene pipe boots shall be flashed using HydroStop® PremiumCoat® Foundation Coat and HydroStop® PremiumCoat® Fabric as described above.

E. Skylights: Curb skylights shall be treated in the same fashion as curb flashings. The entire perimeter shall be flashed with a minimum 6 inches (152 mm) width of HydroStop® PremiumCoat® Foundation Coat and HydroStop® PremiumCoat® Fabric. All exposed skylight fasteners shall be encapsulated with HydroStop® PremiumCoat® Foundation Coat. Do not bridge fasteners. HydroStop® PremiumCoat® Fabric shall be cut around all fasteners so the fabric lies flat.

F. Gutters: Trowel or brush apply FlexSeal™ Sealant to the interior or exterior gutter incorporating 6 inches (152 mm) HydroStop® PremiumCoat® Fabric at all gutter seams. Gutter shall be completely clean and dry before applying FlexSeal™ Sealant.

G. Ponding Water Areas: The severity of the ponding water condition will determine the requirements for additional preparation. Contact the GAF’s Technical Department for information.

H. Inspect Preliminary Work / Flashing Details for problem areas (e.g., gaps, cracks, fishmouths, air pockets, etc.) to ensure that work is complete and satisfactory.

3.3 OTHER ITEMS

A. Installer shall take photographs of representative roof areas, including detail work, before work commences, after the surface has been properly prepared, after all flashing and detail work has been performed, and after the spray application of the HydroStop® PremiumCoat® membrane.

B. Installer shall provide the following support for on-site inspections by a representative from Manufacturer’s Field Services Department:
   1. Representative from the installer's company who has authority to make binding decisions.
   2. Required means to access all areas of the treated roof.
   3. Previous photographs of the roof, including test patch results, as applicable.
4. HydroStop® PremiumCoat® products and application equipment required to repair roof areas where destructive tests are to be performed by Manufacturer’s Field Services Department.

C. Special care shall be taken to avoid shading when spraying dark HydroStop® PremiumCoat® Roofing Membrane colors. When applying a dark HydroStop® PremiumCoat® Membrane color, Installer shall always spray wet material onto wet material to ensure that spray lines do not appear. HydroStop® PremiumCoat® strongly recommends the installation of any dark-colored finish coat by spraying two lighter coats (instead of one heavy coat) using a smaller tip size. Installer should also use the roof ribs or standing seams to terminate each spray pass.

D. Installer shall take special care when moving spray hoses and other equipment on the roof so that flashing work and encapsulated fastener heads are not damaged. Also, all spray equipment shall remain on the ground for the duration of the job.

E. If there will be an extended period of time (6 months or greater) between application of base and finish coats, the use of HydroStop® PremiumCoat® white for the base coat (versus gray) is recommended. The base coat shall be thoroughly cleaned before applying the finish coat.

3.4 REPAIRS

A. In the event that the HydroStop® PremiumCoat® membrane is damaged or punctured, repairs are to be performed using HydroStop® PremiumCoat® Foundation Coat and HydroStop® PremiumCoat® Fabric (where necessary) as follows:

1. Damaged areas are to be cut, cleaned and dried.

2. Apply HydroStop® PremiumCoat® Butter Grade Flashing or HydroStop® PremiumCoat® Finish Coat with HydroStop® Hydrofiber Bulking Agent, and feather out onto the existing HydroStop® membrane.

3. If a new penetration area has been cut, embed HydroStop® PremiumCoat® Fabric into the HydroStop® PremiumCoat® Butter Grade Flashing or HydroStop® PremiumCoat® Finish Coat with HydroStop® Hydrofiber Bulking Agent according to standard HydroStop® PremiumCoat® specifications.

4. Once the HydroStop® PremiumCoat® Butter Grade Flashing has cured, HydroStop® PremiumCoat® white or appropriate HydroStop® color may be applied for aesthetic uniformity.

3.5 MEMBRANE APPLICATION (PVC – Hypalon)

A. PVC - Coating 20 Year System:

1. Conduct moisture survey and remove/replace all wet areas.

2. Pressure-wash roof.
3. Apply HydroStop® PremiumCoat® Foundation Coat by brush at the rate of 1 gallon per square and embed HydroStop® PremiumCoat® Fabric into the wet material to saturate the fabric.

4. Apply additional HydroStop® PremiumCoat® Foundation Coat by brush at the rate of 1.5 gallons per square over the fabric.

5. Spray-apply base coat of HydroStop® PremiumCoat® Finish Coat at 1 gallon per square.

6. Spray-apply finish coat of HydroStop® PremiumCoat® Finish Coat at 1 gallon per square.

7. Spray-apply finish coat of HydroStop® PremiumCoat® Finish Coat at 1 gallon per square.

8. After a minimum of 24 hours has elapsed, inspect the final roof surface for flaws, areas of insufficient coverage, insufficient thickness, etc. The specified dry membrane thickness is 52 mils in the field and 79 mils on the flashing details. At completion of all work, seams should not be visible on the roof. All unsatisfactory areas must be repaired.

3.6 MEMBRANE APPLICATION (Structural Concrete)

A. Structural Concrete Coating Twenty (20) Year System

1. At a minimum, clean and prepare surfaces to receive waterproofing by removing all debris and/or by washing.

2. Apply Epoxy Primer at the rate of 0.5 gallons per square.

3. Apply HydroStop® PremiumCoat® Foundation Coat by brush at the rate of 1 gallon per square and embed HydroStop® PremiumCoat® Fabric into the wet material to saturate the fabric.

4. Apply additional HydroStop® PremiumCoat® Foundation Coat by brush at the rate of 1.5 gallons per square over fabric.

5. Spray-apply base coat of HydroStop® PremiumCoat® Finish Coat at 1 gallon per square.

6. Spray-apply finish coat of HydroStop® PremiumCoat® Finish Coat at 1 gallon per square.

7. Spray-apply finish coat of HydroStop® PremiumCoat® Finish Coat at 1 gallon per square.

8. After a minimum of 24 hours has elapsed, inspect the final roof surface for flaws, areas of insufficient coverage, insufficient thickness, etc. The specified dry membrane thickness is 45.9 mils in the field of the roof. All unsatisfactory areas must be repaired.

- END OF SECTION -
PART 1 – GENERAL

1.1 SUMMARY
A. This section includes elastomeric membrane roofing for installation over metal (Alternate 1).
B. Manufacturer detail drawings, site-specific drawings and general provisions of the contract, including general, supplementary and special conditions found in the Division 1 specification section apply to the work addressed in this section.

1.2 DEFINITIONS
A. Roofing Terminology: Refer to ASTM D1079 and the glossary of the National Roofing Contractors Association (NRCA) Roofing and Waterproofing Manual for definitions of roofing terms related to this section.

1.3 SYSTEM DESCRIPTION
A. The roofing work includes roofing, flashing and reinforcing of joints and junctions, and roof accessories integrally related to roof installation.
B. Provide an installed roofing membrane and base flashing system that does not permit the passage of water, and will withstand the design pressures calculated in accordance with the applicable version of ASCE 7.
C. Manufacturer shall provide all primary roofing materials that are physically and chemically compatible when installed in accordance with manufacturers current application requirements.

1.4 SUBMITTALS
A. Submit under provisions of Section 01 33 23.
B. Product Data:
   1. Provide Product Data Sheets for each type of product indicated in this section.
C. Shop Drawings:
   1. Provide manufacturers standard details and approved shop drawings for the system specified.

1.5 QUALITY ASSURANCE
A. Manufacturer Qualifications: Provide a roofing system that meets or exceeds the criteria listed in this section.
B. Installer Qualifications: A single installer or firm shall perform all work addressed in this section, and shall possess written certification from Manufacturer.
C. Source Limitations: Components listed shall be provided by a single manufacturer or approved by the primary roofing manufacturer.

1.6 REGULATORY REQUIREMENTS
A. Work shall be performed in a safe, professional manner, conforming to federal, state and local codes.
B. UL Listing: Provide HydroStop® PremiumCoat® Roofing System and component materials which have been evaluated by Underwriters Laboratories for flame-spread, and are listed in the "Underwriters Laboratory Roofing Materials and Systems Directory" for Class A construction over existing metal or other non-combustible roofing (flame-spread shall pass ASTM E-108 and/or UL 790). Provide roof covering materials bearing UL approval marking on the container. This indicates that the material has been subjected to UL’s examination, test procedures and follow-up inspection service.

1.7 PRE-INSTALLATION CONFERENCE

A. Prior to scheduled commencement of the roofing installation and associated work, conduct a meeting at the project site with the installer, A/E, Owner, Manufacturer’s Representative and any other persons directly involved with the performance of the work.
   1. Tour representative areas of roofing substrates to inspect and discuss conditions of substrate, penetrations and other preparatory work to be performed.
   2. Review roofing system requirements, specifications, detail drawings and the Contract Documents.
   3. Review required submittals, both completed and in progress.
   4. Review and finalize the construction schedule related to roofing work, and verify availability of materials, installer’s personnel, equipment and facilities needed to consistently make progress and avoid delays.
   5. Review required inspection(s), testing, and certifying, and material usage accounting procedures. Review forecasted weather conditions.
   6. Establish procedures for coping with unfavorable conditions, including the possibility of temporary roofing work.

1.8 DELIVERY, STORAGE AND PROTECTION

A. Store and handle materials in a manner that will ensure there is no possibility of contamination.

B. Store in a dry, well ventilated, weather tight location at temperatures between 50°F (10 °C) and 90°F (32°C) until the products are ready to be applied (keep from freezing). Do not stack material pallets more than two (2) high.

C. Do not subject existing roof to unnecessary loading of stockpiled materials.

D. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.9 PROJECT CONDITIONS
A. Weather:
   1. Proceed with roofing only when existing and forecasted weather conditions permit.
   2. Ambient temperatures shall be above 50°F (10°C).

   **CAUTION:** Other weather and environmental conditions to consider are mist, dew, condensation and relative humidity. These factors may increase drying times. If various coating products are exposed to rain before they are completely dry, product may “wash-off” the roof.

B. Proceed with roofing work only when existing and forecasted weather conditions will permit work to be performed in accordance with Manufacturer’s recommendations and guarantee requirements as follows:
   1. Do not begin work if precipitation is expected within twenty-four hours of application, or if temperatures are expected to fall below 50°F (10°C) during the duration of the job.
      a. FlexSeal™ Sealant may be used in temperatures lower than 42°F (6°C) if approved by Manufacturer.
   2. Upper temperature restriction (both air and substrate) for application of coating products is 110°F (43°C). If substrate temperatures exceed 110°F (43°C), coating products shall be applied during cooler periods of the day. If this is not practical, the substrate shall be cooled with water, and then coating products applied just after the water has flashed-off.
   3. No moisture may be present when applying coating products. Take into consideration to allow for sufficient daylight hours necessary for curing of materials.

1.10 SUBSTRATE CONDITIONS
   A. If any questions arise regarding the compatibility of coating products with an existing substrate, Installer shall prepare test patches to check adhesion. Contact A/E concerning questionable substrates.
   B. The bonding surface must be free of ponding water, ice, and snow, and should have a horse hair or semicoarse finish.
   C. Contractor shall perform a moisture survey on the roof system. Any wet or deteriorated areas shall be removed and replaced. If the moisture survey reveals more than 20% of the roof area is wet, notify A/E. Provide a copy of the moisture survey to the A/E.

1.11 WARRANTY
   A. Liquid Applied Diamond Pledge™ NDL Roof Guarantee: Manufacturers standard form, without money limitation, in which Manufacturer agrees to repair leaks...
through the coating products on the roof caused by manufacturing defects, natural deterioration of, or workmanship in applying, the coating roofing system.

1. Warranty Duration:
   a. Twenty (20) Years Labor and Material

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Basis of Design - HydroStop® PremiumCoat®, GAF, Commercial Roofing Products Division, 1 Campus Drive; Parsippany, NJ 07054; Toll Free Tel: 800-ROOF-411; Tel: 973-628-3000; Fax: 973-628-3451; Email: technicalquestions@gaf.com; web: www.gaf.com or A/E approved equal.

2.2 COATINGS

Note: Drying Times: Listed drying times for various coating products are directly affected by environmental conditions and thickness of application. Additional drying time must be allowed when experiencing high relative humidity, low temperatures and/or very thick product application to prevent improper curing and/or product “wash-off”.

A. HydroStop® PremiumCoat® Finish Coat: An acrylic, permanently flexible, highly UV-resistant, chemical resistant elastomeric compound fully reinforced with a tough stitch-bonded polyester fabric designed for roofing and flashing applications of all types or A/E approved equal.
   1. Application Rate: 0.75-1.50 gal per 100 sf (3.05-6.11 L/10 sqm) per coat.
   2. Application Method: Roof brush, spray-applied or 1” (25.4 mm) nap roller.
   3. Application Temperature (air, surface): 50°F (10°C) - 110° F (43°C).
   4. Dry time: (touch dry) 1- 4 hours at 77°F (25°C), 40% relative humidity; full cure: 7 days.

B. HydroStop® PremiumCoat® Foundation Coat: An acrylic, permanently flexible, highly UV-resistant, chemical-resistant elastomeric compound fully reinforced with a tough stitch-bonded polyester fabric designed for roofing and flashing applications of all types or A/E approved equal.
   1. Application Rate: 1.00-1.50 gal per 100 sf (4.08-6.11 L/10 sqm) per coat.
   3. Application Temperature (air, surface): 50°F (10°C) - 110° F (43°C).
   4. Dry time: (touch dry) 1- 4 hours at 77°F (25°C), 40% relative humidity; full cure: 7 days.

2.3 FLASHINGS, FABRIC AND BULKING AGENTS
A. HydroStop® PremiumCoat® Butter Grade Flashing: A high volume solids for low shrinkage providing increased tensile strength and elongation on problem roof areas. It is ideally suited for sealing mechanical fasteners and horizontal seams on metal roofs, as well as around flashings, drains and protrusions or A/E approved equal.

1. Application Rate: apply up to ¼” (6.4 mm) thickness.
3. Application Temperature (ambient): minimum 50°F (10°C).
4. Dry Time: 1-4 hours depending on application thickness.
5. Clean-up: Water before curing.

B. HydroStop® PremiumCoat® Fabric: tough, non-woven, stitch-bonded, heat-set polyester designed for roofing and flashing applications of all types. Available in 300ft rolls and varying widths or A/E approved equal.

1. Length: 300ft (91 m) , Width: 4" (102 mm), 6" (152 mm), 8" (203 mm), 12" (305 mm), 16" (406 mm), 20" (508 mm), 24" (610 mm)
2. Length: 336ft. (102 m) , Width: 40" (1.02 m)

2.4 PRIMERS AND SEALANTS

A. XR-2000 Primer: White, water-based adhesion promoting primer designed to enhance the adhesion of the HydroStop® roofing system to pre-finished metal roofing, including those containing fluoropolymers such as KYNAR® or siliconized polyesters. Due to the wide variety of pre-applied finishes, suitability of XR2000 Primer shall be tested on an individual basis. Do not apply in temperatures under 42°F (5.6°C).

1. Application Rate: 0.75 gal per 100 sf (3.05L /10 sqm.).
2. Application Method: Roller or airless sprayer.
3. Application Temperature (air, surface): 42°F (5.5°C) – 120°F (49°C).
4. Dry Time: 75°F (24°C), 50% relative humidity: Approximately 6 hours.

2.5 EQUIPMENT

A. Airless Sprayer and Accessories: As recommended by Manufacturer’s Technical Services.

PART 3 - EXECUTION

3.1 PREPARATION OF SUBSTRATE

A. Preparation of the roof substrate is the responsibility of the Installer. Installer shall address and correct all of the conditions listed in this section. Examine substrates to receive new roofing. Do not proceed with installation of the
HydroStop® PremiumCoat® products until unsatisfactory conditions have been corrected in a manner acceptable to the manufacturer (GAF).

B. Installation of sheet metal crickets: Sheet metal crickets shall be installed according to manufacturer's specifications (minimum 26 gauge (0.455 mm) metal - heavier gauge required for larger crickets) on the high side of all curb units. Vertical ribs shall be cut a minimum of 2 inches (51 mm) from the cricket to allow both the cricket flanges to mount flush to the metal panel and facilitate water drainage. Cut vertical ribs shall then be treated in the same fashion as a void larger than a 1/4 inch (6 mm). New crickets shall be "sealed" by placing a continuous bead of FlexSeal™ Sealant under the flanges before they are mechanically attached to the curb unit and metal roof panel. Then, the cricket flanges shall be stitch screwed to the curb unit and metal roof panel while the FlexSeal™ Sealant is still wet using fasteners. This procedure shall apply to installation of all new crickets and curbs.

C. Treatment of Ponding Water Areas: Installer shall make every effort to mechanically eliminate all ponding water areas on the roof prior to application of HydroStop® products. Ponding water is defined as water which does not properly drain and remains on the roof surface for more than 48 hours after precipitation stops. Ponding water areas which cannot be eliminated shall be treated with FlexSeal™ Sealant prior to application of other HydroStop® PremiumCoat® products.

D. Repair of Dented / Damaged Panels: Installer shall repair dented and/or damaged metal roof panels. Dents shall be mechanically removed to the maximum extent possible. If ribs are broken, Installer shall cover the broken rib area with a sheet metal cap. Sheet metal rib caps shall be sealed to the roof by applying HydroStop® PremiumCoat Butter Grade Flashing over the entire broken rib area to be capped prior to attaching the cap with fasteners. Then, HydroStop® PremiumCoat® Butter Grade shall be used to seal all the newly created rib cap seams and fasteners. Roof panels that are severely damaged shall be removed and replaced prior to application of HydroStop® PremiumCoat® products.

E. Re-tightening and Replacement of Fasteners: All fasteners shall be re-tightened, secured or replaced, as necessary. All stripped fasteners shall be replaced with larger diameter fasteners, and the area re-secured by adding a new fastener next to the one that was stripped. All missing fasteners shall be replaced. In evaluating a roofing substrate for the application HydroStop® PremiumCoat® Products, it is important to note the manner in which the roof is fastened. The fastening pattern may require modification to facilitate the proper installation of the system.

F. Thorough Cleaning / Removal of Existing Paints and Coatings: Metal substrate shall be pressure-washed with water. **Power washing permitted during the hours of 11:00 p.m. to 5:00 a.m. only.** A minimum working pressure of 3,000
psi (20 MPa) shall be used to remove all delaminating paint and coatings dirt, dust, and waste products (oil, oil-based roof cements, solvents, grease, animal fats, etc.). A Roto-spray tip is required to expedite metal panel cleaning. All existing silicone-based sealants shall be completely removed from roof substrate prior to application of HydroStop® PremiumCoat® products. In some cases, a sand injection system may be required during the pressure washing to obtain proper adhesion for HydroStop® PremiumCoat® products. When encountering roof substrates that have living organisms such as algae, mold or fungus, a bleach solution shall be used to kill and remove these organisms during the roof cleaning.

G. Treatment of Residual Asphalt: Installer shall make every effort to remove asphaltic roofing elements. Removal efforts shall include use of methods such as pressure washing, scrapers, wire brushes, electric drill wire-wheels, or other similar tools. Residual asphalt is defined as asphaltic material remaining after the exercise of all required removal efforts, and exists when there is asphaltic material greater in thickness than 3 mils (0.08 mm) over an area greater than 1 square foot (0.1 sqm). Residual asphalt shall be coated with Unibase Primer.

H. Treatment of Rust Areas: Remove all loose, flaking or powdery rust by wire brushing if it has not been removed during the pressure washing. Roof panels which are corroded to the point where holes are present shall be replaced. Prime using Acrylex 400.

I. Priming of Pre-Finished Metal Panels: Where roof panel surfaces are known or suspected to contain Kynar-500, other fluoropolymers or silicone, test patches shall be prepared with and without the use of XR-2000 Primer. Based on test patch adhesion results, Installer shall apply XR-2000 Primer on prefinished metal panels per specifications. Please note that since XR-2000 Primer has rust inhibiting properties, additional primer is not required.

J. Pitch Pans: For most situations, pitch pans shall be capped with sheet metal so they can be sealed with HydroStop® PremiumCoat® products.

K. Neoprene Pipe Boots: HydroStop® PremiumCoat® recommends the installation of neoprene boots prior to flashing work being performed for certain types of pipe penetrations. Neoprene boots shall first be sealed to the roof using HydroStop® PremiumCoat® Butter Grade prior to mechanical attachment with fasteners.

L. Open Ridge Vents: Open ridge vents (as shown in detail drawings) may begin to corrode on the inside, and over time, may leak. HydroStop® PremiumCoat® highly recommends either replacement or the installation of sheet metal caps over the open ridge vents when they are rusted on the inside and/or located in a harsh environment (e.g., salt water areas). Sheet metal caps shall be installed when leaks are suspected from the vents. Installation of a cap on the ridge vent will prevent water entry while allowing air to continue to flow through the vent. Do not seal weep holes on the vents. Inadequate roof ventilation may cause
blistering in the HydroStop® PremiumCoat® products due to inside air "blowing-out" through roof panel seams. When this condition occurs, it may not allow for proper curing of the HydroStop® PremiumCoat® Butter Grade Flashing material which may cause blisters.

M. Condensate Lines: HydroStop® PremiumCoat® recommends the installation of condensate lines from HVAC units to gutters as part of the overall roofing contract. Type of piping used for condensate lines may vary depending on local building codes. Lines shall be securely fastened to panel ribs.

3.2 FLASHING APPLICATION AND INSPECTION INFORMATION

A. Preliminary work consists of substrate preparation (addressed earlier in specifications) and all flashing details. After completion of substrate preparation, all flashing details, horizontal seams, penetrations and curbs shall be flashed with either 6 inches (152 mm) or 12 inches (305 mm) HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade in accordance with HydroStop® PremiumCoat® Detail Drawings. Flashing shall be feathered at the edges (see current HydroStop® PremiumCoat® Detail Drawings) to ensure that water flows over the various flashing details.

B. Fasteners: All fasteners shall be fully encapsulated in HydroStop® PremiumCoat® Butter Grade Flashing.

C. In some cases, brushing may be required to obtain the proper feathering around fasteners.

D. Gutter Straps: All gutter straps that are fastened above roof panels shall be fully encapsulated with HydroStop® PremiumCoat® Butter Grade Flashing, including the fasteners.

E. Vertical Seams:

1. Ribbed: All ribbed panel vertical seams shall be sealed with HydroStop® PremiumCoat® Butter Grade. Feather the HydroStop® PremiumCoat® Butter Grade until seams are no longer visible while brushing in the direction parallel to the seam.

2. Standing Seam: All standing vertical seams shall be sealed with a 1/2 inch (12 mm) bead of HydroStop® PremiumCoat® Butter Grade. Feather HydroStop® PremiumCoat® Butter Grade until seams are no longer visible while brushing in the direction parallel to the seam.

3. Standing "T" Seam: Both vertical seams of the standing "T" shall be flashed with a 1/2 inch (12 mm) bead HydroStop® PremiumCoat® Butter Grade brushed into the seams.

4. Inverted "J" Seam: In snowy climates and/or when roof leaks are suspected from this type of vertical seam, HydroStop® requires re-crimping the short leg of the seam all the way under the horizontal portion
of the inverted "J" seam. Brush or trowel apply HydroStop® PremiumCoat® Butter Grade over the newly created single lock vertical seam. Portable seamers may be used to perform the re-crimping.

5. Corrugated: All corrugated panel vertical seams shall be sealed with HydroStop® PremiumCoat® Butter Grade. Feather the HydroStop® PremiumCoat® Butter Grade until the seams are no longer visible while brushing in the direction parallel to the seam.

6. Batten: Both vertical seams of the batten shall be flashed with a 1/2 inch (12 mm) bead of HydroStop® PremiumCoat® Butter Grade. Feather HydroStop® PremiumCoat® Butter Grade until the seams are no longer visible while brushing in the direction parallel to the seam.

7. NOTE: Any perimeter seams or seams at roof material transition points (e.g., to another type of approved roofing substrate) must be treated with a minimum 12 inches (305 mm) width of HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade (or HydroStop® PremiumCoat® Foundation). Please contact GAF Technical Services with job-specific questions.

F. Horizontal Seams: All horizontal seams shall be reinforced with a layer of HydroStop® PremiumCoat® Foundation Coat or HydroStop® PremiumCoat® Butter Grade, one (1) layer of HydroStop® PremiumCoat® Fabric and then a final layer of HydroStop® PremiumCoat® Foundation Coat or HydroStop® PremiumCoat® Butter Grade to completely encapsulate the HydroStop® PremiumCoat® Fabric. HydroStop® PremiumCoat® Foundation Coat or HydroStop® PremiumCoat® Butter Grade shall be feathered at least 1 inch (25 mm) beyond each side of the 6 inches (152 mm) width of Fabric to allow water to flow over the seam. HydroStop® PremiumCoat® Fabric shall be cut around all fasteners so it lies flat. For ribbed roof panels, the HydroStop® PremiumCoat® Fabric shall be applied over panel ribs in continuous lengths. A minimum 2 inches (51 mm) overlap is required for all splices in HydroStop® PremiumCoat® Fabric. Horizontal seams shall be secured with fasteners on the high side of every other corrugation spaced no more than 6" on center. When using HydroStop® system the horizontal seam shall be made flush by installing two fasteners per flute.

1. NOTE: Any perimeter seams or seams at roof material transition points (e.g., to another type of approved roofing substrate) must be treated with a minimum 12 inches (305 mm) width of HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade (or HydroStop® PremiumCoat® Foundation). Please contact GAF Technical Services with job-specific questions.

G. Cinch Straps at Panel End laps: Re-tighten cinch straps, as necessary. Surround each strap and fastener head with a bead of FlexSeal™ Sealant. Fully inject
FlexSeal™ Sealant into the cinch strap water channel to displace all air and moisture within the channel. Then seal the entire lap, strap and fastener heads with a minimum 6 inches (152 mm) width of HydroStop® PremiumCoat® Butter Grade. Feather the HydroStop® PremiumCoat® Butter Grade to prevent ponding water at the high side of the lap. The use of HydroStop® PremiumCoat® Fabric is not required for cinch straps at panel end laps.

H. Ridge Caps: Except as noted, all ridge caps shall be flashed with 12 inches (305 mm) width of HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade. All voids and open areas in the ridge cap shall be filled with polyurethane foam prior to application of HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade. Metal “Z” closures which are located within 2 inches (51 mm) of the ridge cap edge, remove all exposed sealant and apply a liberal bead of HydroStop® PremiumCoat® Foundation Coat to all sides of the “Z” closure where they intersect with both the roof panel and ridge cap.

I. Rakes: All fixed rake details for the roof shall be secured and sealed with a 12 inches (305 mm) minimum width of HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade. If fixed rake metal is fastened to the top of roof panel ribs and extends back onto the roof, trim off any excess metal and follow horizontal seam flashing procedures. All voids and open areas shall be filled with polyurethane foam prior to application of a HydroStop® PremiumCoat® system. For standing seam roof panels, contact GAF’s Technical Services Department for information.

J. Parapet Walls: All parapet wall details within the roof system shall be secured and sealed with 12 inches (305 mm) minimum width of HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade. If parapet wall flashing metal is fastened to the top of roof panel ribs and extends back onto the roof, trim off any excess metal and follow horizontal seam flashing procedures. All voids and open areas shall be filled with polyurethane foam prior to application of the HydroStop® PremiumCoat® system. For standing seam roof panels, contact Manufacturer’s Technical Services Department for information.

K. For standing seam roof panels, contact Manufacturer’s Technical Services Department for information.

L. Curb Flashings: All curb flashings, including cricket details, shall be flashed with 12 inches (305 mm) width of HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade. Encapsulate all fasteners using HydroStop® PremiumCoat® Butter Grade. Do not bridge fasteners. HydroStop® Fabric shall be cut around all fasteners so the fabric lies flat.

M. Penetrations: HydroStop® PremiumCoat® Butter Grade shall be applied around the base of all penetrations, extending at least 6 inches (152 mm) onto the vertical and 6 inches (152 mm) onto the base. Embed 12 inches (305 mm) width of HydroStop® PremiumCoat® Fabric using additional HydroStop®
PremiumCoat® Butter Grade. Cut HydroStop® PremiumCoat® Fabric to accommodate the shape of the penetration. Both the top and bottom of neoprene pipe boots shall be flashed using HydroStop® PremiumCoat® Butter Grade as described above.

N. Skylights: Curb skylights shall be treated in the same fashion as Curb Flashings. The entire perimeter of flush-mounted skylights shall be flashed with a minimum 12 inches (305 mm) width of HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade. All exposed skylight fasteners shall be encapsulated with HydroStop® PremiumCoat® Butter Grade. Do not bridge fasteners. HydroStop® PremiumCoat® Fabric shall be cut around all fasteners so fabric lies flat. After flashing work has been completed and HydroStop® PremiumCoat® Butter Grade has cured, treat deteriorated fiberglass skylight panels with United Coatings™ Acrysheen Sealer.

O. Gutters: Trowel or brush apply FlexSeal™ Sealant to the interior or exterior gutters incorporating 6 inches (152 mm) HydroStop® PremiumCoat® Fabric at all gutter seams. Gutter shall be completely clean and dry before applying FlexSeal™ Sealant.

P. Ponding Water Areas: Contact the Manufacturer's Technical Services Department for information.

Q. Inspect Preliminary Work / Flashing Details for problem areas (e.g., gaps, cracks, fishmouths, air pockets, etc.) to ensure that work is complete and satisfactory.

R. Inform A/E and GAF’s Technical Services Department when all preliminary work and flashing details will be complete and the Installer is ready to proceed with application of HydroStop® Roofing Membrane. Allow a minimum of two (2) weeks for the interim inspection to be made by the Manufacturer’s Technical Services Department.

S. Any final roofing installation prior to this interim inspection is subject to rejection by the A/E and the Manufacturer’s Technical Services Department.

3.3 OTHER ITEMS

A. Installer shall take photographs of representative roof areas, including detail work, before work commences, after the surface has been properly prepared, after all flashing and detail work has been performed, and after the spray application of the HydroStop® PremiumCoat® membrane.

B. Installer shall provide the following support for on-site inspections by a representative from Manufacturer’s Field Services Department (list is not comprehensive):
   1. Representative from the installer’s company who has authority to make binding decisions
   2. Required means to access all areas of the treated roof.
3. Previous photographs of the roof, including test patch results, as applicable

4. HydroStop® PremiumCoat® products and application equipment required to repair roof areas where destructive tests are to be performed by Manufacturer’s Field Services Department.

C. Special care shall be taken to avoid shading when spraying dark HydroStop® PremiumCoat® Roofing Membrane colors. When applying a dark HydroStop® PremiumCoat® Membrane color, Installer shall always spray wet material onto wet material to ensure that spray lines do not appear. Contractor shall install any dark-colored finish coat by spraying two lighter coats (instead of one heavy coat) using a smaller tip size. Installer shall also use the roof ribs or standing seams to terminate each spray pass.

D. Installer shall take special care when moving spray hoses and other equipment on the roof so that flashing work and encapsulated fastener heads are not damaged. Also, all spray equipment shall remain on the ground for the duration of the job unless otherwise approved in writing by A/E and Owner.

E. If an extended period of time (6 months or greater) occurs between application of base and finish coats, HydroStop® PremiumCoat® white for the base coat (versus gray) shall be used. The base coat shall be thoroughly cleaned before applying the finish coat.

3.4 REPAIRS

A. In the event that the HydroStop® PremiumCoat® membrane is damaged or punctured, repairs are to be performed using HydroStop® PremiumCoat® Finish Coat or HydroStop® PremiumCoat® Butter Grade and HydroStop® PremiumCoat® Fabric (where necessary) as follows:

1. Damaged areas are to be cut, cleaned and dried.

2. Apply HydroStop® PremiumCoat® Butter Grade Flashing or HydroStop® PremiumCoat® Finish Coat with HydroStop® Hydrofiber Bulking Agent, and feather out onto the existing HydroStop® PremiumCoat® membrane.

3. If a new penetration area has been cut, embed HydroStop® PremiumCoat® Fabric into the HydroStop® PremiumCoat® Butter Grade Flashing or HydroStop® PremiumCoat® Finish Coat with HydroStop® Hydrofiber Bulking Agent according to standard HydroStop® PremiumCoat® specifications.

4. Once the HydroStop® PremiumCoat® Butter Grade Flashing has cured, HydroStop® PremiumCoat® white or appropriate HydroStop® PremiumCoat® color may be applied for aesthetic uniformity.

3.5 MEMBRANE APPLICATION

A. Metal Coating – Twenty (20) Year System
1. Tighten and/or replace existing fasteners. Pressure-wash roof. Pressure-wash roof.

2. Prime rusty areas with GAF XR-2000 Primer at the rate of 0.75 gallon/100 sq. ft.

3. Treat horizontal seams with 6" wide band of HydroStop® PremiumCoat® Foundation Coat or Butter Grade and HydroStop® PremiumCoat® Fabric at the rate of 5 gallons per 300 lineal feet.

4. Treat vertical seams with HydroStop® PremiumCoat® Butter Grade at the rate of 5 gallons per 650 lineal feet.

5. Treat all roof penetrations, skylights, and rake edges with 12" wide band of HydroStop®

6. PremiumCoat® Butter Grade and HydroStop® PremiumCoat® Fabric at the rate of 5 gallons per 300 lineal feet.

7. Encapsulate exposed fasteners with HydroStop® PremiumCoat® Butter Grade or fasten with UniCap Fastener Covers.

8. Spray-apply base coat of HydroStop® PremiumCoat® Finish Coat at 1.0 gallon per square.

9. Spray-apply inter coat of HydroStop® PremiumCoat® Finish Coat at 1.0 gallon per square.

10. Spray-apply finish coat of HydroStop® PremiumCoat® Finish Coat at 1.0 gallon per square.

11. After a minimum of 24 hours has elapsed, inspect the final roof surface for flaws, areas of insufficient coverage, insufficient thickness, etc. The total dry mil thickness in the field of the roof is 25 mils. All unsatisfactory areas must be repaired.

– END OF SECTION
PART 1 - GENERAL

1.1 SECTION INCLUDES
A. Preparation of surfaces to receive factory fabricated metal perimeter systems.
B. Installation of factory fabricated and finished metal perimeter systems.

1.2 RELATED SECTIONS
A. Section 06 10 00 – Miscellaneous Carpentry
B. Section 07 52 16 – SBS Modified Bituminous Membrane Roofing
C. Section 07 92 00 – Joint Sealants

1.3 REFERENCE STANDARDS
A. NRCA National Roofing Contractors Association
   Rosemont, IL
B. OSHA Occupational Safety and Health Administration
   Washington, DC
C. SMACNA Sheet Metal and Air Conditioning Contractors National Association
   Chantilly, VA
D. FM Factory Mutual Engineering and Research
   Norwood, MA
E. ANSI American National Standards Institute
   Washington, DC
F. SPRI Single Ply Roofing Industry
   Waltham, MA

1.4 SUBMITTALS
A. Submittals Required
   1. Submit a letter from the roofing membrane manufacturer confirming that
      the factory fabricated metal accessory systems furnished for the project
      are supplied or manufactured by the roofing membrane manufacturer and
      that each component section is labeled with the roofing membrane
      manufacturer’s logo.
   2. Latest edition of factory fabricated metal component manufacturer / supplier’s installation instructions for the factory fabricated metal perimeter system(s).
   3. Samples from the manufacturer / supplier sized to represent metal components.
   4. Copies of the manufacturer / supplier’s color selection chart showing the manufacturer / supplier’s full range of standard colors as well as physical samples of each standard color.
   5. Sample copy of the roofing system manufacturer’s inclusion addendum offering coverage of the factory fabricated metal perimeter system(s) as part of the roofing membrane system.

1.5 QUALITY ASSURANCE
A. Agency Approvals: The proposed factory fabricated metal component shall conform to the following requirements. No other testing agency approvals will be accepted.

1. The roof perimeter fascia and coping systems shall be certified through third party verification by the manufacturer / supplier to meet performance design criteria according to the applicable edition of ANSI/SPRI/FM 4435/ES-1: Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems.
   
a. ANSI/SPRI ES-1 classification – The fascia and coping shall meet the following uplift pressures when tested according to Test Method RE-2 for fascia and RE-3 for coping.
      
      Horizontal - 79 psf
      Vertical - 130 psf
      FM Global Class 1-90 minimum

B. Scope of Work: The work to be performed under this specification shall include but is not limited to the following: Attend necessary job meetings and furnish competent and full time supervision, experienced mechanics, all materials, tools, and equipment necessary to complete, in an acceptable manner, the factory fabricated metal installation in accordance with this specification. Comply with the latest written application instructions of the manufacturer/supplier of the factory fabricated metal components.

C. Local Regulations: Conform to regulations of public agencies, including any specific requirements of the city and/or state of jurisdiction.

D. Manufacturer Requirements:
   
   1. Ensure that the factory fabricated metal components are labeled with the roofing membrane manufacturer’s logo.
   
   2. Ensure that the factory fabricated metal component manufacturer/supplier provides direct trained company personnel to attend necessary job meetings, perform periodic inspections as necessary, and conducts a final inspection upon successful completion of the project.

1.6 PRODUCT DELIVERY STORAGE AND HANDLING

A. Delivery: Deliver materials in the manufacturer's original packaging.

B. Storage: Store materials out of direct exposure to the elements.

C. Strippable Film Masking: Do not remove the strippable film masking on the metal component until immediately following installation. Do not allow extended UV or heat exposure to metal components covered with strippable film masking.

D. Damaged Material: Any materials that are found to be damaged will be automatically rejected, removed and replaced at the Contractor's expense.

1.7 PROJECT/SITE CONDITIONS

A. Requirements Prior to Job Start
   
   1. Related Work: Verify that all related work performed by other trades is complete prior to installing the factory fabricated metal components.
2. Component Substrate Condition: Mounting surfaces shall be straight and secure and provide adequate widths to properly support the factory fabricated metal components.

3. Safety: Familiarize every member of the application crew with all safety regulations recommended by OSHA, SMACNA and other industry or local governmental groups.

B. Protection Requirements

1. Component Protection: Protect newly applied factory fabricated metal component surfaces against mechanical damage.

2. Limited Access: Prevent access by the public to materials, tools and equipment during the course of the project.

3. Debris Removal: Remove all debris daily from the project site.

4. Site Condition: Complete, to the owner's satisfaction, all job site clean-up including building interior, exterior and landscaping where affected by construction.

1.8 GUARANTEE/ ADDENDUM

A. Roof Membrane Guarantee Addendum: In addition to the specified guarantee under Section 07 52 16, furnish the Owner with the roofing manufacturer's inclusion addendum to the guarantee offering coverage of the factory fabricated raised edge, gravel stop, extruded fascia, coping, expansion joint systems under the standard terms of the roofing membrane/system guarantee.

1. Siplast Paraguard Roof Perimeter System Inclusion Addendum

2. Soprema Sopra-Edge Metal Roof Perimeter System Inclusion Addendum

PART 2 - PRODUCTS

2.1 DESCRIPTION OF FACTORY FABRICATED METAL SYSTEMS

A. Factory Fabricated Metal Coping System: Metal Coping components shall be factory fabricated according to the requirements of the roofing membrane manufacturer and labeled with the roofing manufacturer’s logo. The metal coping system shall consist of the following components:

1. Factory formed anchor/cleat plates fabricated from 16 gauge, G90 galvanized steel and a maximum cleat spacing of 4 feet on center.

2. Factory formed splice plates with embossed ribs to prevent lateral water flow at joints between adjacent sections fabricated from 0.032 inch aluminum and having factory applied sealant strips.

3. A factory formed coping cap fabricated from minimum 24 gauge galvanized steel having a coil coated Kynar™ finish.

4. Factory formed miters and end caps.

5. Paraguard L Coping System, by Siplast, Inc., Irving, TX (800) 922-8800

6. Sopra-Tite Coping System by Soprema, Wadsworth, OH (800) 356-3521
B. Factory Fabricated Gravel Stop: Factory fabricated gravel stop components shall be factory formed according to the requirements of the membrane manufacturer and labeled with the roofing manufacturer’s logo. The gravel stop system shall consist of the following components:

1. A factory formed cleat with pre-punched nail holes fabricated from 22 gauge, G90 galvanized steel, secured using galvanized ringshank roofing nails.
2. A factory formed coping cap fabricated from minimum 24 gauge galvanized steel having a coil coated Kynar™ finish.
3. Factory formed concealed splice plates.
4. Factory formed welded miters.
5. Proform Gravel Stop, by Siplast, Inc., Irving, TX (800) 922-8800
6. Sopra-Edge Gravel Stop, by Soprema, Wadsworth, OH (800) 356-3521

C. Factory Fabricated Fascia: Fascia components shall be factory formed according to the requirements of the membrane manufacturer and labeled with the roofing manufacturer’s logo. The fascia system shall consist of the following components:

1. An extruded aluminum anchor bar with pre-punched slotted fastening holes, secured using stainless steel hex head fasteners provided by the manufacturer.
2. Pre-formed EPDM anchor bar spacers.
3. A factory formed exterior fascia, fabricated from minimum 24 gauge galvanized steel having a coil coated Kynar™ finish.
4. Factory formed folded miters and end caps.
6. Sopra-Edge Extruded Edge, by Soprema, Wadsworth, OH (800) 356-3521

D. Factory Fabricated Roof-To-Roof-Expansion Joint: Factory fabricated roof-to-roof expansion joint components shall be factory formed according to the requirements of the membrane manufacturer and labeled with the roofing manufacturer’s logo. The roof-to-roof expansion joint system shall consist of the following components:

1. A factory formed cap fabricated from minimum 24 gauge galvanized steel having a coil coated Kynar™ finish.
2. A factory formed travel cleat fabricated from 20 gauge, G90 galvanized steel.
3. Specially designed shouldered washers to allow for travel cleat movement.
4. Factory formed splice plates fabricated from 0.040 inch aluminum with factory applied sealant strips.
5. Factory formed curb rails fabricated from 24 gauge, G90 galvanized steel.
6. Factory formed welded miters, end caps, tees, and crosses.
7. Paraguard Roof-To-Roof Expansion Joint System, by Siplast, Inc., Irving, TX (800) 922-8800
8. Sopra-Tite Roof-To-Roof Expansion Joint System, by Soprema, Wadsworth, OH (800) 356-3521

E. Factory Fabricated Roof-To-Wall Expansion Joint: Factory fabricated roof-to-wall expansion joint components shall be factory formed according to the requirements of the membrane manufacturer and labeled with the roofing manufacturer's logo. The roof-to-wall expansion joint system shall consist of the following components:

1. A factory formed cap fabricated from minimum 24 gauge galvanized steel having a coil coated Kynar™ finish.
2. A factory formed travel cleat fabricated from 20 gauge, G90 galvanized steel.
3. Specially designed shouldered washers to allow for travel cleat movement.
4. Factory formed splice plates fabricated from 0.040 inch aluminum with factory applied sealant strips.
5. Factory formed curb rail fabricated from 24 gauge, G90 galvanized steel.
6. Factory formed welded miters and end caps.
7. Paraguard Roof-To-Wall Expansion Joint System, by Siplast, Inc., Irving, TX (800) 922-8800
8. Sopra-Tite Roof-To-Wall Expansion Joint System, by Soprema, Wadsworth, OH (800) 356-3521

PART 3 - EXECUTION

3.1 SUBSTRATE PREPARATION
A. Perimeter Nailers: Perimeter nailers shall be flat and level to the building perimeter edge. The front edge of the nailer must be flush with the outside face or wall of the building. Anchor all perimeter nailers in strict accordance with the guidelines set forth in FM Global Property Loss Prevention Data Sheet 1-49.

B. Curbs for Expansion Joint Components: Curbs must be straight, level, and properly anchored to the building structural deck. Any curbs, which are improperly installed or anchored, must be corrected prior to installation of the expansion joint systems.

C. Flashing Membrane Installation: Ensure that all roofing flashing treatments used in conjunction with factory fabricated metal components are installed according to the roofing membrane manufacturer's specifications, current technical guide, and details prior to installation of the factory fabricated metal component.

D. Surface Cleaning: Sweep or vacuum all surfaces to receive the metal components, removing all loose aggregate, soil, and foreign substances prior to installation of the factory fabricated metal components.

3.2 FACTORY FABRICATED METAL COMPONENT INSTALLATION
A. Install metal components in accordance with the roofing/waterproofing manufacturer's instructions and the following requirements.

B. Factory Fabricated Metal Coping Installation.
   1. Place corner support clips at all corners to support the cap. Set the coping system manufacturer's support clips at the corner and fasten in accordance with the coping system manufacturer's installation instructions.
   2. Beginning at the corners and/or ends, install the anchor cleats, splice plates, and factory formed miters and end cap components in strict accordance with the coping system manufacturer's installation instructions.
   3. Position all remaining anchor cleats for straight sections of coping in strict accordance with the factory fabricated coping system manufacturer's installation instructions and code approval requirements, pulling each cleat snugly against the exterior face of the building.
   4. Install splices centered on the anchor cleats in accordance with the coping system manufacturer's installation instructions.
   5. Install full length sections of coping cap by hooking the outside leg of the coping cap over the outside face of the cleats first. Rotate the cap over the top of the wall pressing lightly, but firmly, on the top of the cap until the inside leg fully locks over the roof side of the anchor cleats. Allow a 3/8 inch gap between coping sections for thermal movement.

C. Factory Fabricated Gravel Stop
   1. Place the continuous retainer cleat to the roofing surface firmly against the perimeter nailer. The retainer cleat should be level and the nailing slots should align centered with the nailer underneath. Fasten the retaining cleat in accordance with the gravel stop system manufacturer's installation instructions.
   2. Starting at the corners, trowel a bead of the roofing manufacturer's specified mastic over the base ply of membrane where the flange of the exterior fascia is to be set. Hook the drip edge of the exterior fascia over the retainer cleat and fasten the flange through the pre-punched holes in accordance with the gravel stop system manufacturer's installation instructions. Slide a concealed joint splice plate halfway into the fascia to allow the next section to fit halfway over the joint splice plate as well. Allow a 3/8 inch gap between gravel stop sections for thermal movement.
   3. After installation of the factory fabricated gravel stop is complete, ensure that the roofing stripping and finish plies are installed in accordance with the roofing membrane manufacturer's specifications and details.

D. Factory Fabricated Fascia
   1. After completion of the installation of the roofing membrane plies, apply a three inch wide, ¼ inch thick band of the roofing manufacturer’s specified mastic or sealant to the underside of the flange of the extruded aluminum anchor bar. Install the anchor bar joint spacer into the end of the extruded aluminum anchor bar to allow the next section to fit properly.
over the anchor bar joint spacer. Secure the extruded aluminum anchor bar to the perimeter nailer in accordance with the roof system manufacturer's installation instructions.

2. Beginning again at the corners, hook the top of the exterior fascia onto the top of the extruded aluminum anchor bar and apply slight pressure downward until the fascia engages over the bottom of the extruded aluminum anchor bar. Position the next section to overlap the preceding section approximately 1 inch at the notches provided. Install sections of the fascia cover from right to left as viewed from the rooftop engaging the fascia cover over the anchor bar in the same method as previously described.

E. Factory Fabricated Roof to Roof Expansion Joint

1. Fasten the curb rails to the previously flashed curbs using roofing nails every 24 inches on center.

2. Place the traveler cleat over the curb rails, allowing the horizontal slots to center over the rail. Secure the travel cleat in accordance with the expansion joint system manufacturer's installation instructions.

3. Splice plates are placed over the travel cleat on 12 foot centers, ensuring that a splice plate is placed centered where there will be a joint in the cap sections.

4. Hook the bottom edge of the cap face of one side securely on the drip edge of the traveler cleat. While maintaining engagement, rotate the cap length over the cleat and press the cap firmly downward on the back edge above the traveler cleat until it locks onto the cleat. Allow a 3/8 inch gap between expansion joint sections for thermal movement.

F. Factory Fabricated Roof to Wall Expansion Joint

1. Fasten the curb rail to the previously flashed curb using roofing nails spaced 24 inches on center.

2. Fasten the wall rail to the wall using fasteners approved for use with the wall substrate every 24 inches on center.

3. Place the travel cleat over the curb rail, allowing the horizontal slots to center over the rail. Secure the travel cleat through the slots using the drill point screws and extruded washers to the curb first and then to the wall centered over the installed rails.

4. Place guttered splice plates over the traveler cleat on 12 foot centers, ensuring that a splice plate is placed centered where there will be a joint in the cap sections.

5. Hook the bottom edge of the cap face securely on the drip edge of the traveler cleat. While maintaining engagement, rotate the cap length over the cleat positioning the top leg of the cap firmly against the wall. Fasten the top leg of the cap to the wall using fasteners approved for use with the wall substrate at 12 inches on center. Flash or seal the top leg of the expansion joint cap in accordance with the roofing membrane manufacturer's specifications and details. Allow a 3/8 inch gap between expansion joint sections for thermal movement.
3.3 FIELD QUALITY CONTROL AND INSPECTIONS

A. Site Condition: Leave all areas around the job site free of debris, construction materials, equipment and related items after completion of job.

B. Issuance of the Addendum to the Roofing Membrane/System Guarantee: Complete all post installation procedures and meet the factory fabricated metal manufacturer/supplier's final endorsement for issuance of the addendum to the specified roofing/waterproofing guarantee.

– END OF SECTION –
PART 1 – GENERAL

1.1 SECTION INCLUDES
A. Rooftop Guard Rail

1.2 REFERENCES
B. 29 CFR 1910.28 - Walking/Working Surfaces, Subpart D.
C. 29 CFR 1926.500 - Safety and Health Regulations for Construction, Subpart M-Fall Protection.
E. AISI SG-971-1996.
G. ANSI Z359.1 - Safety Requirements for Personal Fall Arrest Systems, Subsystems and Components.
K. ASTM A 193 - Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High Temperature or High Pressure Service and Other Special Purpose Applications.
L. ASTM A 500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

1.3 DESIGN / PERFORMANCE REQUIREMENTS
A. Provide Fall Protection System in compliance with OSHA, ANSI, and all applicable state and federal regulatory requirements.
B. Fall Protection System shall provide independent fall arrest in addition to suspension line anchorages for descent location. Design of fall arrest safety systems, and equipment shall meet or exceed the following:
   1. Fall Arrest Safety Rooftop Anchors: designed to a maximum fall arresting force of typically 1800 lbs (8.0 k) when wearing a body harness with a safety factor of 2 without any permanent deformation; and to 5000 lbs (22.24 k) against fracture or detachment.
2. Ensure design of primary support equipment is capable of sustaining without failure at least four times the maximum static working load applied or transmitted to the components.

3. Design system fall arrest safety anchors and equipment supports to comply with the following structural requirements: Supports for Suspended Platforms: Rooftop Davits, Rooftop Rigging Sleeves and Rooftop Monorails are used for suspending a powered Platform from storage and rigging/working locations on the building. These supports and the structures to which they are attached are typically designed to 1000 lbs (4.5 kN) vertical service load plus impact with a factor of safety as per AISC requirements and/or ACI or other applicable construction codes and to 4 times the rated load against fracture or detachment (i.e. 4 to 1 stability factor).

1.4 SUBMITTALS

A. The Contractor is required to furnish written submittals as outlined in Division 1.

B. Product Data: Manufacturer’s data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

C. Shop Drawings: Plans and details of entire fall protection layout, showing member sizes and part identification, fasteners, anchors, fittings and evidence of compliance with structural performance requirements.
   1. Include system layout, design analysis, and calculations prepared and sealed by a Registered Professional A/E licensed in the State where the project is located.
   2. Provide manufacturer’s certifications that the ultimate strength of the fall protection system is equal to or greater than those specified.
   3. Include data regarding installation and rigging as well as all necessary Restrictive and Non-Restrictive General Safety and Usage Notes.

D. Operation and Maintenance Data
   1. Include parts catalog with complete list of equipment replacement parts; identify each entry with equipment description and identifying part numbers.
   2. Include technical information for servicing equipment.
   3. Include detailed operating procedures indicating proper use of equipment for safe operation of the system.

E. Manufacturer’s Certificates: Certify products meet or exceed specified requirements.

F. Closeout Submittals: Provide manufacturer’s maintenance instructions that include recommendations for annual inspection, re-certifications, periodic checking and adjustment of cable tension and periodic cleaning and maintenance of all railing and infill components (if applicable).
1.5 QUALITY ASSURANCE
A. Manufacturer Qualifications: Work of this Section to be executed by manufacturer specializing in the design, fabrication and installation. Must carry specific liability insurance in the amount of $10,000,000.00 to protect against product/system failure. Companies, such as miscellaneous metal fabricators, who do not typically engage in the design and manufacturing of suspended maintenance equipment, are not permitted to bid.
B. Welding to be executed by certified welders in accordance with AWS requirements.
C. Installer Qualifications: Specializing in the Work of this section and trained and certified by the fall protection system manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING
A. Store products in manufacturer’s unopened packaging until ready for installation.

1.7 SEQUENCING
A. Ensure that locating templates and other information required for installation of products of this section are furnished to affected trades in time to prevent interruption of construction progress.
B. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.8 PROJECT CONDITIONS
A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer’s absolute limits.

1.9 MAINTENANCE SERVICE
A. Furnish service and maintenance for fall protection system and components for a period of one year from Date of Substantial Completion with an option for extending maintenance service on an annual basis thereafter.

1.10 WARRANTY
A. Rooftop Guard Rail: Provide with manufacturers One (1) Year limited warranty.

PART 2 – PRODUCTS
2.1 Manufacturers
A. Acceptable Manufacturer: Rooftop Anchors Inc., 844 South, 430 West, Suite 200, Heber City, UT 84032. For more specific information on any section, contact Rooftop Anchor, Inc. at 800-411-3914.
Tel: Toll Free: (800) 411-3914, Tel: (801) 839-2900. Fax: (800) 839-2929. Web Site: www.RooftopAnchor.com E-mail: sales@RooftopAnchor.com.
B. Substitutions: Not permitted.
C. Requests for substitutions will be considered in accordance with provisions of Section 01 25 13.

2.2 MATERIAL
A. Exposed Structural Components Finish: Aluminum
   1. Steel: ASTM A 500, Grade B.
   2. Steel: ASTM A 36.
B. Exposed Structural Components Finish: Stainless Steel
C. Non-Structural Components
   1. Sheet and Plate: ASTM A 36.
   2. Extruded Bars, Rods, Shapes, and Tubes.
D. Nuts, Bolts, Davit Pins, and Washers
   1. Stainless Steel: 304 ASTM A 193 Grade B8 or ASTM F 593C.
E. Anchor Bolts for Securing Base Plates
   1. Metal: Stainless Steel, 304 Stainless Steel; ASTM A 193 Grade 8.
   2. Zinc coated (Roof safe base plates only).
F. Hilti HIT-HY 200 Adhesive Anchoring System
   1. Anchor size and embedment depth: As needed to suit loads imposed by Rooftop Anchor equipment with supporting engineered calculations.
   2. Final determination of proper anchoring system shall be based on concrete condition, psi, and thickness.

2.3 ROOFTOP GUARD RAIL
A. General: Fabricate pipe handrails and railing systems to comply with requirements indicated for design, dimensions, details, finish and member sizes including wall thickness of post, post spacing and anchorage, but not less than that required to support the structural loads.
B. Fabricate railings with no projections preventing a hand from sliding along entire length.
C. To provide safety to workers near the edge of a rooftop, safety guardrails are to be installed along open-sided walking surfaces, roofs, terraces, balconies, stairways, ramps, and landings located more than 48” above floor level. Minimum height of 42”. Design to OSHA guidelines.
D. Railings Structural Requirements
   1. Handrail, wall rail and guardrail assemblies and attachments shall withstand a minimum concentrated load of 200 pounds (90719 g) applied in any direction on the top rail.
   2. Mid-rail shall withstand a minimum concentrated load of 50 lbs applied horizontally on an area of 1 sq. ft.
   3. Minimum 4” high toe board, where applicable.
E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrication by preventing buckling,
opening of joints, overstressing of components, failure of connections and other detrimental effects. Expansion couplers to be inserted a minimum of every 20’.

F. Isolate Dissimilar Metals

G. Flashing/Water Tight Finish: Coordinate with roofing contractor for proper flashing of each penetration. Additionally, ensure moisture cannot bypass flashing via weep/vent holes required for galvanizing process.

2.4 EQUIPMENT

   A. List type and quantity as required. Specifications for rigging sleeves, outrigger beams, permanent power platform, gantry systems, rolling ladders, climbing monorails, and powered roof cars are not included here as there use in projects is not typical.

2.5 FABRICATION

   A. Fabricate work true to dimension, square, plumb, level, and free from distortion or defects detrimental to appearance and performance.

   B. Grind off surplus welding material to ensure exposed surfaces are smooth so as not to abrade workers’ ropes.

   C. Coordinate anchorage system with supporting structure.

   D. Welding shall be in accordance with the AWS Structural Welding Code D1.1/D1.

PART 3 – EXECUTION

3.1 EXAMINATION

   A. Do not begin installation until substrates have been properly prepared.

   B. Examine project prior to installation and report in writing any defects or other site conditions that would cause problematic installation of Rooftop Anchor products or possible deficiency.

   C. Confirm site dimensions.

   D. If substrate preparation is the responsibility of another installer, notify client of unsatisfactory preparation before proceeding.

3.2 PREPARATION

   A. Clean surfaces thoroughly prior to installation.

   B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

   A. Install in accordance with Roof Fall Protection manufacturer’s instructions and approved shop drawings.

   B. Roof Fall Protection manufacturer shall supervise, inspect, and test installation of fall protection system.

   C. Non-swaged cable terminations are not acceptable.

   D. All swaged cable terminations are to be statically load tested to 50% of the maximum design load prior to being placed in service.
E. Assure that all anchors are level, tightly fitted and flush with adjoining surfaces as required.

F. To prevent accidental removal, deform minimum of two threads of tail end of anchor studs after nuts have been tightened.

G. Isolate dissimilar materials as required to prevent electrolytic corrosion.

H. Coordinate with roofing specified in Section 07 60 00 for the installation of flashings to assure watertight.

I. Adhesive Anchoring System
   1. Install using manufacture accredited installers using manufacture installation instructions.
   2. Load test each installed anchor assembly to 50 percent of its rated capacity. Test results shall be certified by a certified installer with experience in suspended access equipment.

J. Adjust and leave properly functioning equipment.

3.4 MANUFACTURER’S FIELD SERVICES

A. Testing and certification shall be provided under supervision of the fall protection manufacturer or original installer.

B. Annual inspection plus 5 and 10 year recertification provided by the manufacturer or their authorized rep representatives.

C. Repair or replace parts whenever required. Use parts produced by manufacturer of original equipment.

D. Provide emergency call back service at all hours for this maintenance period.

E. Perform maintenance work using competent and qualified personnel under supervision of the fall protection manufacturer or original installer.

F. Annual inspection of horizontal lifeline shall include documented static load testing of every swaged termination.

3.5 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

– END OF SECTION –
PART 1 - GENERAL

1.01 SCOPE
A. Provide factory fabricated elastomeric expansion waterproofing joint, to prevent the penetration of water at control, expansion or building joints as indicated on drawings, in new or retrofit installations.

1.02 SUBMITTALS
A. Submit to joint manufacturer drawings indicating location of joint and configurations.
B. Manufacturer’s printed literature and installation instructions.

PART 2 - PRODUCTS

2.01 DESCRIPTION
A. Provide flat, vulcanized waterproofing joint integral with the waterproofing membrane to accommodate movements up to ±1” [±25 mm] / ±2” [±50 mm] / ±10” [±250 mm] capable of 500% elongation at -40°F [-40°C] across its length and at all vulcanized points.
B. All details and connections are factory fabricated by means of vulcanization.
C. Joint material is to be RedLINE, size as required, as supplied by SITURA INC., 1-888-474-8872.
D. Mastic
   1. Winter Grade Karnack #19 or approved equal.
   2. Siplast SFT Cement by Siplast.
   3. Winter Grade Soprema Colply FF Flashing Cement.

PART 3 - EXECUTION

3.01 INSTALLATION
A. Install all components of the system in accordance with the manufacturer’s instructions. Please refer to the provided joint selection chart on project drawings.
B. In ACM identified areas only, encapsulate the RedLINE material in a bed of trowel grade cold adhesive. Coat the substrate with the cold adhesive in accordance to the manufacturer’s recommendations and embed the bottom fleece surface of RedLINE in it. In all other non-ACM identified areas, utilize mechanical attachment method per manufacturer’s guidelines.
C. Coat the top fleece surface of the RedLINE, with trowel grade cold adhesive and lay in the roofing / waterproofing membrane in the cold adhesives. Consult the manufacturer for specific application procedures. The joint shall not obstruct water flow across its surface and forms a continuous monolithic waterproof barrier.

3.02 PROTECTION
A. The joint can be protected by means of an overlap membrane adhered to one
side of the joint.

- END OF SECTION 07 71 28 -
PART 1 - GENERAL

1.01 SCOPE

A. Provide factory fabricated elastomeric expansion waterproofing joint, to prevent the penetration of water at control, expansion or building joints as indicated on drawings, in new or retrofit installations.

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PART 2 - PRODUCTS

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B. All details and connections are factory fabricated by means of vulcanization.

C. Joint material is to be RedLINE, size as required, as supplied by SITURA INC., 1-888-474-8872.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install all components of the system in accordance with the manufacturer’s instructions. The system is to be wholly encapsulated in a manufacturer’s approved two component, high viscosity, epoxy resin.

B. The epoxy resin is applied to the substrate and the bottom surface of the RedLINE fleece is embedded in it, by pressing. The top surface of the fleece is then covered by the epoxy resin and allowed to dry. The joint shall not obstruct water flow across its surface and forms a continuous monolithic waterproof barrier.

3.02 PRECAUTIONS

A. The applicator must observe the open pot time of the epoxy resin manufacturer.

3.03 PROTECTION

A. The joint material can be protected by means of a light gauge metal cover, to match external finishes, if required.

- END OF SECTION 07 71 28 -
PART 1 - GENERAL

1.01 RELATED DOCUMENTS
A. Drawings and general provisions of the contract, including General Conditions and other Division 1 specification sections, apply to this section.

1.02 SUMMARY
A. Related Sections
2. Section 07 41 10 – Standing Seam Metal Roof Panels.
3. Section 07 42 13 – Insulated Metal Wall Panels.
4. Section 07 52 16 - SBS Modified Bituminous Membrane Roofing.
5. Section 07 56 00 - Elastomeric Membrane Roofing (Hydrostop Over PVC / Structural Concrete).
6. Section 07 56 10 - Elastomeric Membrane Roofing (Over Metal Substrate).
7. Section 07 60 00 - Flashing and Sheet Metal.
8. Section 07 70 00 – Fall Protection Equipment Systems.
9. Section 07 72 33 – Roof Hatches.
10. Section 07 72 33.13 – Roof Hatch Rail System.
11. Section 07 92 00 – Joint Sealants.

1.03 REFERENCES
C. ASTM A 525 – Specification for General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
F. MSS SP-69 – Pipe Hangars and Supports – Selection and Application; Manufacturers Standardization Society of the Valve and Fittings Industry.

1.04 SYSTEM DESCRIPTION
A. Support piping on roof with an engineered prefabrication PHP System, or A/E approved equal, designed for installation without roof penetrations, flashings or damage to the roofing material. The system shall consist of bases, made of high density polypropylene plastics with UV Protection, a HDG structural steel frame
and suitable pipe hangers for the application. Nuts, threaded rods and washers shall be HDG, spring nuts and bolts for spring nuts will be electro-plated. System shall be custom designed to fit piping and conduit to be installed and the actual conditions of service.

B. Support ductwork on roof with an engineered prefabricated PHP-Duct System designed for installation without roof penetrations, flashings or damage to the roofing material. The system shall consist of bases, made of high density polypropylene plastics with UV Protection, and a HDG structural steel frame. Nuts, threaded rods and washers shall be HDG, spring nuts and bolts for spring nuts will be electro-plated. System shall be custom designed to fit the load requirements.

1.05 SUBMITTALS
A. Submit under provisions of Division 1 specifications.
B. Product Data: Manufacturer’s data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
C. Shop Drawings: Show installation layout, sizes of units, and details of installation.
D. Verification Samples: Actual samples of bases, each type of support, hanger, and fasteners, and not less than 12 inches (300 mm) of framing members.
E. Manufacturer’s Certificates: Certify products meet or exceed specified requirements.
F. Closeout Submittals: Provide manufacturer’s maintenance instructions that include recommendations for periodic checking and adjustment of components.

1.6 QUALITY ASSURANCE
A. Manufacturer Qualifications: Company specializing in manufacturing pipe support systems, with a minimum of eight years of documented experience.
B. Installer Qualifications: Company approved by manufacturer and with not less than five years of experience in installation of piping support systems.
C. References: Submit list of references comprising not less than 10 installations that have been in use for a minimum of five years. Include contact name and phone number for each reference.
D. Pre-Installation Meeting: After approval of submittals, but before beginning installation, conduct a meeting at project site attended by A/E, Contractor, installers of roofing, and mechanical and electrical piping to be installed on pipe support systems.
   1. Purpose of meeting is to describe in detail the installation process and to establish agreement, coordination, and responsibilities.
   2. Prepare detailed meeting report and distribute copies to the A/E and all attendees.
1.7 DELIVERY, STORAGE, AND HANDLING
   A. Deliver all materials to project site in manufacturer’s original packaging, marked
      with manufacturer’s name, product model names and catalog numbers,
      identification numbers, and other related information.
   B. Store materials under cover until needed for installation.

1.8 WARRANTY
   A. PHP Systems/Design 5 year limited warranty to repair or replace, at our option,
      any products we find to be structurally defective in material or workmanship.
      Warranty is not valid if System was modified, installed incorrectly, or not
      designed by Portable Pipe Hangars PHP Systems/Design.

PART 2 - PRODUCTS

2.1 MANUFACTURERS
   A. Acceptable Manufacturer: PHP Systems/Design, which is located at: 5534
      Harvey Wilson Dr; Houston, TX 77020; Telephone: 800-797-6585 or 713-672-
      5088; Email: info@phpsd.com; Web: www.phpsd.com
   B. Substitutions must be submitted and approved per Division 1 specifications.

2.2 APPLICATION
   A. Support pipes, conduit, and ducts minimum of 8 inches (150 mm) above roof
      surface.
      1. Support Spacing: 8 feet.
      2. For Electrical and Gas Lines 2-1/2 inches (64 mm) in Diameter or Less,
         up to 10 inches (254 mm) above roof: Portable Pipe Hanger Model
         Number: SS8.
      3. For Electrical and Gas Lines 3-1/2 inches (89 mm) in Diameter or Less,
         up to 16 inches (406 mm) above roof: Portable Pipe Hanger Model
         Number: PP10.
      4. For Gas Lines 4 to 6 inches (100-150 mm) in Diameter, up to 12 inches
         (305 mm) above roof: Portable Pipe Hanger Model Number: RB18.
      5. For single Electrical and Gas Lines 3 to 8 inches (80-200 mm) in
         Diameter: Portable Pipe Hanger Model Number PS 1-2.
      6. For Multiple Lines: Portable Pipe Hanger Model Number PSE custom.
      7. For Ductwork: Portable Pipe Hanger Model Number PPH-D – Goal Post
         style.
      8. For Ductwork: Portable Pipe Hanger Model Number PPH-D – Enclosed
         style.
      9. Accessories for PSE Custom and Other Applications when required
         a. On Sloped Roof Surfaces, Where Slope Exceeds ¼ inch per foot
            (13 mm per 305 mm): Provide base with swivel for slope
            adjustment. Note: PHP Approved bracing required when using
            base with swivel.
b. Un-insulated Piping: Roller support or clevis hanger.

c. Insulated Piping: Band hanger supported from horizontal strut or clevis hanger with Insulation Protection Shield.

d. Conduit: Band hanger supported from horizontal strut.

e. Bracing required when using base with swivel, when pipe exceeds 24 inches (610 mm) above roof, or when thermal expansion of pipe is great.

B. Walkway, Crossover, Stairs, Ramps and Equipment Platform Access: Elevated walkway systems as manufactured by PHP Systems/Design or A/E approved equal.

1. Support Spacing: 8 feet (2,438.4 mm)

2. Bases High Density Polypropylene plastics with additives for UV protection.

3. Substructure: 12 gauge back-to-back strut G-1012A, or approved equal supported directly from the bases.

4. Grating: Mill-galvanized carbon steel in accordance with ASTM A525:
   a. Gauge 18-ga. steel.
   b. Section Width: 12 inches (305 mm) (standard).
   c. Channel Height: 2 inches (51 mm) (standard).
   d. Flange Options: FM.
   e. Flange Options: MM.
   f. Surface Condition: MG-traction grip.

5. All substructures shall be galvanized steel. Spring nuts and bolts for spring nuts will be electr-plated.

2.3 MATERIALS

A. Portable Support System: Engineered, portable system specifically designed for installation without the need for roof penetrations or flashings, and without causing damage to the roofing membrane.

1. Design system using high density / high impact polypropylene bases with carbon black, anti-oxidants for UV protection, and steel framing for support is 1-5/8 inch (41 mm) B22TH or 1-7/8 inch (48 mm) BTS22TH.

2. Custom design system to fit piping, conduits, equipment, or walkways to be installed and actual conditions of service and loading.

3. Piping Supports: Provide suitable hangers and supports.

4. Duct and Equipment Supports: Factory fabricated to support exact duct sizes and equipment to be installed.

5. Walkways and Platforms: Provide galvanized slotted metal grating, in configurations as indicated, and tubular handrails where indicated.
B. Bases: Injection molded high density / high impact polypropylene with UV-inhibitors and anti-oxidants, conforming to the following:

1. Moisture Content: Negligible.
2. Shrinkage / Swelling Due to Moisture: Negligible.
3. Density: 55.8 lb/cu ft (894 kg/cu m).
4. Insect Resistance: No known insect damage potential.
5. Chemical Resistance (oil, brake fluid, gasoline, diesel, antifreeze, battery acid, and sulfuric acid): No visual or physical change apparent.
6. Flammability: No ignition after 10 minutes, 25 kW/m, when tested in accordance with ASTM d 1929.
7. Sized as required by loading conditions and as indicated on the drawings.
8. Shop fabricated with inserts for square tubing or threaded rods as required.
9. Color: Integral black color as molded.
10. Bases for Mechanical Attachment: Sealant chamber around penetration point, with injection port for sealing after fastening; beveled lip for sealant bead around entire diameter.
11. Do not use bases containing carbonated plastics, press molded recycled rubber and plastics, steel, stainless steel, or any injection molded threaded receivers.

C. Steel Framing

1. Channel Types: 1-5/8 inch (41.3 mm) B22TH or 1-7/8 inch (47.6 mm) BTS22H, as required for loading conditions.
2. Thickness: 12 gage (2.7 mm).
3. Form: Roll-formed 3-sided or tubular shape, perforated with 9/16 inch (14.3 mm) holes at 1-7/8 inch (47.6 mm) centers on three sides.
4. Finish: Hot dip galvanize in accordance with ASTM A 123 after fabrication, free of roughness, whiskers, unsightly spangles, icicles, runs, barbs, sags, droplets, and other surface blemishes.
5. Do not use tubing or tube steel.

D. Stainless Steel Framing

1. Channel Types: 1-5/8 inch (41.3 mm) or 1-7/8 inch (47.6 mm), as required for loading conditions.
2. Thickness: 12 gage (2.7 mm).
3. Form: Roll-formed 3-sided or tubular shape.
5. Do not use tubing or tube steel.

E. Pipe Supports and Hangers: Conform to MSS SP-58 and MSS SP-69 and as follows:
1. Fabricate of carbon steel where framing is carbon steel; fabricate of stainless steel where framing is stainless steel; finished same as framing.

2. Sizes 2-1/2 inch (63 mm) and smaller: Single roller supports for piping subject to expansion and contraction; 3-sided channels and pipe clamps.

3. Sizes 3 inch (76 mm) and larger: Rollers, clevis hangers, or band hangers, to allow for expansion and contraction without movement of the bases or framing.

F. Accessories: Clamps, bolts, nuts, washers, and other devices as required for a complete system.

1. Carbon Steel: Hot-dip galvanized in accordance with ASTM A 153/A 153M.

2. Stainless Steel: Mill finish.

3. For Mechanical Fastening to Deck: On wood and steel decks, use bolts with toggle wings; on concrete decks use threaded rods and adhesive anchors, with rod embedded at least 1-3/4 inches (44 mm) into concrete.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that roofing system is complete and that roof surfaces are smooth, flat, and ready to receive work of this section.

B. Verify that roof surface temperature is at minimum 60 degrees F (15.5 degrees C), for proper adhesive performance.

3.02 PREPARATION

A. Clean surfaces of roof in areas to receive portable support bases.

1. Remove dirt, dust, oils, and other foreign materials.

3.03 INSTALLATION

A. Pipe, Duct, and Conduit Support Systems

1. Locate bases and support framing as indicated on drawings and as specified herein. Provide complete and adequate support of all piping, ducts, and conduit, whether or not all required devices are shown.

2. The use of wood for supporting piping is not permitted.

3. Provide supports spaced so deflection of piping does not exceed 1/240 of span.

4. Install framing at spacing indicated, but in no case at greater than 10 feet (3 m) on center.

5. Accurately locate and align bases.

a. Consult manufacturer of existing or new roofing system as the type of isolation pads required between the roof and base.

b. Set isolation pads in adhesive if required by manufacturer’s instructions.
c. Place bases on isolation pads.

d. Adhere or mechanically attach if required by code.

e. Where applicable, replace gravel around bases.

6. Set framing posts into bases and assemble framing structure as indicated.

7. Use galvanized fasteners for galvanized framing and stainless steel fasteners for stainless steel framing.

B. Duct Support Systems

1. Locate bases and support framing as indicated on drawings and as specified herein. Provide complete and adequate support of all piping, ducts, and conduit, whether or not all required devices are shown.

2. Accurately locate and align bases.

   a. Consult manufacturer of existing or new roofing system as to the type of isolation pads required between the roof and base.

   b. Set isolation pads in adhesive if required by manufacturer’s instructions.

   c. Place bases on isolation pads.

   d. Adhere or mechanically attach if required by code.

   e. Where applicable, replace gravel around bases.

3. Place pre-assembled support on bases and attach framing post to base bracket with ½ inch bolts provided and adjust as needed. Support shall be adjustable to maintain existing elevation and slope.

4. Use galvanized fasteners for galvanized framing and stainless steel fasteners for stainless steel framing.

C. Crossover

1. Install substructures at spacing indicated, but not greater than 5 fee (1.5 m) on center.

2. Locate bases and support framing as indicated on drawings and as specified herein. Provide complete and adequate support of all structures.

3. Accurately locate and align bases.

   a. Consult manufacturer of existing or new roofing system as to the type of isolation pads required between the roof and base.

   b. Set isolation pads in adhesive if required by manufacturer’s instructions.

   c. Place bases on isolation pads.

   d. Adhere or mechanically attach if required by code.

   e. Where applicable, replace gravel around bases.

4. Set legs of substructures into bases as indicated.
5. Use galvanized fasteners for galvanized framing and stainless steel fasteners for stainless steel framing.

6. Layout and fasten planking to substructures.

7. Where handrails are required, install as follows:
   a. Install intermediate rails without tightening.
   b. Make minor adjustments as needed, such as spacing of substructures to accommodate intermediate handrails, and install hold-downs.
   c. Secure intermediate handrails and install top handrails.

3.04 FIELD QUALITY CONTROL
   A. Provide a factory-trained representative of the manufacturer to visit the site while the work is in progress to assure that the installation conforms to the design requirements and the manufacturer’s installation requirements.

3.05 CLEANING AND PROTECTION
   A. Remove all packaging, unused fasteners, adhesive, and other installation materials from the project site.
   B. Remove adhesive from exposed surfaces of supports and bases, and lave the work in clean condition.
   C. Provide protection as required to leave the work in undamaged condition at the time of substantial completion.

- END OF SECTION 07 72 00
PART 1 - GENERAL

1.1 Summary
   A. Work Included: Provide factory-fabricated roof hatches for ladder access.

1.2 Submittals
   A. Product Data: Submit manufacturer’s product data.
   B. Shop Drawings: Submit shop drawings including profiles, accessories, location, adjacent construction interface, and dimensions.
   C. Warranty: Submit executed copy of manufacturer’s standard warranty.

1.3 Quality Assurance
   A. Manufacturer: A minimum of 5 years’ experience manufacturing similar products.
   B. Installer: A minimum of 2 years’ experience installing similar products.
   C. Manufacturer’s Quality System: Registered to ISO 9001:2008 Quality Standards including in-house engineering for product design activities.

1.4 Delivery, Storage, and Handling
   A. Deliver products in manufacturer’s original packaging. Store materials in a dry, protected, well-vented area. Inspect product upon receipt and report damaged material immediately to delivering carrier and note such damage on the carrier’s freight bill of lading.

1.5 Warranty
   A. Manufacturer’s Warranty: Provide manufacturer’s standard warranty. Materials shall be free of defects in material and workmanship for a period of Five (5) Years from the date of purchase. Should a part fail to function in normal use within this period, manufacturer shall furnish a new part at no charge.

PART 2 - PRODUCTS

2.1 Manufacturer
   A. Basis-of-Design Manufacturer: Type E-50 Roof Hatch by The BILCO Company, P.O. Box 1203, New Haven, CT 06505, 1-800-366-6530, Fax: 1-203-933-8478, Web: www.bilco.com.

2.2 Roof Hatch
   A. Furnish and install where indicated on plans metal roof hatch Type E-50, size width: 36" (914mm) x length: 36" (914mm). Length denotes hinge side. The roof hatch shall be single leaf. The roof hatch shall be pre-assembled from the manufacturer.
   B. Performance characteristics:
      1. Cover and curb shall be thermally broken to prevent heat transfer between interior and exterior surfaces.
2. Cover shall be reinforced to support a minimum live load of 40 psf (195kg/m²) with a maximum deflection of 1/150th of the span or 20 psf (97kg/m²) wind uplift.

3. Operation of the cover shall be smooth and easy with controlled operation throughout the entire arc of opening and closing.

4. Operation of the cover shall not be affected by temperature.

5. Entire hatch shall be weather tight with fully welded corner joints on cover and curb.

C. Cover: Shall be 11 gauge (2.3mm) aluminum with a 5” (127mm) beaded flange with formed reinforcing members. Interior and exterior surfaces shall be thermally broken to minimize heat transfer and to resist condensation. Cover shall have a heavy extruded EPDM rubber gasket bonded to the cover interior to assure a continuous seal when compressed to the top surface of the curb.

D. Cover insulation: Shall be 3” (75mm) thick polyisocyanurate with an R-value = 18 (U=0.315 W/m²K), fully covered and protected by an 18 gauge (1mm) aluminum liner.

E. Curb: Shall be 12” (305mm) in height and of 11 gauge (2.3mm) aluminum. Interior and exterior surfaces shall be thermally broken to minimize heat transfer and to resist condensation. The curb shall be formed with a 5-1/2” (140mm) flange with 7/16” (11mm) holes provided for securing to the roof deck. The curb shall be equipped with an integral metal cap flashing of the same gauge and material as the curb, fully welded at the corners, that features the Bil-Clip® flashing system, including stamped tabs, 6” (153mm) on center, to be bent inward to hold single ply roofing membrane securely in place.

F. Curb insulation: Shall be 3” (75mm) thick polyisocyanurate with an R-value = 18 (U=0.315 W/m²K).

G. Lifting mechanisms: Manufacturer shall provide compression spring operators enclosed in telescopic tubes to provide, smooth, easy, and controlled cover operation throughout the entire arc of opening and closing. The upper tube shall be the outer tube to prevent accumulation of moisture, grit, and debris inside the lower tube assembly. The lower tube shall interlock with a flanged support shoe welded to the curb assembly.

H. Hardware

1. Heavy stainless steel hinges shall be provided

2. Cover shall be equipped with a spring latch with interior and exterior turn handles

3. Roof hatch shall be equipped with interior and exterior padlock hasps.

4. The latch strike shall be a stamped component bolted to the curb assembly.

5. Cover shall automatically lock in the open position with a rigid hold open arm equipped with a 1” (25mm) diameter red vinyl grip handle to permit easy release for closing.
6. Compression spring tubes shall be an anti-corrosive composite material and all other hardware shall be zinc plated and chromate sealed. [For installation in highly corrosive environments or when prolonged exposure to hot water or steam is anticipated, specify Type 316 stainless steel hardware].

7. Cover hardware shall be bolted into heavy gauge channel reinforcing welded to the underside of the cover and concealed within the insulation space.

8. LadderUP® Safety Post shall be attached to the top two rungs of the fixed ladder, providing a positive hand-hold and enabling the user to enter or exit the opening in an upright and balanced position.

I. Finishes: Factory finish shall be anodized finish aluminum.

PART 3 - EXECUTION

3.1 Examination
   A. Examine substrates and openings for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 Installation
   A. Install products in strict accordance with manufacturer’s instructions and approved submittals. Locate units level, plumb, and in proper alignment with adjacent work.
      1. Test units for proper function and adjust until proper operation is achieved.
      2. Repair finishes damaged during installation.
      3. Restore finishes so no evidence remains of corrective work.

3.3 Adjusting and Cleaning
   A. Clean exposed surfaces using methods acceptable to the manufacturer which will not damage finish.

- END OF SECTION -
PART 1 - GENERAL

1.1 SUMMARY
A. Work Included: Provide factory-fabricated fixed hatch railing system.

1.2 SUBMITTALS
A. Product Data: Submit manufacturer’s product data.
B. Shop Drawings: Submit shop drawings including profiles, accessories, location, adjacent construction interface, and dimensions.
C. Warranty: Submit executed copy of manufacturer’s standard warranty.

1.3 QUALITY ASSURANCE
A. Manufacturer: A minimum of 5 years’ experience manufacturing similar products.
B. Installer: A minimum of 2 years’ experience installing similar products.
C. Manufacturer’s Quality System: Registered to ISO 9001:2008 Quality Standards including in-house engineering for product design activities.

1.4 DELIVERY, STORAGE AND HANDLING
A. Deliver products in manufacturer’s original packaging. Store materials in a dry, protected, well-vented area. Inspect product upon receipt and report damaged material immediately to delivering carrier and note such damage on the carrier’s freight bill of lading.

1.5 WARRANTY
A. Manufacturer’s Warranty: Provide manufacturer’s standard warranty. Materials shall be free of defects in material and workmanship for a period of Five (5) Years from the date of purchase. Should a part fail to function in normal use within this period, manufacturer shall furnish a new part at no charge.

PART 2 - PRODUCTS

2.1 MANUFACTURER
A. Basis-of-Design Manufacturer: Type Bil-Guard® 2.0 Roof Hatch Railing System by The BILCO Company, P.O. Box 1203, New Haven, CT 06505, 800-366-6530, Fax: 1-203-535-1582, Web: www.bilco.com.

2.2 HATCH RAIL SYSTEM
A. Furnish and install where indicated on plans hatch rail system Model RL-SSL. The hatch rail system shall be field assembled and installed per the manufacturer’s instructions.
B. Performance Characteristics
   1. High visibility safety yellow powder coat paint finish.
   2. Hatch rail system shall attach to the capflashing of the roof hatch and shall not penetrate any roofing material.
Hatch rail system shall satisfy the requirements of OSHA 29 CFR 1910.29 and shall meet OSHA strength requirements with a factor of safety of two.

3. Corrosion resistant construction with a five (5) Year warranty.
4. Hinged gate shall ensure continuous barrier around the roof hatch.
5. Self-closing gate hinge and positive latching system provided with hatch rail system.

C. Posts and Rails: 1-1/4” (32mm) 6061 T6 schedule 40 aluminum pipe.
D. Hardware: Mounting brackets shall be 3/8” (9mm) thick extruded aluminum. Pivoting post guides with compression fittings and latching mechanism shall be cast aluminum. Self-closing hinges and all fasteners shall be type 316 stainless steel.

PART 3 - EXECUTION

3.1 EXAMINATION
A. Examine substrates and openings for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION
A. Install products in strict accordance with manufacturer’s instructions and approved submittals. Locate units level, plumb, and in proper alignment with adjacent work.

1. Test units for proper function; adjust until proper operation is achieved.
2. Repair finishes damaged during installation.
3. Restore finishes so no evidence remains of corrective work.

3.3 ADJUSTING AND CLEANING
A. Clean exposed surfaces using methods acceptable to the manufacturer which will not damage finish.

- END OF SECTION -
PART 1 – GENERAL

1.1 SUMMARY
A. Section includes exterior elastomeric weatherproofing sealants and interior joint sealants.

1.2 SUBMITTALS
A. Product Data: For each type of joint sealant product specified.
B. Samples for Color Selection: For each joint sealant type.
C. Samples for Verification: For each exterior joint sealant product, for each color selected.
D. Qualification Data: For qualified applicator.
E. Sealant, Waterproofing, and Restoration Institute (SWRI) Validation Certificate: For each sealant specified to be validated by SWRI's Sealant Validation Program.
F. Preconstruction field-adhesion test reports.
G. Warranty: Sample of unexecuted manufacturer and installer special warranties.

1.3 QUALITY ASSURANCE
A. Installer Qualifications: Experienced Installer equipped and trained for application of joint sealants required for this Project with record of successful completion of projects of similar scope.
B. Single Source Responsibility: Provide exterior joint sealants by a single manufacturer.
C. Preconstruction Field-Adhesion Testing: Prior to installing joint sealants, field test adhesion to joint substrates using ASTM C 1193 Method A or method recommended by manufacturer. Verify adhesion is adequate. Modify joint preparation recommendations for failed joints and re-test. Submit written report to A/E.

1.4 WARRANTY
A. Special Installer’s Warranty: Original statement on Installer’s letterhead in which Installer agrees to repair or replace joint sealants that demonstrate deterioration or failure within Five (5) Year warranty period specified
   1. Warranty Period: Five (5) Years from date of Substantial Completion.
B. Special Manufacturer's Warranty: Manufacturer's standard form in which joint sealant manufacturer agrees to furnish joint sealants to repair or replace those that demonstrate deterioration or failure under normal use within warranty period specified.
C. Warranty Period for Silicone Sealants: Twenty (20) Years following date of Substantial Completion.
D. Warranty Conditions: Special warranties exclude deterioration or failure of joint sealants in normal use due to structural movement resulting in stresses on joint sealants exceeding sealant manufacturer's written specifications, joint substrate deterioration, mechanical damage, or normal accumulation of dirt or other contaminants.

PART 2 – PRODUCTS
2.1 MANUFACTURER
A. Basis-of-Design Product: Provide products manufactured by The Dow Chemical Company., Midland MI; (877) SEALANT, (877) 732-5268; email: construction@dowcorning.com; website: consumer.dow.com/construction

2.2 MATERIALS, GENERAL
A. Compatibility: Provide joint sealants and accessory materials that are compatible with one another, with joint substrates, and with materials in close proximity under use conditions, as demonstrated by sealant manufacturer by testing and related experience.
B. Joint Sealant Standard: Comply with ASTM C 920 and other specified requirements for each liquid-applied joint sealant.
C. Stain Test Characteristics: Where sealants are required to be nonstaining, provide sealants tested per ASTM C 1248 as non-staining on porous joint substrates indicated for Project.
D. Food Contact Suitability: Where sealants are required to be suitable for contact with food provide sealants complying with 21 CFR 177.2600.

2.3 WEATHERPROOFING LIQUID SILICONE JOINT SEALANTS
**DOWSIL™ 795 Silicone Building Sealant** is a one-component, medium modulus, neutral-cure, RTV (room temperature vulcanizing) silicone rubber sealant for structural and non-structural glazing, structural attachment for panel systems, as well as above-grade weathersealing joints with most common constructions materials for both new and remedial construction. Product complies with GSA Commercial Item Descriptions CID A-A-272A and CID A-A-1556.

A. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 50, for Use NT, G, A, and O; SWRI validation.
   1. Basis of Design Product: **DOWSIL™ 795 Silicone Building Sealant**.
   2. Color: As selected by Owner from manufacturer’s full line of not less than 10.

2.4 WEATHER BARRIER TRANSITIONS
**DOWSIL™ Silicone Transition Strip (STS)** is a silicone sealant-compatible flexible membrane interface between a variety of air/vapor barrier materials and window, storefront, and curtainwall opening frames. It permanently accommodates the differential thermal movement between wall systems and metal frames, maintaining airtight- and watertight-connections necessary in high performance buildings. Coordinate with Division 07 air barrier section. Recommended silicone sealants for installing DOWSIL™ STS is **DOWSIL™ 758 Silicone Weather Barrier Sealant**, **DOWSIL™ 791 Silicone Weatherproofing Sealant**, and **DOWSIL™ 795 Silicone Building Sealant**.

A. Silicone Elastomer Weather Barrier Transitions: Highly flexible clear flashing and transition sheet and pre-molded corners for bonding with silicone sealant to weather barrier substrates and to adjacent curtain wall, storefront, and window frames and other transition substrates.
   1. Basis of Design Product: **DOWSIL™ Silicone Transition Strip (STS)**.
   2. Bonding Sealant: Manufacturer’s recommended neutral-curing silicone.
2.5 ACCESSORIES

A. Joint Substrate Primers: Substrate primer recommended by sealant manufacturer for application.

B. Cylindrical Sealant Backing: ASTM C 1330, Type B non-absorbent, bi-cellular material with surface skin, or Type O open-cell polyurethane, as recommended by sealant manufacturer for application.

C. Bond Breaker Tape: Polymer tape compatible with joint sealant materials and recommended by sealant manufacturer.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine joint profiles and surfaces to determine if work is ready to receive joint sealants. Verify joint dimensions are adequate for development of sealant movement capability. Proceed with joint sealant work once conditions meet sealant manufacturer’s recommendations.

3.2 PREPARATION

A. Joint Surface Cleaning: Clean joints prior to installing joint sealants using materials and methods recommended by sealant manufacturer.

3.3 APPLICATION

A. Masking: Mask adjacent surfaces to prevent staining or damage by contact with sealant or primer.

B. Joint Priming: Prime joint substrates when recommended by sealant manufacturer or when indicated by preconstruction testing or experience. Apply recommended primer using sealant manufacturer’s recommended application techniques.

C. Joint Backing: Select joint backing materials recommended by sealant manufacturer to be compatible with sealant material. Install backing material at depth required to produce profile of joint sealant allowing optimal sealant movement.

D. Sealant Application: Install sealants using methods recommended by sealant manufacturer, in depths recommended for application. Apply in continuous operation from bottom to top of joint vertically and horizontally in a single direction. Apply using adequate pressure to fill and seal joint width.

E. Cleaning: Remove excess sealant using materials and methods approved by sealant manufacturer that will not damage joint substrate materials.

– END OF SECTION –
PART 1 - GENERAL

1.1 SUMMARY

A. Related Documents
   1. Drawings and general provisions of the Contract apply to this Section.
   2. Review these documents for coordination with additional requirements and information that apply to work under this Section.

B. Section Includes
   1. Steel doors and frames.
   2. Preparation for door hardware.

C. Related Sections
   1. Section 06 10 00 - Miscellaneous Carpentry
   2. Section 08 71 00 - Door Hardware

1.2 REFERENCES

A. General
   1. The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.
   2. Unless otherwise noted, the referenced standard edition is the current one at the time of commencement of the Work.

B. ASTM International
   1. ASTM A653  Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process


F. UL Standard 10C: Positive Pressure Fire Tests of Door Assemblies.

1.3 SUBMITTALS

A. Submit under provisions of Division 1.

B. Product Data: Manufacturer's product literature, specifications and installation instructions.
C. Shop Drawings: Indicate door and frame elevations, dimensions, fire rating, door type, core, reinforcement, finish, hardware locations, cutout locations, frame profiles, details, metal gage, anchorage details, and finish.

D. Schedule: Schedule of doors and frames, using same reference numbers for details and openings as those on Drawings. Indicate frame and door types.

1.4 QUALITY ASSURANCE
A. Comply with HMMA 840 and 861.

1.5 DELIVERY, STORAGE AND HANDLING
A. Deliver, store and handle steel doors and frames in a manner to prevent damage and deterioration.
B. Storage: Comply with HMMA 840 and manufacturer's recommendations.

PART 2 - PRODUCTS

2.1 MANUFACTURERS
A. Typical: Ceco Door Products or approved equal.

2.2 MATERIALS
A. Doors: 1-3/4” IMPERIAL (IU) Polyurethane Core doors, full flush. Face sheets are commercial quality cold rolled steel confirming to ASTM A1008 and A568.
B. Frames: HMMA 861.
   2. Gage: Minimum 16 gage for openings 4 feet (1.2 m) in width or less; 14 gage for openings greater than 4 feet (1.2 m) in width.
   3. Mortar Guard Boxes: Minimum 22 gage, welded in place; provide where frames may be grouted.
   4. Fixed Blade: Stationary, sightproof hood or Y type blades, 18 gage minimum, inserted into door panels, full door thickness, no exposed trim. Provide insect screen in removable frame for louvers in exterior doors.

2.3 FABRICATION
A. Conform to requirements of NAAMMM, except as specified otherwise in this Section.
B. Hardware Preparation: Reinforce and prepare doors and frames to receive hardware furnished under Division 08 Section "Hardware".
   1. Minimum Gages for Hardware Reinforcing Plates: Provide in accordance with HMMA 861, except hinge and pivot reinforcements shall be 7 gage minimum.
   2. Locations for Reinforcing Hardware: Comply with Division 08 Section "Hardware".
C. Frames
   2. Head Reinforcement: Reinforce frames wider than 4’-0” with two 12 gage minimum formed steel channels welded in place, flush with top of frames.

D. Finish: Paint All Doors and Frames per manufacturer’s specifications.

PART 3 - EXECUTION

3.1 COORDINATION

A. Coordinate door and frame [and glazed light frames] fabrication and installation with Division 08 Section "Hardware".

B. Coordinate setting of steel frames and anchor placement with wall construction.

3.2 EXAMINATION

A. Examine subframes and conditions under which doors and frames are to be installed. Proceed with the work only when subframes and conditions are satisfactory.

3.3 INSTALLATION

A. Install doors and frames in accordance with HMMA 840 and with manufacturer's recommendations and instructions.

B. Remove and replace doors and frames damaged during delivery, storage, installation and construction.

1. Paste filler repair is not permitted.

2. Touch up scratched paint surfaces after installation.

C. Protection: Protect metal surfaces after installation. At Substantial Completion, doors and frames shall be without indication of use, deterioration, or damage.

- END OF SECTION -
PART 1 - GENERAL

1.1 SUMMARY

A. Section includes the insulated translucent sandwich panel skylight system and accessories as shown and specified. Work includes providing and installing:
   1. Factory prefabricated structural insulated translucent sandwich panels
   2. Aluminum installation system
   3. Aluminum flashing attached to skylights

B. Related Sections
   1. Section 06 10 00 - Miscellaneous Carpentry
   2. Section 07 52 16 - SBS Modified Bituminous Membrane
   3. Section 07 56 10 - Elastomeric Membrane Roofing
   4. Section 07 60 00 - Flashing and Sheet Metal
   5. Section 07 92 00 - Joint Sealants

1.2 SUBMITTALS

A. Submit manufacturer’s product data. Include construction details, material descriptions, profiles and finishes of skylight components.

B. Submit shop drawings. Include elevations and details.

C. Submit manufacturer's color charts showing the full range of colors available for factory-finished aluminum.
   1. When requested, submit samples for each exposed finish required, in same thickness and material indicated for the work and in size indicated below. If finishes involve normal color variations, include sample sets consisting of two or more units showing the full range of variations expected.
      a. Sandwich panels: 14” x 28” units
      b. Factory finished aluminum: 5” long sections

D. Submit Installer Certificate, signed by installer, certifying compliance with project qualification requirements.

E. Submit product reports from a qualified independent testing agency indicating each type and class of panel system complies with the project performance requirements, based on comprehensive testing of current products. Previously completed reports will be acceptable if for current manufacturer and indicative of products used on this project.
   1. Reports required are:
      b. Flame Spread and Smoke Developed (UL 723) – Submit UL Card
      c. Burn Extent (ASTM D 635)
      d. Color Difference (ASTM D 2244)
      e. Impact Strength (UL 972)
f. Bond Tensile Strength (ASTM C 297 after aging by ASTM D 1037)
g. Bond Shear Strength (ASTM D 1002)
h. Beam Bending Strength (ASTM E 72)
i. Fall Through Resistance (ASTM E 661)
j. Insulation U-Factor (NFRC 100)
k. NFRC System U-Factor Certification (NFRC 700)
l. Solar Heat Gain Coefficient (NFRC or Calculations)
m. Condensation Resistance Factor (AAMA 1503)
n. Air Leakage (ASTM E 283)
o. Structural Performance (ASTM E 330)
p. Water Penetration (ASTM E 331)
q. Class A Roof Covering Burning Brand (ASTM E 108)
r. UL Listed Class A Roof System (UL 790) (Optional) – Submit UL Card
s. LEED Credits
t. Daylight Autonomy

1.3 QUALITY ASSURANCE

A. Manufacturer's Qualifications

1. Material and products shall be manufactured by a company continuously and regularly employed in the manufacture of specified materials for a period of at least ten consecutive years and which can show evidence of those materials being satisfactorily used on at least six projects of similar size, scope and location. At least three of the projects shall have been in successful use for ten years or longer.

2. Panel system must be listed by an ANSI accredited Evaluation Service, which requires quality control inspections and fire, structural and water infiltration testing of sandwich panel systems by an accredited agency.

3. Quality control inspections shall be conducted at least once each year and shall include manufacturing facilities, sandwich panel components and production sandwich panels for conformance with AC177 “Translucent Fiberglass Reinforced Plastic (FRP) Faced Panel Wall, Roof and Skylight Systems” as issued by the ICC-ES.

B. Installer’s Qualifications: Installation shall be by an experienced installer, which has been in the business of installing specified skylight systems for at least two consecutive years and can show evidence of satisfactory completion of projects of similar size, scope and type.

1.4 PERFORMANCE REQUIREMENTS

A. The manufacturer shall be responsible for the configuration and fabrication of the complete skylight panel system.
1. When requested, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

2. Standard skylight system shall have less than 0.01 cfm/ft² air leakage by ASTM E 283 at 6.24 PSF (50 mph) and no water penetration by ASTM E 331 at 15 PSF; and structural testing by ASTM E 330.

3. Structural Loads; Provide skylight system capable of handling the following loads:
   a. Live Load: 20; Wind Load 35 psf
   b. Snow Load: N/A; Drift Load: N/A
   c. Wind Load: 35 psf

1.5 DELIVERY STORAGE AND HANDLING
A. Deliver panel system, components and materials in manufacturer's standard protective packaging.
B. Store panels on the long edge; several inches above the ground, blocked and under cover in accordance with manufacturer's storage and handling instructions.

1.6 WARRANTY
A. Submit manufacturer's and installer's written warranty agreeing to repair or replace panel system work, which fails in materials or workmanship within one year of the date of delivery. Failure of materials or workmanship shall include leakage, excessive deflection, deterioration of finish on metal in excess of normal weathering, defects in accessories, insulated translucent sandwich panels and other components of the work.

PART 2 - PRODUCTS
2.1 MANUFACTURER
A. The basis for this specification is for products manufactured by Kalwall Corporation. Other manufacturers may bid this project provided they comply with all of the performance requirements of this specification and submit evidence thereof. Listing other manufacturers’ names in this specification does not constitute approval of their products or relieve them of compliance with all the performance requirements contained herein.
B. Kalwall Corporation, Tel: (800) 258-9777 – Fax: (603) 627-7905 – Email: info@kalwall.com

2.2 PANEL COMPONENTS
A. Face Sheets
   1. Translucent faces: Manufactured from glass fiber reinforced thermoset resins, formulated specifically for architectural use.
      a. Thermoplastic (e.g. polycarbonate, acrylic) faces are not acceptable.
      b. Face sheets shall not deform, deflect or drip when subjected to fire or flame.
   2. Interior Face Sheets
a. Flame spread: Underwriters Laboratories (UL) listed, which requires periodic unannounced retesting, with flame spread rating no greater than 50 and smoke developed no greater than 250 when tested in accordance with UL 723.

b. Burn extent by ASTM D 635 shall be no greater than 1”.

3. Exterior Face Sheets
a. Color stability: Full thickness of the exterior face sheet shall not change color more than 3 CIE Units DELTA E by ASTM D 2244 after 5 years outdoor South Florida weathering at 5° facing south, determined by the average of at least three white samples with and without a protective film or coating to ensure long-term color stability. Color stability shall be unaffected by abrasion or scratching.

b. Strength: Exterior face sheet shall be uniform in strength, impenetrable by hand held pencil and repel an impact minimum of 70 ft. lbs. without fracture or tear when impacted by a 3-1/4” diameter, 5 lb. free-falling ball per UL 972.

4. Appearance
a. Exterior face sheets: Smooth, .070 thick and white in color.

b. Interior face sheets: Smooth, .045 thick and white in color.

c. Face sheets shall not vary more than ± 10% in thickness and be uniform in color.

B. Grid Core
1. 2’-3/4” I-beam grid core shall be of 6063-T6 or 6005-T5 alloy and temper with provisions for mechanical interlocking of muntin-mullion and perimeter. Width of I-beam shall be no less than 7/16”.

2. I-beam Thermal break: Minimum 1”, thermoset fiberglass composite.

C. Laminate Adhesive
1. Heat and pressure resin type adhesive engineered for structural sandwich panel use, with minimum 25-years field use. Adhesive shall pass testing requirements specified by the International Code Council “Acceptance Criteria for Sandwich Panel Adhesives”.

2. Minimum tensile strength of 750 PSI when the panel assembly is tested by ASTM C 297 after two exposures to six cycles each of the aging conditions prescribed by ASTM D 1037.

3. Minimum shear strength of the panel adhesive by ASTM D 1002 after exposure to four separate conditions:
   a. 50% Relative Humidity at 68° F: 540 PSI
   b. 182° F: 100 PSI
   c. Accelerated Aging by ASTM D 1037 at room temperature: 800 PSI
   d. Accelerated Aging by ASTM D 1037 at 182° F: 250 PSI
2.3 PANEL CONSTRUCTION
A. Provide sandwich panels of flat fiberglass reinforced translucent face sheets laminated to a grid core of mechanically interlocking I-beams. The adhesive bonding line shall be straight, cover the entire width of the I-beam and have a neat, sharp edge.
   1. Thickness: 2-3/4"  
   2. Light transmission: 16%  
   3. Solar heat gain coefficient: .23  
   4. Panel U-factor by NFRC certified laboratory: .29  
   5. Grid pattern: Nominal size 12 x 24; pattern: shoji
B. Standard panels shall deflect no more than 1.9" at 30 PSF in 10’ 0” span without a supporting frame by ASTM E 72.
C. Standard panels shall withstand 1200° F fire for minimum one hour without collapse or exterior flaming.
D. Skylight System
   1. Skylight system shall pass Class A Roof Burning Brand Test By ASTM E 108.
   2. (Optional) Skylight system shall be UL listed as a Class A Roof by UL 790, which requires periodic unannounced inspections and retesting by Underwriters Laboratories.
E. Skylight System shall meet the fall through requirements of OSHA 1910.23 as demonstrated by testing in accordance with ASTM E661, thereby not requiring supplemental screens or railings.

2.4 BATTENS AND PERIMETER CLOSURE SYSTEM
A. Closure System
   1. Extruded aluminum 6063-T6 and 6063-T5 alloy and temper clamp-tite screw type closure system.
   2. Curved closure system may be roll formed.
   3. Skylight perimeter closures at curbs shall be factory sealed to panels.
B. Sealing tape: Manufacturer's standard, pre-applied to closure system at the factory under controlled conditions.
C. Fasteners: 300 series stainless steel screws for aluminum closures, excluding final fasteners to the building.
D. Finish
   1. Manufacturer's factory applied finish, which meets the performance requirements of AAMA 2604. Color to be KCRF (selected from manufacturer's standards).
   2. Mill (optional)

PART 3 - EXECUTION
3.1 EXAMINATION
A. Installer shall examine substrates, supporting structure and installation conditions.
B. Do not proceed with panel installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION
A. Metal Protection
   1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.
   2. Where aluminum will contact concrete, masonry or pressure treated wood, protect against corrosion by painting contact surfaces with bituminous paint or method recommended by manufacturer.

3.3 INSTALLATION
A. Install the skylight system in accordance with the manufacturer's suggested installation recommendations and approved shop drawings.
   1. Anchor component parts securely in place by permanent mechanical attachment system.
   2. Accommodate thermal and mechanical movements.
   3. Set perimeter framing in a full bed of sealant compound, or with joint fillers or gaskets to provide weather-tight construction.
B. Install joint sealants at perimeter joints and within the panel system in accordance with manufacturer's installation instructions.

3.4 FIELD QUALITY CONTROL
A. Water Test: Installer to test skylights according to procedures in AAMA 501.2.
B. Repair or replace work that does not pass testing or that is damaged by testing and retest work.

3.5 CLEANING
A. Clean the skylight system interior and exterior, immediately after installation.
B. Refer to manufacturer's written recommendations.

- END OF SECTION -
PART 1 - GENERAL

1.1 SUMMARY

A. Related Documents
   1. Review these documents for coordination with additional requirements and information that apply to work under this Section.

B. Section Includes
   1. Provision and installation of hardware for steel doors.

C. Related Sections:
   1. Section 08 11 13 - Polyurethane Core Metal Doors and Frames.

1.2 REFERENCES

A. General
   1. The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.
   2. Unless otherwise noted, the referenced standard edition is the current one at the time of commencement of the Work.
   3. Refer to Division 01 Section "General Requirements" for the list of applicable regulatory requirements.

B. Builders Hardware Manufacturers Association (BHMA).
C. BHMA A156 Series 1 through 21 (Hardware).
D. Door and Hardware Institute (DHI).
E. DHI Al 15 and A115W Doors and Frames.
F. Steel Door Institute (SDI).

1.3 SUBMITTALS

A. Submit under provisions of Division 01.

B. Schedule: Identify each piece of hardware with opening number and manufacturer's name and catalog number.

C. Product Data: Along with schedule, submit catalog cuts and item description for each item of hardware. Submit separately and referenced to hardware schedule.

D. Shop Drawings: Indicate hardware locations and mounting heights.

E. Certifications: Certification(s) by hardware supplier(s) that all hardware furnished for this Project is made of new material by the approved manufacturer, and that no remanufactured or retrofitted items are supplied.

F. Closeout Submittals: Manufacturer's parts list and maintenance instructions for each type of hardware supplied and tools necessary for proper maintenance of hardware.

1.4 QUALITY ASSURANCE

A. Hardware Supplier: Recognized builders’ hardware supplier with minimum five years successful experience in scheduling and furnishing hardware.

1.5 DELIVERY, STORAGE AND HANDLING
A. Arrange work and secure delivery of hardware so that Work will progress without delay or interruption.

B. Delivery: Deliver hardware in manufacturer's original packages, marked for intended opening and with hardware schedule item number.

C. Pack complete with necessary screws, bolts, keys, instructions, and installation templates if necessary for spotting mortise tools.

D. Upon delivery, furnish complete list of hardware for checking, clearly marked to correspond with each package and hardware schedule item number. Review list for completeness and accuracy.

E. Template Hardware: Supply templates to door and frame manufacturers for proper and accurate sizing and locations of hardware cutouts.

**PART 2 - PRODUCTS**

2.1 GENERAL

A. Furnish hardware made of new material by approved manufacturers, including electrical components. Remanufactured or retrofitted hardware is not permitted and, if submitted, supplied or installed, will be rejected and replaced with no delay in schedule.

B. Review Drawings for hardware group locations and door types. Provide hardware items with accessories complete to function as intended.

C. Hardware Finish: BHMA 625 (US 26) bright chrome plated, unless otherwise indicated. Cylinders, including cores, shall be "white" metal. Fasteners to match hardware finish.

D. Reinforcing Units: Furnished by door manufacturer, coordinated by hardware manufacturer.

E. Concealed Hardware: Furnish items which must be concealed within metal work to metal door and frame manufacturer.

F. Fasteners: Furnish as recommended by manufacturer and as required to securely install hardware.
   1. Furnish hardware fastened to concrete or masonry with expansion sleeve anchors.
   2. Through bolts are not permitted on wood or metal doors.
   3. Furnish fasteners for items applied to gypsum board sufficiently long to provide solid connection to framing or backing.

2.2 HINGES

A. Manufacturers: McKinney, Hager or approved equal. McKinney products are listed to establish style and function required, unless noted otherwise.

B. Hinges per Door Leaf: Provide minimum 3 hinges to 90 inches (2286 mm) high, 4 hinges to 120 inches (3048 inches) high, plus 1 additional hinge for each additional 30 inches (762 mm) or fraction thereof, unless otherwise indicated.

C. Hinge Size: Hinge sizes given are based on 1-3/4 inch (45mm) thick doors. Follow manufacturer's instructions if thicker doors are used. Provide 4-1/2 by 4-1/2 inches
(114 by 114 mm) for doors 37 inches (940 mm) wide or less, 5 by 4-1/2 inches (125 by 114 mm) for doors 37 inches (940 mm) to 48 inches (1220 mm) wide.

1. Provide widths sufficient to clear trim projection when door swings 180 degrees.

2. Provide ball bearings, with non-removable pins on out-swinging doors and non-rising loose pins on in-swinging doors.

D. Finish

2.3 LOCKSETS
A. Typical Unless Noted Otherwise: Schlage D Series "Sparta," heavy-duty cylindrical-type, no substitutions.
B. Strikes: Furnish standard strikes with extended lips where required to protect trim or frame from being marred by latch bolt. Verify type of cutouts provided in metal frames.
C. Backset: 2-3/4 inch (70 mm) unless noted otherwise.
D. Cylinders
   1. Coordinate cylinder type with DFW Airport Construction Manager.
   2. Typical Unless Otherwise Noted: Deliver all cylinders and key blanks DFW Airport Construction Manager.

2.4 CLOSERS
A. Manufacturers
   1. Mechanical Closers: Norton, or approved equal.
B. Finish: Manufacturer’s Standard BHMA 625 polished chrome, including metal cover
C. Arm Types: Provide parallel-arm closers where possible, and at reverse bevel doors, and where doors swing full 180 degrees.
D. Mounting
   1. Mount closers for maximum swing possible.
   2. Install closers on “room” side of door openings, except install closer C3 on “push” side of doors.
E. Furnish necessary brackets and adapters for closer and arm where job conditions require other than "standard" or "normal" installation.

2.5 FLUSH BOLTS
A. Manufacturer: Glynn-Johnson or A/E approved equal.

2.6 WEATHERSTRIPPING
A. Manufacturers: Pemko, Reese Enterprises, or A/E approved equal. Pemko products are listed to establish style and function required, unless otherwise noted.
B. Weather-Stripping Schedule
   1. W1S88W - Door frame gasket.

2.7 ASTRAGALS
A. Manufacturers: Pemko, Reese Enterprises, or A/E approved equal. Pemko products are listed to establish style and function required, unless otherwise noted.

B. Astragal Schedule
   1. A1 29310CS - Meeting astragal.

2.8 MECHANICAL STOPS AND HOLDERS
A. Manufacturers: Glynn-Johnson, BBW, Ives, or Quality. Glynn-Johnson products are listed to establish style and function required, unless otherwise noted.

B. Provide carpet risers for floor stops where carpet is scheduled.

C. Stop/Holder Schedule:
   1. S1 FB17 - Floor stop.
   2. S2 50W - Wall stop.

2.9 THRESHOLDS
A. Manufacturers: Pemko, Reese, or A/E approved equal. Pemko products are listed to establish style and function required, unless otherwise noted.

B. Finish: Mill finish aluminum.

C. Width: Match door frames.

D. Set exterior thresholds in butyl rubber sealant.

E. Set thresholds on concrete with machine screws and expansion anchors. Fasteners shall penetrate concrete 1 inch (25 mm) minimum.

F. Exterior profiles and/or catalog number are indicated on Drawings.

G. Interior Threshold Schedule:
   1. T1 "Floor plate" type, 1/4 inch (6mm) thick grooved aluminum, with 196A sloping edge each side.

2.10 COMBINATION LATCHSETS
A. Latchset: Schlage D Series “Sparta”, 2-3/4 inches (70 mm) backset, or A/E approved equal.

B. Combination Latchset Schedule
   1. CL1 Omni 100 with latchset.

2.11 EXAMINATION
A. Inspect doors, frames and other surfaces to receive items of finish hardware and report any defects, which might adversely affect the installation and function of the hardware.

B. Commencing work implies acceptance of surfaces as satisfactory.

2.12 INSTALLATION
A. Install hardware specified under this Section.

B. Install hardware in accordance with manufacturers' instructions and recommendations.
C. Fit hardware prior to painting, then remove prior to painting doors and frames; reinstall after painting is complete.

D. Accessibility: Comply with CBC for positioning requirements for accessibility.

E. Mounting Heights Above Finished Floor:
   1. Hinges:
      a. Top: Frame manufacturer's standard, but not greater than 10 inches (250 mm) from head of frame to center line of hinge.
      b. Bottom: Frame manufacturer's standard, but not greater than 12-1/2 inches (318 mm) from floor to center line of hinge.
      c. Intermediate: Equally spaced between top and bottom hinges and from each other.

   2. Locks and Latches: 38 inches (966 mm) to center line of lever.

   3. Door pulls, Push-Pull Bars, Push Plates: 42 inches (1067 mm) to center of pull, bar or plate.

   4. Comply with recommendations of BHMA for heights of items not indicated, subject to approval by LBNL.

2.13 ADJUSTMENT

A. After air system has been balanced, qualified hardware suppliers or manufacturers' representatives shall inspect installation and make adjustments.

   1. Adjust closers, locks, and critical operation hardware.

2.14 HARDWARE SCHEDULE

A. Examine Drawings and Specifications and provide proper hardware for door openings.

- END OF SECTION -
PART 1 - GENERAL

1.01 RELATED DOCUMENTS
   A. Drawings and general provisions of the contract, including General Conditions and other Division 1 specification sections, apply to this section.

1.02 SUMMARY
   A. This section includes general procedural requirements governing execution of the work including, but not limited to, the following:

1. Contractor performing the lightning protection work is to be a State of Texas Licensed Lightning Protection Contractor with Five (5) Years minimum certified experience in similar work.

2. The system design shall comply with the National Fire Protection Association (NFPA) Standard #780, the Lightning Protection Institute (LPI) Standard #175, and Underwriters’ Laboratories, Inc. (UL) Standard #96A. The manufacturer of the material components shall be listed and labeled in accordance with the requirements of UL Standard #96. The system installation shall be made under the supervision of an LPI Certified Master Installer.

3. Upon completion, the Contractor will deliver to the Owner an as-built drawing and the appropriate system certification document under the LPI-IP inspection program.

4. Provide submittal of any added components to the system as well as shop drawings indicating system layout to be submitted as is required per Division 01 specification sections.

5. Inspection of and documentation of the existing lightning protection system associated with each building included in the project Scope of Work.

6. Removal and on-site storage of the existing lightning protection system.

7. Replacement of the existing lightning protection system including all required modifications and additions to bring the system to current compliance.

8. Protection of installed construction.

B. Related Sections
   1. Section 07 52 16 - SBS Modified Bituminous Membrane.
   2. Section 07 56 00 - Elastomeric Membrane Roofing (Hydrostop Over PVC).
   3. Section 07 56 10 - Elastomeric Membrane Roofing (Over Metal Substrate).
   4. Section 07 60 00 - Flashing and Sheet Metal.

1.03 VENDORS
   A. Approved vendors for lightning protection consulting and installation:
2. Bonded Lightning Protection Systems, LTD.; 122 Leesley Ln, Argyle, TX 76226, (800) 950-7933. bondedsales@bondedlp.com
3. Or A/E approved equal.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 EXAMINATION

A. Existing conditions: The existence and location of utilities and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of electrical systems and other construction affecting the work.

1. Before construction, verify the location and points of connection of lightning protection services.
2. Photograph document all existing conditions prior to beginning work. Photograph document all conditions as work progresses. Record and store photographs in a document that is to be retained on site in the project office and is to be included in the close-out packet at the conclusion of the project.

B. Acceptance of conditions: Examine substrates, system components, areas, and conditions, with the installing contractor present, for compliance with current requirements and standards. Record all site observations.

1. Written report: A written report listing conditions detrimental to performance of the work is required include the following:
   a. Description of work.
   b. List of existing conditions and inventory of all components.
   c. List of unacceptable conditions and components.
   d. Recommended corrective actions.
2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes.
3. Examine walls and roofs for suitable conditions where products and systems are to be installed.
4. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with work indicates acceptance of surfaces and conditions.

3.02 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the work, verify layout information shown on the drawings in relation to other disciplines including roofing and mechanical. If discrepancies are discovered, notify the DFW Construction Manager and A/E immediately.

3.03 INSTALLATION
A. Removal: Remove all components of the system which interfere with the installation of the new roofing systems and as indicated on the approved shop drawings. Damage to any components will be replaced with new at no additional cost to owner.

B. Storage: Coordinate the location of removed and new materials and components that are to be stored with the DFW Airport Construction Manager.

C. General: Locate the work and components of the work accurately.
   1. Make vertical work plumb and make horizontal work straight and parallel to building lines.

D. The work site is to be kept clean and neat at all times. All waste is to be removed from the work site as soon as practical but at a minimum daily.

E. When all work is complete, the Contractor shall restore the surrounding area to its original condition.

- END OF SECTION 26 41 13.13