PART 1 GENERAL

1.01 GENERAL NOTES

A. Preceding job start up, contractor shall decide to his satisfaction that all specifications contained herein are workable.
B. Contractor will perform all work by competent, trained, and properly equipped personnel in strict accordance with good roofing practices and applicable industry standards.
C. Contractor will observe all published safety prevention policies and practices relating to application of roofing system and related work. All federal, state, and local codes shall be followed.
D. Contractor will follow application, safety, and etc. information as published in the most current edition of the Roofing System Manufacturer’s Technical Specifications.

1.02 WORK INCLUDED

A. Work under this section covers the installation of a new 60 Mill EPDM Roofing System FOR Wesleyan University in Middletown, CT. Contractor shall include all related items of work as noted herein or indicated on the drawings or otherwise required to complete the specified elements of work and provide the necessary warranties for this work.
B. Contractor shall remove the existing roofs down to the deck including all composition base Flashings. All removal shall comply with state and local codes and requirements and shall be disposed of in a legal manner.

1.03 SECTION INCLUDES

A. Substrate preparation.
B. Wood nailer installation.
C. Membrane installation.
D. Membrane flashing installation.
E. Roof Insulation.
F. Sheet Metal, Flashing and Trim.

1.05 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D1079 for definition of terms related to roofing work not otherwise defined in the section.

1.06 SYSTEM DESCRIPTION

A. 60 mil EPDM elastomeric sheet roofing that is adhered to acceptable substrate with bonding adhesive.

1.07 SUBMITTALS

A. Product Data:
   1. Submit copies of Manufacturer’s Technical Information Sheets (TIS) for primary products used including roof membrane, splice tape, fasteners, and batten strip.
B. Samples:
C. Application Information:
   1. Submit copy of Manufacturer’s application specification.
   2. Submit copy of job related Manufacturer’s details including flashings, base tie-ins, roof edges, terminations, expansion joints, penetrations, drains, and any other relevant details.
E. Warranty: Submit warranty sample.
F. Pre Installation Notice:
   1. Submit copy of Manufacturer’s Pre Installation Notice (PIN) that has been accepted and approved by Manufacturer.
G. Drawings:
   1. Submit manufacturers shop drawing for tapered insulation and crickets (if required)
      a. Shop drawings shall show complete layout of the tapered system and/or cricket locations and shall comply with the drainage patterns required. Only the manufacturer’s tapered insulation and/or cricket shop drawings will be acceptable.
      1. The responsibility of providing shop drawings for this project lies solely with the manufacturer of the tapered insulation and/or cricket systems. Shop drawings by others will not be acceptable.
      2. Shop drawings shall include: Outline of roof, location of drains, scuppers or gutters, profile of tapered insulation components, slope requirements, indications of minimum and maximum insulation thicknesses.
      3. The roofing contractor shall verify all roof dimensions and drain locations and confirm same with the manufacturer.
      4. Approved shop drawings shall be returned to the manufacturer before insulation is delivered to the jobsite.

1.08 QUALITY ASSURANCE
A. Manufacturer:
   1. Company specializing in manufacturing the roofing membrane specified in this Section with ten years of manufacturing experience.
   2. System supplier must have ISO 9002 certification.
   3. Manufacturer must be able to provide the project with the membrane and Isocyanurate insulation that is produced in their facilities.
B. Applicator:
   1. Shall be a Manufacturer’s Licensed Contractor.
   2. Shall have at least five years experience in installing specified system.

1.09 REGULATORY REQUIREMENTS
A. Conform to applicable local building code and U.L. Class A.

1.10 QUALITY INSPECTION/OBSERVATION
A. Inspection by Manufacturer: Provide a final inspection of the roofing system by a Technical Representative employed by roofing system manufacturer.
   1. Technical representative shall not perform any sales functions.
   2. Contractor shall complete any necessary repairs required for issuance of warranty.

1.11 PRE-INSTALLATION CONFERENCE
A. Before start of roofing work, attend a conference to discuss the proper installation of materials. Attendees shall include all parties directly affecting work of this Section.

1.12 DELIVERY, STORAGE AND HANDLING
A. Deliver products in manufacturer’s original containers dry, undamaged, seals and labels intact and legible.
B. Store all materials clear of ground and moisture with weather protective covering.
C. Keep all combustible materials away from ALL ignition sources.

1.13 ENVIRONMENTAL REQUIREMENTS

A. Install roofing membrane only when surfaces are clean, dry, smooth and free of snow or ice.
B. Do not apply roofing membrane during inclement weather or when ambient conditions will not allow proper application. Consult Manufacturer’s Technical Specifications on cold weather application.

1.14 WARRANTY

A. Type/Term:
   1. Provide 20-year Roofing System Limited Warranty. Warranty shall include membrane, roof insulations, all metal, drains and membrane accessories.
B. Coverage
   1. Warranty
      a. Limit of liability: No Dollar Limitation
      Scope of coverage: Repair any leak in the roof system caused by the ordinary wear and tear of the elements, unintentional and occasional damage to the membrane as a result of normal rooftop inspection, maintenance or service, manufacturing defect in one brand materials, and the workmanship used to install these materials.

PART 2 PRODUCTS

2.01 NAILERS FOR FLANGES AND ROOF ACCESSORIES

A. Description: Structural Grade No. 2 or better Southern Pine, Douglas fir or Exterior Grade plywood.
   1. Nailer width: Minimum 3-1/2 in. (nominal) wide or as wide as the nailing flange of each roof accessory.
B. Reference Standards:
   2. Western Woods: PS 20; WWPA Grading Rules
   3. Plywood: PS 1; APA Grade Stamps..

2.02 MANUFACTURERS – ROOFING SYSTEM MATERIALS

Manufacturers:
   A. Firestone Building Products.
   B. Johns Manville

2.04 ELASTOMERIC SHEET ROOFING AND FLASHING MEMBRANE

A. Description: Non-reinforced, cured, synthetic single-ply membrane composed of Ethylene Propylene Diene Terpolymer (EPDM) conforming to the following physical properties:
   1. Membrane Type:
      a. 60 mil LSFR
      b. Membrane shall comply with UL Class A fire requirements in conjunction with specified slope, insulation and surfacing.

Property:                      Specification:
Specific Gravity               1.15 +/- 0.05
Tensile Strength, Minimum, psi ( Mpa ) 1425 (9.8)
Elongation, Minimum, %          475
Tear Resistance, lbf / in (N / M) 210 (933)
Ozone Resistance, 166 hours @ 100 pphm @ 104°F
with 50% extension No Cracks
Heat Aging, 28 days @ 240°F
Tensile Strength, Minimum psi (Mpa) 1415 (9.8)
Elongation, Minimum % 310
Brittleness Point, max., °F, °C -49 (-45)
Water Absorption, change in weight after
immersion in water for 166 hours @ 158°F, % < 2.0
Tolerance On Nominal Thickness, % +/- 10
Water Vapor Permeability, Perm-Mils 2.0

B. Reference Standards:
2. ASTM D297: Methods for Rubber Products, Chemical Analysis.
6. ASTM D624: Die C: Test Method for rubber property-Tear Resistance
8. ASTM D751: (Grab Method) Method of Testing Coated Fabrics.

2.05 INSULATION PRODUCTS

POLYISOCYANURATE ROOF INSULATION

A. Description: Roof insulation consisting of closed cell polyisocyanurate foam core and a perforated
black glass reinforced mat laminated to the face.
1. Thickness: Tapered ISO 95+ GL (As shown)

B. Reference Standards
5. ASTM D 1621 - Compressive Strength.
7. ASTM D 2126 - Dimensional Stability.
8. ASTM E 84 - Flame Spread.

INSULATION ATTACHMENT

1. Insulation installed with ISO-TWIN PACK adhesive.

2.06 ELASTOMERIC SHEET ROOFING SYSTEM COMPONENTS

A. Roof Flashing (Gravel Stops):
1. Description: Semi-cured 45 mil EPDM membrane laminated to 35 mil EPDM tape adhesive

B. Elastomeric Uncured Flashing:
1. Description: Non-reinforced, self curing, synthetic, single-ply flashing composed of Ethylene
Propylene Diene Terpolymer (EPDM) conforming to the following physical properties as indicated
by ASTM D4811-90 standard specification for Non-vulcanized rubber sheet used as roof flashing.
a. Nominal Thickness: .060 inch
Property: Specification:

<table>
<thead>
<tr>
<th>Property</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness</td>
<td>0.055</td>
</tr>
<tr>
<td>Green Strength Modulus 100% @ 75°F (psi)</td>
<td>25-250</td>
</tr>
<tr>
<td>Elongation, (Ultimate), %</td>
<td>400</td>
</tr>
<tr>
<td>modulus 100% @ 122°F (psi)</td>
<td>12</td>
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<tr>
<td>Elongation (Ultimate) %</td>
<td>200</td>
</tr>
<tr>
<td>Shelf Stability: Modulus 100% at 75°F (psi)</td>
<td>250</td>
</tr>
<tr>
<td>Elongation, min, %</td>
<td>400</td>
</tr>
<tr>
<td>Vulcanizability: Tensile strength, min (psi)</td>
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<tr>
<td>Elongation, min, %</td>
<td>400</td>
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<tr>
<td>Tensile Set: min, %</td>
<td>80</td>
</tr>
<tr>
<td>Dimensional Stability, max, %</td>
<td>+/- 10</td>
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<tr>
<td>Weatherability, no cracks or crazing</td>
<td>pass</td>
</tr>
<tr>
<td>Water Vapor Permeability, Perm-Mils</td>
<td>2.0</td>
</tr>
</tbody>
</table>

b. Reference Standards:
1. ASTM D412: Test Methods for Rubber Properties in Tension
2. ASTM D471: Test Methods for Rubber Property-Effect of liquids
3. ASTM D573: Test Methods for Rubber-Deterioration in Air oven
4. ASTM D624: Test Methods for Rubber Property-Tear Resistance
5. ASTM D1149: Test Method for Rubber Deterioration-Surface Ozone Cracking in a chamber
6. ASTM D1204: Test Method for Linear Dimensional Changes on a Non-rigid Thermoplastic Sheeting or Film at Elevated Temperatures
7. ASTM D2137: Test Methods for Rubber Property-Brittleness Point of Flexible Polymers and Coated Fabrics

C. Lap Splice Tape:
   1. Description: 35 mil EPDM-based, formulated for compatibility with EPDM membrane and high-solids primer.

D. Adhesive Primer:
   1. Description: High-solids, butyl based primer formulated for compatibility with EPDM membrane & tape adhesive.

E. Batten Covers:
   1. Description: Cured 60 mil EPDM membrane laminated to 35 mil EPDM tape adhesive.

F. Splice Adhesive:
   1. Description: Butyl-based, formulated for compatibility with EPDM membrane.

G. Bonding Adhesive:
   1. Description: Neoprene-based, formulated for compatibility with EPDM membrane & a wide variety of substrate materials, including masonry, wood, and insulation facings.

H. Pourable Sealer:
   1. Description: 2-Part urethane, 2-color for reliable mixing.

I. Seam Plates, Batten Strips and Insulation Plates:
   1. Description: Steel with a Galvalume® coating.
   2. Reference Standard: Corrosion-resistant to meet FM-4470 criteria.

J. Termination Bar:
   1. Description: 1.3" X 0.10" thick aluminum bar with integral caulking ledge.

2.07 METAL FLASHING

A. Edge Metal:
   1. Edge Metal: Provide 040 aluminum with Kynar finish, Color selected by owner.
   2. Flashing/Counterflashing: Mill aluminum or pre-coat Kynar 500 aluminum sheet
      0.050" Reglet Head
      0.032" Flashing

PART 3 INSTALLATION
3.01 EXAMINATION

A. Examine roof deck to determine that it is sufficiently rigid to support roofers and their mechanical equipment and that deflection will no strain or rupture roof components or deform deck.
B. Verify that surfaces and site conditions are ready to receive work. Correct defects in the substrate before commencing with roofing work.
C. Examine roof substrate to verify that it is properly sloped to drains.
D. Start work with sealants and adhesives at 60° - 80° F.
E. Fumes from adhesive solvents may be drawn into the building during installation through rooftop intakes. Appropriate measures must be taken to assure that fumes from adhesive solvents are not drawn into the building through air intakes.
F. The surface must be clean, dry, smooth, free of sharp edges, fins, loose or foreign materials, oil, grease and other materials that may damage the membrane, all roughened surfaces, which could cause damage, shall be properly repaired before proceeding.
G. All surface voids of the immediate substrate greater than 1/4" wide must be properly filled with an acceptable insulation or suitable fill material.

3.02 PROTECTION OF OTHER WORK

A. Protect metal, glass, plastic, and painted surfaces from adhesives and sealants.
B. Protect neighboring work, property, cars, and persons from spills and overspray from adhesives, sealants and coatings and from damage related to roofing work.
C. Protect finished areas of the roofing system from roofing related work traffic and traffic by other trade.

3.03 MATERIAL STORAGE AND HANDLING

A. Keep all adhesives, sealants, primers and cleaning materials away from all sources of ignition.
B. Consult container labels and material Safety Data Sheets (MSDS) for specific safety instructions.
C. Deliver materials to job site in their original containers as labeled by the manufacturer.

3.04 WOOD NAILER LOCATION AND INSTALLATION

A. 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.
B. Wood nailers shall be firmly fastened to the deck. Mechanically fasten wood nailers to resist a force of 200 lbs. per linear foot.

3.05 ROOF INSULATION APPLICATION: GENERAL

A. Install only as much insulation as can be covered with the completed roofing system before the end of the day's work or before the onset of inclement weather.
B. Lay roof insulation in courses parallel to roof edges.
C. Neatly fit insulation to all penetrations, projections, and nailers. Insulation shall be fit tightly, with gaps not greater than 1/4". All gaps greater than 1/4" shall be filled with acceptable insulation. Under no circumstances shall the roofing membrane be left unsupported over a space greater than 1/4". Tapered insulation shall be installed around roof drains so as to provide proper slope for drainage. Miter roof insulation edges at ridge, valley and other similar non-planar conditions.
D. When installing multiple layers of insulation, all joints between layers shall be staggered at least 6 in.

3.06 INSULATION ATTACHMENT

A. Polyisocyanurate
   1. Attachment: ISO TWIN PACK

3.08 MEMBRANE PLACEMENT AND ATTACHMENT
A. Beginning at the low point of the roof, place the membrane without stretching over the acceptable substrate and allow to relax a minimum of 30 minutes before attachment or splicing.

B. After making sure the sheet is placed in its final position, fold it back evenly onto itself so as to expose the underside.

C. Sweep the mating surface of the membrane with a stiff broom to remove excess dusting agent (if any) or other contaminants from the mating surface.

D. Apply Bonding Adhesive at about the same time to both the exposed underside of the sheet and the substrate to which it will be adhered so as to allow approximately the same drying time. Do not apply bonding adhesive to areas that will be subsequently spliced.

E. Allow Bonding Adhesive to flash off until tacky. Touch the Bonding Adhesive surface with a clean, dry finger to be certain that the adhesive does not stick or string. As you are touching the adhesive, pushing straight down to check for stringing, also push forward on the adhesive at an angle to ensure that the adhesive is ready throughout its thickness. If either motion exposes wet or stringy adhesive when the finger is lifted, then it is not ready for mating.

F. Starting at the fold, roll the previously coated portion of the sheet into the coated substrate slowly and evenly so as to minimize wrinkles.

G. Compress the bonded half of the sheet to the substrate with a stiff push broom.

H. Fold the unadhered half of the membrane sheet back onto itself, and repeat the bonding procedure to complete the bonding of the sheet.

3.09 MEMBRANE LAP SPICING

A. General:
   1. Position the sheet at the splice area by overlapping membrane 5 inches. Once the membrane is in place, mark the bottom sheet 1/2" to 3/4" from the edge of the top sheet every 4 to 6 feet. Tack the sheet back with primer at 5' centers and at factory splices or as necessary to hold back the membrane at the splicing area.
   2. Remove excess amounts of dusting agent on the sheet and at factory splices using a stiff push broom. Stir primer thoroughly before and during use. Dip the Scrubber into the bucket of primer, keeping the Scrubber flat. Apply the Primer using long back and forth type strokes with pressure along the length of the splicing area until surfaces become a dark gray in color. Apply Primer to both surfaces at the same time to allow the same flash off time. Change the scrub pad each 200 feet of 3 inch field splice, or when the pad will no longer hold the proper amount of Primer. Additional scrubbing is required at areas that may have become contaminated or have excess amounts of dusting agent, and at all factory splices.
   3. Position the Seam Splice Tape on the bottom sheet, aligning the edge of the release paper with the markings. Immediately roll the splice tape with a 3"-4" wide silicone or silicone sleeved steel hand roller or a short nap 3" paint roller.
   4. When the Seam Splice Tape has been installed for the entire splice length allow the top sheet to rest on top of the tape's paper backing. Trim the top sheet as necessary to assure that 1/8"-1/2" of the Seam Splice Tape will be exposed on the finished splice.
   5. To remove the paper backing from the tape, first roll back the sheet, then peel the paper backing off the Seam Splice Tape by pulling against the weight of the bottom sheet at approximately a 45 degree angle to the tape and parallel with the roof surface. Allow the top sheet to fall freely onto the exposed Seam Splice Tape. Broom the entire length of the splice as the release paper is being removed.
   6. Roll the splice using a 1-1/2"-2" wide silicone or silicone sleeved steel hand roller, first across the splice, and then along the entire length of the splice.

3.10 MEMBRANE SECUREMENT

A. Secure membrane at all locations where the membrane terminates or goes through an angle change greater than 2° in 12" except for round pipe penetrations less than 18" in diameter and square penetrations less than 4" square.

B. Mechanically fasten Reinforced Perimeter Fastening Strips per manufacturer’s recommendations.

3.11 FLASHING - PENETRATIONS
A. General:
1. If project is a Tear-off, remove all existing flashings (i.e. lead, asphalt, mastic, etc.).
2. Flash all penetrations passing through the membrane.
3. The flashing seal must be made directly to the penetration.

B. Pipes, Round Supports, etc:
1. Flash with Pre-Molded EPDM Pipe Flashings where practical.
2. Flash using FormFlash when Pre-Molded EPDM Pipe Flashing is not practical.

C. Structural Steel Tubing:
1. Use a field fabricated pipe flashing detail provided that the minimum corner radius is greater than 1/4” and the longest side of the tube does not exceed 12”. When the tube exceeds 12” use a standard curb detail.

D. Roof Drains:
1. If project is a Tear-off or Reroof remove all existing flashings, drain leads, roofing materials and cement from the existing drain in preparation for membrane and Water Block Seal.
2. Provide a clean even finish on the mating surfaces between the clamping ring and the drain bowl.
3. Taper insulation around the drain to provide a smooth transition from the roof surface to the drain. Use pre-manufactured tapered insulation with facer or suitable bonding surface to achieve slope. Slope shall not exceed Firestone recommendations.
4. Position the membrane, then cut a hole for the roof drain to allow 1/2" - 3/4" of membrane extending inside the clamping ring past the drain bolts.
5. Make round holes in the membrane to align with clamping bolts. Do not cut the membrane back to the bolt holes.
6. Place Water Block Seal on top of drain bowl where the clamping ring seats below the membrane.
7. Install the roof drain clamping ring and clamping bolts. Tighten the clamping bolts to achieve constant compression.

E. Pipe Clusters and Unusual Shaped Penetrations:
1. Fabricate penetration pockets to allow a minimum clearance of 1" between the penetration and all sides.
2. Secure penetration pockets per manufacturer Details.
3. Fill penetration pockets with Pourable Sealer, so as to shed water. Pourable Sealer shall be a minimum of 2” deep.

F. Hot Pipes:
1. Protect the rubber components from direct contact with steam or heat sources when the in-service temperature is in excess of 180° F. In all such cases flash to an intermediate insulated “cool” sleeve per manufacturer details.

G. Flexible Penetrations:
1. Provide a weathertight gooseneck set in Water Block Seal and secured to the deck.

H. Scuppers:
1. Remove existing scupper and provide a new welded watertight scupper or clean the existing scupper for reuse.
2. Set welded watertight scupper in Water Block Seal and secure to the structure.

I. Expansion Joints:
1. As shown on roof drawings in accordance with manufacturer details.

3.12 FLASHING - WALLS, PARAPETS, MECHANICAL EQUIPMENT CURBS, SKYLIGHTS, ETC.

A. General:
1. Using the longest pieces practical, flash all walls, parapets, curbs, etc., a minimum of 8” high per Manufacturer Details.

B. Evaluate Substrate:
1. Evaluate the substrate and overlay per manufacturer specifications as necessary.

C. For Tear-off projects:
1. Remove loose or unsecured flashings.
2. Remove mineral surfaced or coated flashings.
3. Remove excessive asphalt to provide a smooth, sound surface for new flashings.

D. Complete the splice between flashing and the main roof sheet with Splice Adhesive before adhering flashing to the vertical surface. Provide lap splices in accordance with manufacturer Details.
E. Apply Bonding Adhesive at about the same time to both the flashing and the surface to which it is being bonded so as to allow approximately the same flash off time. Apply Bonding Adhesive in a uniform coating.

F. Allow Bonding Adhesive to flash off until tacky. Touch the Bonding Adhesive surface with a clean, dry finger to be certain that the adhesive does not stick or string. While touching the adhesive, pushing straight down to check for stringing, also push forward on the adhesive at an angle to ensure that the adhesive is ready throughout its thickness. If either motion exposes wet or stringy adhesive when the finger is lifted, then it is not ready for mating. Flash off time will vary depending on ambient air conditions.

G. Roll the flashing into the adhesive evenly and carefully so as to minimize wrinkles.

H. Ensure proper contact of flashing by brooming in place.

I. Provide termination directly to the vertical substrate as shown on roof drawings.

J. Install T-Joint covers at field and flashing splice intersections as required by Firestone.

K. Install intermediate flashing attachment as required by manufacturer Specifications and Details.

3.13 FLASHING - GRAVEL STOPS OR ROOF EDGE METALS

A. Apply Primer to the metal edging and membrane as described in manufacturer Specifications.

B. Place the roll of QuickSeam Flashing on the roof a few feet ahead of the application starting point, positioned so that it unrolls from the top of the roll. Remove approximately 2'-3' of release paper and apply to the metal flange and . Lap adjacent rolls of QuickSeam Flashing a minimum of one inch.

C. With a 2"-3" wide silicone or silicone sleeved steel hand roller, roll the QuickSeam Flashing ensure proper adhesion. Additional attention must be given to factory splice intersections and to any change in plane.

D. Install a second layer of 9" QuickSeam Flashing over the 5" QuickSeam Flashing as described above.

E. Apply 6" length of QuickSeam Flashing, a QuickSeam Joint Cover, or 6"x6" FormFlash to the inside edge of the QuickSeam Flashing at all overlaps.

F. Apply 6" length of QuickSeam Flashing, a QuickSeam Joint Cover, or 6"x6" FormFlash at all intersections between the QuickSeam Flashing and field fabricated splices.

G. Where QuickSeam Flashing will not completely cover the metal flange, an additional piece of QuickSeam Flashing must be applied to the metal edge laps. Apply Seam Edge Treatment at the intersections of the flashing sections.

H. If the roof edge includes a gravel stop and sealant is not applied between the laps in the metal edging, an additional piece of QuickSeam Flashing shall be applied over the metal lap to the top of the gravel stop, after the initial application of QuickSeam Flashing. SeamEdge Treatment shall be applied at the intersections of the two flashing sections.

I. When the roof slope is greater than 1 in 12, apply Seam Edge Treatment along the back edge of the QuickSeam Flashing.

3.14 TEMPORARY CLOSURE

A. Temporary closures, which ensure that moisture does not damage any completed section of the new roofing system, are the responsibility of the applicator. Completion of flashings, terminations, and temporary closures shall be completed as required to provide a watertight condition.

3.15 SHEET METAL WORK

A. Install sheet metal as shown on roof drawings.

B. Follow current industry guidelines for installation or manufacturer requirements, whichever is more stringent.

3.16 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed as required by the manufacturer

B. Correct identified defects or irregularities.

3.17 CLEAN-UP
A. Clean all contaminants from building and surrounding areas.
B. Remove trash, debris, equipment from project site and surrounding areas.
C. Repair or replace damaged building components or surrounding areas to the satisfaction of the building owner.
PART 1 GENERAL

1.01 GENERAL NOTES

A. Preceding job start up, contractor shall decide to his satisfaction that all specifications contained here in are workable.
B. Contractor will perform all work by competent, trained, and properly equipped personnel in strict accordance with good roofing practices and applicable industry standards.
C. Contractor will observe all published safety prevention policies and practices relating to application of roofing system and related work. All federal, state, and local codes shall be followed.
D. Contractor will follow application, safety, etc, information as published in the most current edition of the Firestone Modified Bitumen Roofing System Technical Specifications.
E. Project includes complete removal of existing roof system(s) including all base flashings. All removal shall comply with state and local codes and requirements and shall be disposed of in a legal manner.

1.02 WORK INCLUDED

A. Work under this section covers the installation of new SBS roofing systems for Wesleyan University in Middletown, CT. In addition, contractor shall include all related items of work as noted herein or indicated on the drawings or otherwise required to complete the specified elements of work and provide the necessary warranties for this work.

1.03 SECTION INCLUDES

A. Substrate preparation.
B. Wood nailer installation.
C. Membrane installation.
D. Membrane flashing installation.

1.04 REFERENCES

A. National Roofing Contractors Association (NRCA) - Roofing and Waterproofing Manual.
B. Sheet Metal Air Conditioning Contractors National Association, Inc. (SMACNA) - Architectural Sheet Metal Manual

1.05 DEFINITIONS

A. Firestone: Firestone Building Products Co., Headquarters, 525 Congressional Blvd., Carmel, IN 46032-5607
C. Roofing Terminology: Refer to ASTM D 1079 for definition of terms related to roofing work not otherwise defined in this Section.

1.06 SYSTEM DESCRIPTION

A. Description
1 Cap Sheet Type: SBS FR Cap in Multi Purpose MB adhesive
3. Base Sheet: SBS Base in Multi Purpose MB adhesive
4. Cover Board: ½” ISOGARD HD Attached with ISO TWIN PACK adhesive
5. Insulation: Tapered Polyisocyanurate (as shown) Attached with ISO TWIN PACK adhesive
6. Deck Type: Concrete

1.07 SUBMITTALS

A. Product Data:
1. Submit copies of Firestone Technical Information Sheets (TIS) for roof membrane products.
2. Submit copies of Firestone Technical Information Sheets (TIS) for all products used on this project.

B. Samples:
C. Application Information:
1. Submit copy of Firestone application specification.
2. Submit copy of job related Firestone details including flashings, roof edges, terminations, expansion joints, penetrations, drains, and any other relevant details.

D. Warranty: Submit warranty sample.

1.08 QUALIFICATIONS

A. Manufacturer:
1. Company specializing in manufacturing the roofing membrane specified in this Section with 10 years of manufacturing experience.
2. System supplier must have ISO 9002 certified.
3. Manufacturer must be able to provide the project with the membrane and Isocyanurate insulation that is produced in their facilities.

B. Applicator:
1. Shall be approved, licensed, or authorized applicator of the manufacturer.
2. Shall have at least five years experience in installing specified system.

1.09 REGULATORY REQUIREMENTS

A. Conform to applicable local building code requirements.

1.10 QUALITY INSPECTION/OBSERVATION

A. Inspection by Manufacturer: Provide a final inspection of the roofing system by a Technical Representative employed by roofing system manufacturer.
1. Technical Representative shall not perform any sales functions.
2. Contractor shall complete any necessary repairs required for issuance of warranty.

1.11 PRE-INSTALLATION CONFERENCE

A. Before start of roofing work, attend a conference to discuss the proper installation of materials. Attendees shall include all parties directly affecting work of this Section.

1.12 DELIVERY, STORAGE AND HANDLING

A. Deliver products in manufacturer's original containers dry, undamaged, seals and labels intact and legible.
B. Store all materials clear of ground and moisture with weather protective covering. Store roll goods on end.
C. Keep all combustible materials away from ALL ignition sources.

1.13 ENVIRONMENTAL REQUIREMENTS
A. Install roofing membrane only when surfaces are clean, dry, smooth and free of snow or ice.
B. Do not apply roofing membrane during inclement weather or when ambient conditions will not allow proper application. Consult Firestone Technical Specifications on cold weather application.

1.14 WARRANTY

A. Type/Term:
   1. Provide 20-year Firestone Red Shield Roofing System Limited Warranty (Red Shield Warranty). Warranty shall include membrane, roof insulation, and membrane accessories.

B. Coverage:
   1. Red Shield Warranty:
      a. Limit of liability: No Dollar Limitation
      b. Scope of coverage: Repair any leak in the Firestone Modified Bitumen Roofing System caused by the ordinary wear and tear of the elements, manufacturing defect in Firestone brand materials, and the workmanship used to install these materials.

PART 2 PRODUCTS

2.01 NAILERS FOR FLANGES AND ROOF ACCESSORIES

A. Description: Structural Grade No. 2 or better Southern Pine, Douglas Fir, or Exterior Grade plywood. All wood shall be pressure treated for rot resistance.
   1. Nailer width: Minimum 3 ½ in. (nominal) wide or as wide as the nailing flange of each roof accessory.

B. Reference Standards:
   2. Western Woods: PS 20; WWPA Grading Rules.
   3. Plywood: PS 1; APA Grade Stamps.

2.02 MANUFACTURERS - MEMBRANE MATERIALS

A. Firestone Modified Bitumen, SBS Roofing System.

B. Manufacturers:
   A. Firestone Building Products.
   B. Johns Manville

C. Product/Producer:
   1. SBS Cap Sheet Membrane by Firestone or Johns Manville

2.03 MEMBRANE MATERIALS

A. Description: granule surfaced roofing membrane consisting of a specially formulated fire retardant styrene-butadiene-styrene (SBS) polymer modified asphalt compound, reinforced with 190 g/ sq. m (5.6 oz /sq. yd) non-woven polyester mat enhanced with continuous glass fiber strands in the machine direction conforming to the following physical properties:
   1. Nominal Thickness: 150 mils (3.8 mm)
   2. Nominal Weight: 91 lb/100 sq ft (4443 g/sq. m)
   3. Approximate Coverage: 100 sq. ft. (9.3 sq. m)

B. Reference Standard: ASTM D 6164-00 Type I, Grade G

C. Product/Producer:
   1. SBS Cap Sheet Membrane by Firestone or Johns Manville

2.04 BASE SHEET MATERIALS
A. Description: Fine mineral surfaced base ply consisting of a styrene-butadiene-styrene (SBS) polymer modified asphalt, reinforced with a strong fiberglass mat conforming to the following physical properties:
   1. Nominal Thickness: 90 mils (2.2 mm)
   2. Nominal Weight: 54 lb/100 sq ft (2635 g/sq. m)
   3. Approximate Coverage: 150 sq. ft. (13.9 sq. m)
B. Reference Standard: ASTM D 6163-00 Type I, Grade S
C. Product/Producer:
   1. SBS Base Modified Bitumen Base Sheet by Firestone or Johns Manville

### 2.05 POLYISOCYANURATE ROOF INSULATION

A. Description: Roof insulation consisting of closed cell polyisocyanurate foam core and a perforated black reinforced mat laminated to the face.
   1. Thickness: Varies
   2. Nominal Size: 48” X 48”
B. Product/Producer: ISO 95+ GL polyisocyanurate Insulation by Firestone

### COVER BOARD – ISO 95+ GL polyisocyanurate Insulation

A. Description: High Density, closed cell polyisocyanurate foam core manufactured with a coated glass facer
   1. Thickness: ½”
   2. Nominal Size: 48” X 48”
   3. Compressive Strength, psi 120
B. Product/Producer: ISOGARD HD by Firestone

### 2.06 CANTS

A. Description: Wood fiber cants, with 45° face slope and minimum 5” face dimension.
   1. Required at all angle changes, greater than 45° between the vertical surface and horizontal plane.
   2. Cant strips shall be set in hot steep asphalt, roofing mastic, or mechanically attached with acceptable fasteners and plates.
B. Reference Standard: ASTM C 208

### 2.07 ASPHALT FLASHING CEMENT, ASBESTOS-FREE

A. Description: Asphalt-based flashing cement, asbestos-free.
B. Reference Standard: ASTM D 4586

### 2.08 FLASHING

A. Description:
   1. Edge Metal: Provide 040 aluminum with Kynar finish, Color selected by owner.
   2. Flashing/Counterflashing: Mill aluminum or pre-coat Kynar 500 aluminum sheet
      0.050” Reglet Head
      0.032” Flashing

### PART 3 EXECUTION

#### 3.01 EXAMINATION

A. Verify that surfaces and site conditions are ready to receive work.
B. Examine roof deck to determine that it is sufficiently rigid to support roofers and their mechanical equipment and that deflection will not strain or rupture roof components or deform deck.
C. Verify deck is clean and smooth, free of depressions, waves, or projections, properly sloped to insure drainage. Examine substrate to determine that surface is in a suitable condition for roofing work. Do not start roof application until defects have been corrected.
D. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, and cant strips, wood nailing strips and reglets are in place.
E. The condition of surface to receive roof insulation shall be firm, clean, smooth, and dry.
3.02 PROTECTION OF OTHER WORK
   A. Protect metal, glass, plastic, and painted surfaces within wind-borne range of bitumen application. Protect
      neighboring work, properties, cars, and persons from spills and wind-borne bitumen.

3.03 MATERIAL STORAGE AND HANDLING
   A. Keep all adhesives, sealants, primers and cleaning materials away from all sources of ignition.
   B. Consult container labels and Material Safety Data Sheets (MSDS) for specific safety instructions.

3.04 WOOD NAILER LOCATION AND INSTALLATION
   A. 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.
   B. Wood nailers shall be firmly fastened to the deck. Mechanically fasten wood nailers to resist a force of 200
      lbs. per lineal foot.

3.08 ROOF MEMBRANE SYSTEM
   A. Description
      1. Concrete Deck
      2. Tapered polysisocyanurate
      3. Attachment:  ISO TWIN PACK adhesive
      4. Cover Board:  ISO GARD HD
      5. Attachment:  ISO TWIN PACK adhesive
      6. Base Ply:  SBS Base
      7. Base Ply Attachment:  Multi Purpose MB adhesive
      8. Cap Sheet:  SBS FR Cap
      9. Cap Sheet Attachment:  Multi Purpose MB adhesive

3.09 MEMBRANE APPLICATION
   A. Starting at the low point of the roof, embed one ply of Firestone SBS FR in a uniform application of adhesive.
      Broom in cap sheet to obtain proper contact with the base layers.
   B. Apply granules to areas of bleed out.

3.10 BASE SHEET APPLICATION
   A. Starting at the low point of the roof, embed one ply of SBS Base Base Sheet in a uniform application of MB
      cold adhesive. Keep sheet free of wrinkles, buckles and fish mouths. Brooming in may be required to
      eliminate voids and obtain proper embedment.

3.11 BASE FLASHINGS
   A. Base flashings may be adhered or torched to Base Sheet using Firestone’s Modified Bitumen Flashing
      cement.
   B. Where flashing laps onto field cap sheet, the lap area shall be completed by heat fusing in accordance with
      Firestone’s requirements.

NOTE: When torching granulated Modified Bitumen sheet, areas such as end laps, base flashings, and patches
that have granules on receiving surface embed granules in underlying sheet. Embed granules with a hot trowel
by heating surface and troweling-in all granules until a uniform black surface coated with compound is achieved
in lap area. Any area of the sheet not protected with a granule surface should be dressed with additional loose
granules or patched with an additional piece of granule surfaced modified.
3.12 Edge Metal

A. Edge Metal and/or Coping
   1. Description: Provide prefabricated .040 aluminum with Kynar finish in manufacturers standard colors to be selected by the owner.

3.13 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed as required by manufacturer.
B. Correct identified defects or irregularities.

3.14 CLEANUP

A. Remove bituminous markings from finished surfaces.
B. In areas where finished surfaces are soiled by work of this Section, consult manufacturer of surfaces for cleaning advice and conform to their instructions.
C. Remove excess materials, trash, debris, equipment, and parts from the Work.
D. Repair or replace defaced or disfigured finishes caused by work of this Section.

3.15 PROTECTION

A. Protect building surfaces against damage from roofing work.
B. Where traffic must continue over finished roof membrane, protect surfaces.

END OF SECTION
NOT ALL CONDITIONS ARE REPRESENTED AND EXISTING FIELD CONDITIONS MAY DIFFER.
REFERENCE JOHNS MANVILLE FOR JOHNS MANVILLE DETAILS.

STREAMLINE® METAL PANEL WATERPROOFING SYSTEM
(STANDARD COPING SHOWN)

COPING INSTALLATION
COPING [SEE NOTE 7]
* GAUGE AND FINISH PER SPECIFICATIONS
* ALL FRAMES TO BE CAULKED WITH TYPE II URETHANE

CONCEALED SPlice PLATE
CONTINUOUS SEAL

NOTE
SEE SEPARATE SPECIFICATION SHEET FOR ALTERNATE COPING INSTALLATION

1/4" DIAMETER MASONRY ANCHORS STABILIZED 12" ON CENTER.

STEEL-140 PAINTED STAINLESS STEEL, SELF-DRAINING, TOPICAL PANEL, FASTENER INSTALLED TO SUBJET 12" ON CENTER.

STREAMLINE® PANEL INSTALLATION
STREAMLINE® PANEL
* GAUGE AND FINISH PER SPECIFICATIONS

SUBJET
* 18 - 20 GAUGE GALVANIZED STEEL
* INSTALLED HORIZONTALLY 30" ON CENTER MAXIMUM

BOTTOM CLOSURE
* FINISH TO MATCH STREAMLINE PANEL

(SEEN ON ALTERNATE TWO-PIECE DESIGN)

FOR MORE INFORMATION SEE SEPARATE SPECIFICATION SHEET
* FOR TWO-PIECE CAP FLASHING

LITSCO
LONG ISLAND TRANSIT SUPPLY CORP.
505 E. 18TH STREET, GLENSIDE, PA 19038
PHONE (215) 846-4040 FAX (215) 846-7902
WWW.LITSCO.COM
NOTE: NOT ALL CONDITIONS ARE REPRESENTED, AND EXISTING FIELD CONDITIONS MAY DIFFER.

REFERENCE JENS MANVILLE FOR JENS MANVILLE DETAILS.