PART 1  GENERAL

1.01  SECTION INCLUDES
A. Sheet membrane waterproofing.
B. Cant strips and other accessories.
C. Drainage panels and Protection boards.

1.02  RELATED REQUIREMENTS
A. Section 03.30.00 - Cast-in-Place Concrete: Concrete substrate.

1.03  REFERENCE STANDARDS
E. ASTM D1876 - Standard Test Method for Peel Resistance of Adhesives (T-Peel Test); 2008.
J. ASTM E154/E154M - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover; 2008a (Reapproved 2013).

1.04  SUBMITTALS
A. See Section 01.30.00 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide data for membrane.
C. Shop Drawings: Indicate special joint or termination conditions and conditions of interface with other materials.
D. Certificate: Certify that products meet or exceed specified requirements.
E. Manufacturer's Installation Instructions: Indicate special procedures.
F. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.05  QUALITY ASSURANCE
A. Membrane Manufacturer Qualifications: Company specializing in waterproofing sheet membranes with ten years experience.
B. Installer Qualifications: Company specializing in performing the work of this section approved by manufacturer.

1.06 MOCK-UP
A. Construct mock-up 100 sq ft of horizontal waterproofed panel; to represent finished work including internal and external corners.
B. Locate where directed.

1.07 FIELD CONDITIONS
A. Maintain ambient temperatures above 40 degrees F for 24 hours before and during application and until liquid or mastic accessories have cured.

1.08 WARRANTY
A. See Section 01.78.00 - Closeout Submittals, for additional warranty requirements.
B. Provide five year manufacturer warranty for waterproofing failing to resist penetration of water, except where such failures are the result of structural failures of building. Hairline cracking of concrete due to temperature change or shrinkage is not considered a structural failure.

PART 2 PRODUCTS

2.01 MEMBRANE MATERIALS
A. Self-Adhered Modified Bituminous Membrane:
1. Thickness: 60 mil (0.060 inch).
2. Sheet Width: 36 inches.
3. Tensile Strength:
   a. Film: 5000 pounds per square inch, minimum, measured according to ASTM D882 and at grip-separation rate of 2 inches per minute.
4. Elongation at Break: 300 percent, minimum, measured according to ASTM D412.
5. Water Vapor Permeance: 0.05 perm, maximum, measured in accordance with ASTM E96/E96M.
6. Low Temperature Flexibility: Unaffected when tested according to ASTM D1970 at minus 20 degrees F, 180 degree bend on 1 inch mandrel.
7. Peel Strength: 7 pounds per inch, minimum, when tested according to ASTM D903.
8. Lap Adhesion Strength: 5 pounds per inch, minimum, when tested according to ASTM D1876.
9. Puncture Resistance: 50 pounds, minimum, measured in accordance with ASTM E154/E154M.
10. Water Absorption: 0.1 percent increase in weight, maximum, measured in accordance with ASTM D570, 24 hour immersion.
11. Hydrostatic Resistance: Resists the weight of 200 feet when tested according to ASTM D5385/D5385M.
12. Adhesives, Sealants, Tapes, and Accessories: As recommended by membrane manufacturer.
13. Manufacturers:
B. Seaming Materials: As recommended by membrane manufacturer.
C. Membrane Sealant: As recommended by membrane manufacturer.
D. Adhesives: As recommended by membrane manufacturer.
E. Thinner and Cleaner: As recommended by adhesive manufacturer, compatible with sheet membrane.
2.02 ACCESSORIES

A. Sealant for Cracks and Joints In Substrates: Resilient elastomeric joint sealant compatible with substrates and waterproofing materials.

B. Protection Board: Type capable of preventing damage to waterproofing due to backfilling and construction traffic.
   1. Use one of the following:
      a. Asphalt impregnated wood fiberboard, 1/4 inch thick.
      b. Polystyrene foam board, 1 inch thick.

C. Drainage Panel: Drainage layer with geotextile filter fabric on earth side.

D. Cant Strips: Premolded composition material.

E. Flexible Flashings: Type recommended by membrane manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify substrate surfaces are durable; free of matter detrimental to adhesion or application of waterproofing system.

C. Verify that items that penetrate surfaces to receive waterproofing are securely installed.

3.02 PREPARATION

A. Protect adjacent surfaces not designated to receive waterproofing.

B. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions.

C. Do not apply waterproofing to surfaces unacceptable to membrane manufacturer.

D. Fill non-moving joints and cracks with a filler compatible with waterproofing materials.

E. Seal moving cracks with sealant, not rigid filler, using procedures recommended by sealant and waterproofing manufacturers.

F. Prepare building expansion joints as indicated on drawings.

G. Surfaces for Adhesive Bonding: Apply surface conditioner at a rate recommended by manufacturer. Protect conditioner from rain or frost until dry.

H. Concrete Surfaces for Adhesive Bonding: Prepare concrete substrate according to ASTM D5295/D5295M.
   1. Remove substances that inhibit adhesion including form release agents, curing compounds admixtures, laitance, moisture, dust, dirt, grease and oil.
   2. Repair surface defects including honeycombs, fins, tie holes, bug holes, sharp offsets, rutted cracks, ragged corners, deviations in surface plane, spalling and delaminations, as described in the reference standard.
   3. Remove and replace areas of defective concrete as specified in Section 03.30.00.
   4. Prepare concrete for adhesive bonded waterproofing using mechanical or chemical methods described in the referenced standard.
   5. Test concrete surfaces as described in the referenced standards. Verify surfaces are ready to receive adhesive bonded waterproofing membrane system.

3.03 INSTALLATION - MEMBRANE

A. Install membrane waterproofing in accordance with manufacturer's instructions.
B. Roll out membrane. Minimize wrinkles and bubbles.

C. Self-Adhering Membrane: Remove release paper layer. Roll out on substrate with a mechanical roller to encourage full contact bond.

D. Adhesive Bonded Membrane: Apply adhesive in accordance with manufacturer's instructions. Bond sheet to substrate except those areas directly over or within 3 inches of a control or expansion joint.

E. Overlap edges and ends and seal by method recommended by manufacturer, minimum 3 inches. Seal permanently waterproof. Apply uniform bead of sealant to joint edge.

F. Reinforce membrane with multiple thickness of membrane material over joints, whether joints are static or dynamic.

G. Weather lap joints on sloped substrate in direction of drainage. Seal joints and seams.

H. Coordinate with drain installation; see Section 22.10.06.

I. Install building expansion joints as indicated on drawings.

J. Install flexible flashings. Seal items penetrating through membrane with flexible flashings. Seal watertight to membrane.

K. Extend membrane over cants and up intersecting surfaces at membrane perimeter minimum 6 inches above horizontal surface for first ply and 4 inches at subsequent plies laid in shingle fashion.

L. Seal membrane and flashings to adjoining surfaces. Install termination bar at all edges. Install counterflashing over all exposed edges.

3.04 INSTALLATION - DRAINAGE PANEL AND PROTECTION BOARD

A. Place drainage panel directly against membrane, butt joints, place to encourage drainage downward. Scribe and cut boards around projections, penetrations, and interruptions.

B. Place protection board directly against drainage panel; butt joints. Scribe and cut boards around projections, penetrations, and interruptions.

C. Adhere protection board to substrate with compatible adhesive.

3.05 FIELD QUALITY CONTROL

A. On completion of horizontal membrane installation, dam installation area in preparation for flood testing.

B. Flood to minimum depth of 1 inch with clean water. After 48 hours, inspect for leaks.

C. If leaking is found, remove water, repair leaking areas with new waterproofing materials as directed by Architect; repeat flood test. Repair damage to building.

D. When area is proven watertight, drain water and remove dam.

3.06 PROTECTION

A. Do not permit traffic over unprotected or uncovered membrane.

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Batt insulation ____ in interior wall and ceiling construction.

1.02 RELATED REQUIREMENTS
   A. Section 03.30.00 - Cast-in-Place Concrete: Field-applied termiticide for concrete slabs and foundations.
   B. Section 06.10.00 - Rough Carpentry: Supporting construction for batt insulation.
   C. Section 06.10.00 - Rough Carpentry: Installation requirements for board insulation over steep slope roof sheathing or roof structure.
   D. Section 09.21.16 - Gypsum Board Assemblies: Acoustic insulation inside walls and partitions.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS
   A. See Section 01.30.00 - Administrative Requirements, for submittal procedures.
   B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.
   C. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.
   D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.05 FIELD CONDITIONS
   A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

PART 2 PRODUCTS

2.01 APPLICATIONS
   A. Insulation in Metal Framed Walls: Batt insulation with no vapor retarder.
   B. Insulation Above Lay-In Acoustical Ceilings: Batt insulation with no vapor retarder.
2.02 BATT INSULATION MATERIALS

A. Glass Fiber Batt Insulation: Flexible preformed batt or blanket, complying with ASTM C665; friction fit.
   1. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.
   2. Facing: Aluminum foil, flame spread 25 rated; one side.

B. Mineral Fiber Batt Insulation: Flexible or semi-rigid preformed batt or blanket, complying with ASTM C665; friction fit; unfaced flame spread index of 0 (zero) when tested in accordance with ASTM E84.
   1. Smoke Developed Index: 0 (zero), when tested in accordance with ASTM E84.
   2. Manufacturers:
      b. ROXUL, Inc; Roxul AFB: www.rspect.com.

2.03 ACCESSORIES

A. Tape: Bright aluminum self-adhering type, mesh reinforced, 2 inch wide.
B. Adhesive: Type recommended by insulation manufacturer for application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.
B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.02 BATT INSTALLATION

A. Install insulation and vapor retarder in accordance with manufacturer's instructions.
B. Install in exterior wall and roof spaces without gaps or voids. Do not compress insulation.
C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.
E. Tape insulation batts in place.
F. Tape seal butt ends, lapped flanges, and tears or cuts in membrane.
G. At metal framing, place vapor retarder on warm side of insulation; lap and seal sheet retarder joints over member face.
H. Tape seal tears or cuts in vapor retarder.
I. Extend vapor retarder tightly to full perimeter of adjacent window and door frames and other items interrupting the plane of the membrane. Tape seal in place.
J. Coordinate work of this section with construction of air barrier seal specified in Section 07.25.00.
K. PROTECTION
   1. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION
SECTION 07 50 35
TOTAL ROOFING SYSTEM WARRANTY INSTRUCTIONS

PART 1 – GENERAL: not used

PART 2 – PRODUCTS

2.01 The Total Roofing System Warranty shall be provided on the form of Section 07 50 36. No other warranty form is acceptable, and no other warranty, stipulations, or qualifications may be incorporated or attached. If more than one building, roof, or type of membrane is provided in the Contract, provide a separate warranty for each, even if they are alike. All informational blanks on the warranty form shall be filled in prior to execution.

PART 3 – EXECUTION

3.01 Prior to the Manufacturer’s final inspection, which is a distinct and different inspection from the Designer’s final inspection of the Work of the Contract, and prior to the Manufacturer’s execution of the Total Roofing System Warranty, submit a mock-up of the Total Roofing System Warranty to the Designer, completely filled out with all information except, if not yet certain, the warranty number and individual persons names, titles, signatures, dates of signature, and contact information. Obtain Designer’s approval of this mock-up, and use this for the executed warranty. Execute the Warranty in two (2) counterparts for inclusion in the two (2) sets of Project data Binders (See specification section 01 78 21). All signatures on counterparts shall be “wet” (blue ink on paper, affixed by hand) signatures. Provide copies attached to final pay requests (See specification 01 29 76).

3.02 Filling in the upper portion of page 1:
A. SBC Project Number: fill in the “the Project” identification shown on page 1 of the construction Agreement in the format of 000/000-00-000XX, in which characters might or might not have been included for the Xs.
B. Warranty Period: fill in “thirty (30) years”.
C. Warranty Number: fill in a unique number provided by the Manufacturer for its own tracking purposes. Fill this identically in the blanks near the upper right of each page of the form.
D. Building, Campus and Address: fill in:
   1. the name of the institution;
   2. “main campus” or the name of the campus if not the main campus;
   3. the name of the building and address or the campus ID number;
   4. if only a portion of a building, indicate which portion using conventions of the institution;
E. Roofing System Manufacturer & Address: fill in completely.
F. Roofing System Manufacturer Contact, Phone, and Email: fill in the name of the appropriate person to provide warranty service response on behalf of the Manufacturer, and their commonly used phone number and email address.
G. Manufacturer Authorized Roofing Applicator: fill in name and address of the “Roofing Contractor” (or subcontractor) that installed the System covered by this warranty.
H. Designer: fill in name of Designer shown on page 1 of the construction Agreement.
I. Contractor: fill in name of the general Contractor shown on page 1 of the construction Agreement, if different from the Applicator identified above. If the same, fill in “same”.

3.03 Filling in THE TOTAL ROOFING SYSTEM COMPONENTS on page 1
Refer to the roofing system specifications for the list of components to be included in the Total Roofing System Warranty. The components already named in the form shall be included if they occur in this system. Strike out components already named in the form that are not included in this roofing system and add components not already named in the form that are specified for inclusion.
3.04 Filling in where THE ROOFING CONTRACTOR CERTIFIES on page 1:
A. Roofing Contractor: fill in the name of the Roofing Contractor, same as the Authorized Roofing Applicator above (per 3.02.G in this section).
B. Authorized Signature: a suitably authorized representative of the Roofing Contractor with authority to bind the Roofing Contractor to the terms of this certification shall sign here.
C. Fill in the name of the person providing the Authorized Signature, their title within the Roofing Contractor organization, and the date on which the signature is affixed.

3.05 Filling in where THE MANUFACTURER WARRANTS on page 1:
A. Manufacturer: fill in the name of the Manufacturer, same as the Roofing System Manufacturer above (per 3.02.E in this section).
B. Authorized Signature: a suitably authorized representative of the Manufacturer with authority to bind the Manufacturer to the terms of this Warranty shall sign here.
C. Fill in the name of the person providing the Authorized Signature, their title within the Manufacturer organization, and the date on which the signature is affixed.

3.06 Filling in the ROOFING SYSTEM INFORMATION on page 2:
A. Fill in an “X” or similarly in one of the provided boxes to indicate that the roof is a “New Roof” over new construction or is a “Reroof” over existing construction.
B. Warranty Number: fill in same as in upper right of page 1.
C. Area of Roof Installed: fill in the total square feet (SF) of the roof installed.
D. Date of Substantial Completion: Fill in the date certified by the Designer.
E. Date of Warranty Expiration: Fill in the date equal to the Date of Substantial Completion (per 3.06.D this section) plus the Warranty Period filled in at the top of page 1 (per 3.02.B this section).
F. ROOFING SYSTEM COMPONENTS:
Complete all information for each item listed. Provide complete description of each component in the system. When different components or systems are present, describe each condition and location. If the particular component is not used in this system, fill in “n/a” in the space.
G. MANUFACTURER’S MEMBRANE INFORMATION:
Provide Manufacturer unique roll identification number for each roll used in this project.

H. MANUFACTURER FINAL INSPECTION:
1. The Manufacturer’s final inspection is limited in scope to the Roofing System, and is a distinct and different inspection from the Designer’s final inspection of the Work of the Contract.
2. Fill in name and title of the Manufacturer’s representative making the inspection. Fill in the date of the inspection. Provide signature by that representative.
3. Fill in the name and title of the Designer representative that was present at inspection.
4. Fill in the name and title of the Owner’s representative (other than the Designer) that was present at inspection.

3.07 Executing the Warranty by the TOTAL ROOFING SYSTEM MANUFACTURER at the bottom of page 4:
A. Fill in Roofing System Manufacturer’s name, same as on page 1 (per 3.02.E and 3.05.A this section).
B. Once the roof work is acceptable to the Roofing System Manufacturer, affix signature of Roofing System Manufacturer’s authorized and binding representative. Fill in date of signature.
C. Fill in the name and title of the Roof System Manufacturer’s signatory.

END OF SECTION
SECTION 07 50 36  
TOTAL ROOFING SYSTEM WARRANTY  
State of Tennessee

<table>
<thead>
<tr>
<th>SBC Project Number</th>
<th>Warranty Period (Years)</th>
<th>Warranty Number</th>
</tr>
</thead>
</table>

Building, campus, and address

Roofing System Manufacturer ("Manufacturer") and address

Roofing System Manufacturer Contact  Phone  email

Manufacturer Authorized Roofing Applicator ("Roofing Contractor"); and address

Designer  General Contractor (if different from applicator above)

The Roofing System Manufacturer, (Manufacturer) warrants to the Tennessee Board of Regents (Owner) of the above building, that subject to the Terms, Conditions, and Limitations stated in this no dollar limit (NDL) warranty, the Manufacturer will repair any leak in the Total Roofing System installed by a Manufacturer authorized roofing applicator (Roofing Contractor) for a period stated above commencing with the date of Substantial Completion. The Manufacturer will repair or replace system defects or failures.

THE TOTAL ROOFING SYSTEM COMPONENTS are defined as the following; all materials as manufactured or authorized by the Manufacturer: including, but not limited to: membrane, flashings, counterflashings, adhesives and sealants, insulation, cover boards, fasteners, fastener plates, fastening bars, metal work, insulation adhesives, and any other products utilized in this installation. (Strike out materials not included in this system and add other materials included as required):

THE ROOFING CONTRACTOR CERTIFIES that the Total Roofing System was installed in strict accordance with the Manufacturer’s recommendations utilizing only the Manufacturer’s authorized products to install the Total Roofing System and that all products were protected while in their possession prior to installation and had no moisture or water trapped in the Total Roofing System. The Roofing Contractor certifies that all necessary steps were taken to ensure that all conditions were met for the issuance of The Total Roofing System Warranty by the Manufacturer.

Roofing Contractor  Authorized Signature  
Print or Type Name  Title  Date

THE MANUFACTURER WARRANTS that if it cannot supply a specified product for inclusion in a Total Roofing System Warranty, the Roofing Contractor must obtain prior written approval from the Manufacturer for all products not supplied by the Manufacturer to be incorporated in the Total Roofing System Warranty. The Manufacturer will issue a Total Roofing System Warranty. In addition to a final inspection of the completed installation by the Manufacturer, the Manufacturer is also entitled to supplement their final field inspection with the Roofing Contractors above certification. There will be NO exceptions or exclusions to the Total Roofing System Warranty based upon products used or installation issues by the authorized Roofing Contractor, provided all materials installed are provided or authorized by the Roofing System Manufacturer.

Manufacturer  Authorized Signature  
Print or Type Name  Title  Date

Total Roofing System Warranty  
07 50 36 - 1
ROOFING SYSTEM INFORMATION

☐ New Roof    ☐ Reroof

Warranty Number

Area of Roof Installed (SF)    Date of Substantial Completion    Date of Warranty Expiration

TOTAL ROOFING SYSTEM COMPONENTS – list all that apply:

Type of Roof deck(s)

Type of metal flashing / trim / coping, etc.

Type of vapor barrier

Type of air barrier

Type and thickness of flat insulation    Method of attachment

Type and slope of tapered insulation    Method of attachment

Type of recovery board    Method of attachment

Type of flashing    Method of attachment

Membrane type and color

MANUFACTURER’S MEMBRANE INFORMATION
List manufacturer’s roll identification for ALL rolls of used:    If additional space is needed, attach additional sheet

MANUFACTURER FINAL INSPECTION    performed by:

Print or type name and title    Date    Signature

Designer Representative present for Final Inspection:

Print or type name and title

Owner Representative present for Final Inspection: (when practical)

Print or type name and title
1. Owner shall provide the Manufacturer with written notice within thirty (30) days of the discovery of any leak(s) in the roof system.

2. The Manufacturer shall within fourteen (14) calendar days, commencing with receipt of written notice from the Owner, inspect the roofing system in the presence of the Owner's representative (when practical) and if the cause(s) of the leak(s) is found the responsibility of the Manufacturer under this warranty, promptly make or cause to be made, the repair(s) or replacements(s) necessary to return the roofing system to the condition which is watertight and remediate moisture. All repair expenses incurred in connection herewith will be the responsibility of and borne by the Manufacturer.

3. If upon joint inspection by the Manufacturer and the Owner’s representative of the roofing system as provided in Paragraph 2, the cause(s) of any leak(s) is found not the responsibility of the Manufacturer under this warranty, the Manufacturer will immediately advise the Owner of the type and extent of repair(s) required to be made at the Owner's expense and if such repair(s) be promptly and reasonably made by the Manufacturer, this warranty will remain in effect for the unexpired portion of the warranty period; otherwise, this warranty will become null and void with respect to the area(s) or item(s) affected.

4. In the event the Manufacturer and Owner disagree as to the cause(s) and responsibility of the leak(s), then the Owner, without prejudice to any other remedy Owner may have, may make repair(s) of any leak(s) in accordance with Manufacturer recommendations if timely made available. Such action by the Owner shall not constitute a violation of this warranty. The Owner reserves the right to pursue reimbursement from the Manufacturer for all cost(s) and expense(s) of such repair(s), subject to the Manufacturer's responsibility under this warranty. If it is determined that the Manufacturer has no responsibility for the leak(s) under this warranty, the Owner will reimburse the Manufacturer for direct expenses encountered for trips requested by the Owner after the initial inspection.

5. In the event an emergency condition arises where, in the reasonable opinion of the Owner immediate reasonable repair(s) are necessary to avoid substantial damage to the building or its contents and the Manufacturer advises the Owner in writing of its inability, for reasons beyond its control, to inspect and repair the roof system as necessary within fourteen (14) days of written notification from the Owner, then the Owner may make such temporary repair(s) as in the opinion of the Owner are essential and necessary and such action by the Owner shall not constitute a violation of this warranty. In these circumstances, the Manufacturer shall reimburse the Owner for all reasonable costs and expenses of such temporary repair(s) subject to the Manufacturer's responsibility under this warranty.

6. In the event the Manufacturer fails to respond to written notification of known or suspected leak(s) as provided in Paragraph 2, the Owner may, after fourteen (14) days following receipt by the Manufacturer of an additional written notice and without prejudice to any other remedy he may have, make permanent repair(s) of any leak(s) and recover all reasonable costs and expenses of such repair(s) from the Manufacturer. The Manufacturer will, upon demand by the Owner, promptly reimburse the Owner these reasonable repair costs and expenses. Such action by the Owner shall in no way negate the responsibilities of the Manufacturer under this warranty for the unexpired portion of the warranty period.

7. Except as provided in Paragraphs 4, 5 & 6, any alterations of the roofing system after completion and acceptance including the placement of fixtures, utilities and equipment on or through the roof or additions thereto, will render this warranty null and void with respect to the area(s) or item(s) affected unless prior written authorization of such alterations of the roof system or additions thereto is given by the Manufacturer. Such authorization will not be unreasonably withheld.

8. This warranty shall not be applicable to the extent the roofing system sustains damage(s) by any of the following:
   (a) Acts of God and natural disasters, including but not limited to lightning, hurricanes, tornadoes, and earthquakes, winds of (3 second) peak gust speeds of 72 MPH or higher (determined by the nearest US Weather Station measured at 10 meters above ground or at the given address if reliable pinpoint wind data is available for the address), hail with a diameter greater than two inches;
   (b) Acts of negligence (whether of omission or commission), fire, accidents, or misuse, including but not limited to vandalism, civil disobedience, or acts of war, provided same are not caused by the Manufacturer and/or the Contractor.
   (c) Failure by the Owner to use reasonable care in maintaining the roof and appurtenances, provided same caused the leak(s) or item(s) affected; or,
   (d) For built-up and modified bitumen roofs: A roof design or specification authorized by the Owner with less than 1/8” per foot slope for drainage.
   (e) Building design issues that affect the performance of the Total Roofing System.

9. When the roof system has been damaged by any of the foregoing causes, repair(s) shall be at the Owner's expense and such repair(s) shall be made as provided in Paragraph 3; otherwise, this warranty will become null and void with respect to the area(s) or item(s) affected.
10. Until such time as the third year of this warranty has expired, the Manufacturer's obligations hereunder shall be joint and several with the Contractor. For the purpose of this paragraph, all of the Contractor's actions, whether of omission or commission, that are subject to this warranty are likewise the actions of the Manufacturer hereunder and shall in no way negate or reduce the responsibilities of the Manufacturer under this warranty.

11. As part of the repair of leaks, the Manufacturer shall replace roof insulation included in the this warranty that become damaged as a result of a roof leak, provided the roof leak is not excluded under the Terms, Conditions, and Limitations set forth in this warranty. The replacement of damaged roof insulation shall be limited to those boards that have lost the structural integrity necessary to support and restrain the System when it is subjected to dynamic loads such as typical roof service traffic, winds up to 72 mph, hail up to two inches in diameter, and periodic accumulations of water, snow, or ice. In the event that roof insulation is damaged as a result of a roof leak excluded under the Terms, Conditions and Limitations set forth in this warranty, the Manufacturer will advise the Owner of the type and extent of insulation and recovery board replacement to be made at the Owner's expense. Failure by the Owner to properly make these repairs in a reasonable manner using a Manufacturer licensed applicator and within a reasonable period of time shall render this Warranty null and void in the area of the damage. Neither the Manufacturer nor the Owner shall have any obligation to replace roof insulation and recovery board if the area affected by the leak is less than fifty (50) square feet.

12. The Manufacturer certifies that it:
   (a) Manufacturers or purchases products for the purpose of designing, developing, and marketing a roof system;
   (b) Provides recommendations, specifications, and details for the roofing system materials and installation;
   (c) Trains and authorizes Roofing Contractors;
   (d) Provides technical assistance to Roofing Contractors;
   (e) Approves or prepares shop drawings; and,
   (f) Provides a technical representative employed by the Manufacturer for the final inspection, and to all inspections required by this warranty.

13. During the period of this warranty, the Manufacturer, its agents or employees, will have free access to the roof during regular business hours of the Owner.

14. Owner shall be responsible for the costs associated with the removal and replacement, as well as any damage caused by the removal and replacement of any overburden, super strata, or overlays, either permanent or temporary, excluding accepted stone ballast or pavers, as necessary to expose the system for inspection and/or repair.

15. Alterations or repairs to the System that are not completed in accordance with Manufacturer's published specifications, not completed by an authorized contractor, and/or where current notification procedures were not followed are excluded and this warranty will become null and void with respect to the area(s) or item(s) affected.

16. For a 30 year single ply membrane roof system, the Total Roofing System Warranty shall cover the proper repair of leaks caused by unintentional, accidental and occasional puncture damage to the membrane as a result of normal rooftop inspection, maintenance or service; however, it does not cover damage caused by snow removal or damage caused by other trades during construction. There shall be no man hour limitation per year on accidental puncture repairs covered by this provision of the warranty. Resulting wet insulation shall be treated as set forth in Paragraph 11 above.

TOTAL ROOFING SYSTEM MANUFACTURER

[Signature]
Roofing System Manufacturer name

[Signature]
Authorized Signature & Date
Print or Type Name & Title

Total Roofing System Warranty
07 50 36 - 4
PART 1  GENERAL

1.01  SECTION INCLUDES
   A.  Sheet metal roofing, associated flashings, and underlayment.
   B.  Counterflashings.
   C.  Gutters and downspouts.
   D.  Sealants for joints within sheet metal fabrications.

1.02  RELATED REQUIREMENTS
   A.  Section 03.10.00 - Concrete Formwork: Placement of recessed reglets in formwork.
   B.  Section 07.72.00 - Roof Accessories: Manufactured accessories.

1.03  REFERENCE STANDARDS
   F.  SMACNA (ASMM) - Architectural Sheet Metal Manual; Sheet Metal and Air Conditioning Contractors' National Association; 2012.

1.04  ADMINISTRATIVE REQUIREMENTS
   A.  Preinstallation Meeting: Convene one week before starting work of this section.

1.05  SUBMITTALS
   A.  See Section 01.30.00 - Administrative Requirements, for submittal procedures.
   B.  Product Data: Provide data on metal types, finishes, characteristics.
   C.  Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.
   D.  Color Samples: Submit two samples 12 x 12 inch in size illustrating metal finish color.

1.06  QUALITY ASSURANCE
   A.  Perform work in accordance with SMACNA (ASMM) requirements and standard details, except as otherwise noted.
   B.  Installer Qualifications: Company specializing in performing sheet metal roof installations with minimum three years of experience.

1.07  DELIVERY, STORAGE, AND HANDLING
   A.  Stack material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
B. Prevent contact with materials that could cause discoloration or staining.

1.08 WARRANTY
A. Correct defective Work within a five year period after Date of Substantial Completion. Defective work includes degradation of metal finish.
B. Provide five year manufacturer warranty for watertightness and materials. Warranty shall include degradation of metal finish.

PART 2 PRODUCTS

2.01 SHEET MATERIALS
A. Pre-Finished Galvanized Steel Sheet: ASTM A653/A653M, with G90/Z275 zinc coating; 24 gage, 0.0239 inch minimum base metal thickness, shop pre-coated with PVDF (polyvinylidene fluoride) coating; color as selected.

2.02 ACCESSORIES
A. Fasteners: Stainless steel, with soft neoprene washers.
B. Sealant to be Concealed in Completed Work: Non-curing butyl sealant.
C. Sealant to be Exposed in Completed Work: ASTM C920 elastomeric sealant, 100 percent silicone with minimum movement capability of plus/minus 25 percent and recommended by manufacturer for substrates to be sealed; clear.

2.03 FABRICATION
A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
B. Fabricate cleats of same material as sheet, thickness to match roofing sheet, and at least ___ inch wide, interlockable with sheet.
C. Fabricate starter strips, interlockable with sheet.
D. Form pieces in longest practical lengths.
E. Hem exposed edges on underside 1/2 inch; miter and seam corners.
F. Form material with standing seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.

2.04 FACTORY FINISHING
B. Color: As selected by Architect from manufacturer's full colors.
C. Primer Coat: On coated sheets, finish concealed side of sheet with primer compatible with finish system as recommended by finish system manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION
A. Inspect roof deck to verify deck is clean and smooth, free of depressions, waves, or projections, properly sloped to drains.
B. Verify deck is dry and free of snow or ice. Verify joints in wood deck are solidly supported and fastened.
C. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, reglets are in place, and nailing strips located.
D. Verify roofing termination and base flashings are in place, sealed, and secure.

3.02 PREPARATION
A. Install starter and edge strips, and cleats before starting installation.
B. Back paint concealed metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to a minimum dry film thickness of 15 mil.

3.03 INSTALLATION - FLAT SEAM ROOFING
A. Notch corners and turn up edges 3/4 inch.
B. Lay sheets with long dimension parallel to eaves. Apply pans beginning at eaves.
C. Lock cleats into seams and flatten in direction of drainage.
D. Stagger transverse joints of roofing sheets.
E. At eaves and gable ends, terminate roofing by hooking over edge strip.
F. Fold lower ends of seams at eaves over at 45 degree angle.

3.04 INSTALLATION - BUILT-IN GUTTERS AND DOWNSPOUTS
A. Secure gutter lining to substrate with cleats spaced minimum ___ inches on center along edges of gutters.
B. Longitudinal joints not acceptable.
C. At roof edges, extend gutter lining under metal roofing 6 inches minimum and terminate in 3/4 inch folded edge secured by cleats. Hook lower end of roofing into lock strip to form 3/4 inch wide loose-lock seam.
D. Seal gutters watertight. Seal joint of gutter to drain.

3.05 INSTALLATION - FLASHINGS
A. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted.
B. Cleat and seam all joints.
C. Apply plastic cement compound between metal flashings and felt flashings.
D. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.

3.06 PROTECTION
A. Do not permit traffic over unprotected roof surface.

END OF SECTION
SECTION 07.92.00
JOINT SEALANTS

PART 1  GENERAL

1.01  SECTION INCLUDES
A. Self-leveling pourable joint sealants.
B. Joint backings and accessories.

1.02  RELATED REQUIREMENTS
A. Section 01.61.16 - Volatile Organic Compound (VOC) Content Restrictions: Additional requirements for sealants and primers.
B. Section 07.13.00 - Sheet Waterproofing: Sealing cracks and joints in waterproofing substrate surfaces using materials specified in this section.
C. Section 08.71.00 - Door Hardware: Setting exterior door thresholds in sealant.
D. Section 09.21.16 - Gypsum Board Assemblies: Sealing acoustical and sound-rated walls and ceilings.
E. Section 09.22.16 - Non-Structural Metal Framing: Sealing between framing and adjacent construction in acoustical and sound-rated walls and ceilings.

1.03  REFERENCE STANDARDS

1.04  SUBMITTALS
A. See Section 01.30.00 - Administrative Requirements, for submittal procedures.
B. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.
   1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
   2. List of backing materials approved for use with the specific product.
   3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
   4. Substrates the product should not be used on.
   5. Substrates for which use of primer is required.
C. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.
D. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.
E. Field Quality Control Plan: Submit at least two weeks prior to start of installation.
F. Field Quality Control Log: Submit filled out log for each length or instance of sealant installed, within 10 days after completion of inspections/tests; include bagged test samples and photographic records, if any.

1.05  QUALITY ASSURANCE
A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
B. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience and approved by manufacturer.

C. Field Testing Agency Qualifications: Experienced in performing the inspections/testing specified, with qualified technicians on staff.

D. Field Quality Control Plan:
   1. Visual inspection of entire length of sealant joints.

1.06 WARRANTY
A. See Section 01.78.00 - Closeout Submittals, for additional warranty requirements.
B. Correct defective work within a five year period after Date of Substantial Completion.
C. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 MANUFACTURERS
A. Nonsag Sealants: Permits application in joints on vertical surfaces without sagging or slumping.
   4. Substitutions: See Section 01.60.00 - Product Requirements.
B. Selfleveling Sealants: Pourable or self-leveling sealant that has sufficient flow to form a smooth, level surface when applied in a horizontal joint.
   4. Substitutions: See Section 01.60.00 - Product Requirements.

2.02 JOINT SEALANT APPLICATIONS
A. Scope:
   1. Exterior Joints: Seal open joints, whether or not the joint is indicated on the drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.
      a. Wall expansion and control joints.
      b. Joints between door, window, and other frames and adjacent construction.
      c. Joints between different exposed materials.
      d. Openings below ledge angles in masonry.
      e. Other joints indicated below.
   2. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
      a. Joints between door, window, and other frames and adjacent construction.
      b. Other joints indicated below.
   3. Do not seal the following types of joints.
      a. Intentional weepholes in masonry.
      b. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.
      c. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
      d. Joints where installation of sealant is specified in another section.
      e. Joints between suspended panel ceilings/grid and walls.
B. Exterior Joints: Use nonsag non-staining silicone sealant, _____, unless otherwise indicated.
C. Interior Joints: Use nonsag polyurethane sealant, unless otherwise indicated.
   1. Wall and Ceiling Joints in Non-Wet Areas: Acrylic emulsion latex sealant; Type _____.
D. Sound-Rated Assemblies: Walls and ceilings identified as "STC-rated", "sound-rated", or "acoustical".

2.03 JOINT SEALANTS - GENERAL
   A. Sealants and Primers: Provide products with levels of volatile organic compound (VOC) content as indicated in Section 01.61.16.

2.04 ACCESSORIES
   A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
      1. Type for Joints Not Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type O - Open Cell Polyurethane.
      2. Type for Joints Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type B - Bi-Cellular Polyethylene.
      3. Open Cell: 40 to 50 percent larger in diameter than joint width.
      4. Closed Cell and Bi-Cellular: 25 to 33 percent larger in diameter than joint width.
   B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.
   C. Masking Tape: Self-adhesive, nonabsorbent, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.
   D. Joint Cleaner: Non-corrosive and non-staining type, type recommended by sealant manufacturer; compatible with joint forming materials.
   E. Primers: Type recommended by sealant manufacturer to suit application; non-staining.

PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify that joints are ready to receive work.
   B. Verify that backing materials are compatible with sealants.
   C. Verify that backer rods are of the correct size.

3.02 PREPARATION
   A. Remove loose materials and foreign matter that could impair adhesion of sealant.
   B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.
   C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
   D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.
   E. Concrete Floor Joints That Will Be Exposed in Completed Work: Test joint filler in inconspicuous area to verify that it does not stain or discolor slab.

3.03 INSTALLATION
   A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
   B. Perform installation in accordance with ASTM C1193.
C. Perform acoustical sealant application work in accordance with ASTM C919.

D. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.

E. Install bond breaker backing tape where backer rod cannot be used.

F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.

G. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.

H. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

I. Concrete Floor Joint Filler: After full cure, shave joint filler flush with top of concrete slab.

3.04 FIELD QUALITY CONTROL

A. Perform field quality control inspection/testing as specified in PART 1 under QUALITY ASSURANCE article.

B. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.

3.05 POST-OCCUPANCY

A. Post-Occupancy Inspection: Perform visual inspection of entire length of project sealant joints at a time that joints have opened to their greatest width; i.e. at the low temperature in the thermal cycle. Report failures immediately and repair.

END OF SECTION