

DIVISION 1

SECTION 01340 - SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

PART I - GENERAL

- 1.01 Related Documents
- 1.02 Requirements
- 1.03 Submittal Procedure

PART II - PRODUCTS

Not Applicable

PART III - EXECUTION

Not Applicable

SECTION 01340 - SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

PART I - GENERAL

1.01 Related Documents

The provisions of the Contract, the General Conditions, the Supplementary Conditions and other Division I Specification Sections, apply to the work in this section.

1.02 Requirements

This section refers to non-administrative submittals such as shop drawings, product samples, data and other related items. These submittals are in addition to such administrative items as, Permits, Schedule of Values, Payment Applications, Performance and Payment Bonds, Insurance Certificates, Listing (Subcontractors, Suppliers and Fabricators).

1.03 Submittal Procedure

Schedule and coordinate submittals to correspond to the progress of the work and with sufficient time to allow for review and processing by the Owner's Representative.

No extensions of time will be allowed because of the Contractor's failure to transmit submittals in a timely fashion.

PART II - PRODUCTS

Not Applicable

PART III- EXECUTION

Not Applicable

END OF SECTION 01340

DIVISION 1

SECTION 01600 - MATERIALS

PART I - GENERAL

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- 1.03 General Product Requirements
- 1.04 Transportation and Handling
- 1.05 Storage and Protection
- 1.06 Substitutions
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PART II - PRODUCTS

Not Applicable

PART III - EXECUTION

Not Applicable

SECTION 01600 - MATERIALS

PART I - GENERAL

1.01 Related Documents

The provisions of the Contract, the General Conditions, the Supplementary Conditions and other Division I Specification Sections, apply to the work in this section.

1.02 Products

- A. For products specified only by Reference Standards, select any product meeting standards, by any manufacturer.
- B. For products specified by naming several products or manufacturers, select any product and manufacturer named.
- C. For products specified by naming one or more products, but indicating the option of selecting equivalent products e.g., by stating "or approved equal" after specified product, Contractor must submit request as required for substitution, for any product not specifically named.
- D. For products specified by naming only one product and manufacturer, there is no option, and substitutions will be allowed by approval prior to bidding only. The products specified shall be the minimum standard for the purposes of establishing equality of proposed material substitutes.

1.03 General Product Requirements

Provide products which comply with requirements in new unopened containers, clearly marked from the Manufacturer.

1.04 Transportation and Handling

- A. Deliver products to site with seals and labels intact.
- B. Deliver materials in manufacturer's original containers, dry, undamaged.
- C. Stand roll materials on end.

1.05 Storage and Protection

- A. During execution of work covered by these specifications, the Contractor shall provide protection for equipment, materials, and personnel inside building against falling debris, sparks, and water. Protection shall be provided in a manner to minimize interference, interruption, and inconvenience to any ongoing activities.
- B. The contractor shall protect from damage, all existing mechanical, electrical and plumbing equipment.

- C. Protect building surfaces against damage from roofing work.
- D. All workmen shall wear clean, soft rubber-soled shoes for any application work where they may be walking on the in-place roofing membrane. Precautions shall be taken to protect the membrane and to maintain a clean appearance.

1.06 Substitutions

- A. During bidding, Contracts/Engineer will consider written requests from prime bidders for substitutions, received at least **7 DAYS PRIOR TO BID DATE**; requests received after that time will not be considered. In the event a substitution is accepted, all bidders shall be notified of the acceptable alternate within (3) three days prior to the bid opening.
- B. Submit five copies of request for substitution, include in request:
 - 1. Complete data substantiating compliance of proposed substitution with Contract Documents.
 - 2. For products:
 - a. Product identification, including manufacturer's literature and manufacturer's name and address & phone number.
 - b. Current certificate from an accredited testing laboratory comparing the physical and performance attributes of the proposed material with those of the specified materials substantiating, SEBS Rubber Content, Ash Content, Low Temperature Flexibility, Tensile Strength of finished membranes. Test results must be dated, notarized, and on testing laboratory stationery.
 - c. A five gallon sample of any adhesive, coating, mastic or sealant and a 3'x 5', sample of any sheeting goods as may be specified. Manufacturer's labels must be on containers, smaller containers may be submitted if manufacturer's labels are attached.
 - d. Material Safety Data Sheets providing all pertinent data as to flammability, combustibility, toxicity, etc.

- e. List of at least (5) five local jobs, where the proposed alternate material was used under similar conditions. These jobs must be available for inspection by the Architect. Names and phone numbers are required for verification.
- f. Notarized statement from the Roofing System Manufacturer, signed by a corporate officer of the Corporation with the Corporate Seal affixed thereto stating in writing that;
 - 1. All Bidding Documents have been reviewed and approved of.
 - 2. The Project site has been inspected.
 - 3. The Roofing System Manufacturer will provide daily field inspections during period of construction. Inspections shall be performed by a full time employee of the manufacturer. These inspections shall be provided to the Owner at no additional cost, or charge to them.
- 3. For construction methods:
 - a. Detailed description of proposed method.
 - b. Drawings illustrating methods.
- 4. Itemized comparison of proposed substitution with product or method specified.
- 5. Data relating to changes in construction schedule.
- 6. Accurate cost data on proposed substitution in comparison with product or method specified, including presenting credits to the Owner, where applicable.

C. In making request for substitution, Bidder/Contractor represents:

- 1. He has personally investigated proposed product or method, and determined that it is equal or superior in all respects to that specified.
- 2. He will provide the same guarantee for substitution as for product or method specified.

3. He will coordinate installation of accepted substitution in work, making such changes as may be required for work to be completed in all respects.
4. He waives all claims for additional cost related to substitution which consequently become apparent.
5. Cost data is complete and includes all related cost under his contract or other contracts which may be affected by the substitution.

D. Substitutions will not be considered if:

1. Product or method to be considered does not have a minimum of (10) ten years of successful performance in roofing and reroofing applications in the United States.
2. Any discrepancies in the test data, or if the tests or submittals are incomplete.
3. They are indicated or implied on Shop Drawings or Project Data Submittals without formal request.
4. Acceptance will require substantial revision of Contract Documents.

NOTE: THESE REQUIREMENTS ARE NOT INTENDED TO LIMIT COMPETITION. THE INTENTION OF THESE REQUIREMENTS IS TO ESTABLISH THE EQUALITY OF ANY SUBSTITUTE PRODUCT OR METHOD WITH THE STANDARD PRODUCT/METHOD SPECIFIED. ALSO, IT WILL GIVE AN EQUAL OPPORTUNITY TO ALL CONTRACTORS TO BID AN APPROVED SUBSTITUTE PRODUCT/METHOD IF ANY SUBSTITUTE IS APPROVED.

1.07 Work-Related Submittals

Contractor's submittal of shop drawings, product data or samples which relate to work not complying with requirements of Contract Documents, does not constitute an acceptable or valid request for a substitution, nor approval thereof.

1.08 Guaranty/Warranty

- A. Provide a manufacturer's 30 year warranty for materials and installation at no cost to the Owner.
- B. Manufacturer's Warranty: Cover all cost of repairs to the roof system necessary to stop any leaks which occur during the warranty period. The material manufacturer shall warrant and guarantee all work against defects in materials, equipment or workmanship, or as a result of the following:
 - 1. Deterioration of the roofing membrane or flashing system resulting from ordinary wear and tear by the elements.
 - 2. Workmanship on the part of the roofing contractor in the application of the roofing system.
 - 3. Splits or breaks in the membrane not caused by structural movement or failure or any movement of material underlying the roofing membrane or base flashing.
 - 4. Blisters, wrinkles, ridges, fishmouths, or open laps in the roofing membrane.
 - 5. Slippage of the roofing membrane or base flashing.

END OF SECTION 01600

SECTION 07220
ROOF DECK AND INSULATION

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. Mechanically fasten base layer of 1/8" tapered polyisocyanurate insulation.
- B. Install hat channels according to I - 90 wind uplift requirements.
- C. Install 1" Polyisocyanurate insulation according to I - 90 wind uplift requirements,

1.2 RELATED SECTIONS

- A. Drawing and general provisions of the Contract, including General Supplementary Conditions and Division 1 Specification Sections, Apply to this Section.

B. RELATED SECTIONS

- 1. Section 07660 - Flashing and Sheet Metal
- 2. Section 07720 - Roof Accessories

1.3 REFERENCES

ASTM A-167-94a	Specification for Stainless and Heat-Resisting Chromium Nickel Steel Plate, Sheet and Strip
ASTM A- 653	Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc - Iron Alloy-Coated (Galvanized) by the Hot-Dip Process
ASTM B-29	Pig Lead
ASTM B-32	Solder Metal
ASTM C-165-95	Test Method for Measuring Compressive Properties of Thermal Insulation
ASTM C-208-95	Specifications for Cellulosic Fiber Insulating Board
ASTM C-209-92	Test Method for Cellulosic Fiber Insulating Board
ASTM C-272-91	Test Method for Water Absorption of Core Materials for Structural Sandwich Constructions
ASTM C-36	Specification for Gypsum Wallboard
ASTM C-518-91	Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
ASTM C-578-92	Specification for Rigid, Cellular, Polystyrene Thermal Insulation
ASTM C-728-91	Specification for Perlite Thermal Insulation Board
ASTM D-5	Test Method for Penetration of Bituminous Materials
ASTM D-36	Test Method for Softening Point of Bitumen (Ring and Ball Apparatus)
ASTM D-92	Test Method for Flash and Fire Pints by Cleveland Open Cup
ASTM D-312	Specification for Asphalt Used in Roofing

ASTM D-412-92	Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension
ASTM D-1621-94	Test Method for Compressive Properties of Rigid Cellular Plastics
ASTM D-1622	Test Method for Apparent Density of Rigid Cellular Plastics
ASTM D-1863	Specification for Mineral Aggregate Used on Built-up Roofs
ASTM D-2126-94	Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging
ASTM D-2178	Standard Specification for Asphalt Glass Felts used in Roofing and Waterproofing
ASTM D-4601-94	Specification for Asphalt - Coated Glass Fiber Base Sheet Used in Roofing
ASTM D-5147	Sampling and Testing Modified Bituminous Sheet Material
CISPI	Cast Iron Soil Pipe Institute, Washington, D.C.
FM	Factory Mutual System, Norwood, Massachusetts
NRCA	National Roofing Contractors Association, Chicago, IL
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SDI	Steel Deck Institute, St. Louis, Missouri
SPIB	Southern Pine Inspection Bureau, Pensacola, Florida
UL	Underwriter's Laboratories, Inc., Northbrook, Illinois
FS HH-I-1972	Insulation Board, Polyisocyanurate
FS LLL-1-535B	Insulation Board, Thermal (Fiberboard)
WH	Warnock Hersey International, Inc. Middleton, WI

1.4 SUBMITTALS

- A. Submit under provisions of Section 01300 - Submittals.
- B. Product Data: Provide manufacturer's specification data sheets for each product in accordance with Section 01300.
- C. Provide approval letters from insulation manufacturer for use of their insulation within this particular roofing system type.
- D. Provide a sample of each insulation type.
- E. Shop Drawings
 1. Submit manufacturer's shop drawings indicating complete installation details of tapered insulation system, including identification of each insulation block, sequence of installation, layout, drain locations, roof slopes, thicknesses, crickets and saddles.
 2. Shop drawing shall include: Outline of roof, location of drains, complete board layout of tapered insulation components, thickness and the average "R" value for the completed insulation system.

F. Certification

1. Submit roof manufacturer's certification that insulation fasteners furnished are acceptable to roof manufacturer.
2. Submit roof manufacturer's certification that insulation furnished is acceptable to roofing manufacturer as a component of roofing system and is eligible for roof manufacturer's system warranty.
3. Submit certification that insulation and fastening system furnished is Tested and Approved by Factory Mutual for I-90 Wind Up-Lift Requirements.

1.5 QUALITY ASSURANCE:

A. Fire Classification, ASTM E-108

It is the intent of this specification to provide a roof system with an external fire rating. The descriptions given below are general descriptions. The insulation, recovery board, and other components shall be as required by the membrane manufacturer to provide a Factory Mutual Class 1A fire resistance rating or Listed by Underwriter's Laboratories or Warnock Hersey for external fire tests of ASTM - E - 108 Class A.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original, unopened containers or packages with labels intact and legible.
- B. Store all insulation materials in manner to protect them from the wind, sun, and moisture damage prior to and during installation. Any insulation that has been exposed to any moisture shall be removed from the project site.
- C. Keep materials enclosed in a watertight, ventilated enclosure (i.e. tarpaulins)
- D. Store materials off the ground. Any warped or broken insulation boards shall be removed from the site.

PART 2 - PRODUCTS

2.1 APPROVED EQUIVALENT

- A. Contractor must submit any product not specified a minimum seven days before the bid date to Owner in order for product to be considered for approval. The Owner will notify Contractor, in writing, of decision to accept or reject request.

2.2 INSULATION MATERIALS

- A. Provide thicknesses of insulation as indicated, provide combination of types and thicknesses to provide a complete system.

1. TAPERED POLYISOCYANURATE ROOF INSULATION

- a. Qualities: Factory Tapered, closed cell polyisocyanurate foam core bonded to heavy duty glass fiber mat facers.

1. Taper Thickness: Minimum 1/2 in. at low points.
2. Tapered Slope: 1/8 [1/4] in. per foot.
3. Average R-Value: Minimum 10.0 [].

b. Source

1. ENRGY-2 By NRG Barriers, Inc.
2. UltraGard Gold II by Schuller Roofing Systems
3. GAFTEMP Isotherm R by GAF
4. Approved Equivalent

c. Insulation board shall meet the following requirements

1. UL, WH or FM listed under Roofing Systems
2. Federal Specification HH-I-1972, Class 1

d. Physical Properties

Dimensional Stability	ASTM D2126	2% max.
Compressive Strength	ASTM D1621	25 psi min.
Vapor Permeability	ASTM E-96	1 perm max.
Foam Core Density	ASTM D-1622	2.0 pcf min.
Water Absorption	ASTM C209	<1%
R-Factor HR per inch Thickness	ASTM C518	5.6 (Design Value)

2. RIGID POLYISOCYANURATE ROOF INSULATION

a. Qualities: Rigid, closed cell polyisocyanurate foam core bonded to heavy duty glass fiber mat facers.

1. Thickness: 1" in.
2. R-Value: Minimum 6.67

b. Source

1. ENRGY-2 By NRG Barriers, Inc.
2. Ultra Gard Gold II by Schuller Roofing Systems
3. GAFTEMP Isotherm R by GAF
4. Approved Equivalent

c. Insulation board shall meet the following requirements

1. UL, WH or FM listed under Roofing Systems
2. Federal Specification HH-I-1972, Class 1

d. Physical Properties

Dimensional Stability	ASTM D2126	2% max.
Compressive Strength	ASTM D1621	25 psi min.
Vapor Permeability	ASTM E-96	1 perm max.
Foam Core Density	ASTM D-1622	2.0 pcf min.
Water Absorption	ASTM C209	<1%
R-Factor HR per inch		
Thickness	ASTM C518	5.6 (Design Value)

2.3 RELATED MATERIALS

A. Fiber Cant and Tapered Edge Strips: Performed rigid insulation units of sizes/shapes indicated, matching insulation board or of perlite or organic fiberboard, as per the approved manufacturer.

1. Acceptable Manufacturers
 - a. The Garland Company
 - b. Celotex
 - c. Schuller Roofing Systems
 - d. International Permalite, Inc.
 - e. Approved Equivalent

B. Fasteners

1. Corrosion resistant screw fastener as recommended by roof membrane manufacturers
2. Factory Mutual Tested and Approved with 3 in. coated disc for 1-90 rating, length required to penetrate metal deck one inch.
3. Minimum pull out resistance of 800 lbs.

PART 3 - EXECUTION

3.1 INSPECTION OF SURFACES

- A. Roofing contractor shall be responsible for preparing and adequate substrate to receive insulation.
1. Verify that work which penetrates roof deck has been completed.
 2. Verify that wood nailers are properly and securely installed.
 3. Examine surfaces for defects, rough spots, ridges, depressions, foreign material, moisture, and unevenness.
 4. Do not proceed until defects are corrected.
 5. Do not apply insulation until substrate is sufficiently dry.
 6. Broom clean substrate immediately prior to application.
 7. Use additional insulation to fill depressions and low spots that would otherwise cause ponding water.
 8. Verify that temporary roof has been completed.

3.2 INSTALLATION

A. Attachment with Mechanical Fasteners

1. Approved insulation board shall be fully attached to the deck with an approved mechanical fastening system. As a minimum, the amount of fasteners shall be in accordance with manufacturer's recommendation for FM 1-90 approved system. Otherwise, a minimum of one fastener per two square feet shall be installed.
2. Filler pieces of insulation require at least two fasteners per piece if size of insulation is less than four square feet.
3. Spacing pattern of fasteners shall be as per manufacturer's recommendations to meet the FM I-90 requirements. Placement of any fastener from edge of insulation board shall be a minimum of three inches, and a maximum of six inches.
4. Minimum penetration into deck shall be as recommended by the fastener manufacture. There is an one inch (1") minimum for metal.

3.3

CLEANING

- A. Remove debris and cartons from roof deck. Leave insulation clean and dry, ready to receive roofing membrane.

END OF SECTION

SECTION 07410
MANUFACTURED ROOF PANELS

PART I GENERAL

1 SUMMARY

A. Section Includes:

1. Sealed seam steel roofing system.
2. Related flashings and accessories.

B. Related Sections:

1. Section 07220 - Roof and Deck Insulation
2. Section 07710 - Manufactured Roof Specialties
3. Section 07920 - Sealants, Caulking and Seals
4. Section 01200 - Project Meetings
5. Section 01640 - Products Testing and Substitution
6. Section 07620 - Sheet Metal Flashing and Trim
7. Section 07630 - Sheet Metal Roofing Specialties
8. Section 07910 - Joint Fillers, Gaskets and Compression
Seals
9. Section 09800 - Metal Protective Coatings

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM A446: Steel Sheet, Zinc-Coated (Galvanized) by the Hot Dip Process, Structural (Physical) Quality
2. ASTM A525-91b: General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot Dip Process
3. ASTM A527-80: Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Lock-Forming Quality

4. ASTM A792-77: Steel Sheet, Aluminum-Zinc Alloy-Coated by the Hot-Dip Process
 5. ASTM E241-77: Increased Durability of Building Constructions Against Water Induced Damage
 6. ASTM E283: Static Air Infiltration
 7. ASTM E331: Static Water Infiltration
- B. Sheet Metal and Air Conditioning Contractors of North America (SMACNA): Architectural Sheet Metal Manual
 - C. National Coil Coaters Association
 - D. Uniform Building Code
 - E. Underwriters Laboratories (UL): Applicable listings.
 - F. Factory Mutual Research Corporation (FM): Applicable listings.

1.3 SYSTEM DESCRIPTION

- A. Provide a factory-formed, prefinished, sealed-seam metal roofing system with non-thermal bridging fastening system over rigid insulating substrate that includes:
 1. Panels pre-manufactured in continuous lengths up to one hundred feet.
 2. Flashings, edges, and terminations pre-manufactured by the panel manufacturer.
 3. Steel framing and support structure pre-fabricated and furnished by the panel manufacturer.
 4. All exposed fasteners shall be furnished by the panel manufacturer.
 5. All caulking, sealants, and related roofing components furnished by the panel manufacturer.
- B. Provide a completed roofing system that has been evaluated and tested with documentation to support the following requirements:
 1. Roof system's ability to adequately absorb all movement or withstand all stresses induced through a 100 degree Fahrenheit temperature change, with a safety factor of 1.5.
 2. Roof system's ability to withstand a minimum 200 PSF live load for ten minutes.
 3. System shall be verified to support an 80 PSF design live load with a 2.5 minimum factor of safety.

4. The sealed seam of the roofing system shall be tested and verified to retain 3" of water above the highest point of the seam for a period of one hour without any leakage.

5. Thermal Performance:

- a. Minimum Average Thermal Resistance (R):

1. R - 10

- b. Manufacturer shall verify that no heat-conductive mechanical fastener shall be required in the roof system that will be in contact with both the steel roof surface and the interior building space, air plenum, or attic.

- 1.4 SUBMITTALS

- A. Prior to Bid:

1. Products Data:

- a. Manufacturers product catalogs or descriptive data, standard specifications and details.
 - b. Technical data to substantiate compliance with these specifications.

2. Certification:

- a. Independent laboratory testing report for system design load and seam integrity.
 - b. Professional engineer's documentation that system incorporates sufficient allowance for stress and movement.
 - c. A letter from an officer of the manufacturing company certifying that the materials furnished for this project are the same as represented in tests and supporting data.
 - d. Manufacturer's verifications that the panels are factory roll formed.

- B. Prior to Fabrication:

1. Shop drawings showing layout of every roof panel and structural supporting member required in the installation with side laps and end laps marked within 1% deviation of their actual location. Details shall also be provided for edge conditions, seams, joints, corners, panel profiles, assembly anchoring techniques, round and square flashings and counterflashings.
 2. Samples illustrating thickness, finish, color and textures of materials.
 3. Mill production reports showing that the steel thicknesses are within allowable tolerances of the nominal or minimum thickness or gauge specified.

C. Prior to Final Acceptance:

1. Manufacturer's standard Care and Maintenance Manual.
2. A final corrected copy of catalog data and as-built Shop Drawings.
3. Copies of manufacturer's job progress and inspection reports with photographic documentation.

1.5 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installer shall demonstrate written proof that he has completed the manufacturer's Approved Roofing Contractor course and is formally licensed for the installation of this roof system.
2. Installer shall further provide evidence that the superintendent and foreman selected for supervision on this job shall be approved by the manufacturer or shall submit a resume of past jobs of similar scope and complexity that the personnel have been involved with.

B. Submit certifications of compliance with regulatory requirements:

1. State and City Uniform Building Code.
2. Compliance with Recycled Materials Act.
3. ASTM E-108 or similar evidence of Class A Fire Resistance..
4. Factory Mutual wind uplift requirement for Class1 - 90

C. Manufacturer's Qualifications:

1. Roof system manufacturer shall be a nationally recognized, prime manufacturer of metal roof systems.
2. Manufacturer shall have direct authority and control over all fabrication of steel components as well as the raw materials used in their fabrication.
3. Manufacturer shall be a member of the National Roofing Contractors Association (NRCA) and shall abide by the published standard practices of the organization.
4. Manufacturer shall have in place a documented, standardized method for maintaining quality control such as ISO-9002 approval

D. Designer/Inspector Qualifications:

1. The roof system shall be designed by an employee of the manufacturer who has visited the job site and has familiarized himself with all conditions of the job.

2. The designer shall conduct all required periodic inspections of work in progress as described herein and shall furnish written documentation of all such inspections.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. All roof panels shall be shipped from the manufacturer with polystyrene or similar cushioned packaging material separating the individual panels to minimize flexing, stressing, scratching or otherwise damaging the material during transit to the job.
- B. All steel shall be fully covered during transit by tarpaulins or similar protective cover to prevent dirt and debris from coming in contact with the finished goods.
- C. Stack prefabricated materials to prevent twisting, bending, abrasion and denting and elevate one end to facilitate moisture run-off.
- D. Load roof panels using a boom or crane, supporting the panels in at least two locations during lifting, and never lift more than three panels at a time.
- E. Cover all materials that are moisture sensitive to keep completely protected from the weather.
- F. Protect water-based materials from inclement weather.
- G. It is the installer's responsibility to confirm the correct quantity and condition of all material prior to accepting delivery.

1.7 PROJECT/SITE CONDITIONS

- A. Field Measurements:
 1. It is the installer's responsibility to confirm field dimensions prior to ordering for fabrication.
 2. All field measurements shall be performed in a manner to allow for the minimum number of field seams while assuring that water flows parallel to the roll-formed direction of the panels.
- B. Pre-Construction Meeting shall be required a minimum of one week after award.
 1. Review specifications, proposed deviations, discuss shop drawings, and verify substrate conditions.
 2. Clarify site access, storage areas, crane access, coordination with trades and sequencing of work.
 3. Verify exact measurements of roof areas to order material sizes and determine if manufacturer technical support should be scheduled.

1.8 SEQUENCING AND SCHEDULING

- A. All tapered insulation and/or structural systems, including drain crickets and saddles shall be installed prior to installation of the roof framing system.
- B. All masonry repairs, painting, or debris removal to occur above the roof system shall be completed prior to completion of this roof area.
- C. All copper, lead or other metal they may induce galvanic corrosion shall be removed or replaced prior to the installation of steel products that will be in direct exposure with the dissimilar material.
- D. Coordinate all plumbing, mechanical and electrical trades so that newly installed roofing is not unnecessarily damaged.

1.9 WARRANTY

- A. Complete roof system shall be warranted against leaks for a period of 30 years.
- B. All steel and paint finishes shall be warranted by the manufacturer to be free from red rust, chipping, cracking, flaking, blisters or peeling for a period of twenty years.

PART 2 PRODUCTS

2.1 SYSTEM PERFORMANCE

- A. Longevity:
 - 1. System, as specified, shall have been in continuous use for a minimum of thirty (30) years.
- B. Utility:
 - 1. System shall be capable of accommodating the existing building structure without the need for major structural modification, alteration, or disturbance of the existing operation.
- C. Versatility:
 - 1. System shall be capable of adaptation to any commonly used structural type so that standardization of use may be maintained in the future.
 - 2. System shall demonstrate that future modifications can be made such as addition and/or removal of roof top equipment or building additions.
- D. Design:
 - 1. System shall be capable of installation with all seam and flashing sealants in continuous, full compression.
 - 2. System shall be capable of accommodating all expected, normal building movement without any transmittal of expansion or contraction through or along a sealed seam.

2.2 COMPONENTS

A. Aluminum-Zinc Alloy Coated Steel:

1. Steel sheet, Aluminum-Zinc Alloy Coated, ASTM A792, Coating Designation AZ-50, in thickness of .0157 for field panel, .0217 for accessory components, .0336 for framing pieces by min. 36 in. by coil, chemically treated, commercial, lock-forming quality.

B. Steel Finishes

1. Siliconized modified polyester, fluorocarbon, or plastisol finish. Epoxy primer baked both sides, .2-.25 mils thickness as approved by finish coat manufacturer. Weathering finish as referred by National Coil Coaters Association (NCCA).

Property	Test Method	SMP	Fluorocarbon*	Plastisol*
Pencil Hardness	ASTM D-3363 NCAA II-2	F-H	HB-H	not applicable
Bend	ASTM D-4145 NCAA II-19	2-T	O-T	O-T
Cross-Hatch Adhesion	ASTM D-3359	no loss of adhesion	no loss of adhesion	no loss of adhesion
Gloss (60 degree angle)	ASTM D-523	90+/-5%	25+/-5%	30+/-10%
Reverse Impact	ASTM D-2794	no cracking or loss of adhesion	no cracking or loss of adhesion	no cracking or loss of adhesion
Nominal Thickness ASTM D-1005				
primer		0.2 mils	0.2 mils	0.2 mils
topcoat		0.8 mils	0.8 mils	4.0 mils
total		1.0 mils	1.0 mils	4.2 mils

*Subject to minimum quantity requirements

C. Accessories:

1. Job Installed In-Seam Sealant: Modified polyisobutylene tape, 1/8" thick by 1-1/2" wide, minimum.
 - a. Seaming material shall be comprised of a pre-formed, non-hardening polyisobutylene rubber based elastic compound designed for use where space tolerance is limited.
 - b. Material shall be furnished in a two-sided, moisture-proof, self-adhering tape form that shall accommodate compression, extension, elongation in a form fitting profile without exhibiting memory tendency in order to allow for permanent or semi-permanent surface irregularities or structural expansion/contraction within the system.
 - c. Elongation: 25% Maximum
 - d. Recovery: 2% Maximum
 - e. Solids: 100% Maximum
 - f. Odor: NONE
 - g. Cure Time: Non-Curing
 - h. Flow: Slight
 - i. Color: Black or white
 - j. Adhesion (Metal): Peel: 15lbs./lin.in.
Shear: 55lbs./in.
 - k. Seamability: 100% cohesion of mating surfaces
 - l. Cold Temperature: Passes -30 degrees F. Flex over 1" Mandrel
 - m. Softening Point: 200 degrees F.
2. Factory Applied Sealant:
 - a. Sealant must consist of a specified hot melt (100% solids thermoplastic material) in a 100% consistent application to effect a permanent, water-tight seal in a full compression configuration.
3. One component urethane meeting FS TT-S-00230C and ASTM C-920-79.
4. One component acrylic terpolymer meeting FS TT-S-00230.
5. Framing System Fasteners:
 - a. Metal Deck: ASTM A4470 Pinch point, fluorocarbon coated #14 fastener.
6. Seam Screws: Sheet Metal Fastener size #10 or #12 by 3/4" or 1" coated to meet ASTM 4470 corrosion test as supplied by roof system manufacturer.
7. Wood Nailers, Curbs and Sleepers: California Redwood, #2 grade. No treated wood utilizing salt-base preservatives shall be allowed.

8. Miscellaneous Fasteners:
 - a. TEK #1 or #4 screws-
 - b. Expanding fasteners 1/4" min.-
9. Prefabricated Stack Flashings: Flexible pre-fabricated round stack flashings with integrated pressure ring shall be used for all round pipe flashings as furnished by roof system manufacturer.
10. Temporary Night Sealant: Self-contained, two-component urethane foam.
11. Unitized Vents: Spun-aluminum, one way moisture vapor relief vents as furnished by roof system manufacturer.

2.3 FABRICATION

- A. In order to maximize quality control and conform to inorganic coating manufacturers' warranty limitations, all roll forming processes shall be done at the manufacturer's factory. Absolutely no roll forming will be permitted on the job site.
- B. Exercise careful compliance with specified requirements for fabricated profile, dimensional, and structural requirements.
- C. Provision shall be made for the roof system to self-ventilate and breathe according to ASTM E241 guidelines.
 1. Ventilation shall be shown to be free-flowing between panels in each contiguous roof area.
- D. Roofing system shall be designed to resist capillary action of water at any slope.
- E. Tolerances:
 1. Roof system shall be designed to accommodate normal building dimension tolerances without panel distortion or weaving.
 2. Panels shall not be shimmed to straighten an out-of-line structure.
 3. Follow the correct published panel alignment recommendations of the manufacturer without variation.
 4. All supporting and attachment framework and attachment components shall be aligned within 50% of the manufacturer's minimum recommended tolerance.

2.4 SOURCE QUALITY CONTROL

- A. Manufacturer shall furnish written documentation that all roof panels, flashing, trim, seam attachment devices, framing members, weather-exposed accessories, tape, caulking and sealants were furnished by this single-source company.
- B. Manufacturer shall furnish mill production documentation of specifications for steel coil stock used in the fabrication of the roof system, without organic coating per ASTM A446, ASTM A525, ASTM A527 or ASTM A792.
- C. Manufacturer shall furnish all other documentation as required herein.

PART 3 EXECUTION

3.1 VERIFICATION OF CONDITIONS

- A. Contractor shall verify, on-site, that conditions presented are suitable for performance of the work. Report discrepancies in writing to the Owner or Project Designer.
 - 1. The roof deck or substrate shall be inspected to assure that all surfaces are even, sound, and free of depressions, waves or unsuitable projections.
- B. Contractor shall verify all physical dimensions so that all materials are ordered to fit the job.

3.2 PREPARATION

- A. System shall be designed so that the panel installation may be started and/or terminated at any given point in the area. It is understood that the ongoing operations of the Owner are of a critical nature as to leak sensitivity. Do not work on more roof area than can be restored completely watertight in one day.
- B. Remove all existing loose material, dirt and debris down from the roof area. All accumulations of asphalt or other repair materials shall be removed to provide a relatively level substrate.
 - 1. Existing metal details and other metal accessories specified for re-use that interfere with the installation of the new roof system shall be carefully removed and set aside for re-use.
 - 2. Any metal described above that will come in contact with the new roof shall be checked for type and replaced or protected if galvanic action may be a problem.
- C. Existing contaminating material must be stripped from all metal components that are indicated to be re-utilized. Care must be taken to protect these metal components and any damaged shall be replaced with new of similar type and dimension.
- D. All wood blocks and/or sleepers are to be replaced as part of this project with new treated wood or redwood.

- E. Any pipes, conduits or equipment that the Owner determines to be no longer needed shall be removed under this contract.
- F. All curbs, soil stacks, and other interior flashing surfaces shall be extended to a minimum of 8" above the new horizontal roof surface or shall be pressure sealed at the top edge.

3.3 INSTALLATION

- A. Install all components of the roof system in exact accordance with the manufacturer's standard published procedures as applicable to these project conditions and substrates.
- B. The expressed and implied intent of all specifications contained herein shall prevail and take precedent over the manufacturer or any other specifying or associated authority.
- C. At any time during the installation, should manufacturer's procedures and these specifications come into unworkable conflict, all work shall be stopped, interested parties notified, and no work shall take place until a resolution is reached.
- D. Install all required vapor retarders, air seals and preliminary tapered, insulating substrates required per enclosed specifications.
- E. Lay out and anchor all roof framing sections or purlins according to the approved roof plan.
- F. Steel framing system installation
 - 1. The steel framing system shall be installed around the entire perimeter of the roof, all curbs and boxes and as closely to the existing edge and vertical walls as possible. If specified, a secondary framing system shall be installed at a nominal distance of 48" in from all outside perimeters of roof areas. This wind protection frame shall be adjustable 24" in either direction, in order to accommodate coincidental field seams that may occur. FM and/or UL requirements shall eliminate this requirement.
 - 2. The entire roof area shall then be measured and laid out to determine the designed or practical use of the furnished panels. The framing system shall be installed to the roof surface so that the framing system may be fastened through the existing roof and into the roof deck or structured supports with the entire perimeter of all steel panels covering the fastening flange of the metal framing system.
 - 3. A pre-fabricated drain or ridge line framing system shall be installed along the bottom of all valleys, including along the leading edge of crickets and saddles and along the ridges formed by adjoining slopes in excess of 2" in 12" or as specified.
 - 4. All steel frames, as described above, shall be anchored to the roof deck with appropriate fasteners. Frames shall be fitted with thermally specified insulation stripes on non-insulated decks.

5. The adjoining ends of framing sections shall be overlapped. Ends that adjoin or abut the sides of frames shall be lap cut so that there are no gaps between adjoining sections.
- G. Install rigid board insulation as specified in Section 07220 - Roof Deck and Insulation.
- H. Steel roof membrane installation
1. All panels and other components of the work shall be installed and anchored to the framing supports, making provision for the critical concerns specified below:
 2. Seam tape shall be applied to the tops of all framing sections occurring in valley channels, on secondary framing systems, or along leading edge of crickets or saddles, centered along the top of the framing sections. The paper seam tape backer shall be removed
 3. The steel roof membrane shall be applied over the framing sections, beginning at the valley or lowest point of the roof, assuring that the panels completely cover the tops of the steel framing sections. 2" x 8" dimensional wood planks shall be used to hold the membrane in place until properly aligned and anchored.
 4. Seam tape shall be applied to the underside of the overlapping portion of adjoining pieces of metal so that approximately 1/8" of tape extends beyond the edge of the metal.
 5. The taped steel panel shall be aligned so that it overlaps the preceding panel by approximately 1-1/2" but does not extend beyond the edge of the top of the underlying framing section.
 - a. Seam fasteners may be placed at any point along the steel panels to temporarily anchor them in place, but these fasteners may require removal during the final anchoring process to allow all slack to be removed from the panel.
 - b. The location of all blind framing sections shall be marked before placing next panel.
 6. The paper seam tape backer shall be carefully removed from the seam tape, and the panels pressed together.
 7. With the installer using 2" X 8" (min.) wood planks to kneel or stand on, the seam fasteners shall be placed approximately 18" O.C., beginning at the middle of the panel and working towards the ends, so that all slack is distributed throughout the length of the panels.
 8. Final seaming shall be completed by installing seam fasteners every 1-1/4" O.C. between the stabilizing fasteners. Fastener guns with adjustable clutch shall be used on all fastening panels and accessories.
 - a. All seam fasteners shall be set so that the seam is fully compressed, with caution being taken not to over-torque or under-torque the fasteners.

- b. The head of each seam fastener shall be set with its leading edge approximately 1/8" to 1/4" from the edge of the steel panel, but never extending beyond the edge of the seam nor occurring greater than 1/4" away from the edge of the seam.
 - c. Final seaming shall not be completed at the walls or vertical surfaces until the wall flashing system is installed.
 - d. A seam fastener shall be placed in the corner of every panel.
 - e. A seam fastener shall be placed directly on either side of every factory seam.
9. Blind seams shall be completed after all panels are in place.
- a. All seam screws shall be set so that the seam is fully compressed, with caution being taken not to over-torque or under-torque the fasteners.
 - b. Using the marks placed on the panels as a guide to the location of the underlying steel framing section, the installer shall snap a chalk line the entire length of the valley, ridge, or secondary framing section.
 - c. The paper backer shall be carefully removed from the seam tape prior to fastening the panel.
 - d. The final blind seaming shall be completed by installing seam fasteners as specified between the stabilizing fasteners, assuring that the fasteners penetrate the underlying sealant.

I. Steel flashings installation at curb and wall

- 1. Factory fabricated wall flashing pieces shall be installed so that the leading edge of the deck flange lines up with the top of the underlying framing section.
- 2. Seam tape shall be applied to the underside of the wall flashing metal so that approximately 1/8" of tape extends beyond the edge of the metal.
- 3. The wall flashing piece shall press against the vertical wall with a spring tension action.
- 4. The final seaming shall be completed by installing seam fasteners every 1-1/4" O.C.
 - a. All seam fasteners shall be set so that the seam is fully compressed, with caution being taken not to over-torque or under-torque the fasteners.
 - b. The heads of the seam fasteners shall never extend beyond the edge of the seam nor occur greater than 1/4" away from the edge of the seam. The adjoining sections of metal shall be seamed together with an overlap a minimum of 2".

5. The final seaming along the vertical portion of the metal flashing shall be completed by installing seam fasteners every 1-1/4" O.C.
 - a. Seam tape shall be applied to the underside of the overlapping piece, allowing approximately 1/8" of tape to be exposed beyond the leading edge. The paper seam tape backer shall be removed
 - b. The seamed area of metal shall be pressed onto the underlying section at appropriate overlap, beginning at the vertex of the angle, so that there is no gap where the two pieces adjoin.
 - c. The first seam fastener shall be installed directly into the angle, securely anchoring this spot, to the underlying flashing.
 - d. All seam fasteners shall be set so that the seam is fully compressed, with caution being taken not to over-torque or under-torque the fasteners.
 - e. The heads of the seam fasteners shall never extend beyond the edge of the seam nor occur greater than 1/4" away from the edge of the seam. The adjoining sections of metal shall be seamed together with an overlap a minimum of 2".
 - f. The inside and outside corners shall be mitered and shall be installed with seam tape and seam fasteners as described above.

J. Flashing installation at pipes, projections, pitch pans and conduits

1. All soil stacks shall receive new pre-fabricated unitized stack flashings.
 - a. The base flange on the unitized flashing shall receive seam tape to the underside of the leading edge of the flange so that approximately 1/8" of tape extends beyond the edge of the metal. The paper seam tape backer shall be removed
 - b. The flexible rubber upper portion of the flashing shall be cut to the size of the O.D. of the pipe, as inscribed on the flashing.
 - c. A bead of caulking shall be applied around the pipe, approximately 2" above the point where the flexible rubber will terminate. The flashing shall then be slid down over the pipe so that the caulking bead is compressed as full contact with the roof is made.
 - d. A stainless steel pipe clamp shall be installed to the upper seal area of the flexible rubber top.
 - e. The final seaming shall be completed by installing seam fasteners every 1-1/4" O.C. around the base.
 - f. All seam fasteners shall be set so that the seam is fully compressed, with caution being taken not to over-torque or under-torque the fasteners.

- g. The heads of the seam fasteners shall never extend beyond the edge of the seam nor occur greater than 1/4" away from the edge of the seam.
- 2. All pitch pans, if required, shall be replaced with new 26 gauge (min.) Galvalume or stainless steel sheet metal.
 - a. New pans shall be constructed so that a continuous 4" flange is in place around the perimeter, with sides a minimum of 3" high and hemmed to the outside.
 - b. There shall be a minimum of 2" clearance, at all points, between the sides of the pan and the projection that it is flashing.
 - c. If made of metal of unknown origin, the pan shall be cleaned of oil residue and contaminants, by washing with trisodium phosphate or vinegar, and rinsing.
 - d. The base flange on the pan shall receive seam tape to the underside of the leading edge of the flange, so that approximately 1/8" of tape extends beyond the edge of the metal. The paper seam tape backer shall be removed.
 - e. The taped metal flange shall be aligned so that it overlaps the underlying panel by a minimum of 2" on all sides.
 - f. The final seaming shall be completed by installing seam fasteners every 1-1/4" O.C. around the base.
 - g. All seam fasteners shall be set so that the seam is fully compressed, with caution being taken not to over-torque or under-torque the fasteners.
 - h. The heads of the seam fasteners shall never extend beyond the edge of the seam nor occur greater than 1/4" away from the edge of the seam.
 - i. The pitch pan shall be filled half-full with non-shrink grout, then filled full with 100% solids pitch pan filter, tapered in a watershed fashion away from the projection.
- 3. All conduits and mechanical lines and pipes shall be installed resting on redwood or treated wood weigh displacement supports. All copper pipes shall be protected from exposing the roof to galvanic reactions.
 - a. The conduit or pipe shall be anchored to the wood block with fasteners and brackets of similar metal to that of the pipe.
 - b. Wood blocks shall be of sufficient size and spacing to adequately support the conduit or pipe above the roof membrane, without bowing.

4. All closed top round flashing shall be flashed with a pre-fabricated wrap-around style unitized flashing.
 - a. The base flange on the unitized flashing shall receive seam tape to the underside of the leading edge of the flange so that approximately 1/8" of tape extends beyond the edge of the metal. The paper seam tape backer shall be removed.
 - b. The flexible rubber upper portion of the flashing shall be cut to the size of the O.D. of the pipe, as inscribed on the flashing.
 - c. A bead of caulking shall be applied around the pipe, at the top of the unitized flashing
 - d. A stainless steel pipe clamp shall be installed to the upper seal area of the flexible rubber top.
 - e. The final seaming shall be completed by installing seam fasteners every 1-1/4" O.C. around the base.
 - f. All seam fasteners shall be set so that the seam is fully compressed, with caution being taken not to over-torque or under-torque the fasteners.
 - g. The heads of the seam fasteners shall never extend beyond the edge of the seam nor occur greater than 1/4" away from the edge of the seam.

K. Counterflashing installation.

1. Prefabricated counterflashings shall be installed as required along all perimeter walls and over all interior flashings that do not have a protective flange covering the top of the baseflashing
2. Seam tape or sealant shall be applied to the back side of the fastening flange of the counterflashing piece. The paper seam tape backer shall be removed.
3. The counterflashing shall be installed in place with appropriate, required fasteners placed 6"-12" O.C. through the center of the fastening flange and anchored so that the flange is secured in place in a spring compression situation. The adjoining sections of metal shall overlap a minimum of 1/2" and a seam fastener shall be installed through both pieces of metal to anchor them to the wall or substrate.
4. A bead of urethane sealant shall be applied to the top edge of the metal, centered over the edge, and tooled to shed water.

L. Metal edge installation

1. If the roof system has been designed for water to drain away from the edge, the metal edge shall be installed after the roof membrane has been installed; if the roof system has been designed for water to flow over the metal edge, the metal edge shall be installed before the roof membrane is installed.

2. If necessary the steel roof membrane shall be cut to be even with the outside edge of the perimeter steel framing section.
3. The metal edge shall be installed with seam tape in place between it and the roof membrane, with the tape exposed approximately 1/8". The open bottom hem of the metal edge shall be used as the outside anchoring cleat. The paper seam tape backer shall be removed.
4. Deck flange on metal edge shall terminate evenly with the inside edge of the top portion of the steel framing section.
5. The final seaming shall be completed by installing seam fasteners every 1-1/4" O.C. around the base.
 - a. All seam fasteners shall be set so that the seam tape is fully compressed, with caution being taken not to over-torque or under-torque the fasteners.
 - b. The heads of the seam fasteners shall never extend beyond the edge of the seam nor occur greater than 1/4" away from the edge of the seam.
6. Metal edge pieces shall be overlapped a minimum of 2", or butted at ends with internal drainage plate or sealed batten cover.

M. Vent installation

1. One-way, moisture vapor relief vents shall be installed on the roof area.
2. One vent shall be installed in a central location of every major roof panel, and aligned for a consistent appearance.
3. A 4" round hole shall be cut at each vent location.
4. Seam tape shall be applied to the underside of the prefabricated vent, allowing approximately 1/8" to extend beyond the edge of the metal. The paper seam tape backer shall be removed.
5. The vent shall be pressed to the roof surface and centered over the 4" hole.
6. The final seaming shall be completed by installing seam fasteners every 1-1/4" O.C. around the base.
 - a. All seam fasteners shall be set so that the seam is fully compressed, with caution being taken not to over-torque or under-torque the fasteners.
 - b. The heads of the seam fasteners shall never extend beyond the edge of the seam nor occur greater than 1/4" away from the edge of the seam.

N. Drain flashing installation

1. Fabricated metal sump pan with integral framing sections shall be installed.
2. Steel roof membrane shall be cut evenly with the inside edge of the top section of the integral framing section.
3. Seam tape shall be installed to the underside of the roof membrane so that 1/8" shows beyond the leading edge. Paper seam tape backer shall be removed, and tape pressed in place.
4. The final seaming shall be completed by installing seam fasteners every 1-1/4" O.C. around the base.
 - a. All seam fasteners shall be set so that the seam is fully compressed, with caution being taken not to over-torque or under-torque the fasteners.
 - b. The heads of the seam fasteners shall never extend beyond the edge of the seam nor occur greater than 1/4" away from the edge of the seam.
5. The adjusting nuts on the backflow prevention device shall be adjusted to expand the urethane seal against the inside of the drain leader.
6. The drain strainer shall be installed.

O. Scupper and through-wall termination installation

1. Prefabricated scupper liners shall be installed in place before the wall flashings are installed.
2. Scupper liners shall be large enough to slip through the opening in the wall, and all flanges must fit flush to their corresponding adjoining surfaces.
3. Scuppers shall be anchored in place with appropriate, recommended fasteners placed 4" O.C. and in all corners and transitions.
4. Seam tape shall be installed on the underside of all flashings and membrane terminations at the scupper. The paper seam tape backer shall be removed.
5. The final seaming shall be completed by installing seam fasteners every 1-1/4" O.C. around the base.
 - a. All seam fasteners shall be set so that the seam is fully compressed, with caution being taken not to over-torque or under-torque the fasteners.
 - b. The heads of the seam fasteners shall never extend beyond the edge of the seam nor occur greater than 1/4" away from the edge of the seam.

P. Protective coating installation

1. All excess seam tape shall be trimmed away even with the edge of the lap, using a piece of discarded sheet metal rounded-off as a knife (do not use utility knives).
2. After all work is complete and the roof has been inspected and approved by the material manufacturer and the owner, a protective coating shall be applied to all seam areas.
3. Protective coating shall be applied to all inside and outside corner seams, along the tops of seams in projections, and around all sump pan and through-wall scupper seams, etc.
4. Protective coating shall be applied to all field seam, blind seam and other mechanically fastened areas, and over all caulking applications.

END OF SECTION

SECTION 07565
PREPARATION FOR RE-ROOFING

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. Remove existing roofing gravel, base flashings, sheet metal, vent stack flashings, existing roofing system, and rigid insulation down to the metal deck. Sweep or clean all debris off of the deck.

1.2 PRE-INSTALLATION CONFERENCE

- A. Refer to Section 1039
- B. Review installation procedures and coordination required with related work.

1.3 ENVIRONMENTAL REQUIREMENTS

- A. Do not remove existing roofing system or damaged decking when weather conditions threaten the integrity of the building contents or intended continued occupancy. Maintain continued temporary protection prior to installation of the new roofing system.

1.4 PROTECTION

- A. It shall be the Contractor's responsibility to respond immediately to correction of roof leakage during construction. A four (4) hour time limit shall be given from the time of notification of emergency conditions. In the event of water penetration during rain or a storm, the Contractor shall provide for repair or protection of the building contents and interior. If the Contractor does not respond or cannot be contacted, the Owner will effect repairs or emergency action and the Contractor shall be back charged for all expenses and damages, if any.

1.5 SCHEDULING

- A. Schedule work to coincide with commencement of installation of new roofing system.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Temporary protection; Sheet Polyethylene. Provide weights or fasteners to retain sheeting in position.
- B. Base Sheet: ASTM D-4601 Type II. Provide weights or fasteners to retain sheeting in position.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Roofing Contractor to verify existing site conditions, including roof dimensions.
- B. Verify that existing roof surface is clear and ready for work of the Section.

3.2 MATERIALS REMOVAL

- A. Remove all gravel, membrane, cant strips, rigid insulation, expansion joints, base flashings, and any other items shown on the drawings. In addition, completely removal of all nails and other debris to leave a smooth, even surface for re-roofing.
- B. Under certain conditions, it will be necessary and desirable to incorporate one or more of the following methods for removal of dirt, silt, gravel, debris, roof membrane, and insulation from the roof surface in order to preserve the ecology, eliminate unsightly conditions, and protect the building surfaces:
 - 1. Roof vacuum systems.
 - 2. Crane and hopper with dump truck system.
 - 3. Enclosed chutes with protective shrouds on the building and ground surfaces.
- C. All debris dumped from the roof shall be transported from the roof via chutes into dumpsters or trucks, and this debris shall be removed from the premises when vehicles are full at the Contractors cost. No debris shall be transported from the area being worked on over a previously finished roof without an underlayment of 3/4" plywood.
- D. All roof equipment not in use or left filled will be parked on the column lines on 3/4" plywood.
- E. Contractor shall provide cut off (night tie in) at the end of each day's work. Area cut off shall be clean of all existing gravel.
- F. Full dumpsters shall NOT be left overnight & partially full dumpsters shall NOT be left adjacent to building over the weekend.

3.3 TEMPORARY PROTECTION

- A. Provide temporary protective sheeting over uncovered deck surfaces.
- B. Turn sheeting up and over parapets and curbing. Retain sheeting in position with weights or temporary fasteners. Overnight protection shall be adequate to prevent infiltration of rain and / or snow into the facility or new insulation.
- C. Provide for surface drainage from sheeting to existing drainage facilities.
- D. Do not permit traffic over unprotected deck surface.

END OF SECTION

SECTION 07600
FLASHING AND SHEET METAL

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. Provide all labor, equipment, and materials fabricate and install the following.

1. Edge strip and flashing.
2. Fascia, scuppers, and trim.
3. Counterflashings for roof accessories.
4. Counterflashings at roof mounted equipment and vent stacks.
5. Base flashing coverings.
6. Coping cap at parapets.
7. Expansion joint and area divider covers.
8. Fascia and edge metal.
9. Counterflashings at walls and penetrations.

1.2 RELATED SECTIONS

A. Drawing and general provisions of the Contract, including General Supplementary Conditions and Division 1 Specification Sections, Apply to this Section.

B. RELATED SECTIONS

1. Section 06100 - Rough Carpentry
2. Section 07720 - Roof Accessories
3. Section 07900 - Joint Sealants

1.3 REFERENCES

ASTM A-446	Specification for steel sheet
ASTM B-209	Specification for aluminum sheet
ASTM B-221	Specification for aluminum extruded shape
FS QQ-L-201	Specification for Lead Sheet
ASTM A792	Steel Sheet, Aluminum-Zinc Alloy-Coated, by the Hot-Dip Process
ASTM B32	Solder Metal
ASTM B209	Aluminum and Alloy Sheet and Plate
ASTM B486	Paste Solder
ASTM D226	Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing
ASTM D486	Asphalt Roof Cement, Asbestos-free
FS O-F-506	Flux, Soldering, Paste and Liquid
WH	Warnock Hersey International, Inc. Middleton, WI.
FM	Loss Prevention Data Sheet
NRCA	National Roofing Contractors Association - Roofing Manual
SMACNA	Architectural Sheet Metal Manual

1.4 SUBMITTALS

- A. Submit under provisions of Section 01300 - Submittals.
- B. Product Data: Provide manufacturer's specification data sheets for each product in accordance with Section 01300.
- C. Provide approval letters from metal manufacturer for use of their metal within this particular roofing system type.
- D. Submit two samples, 12 x 12 inch in size illustrating typical external corner, internal corner, valley, junction to vertical dissimilar surface, material and finish.
- E. Shop Drawings
 - 1. For manufactured and shop fabricated gravel stops, fascia, scuppers, and all other sheet metal fabrications.
 - 2. Shop drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashing, termination's, and installation details.
 - 3. Indicate type, gauge and finish of metal.
- F. Certification
 - 1. Submit roof manufacturer's certification that metal fasteners furnished are acceptable to roof manufacturer.
 - 2. Submit roof manufacturer's certification that metal furnished is acceptable to roofing manufacturer as a component of roofing system and is eligible for roof manufacturer's system warranty.
 - 3. Submit certification that metal and fastening system furnished is Tested and Approved by Factory Mutual for I-90 Wind Up-Lift Requirements.
- B. Manufacturer's Product Data
 - 1. Metal material characteristics and installation recommendations.
 - 2. Submit color chart prior to material ordering and/or fabrication so that equivalent colors to those specified can be approved.

1.5 QUALITY CONTROL

- A. Reference Standards
 - 1. Comply with details and recommendations of SMACNA Manual for workmanship, methods of joining, anchorage, provisions for expansion, etc.
 - 2. Factory Mutual Loss Prevention Data Sheet 1-49 windstorm resistance 1-90.

B. Manufacturer's Warranty

1. Pre-finished metal material shall require a written 20-year non-prorated warranty covering fade, chalking and film integrity. The material shall not show a color change greater than 5 NBS color units per ASTM D-2244 or chalking excess of 8 units per ASTM D-659. If either occurs material shall be replaced per warranty, at no cost to the Owner.

C. Contractor's Warranty

1. The Contractor shall provide the Owner with a notarized written warranty assuring that all sheet metal work including caulking and fasteners to be water-tight and secure for a period of two years from the date of final acceptance of the building. Warranty shall include all materials and workmanship required to repair any leaks that develop, and make good any damage to other work or equipment caused by such leaks or the repairs thereof.

1.6 QUALIFICATIONS

- A. Fabricator and Installer: Company specializing in sheet metal flashing work with 5 years experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original, unopened containers or packages with labels intact and legible.
- B. Stack performed and prefinished material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- C. Prevent contact with materials which may cause discoloration or staining.

PART 2 - PRODUCTS

2.1 APPROVED EQUIVALENT

- A. Contractor must submit any product not specified a minimum five days before the bid date to Architect in order for product to be considered for approval. The Architect will notify Contractor, in writing, of decision to accept or reject request.

2.2 MATERIALS

- A. Metal system is to be comprised of minimum Galvalume steel coated on both sides with an epoxy primer and on the weathering surface with a polyvinylidene fluoride or siliconized polyester baked organic coated finish.
1. Acceptable Manufacturers
 - a. R-Mer Lite: The Garland Company
 - b. IMETCO Metal Flash: Innovative Metals Company, Inc.
 - c. Approved equivalent.
 2. Materials
 - a. Exposed Components (Weathering Surfaces) Aluminum-Zinc alloy Coated Steel: aluminum-zinc alloy (galvalume) coated steel for all exposed surfaces, ASTM A792, coating designation AZ-50, in thickness of .0336 nom. /22 gauge or 0.157 nom. / 30 gauge for accessory components; 36" to 48" by coil length, chemically treated, commercial or lock-forming quality.
 1. Minimum gauge of steel to be specified in accordance with Architectural Sheet Metal Manual, Sheet Metal and Air Conditioning Contracor's National Association, Inc.reccomendations.
 - b. Concealed Components (Non-Weathering Surfaces) Aluminum-Zinc alloy Coated Steel: aluminum-zinc alloy (galvalume) coated steel for all concealed components, ASTM A792, coated designation AZ-50, in thickness .0336 nom. /22 gauge, 36" to 48" by coil length, chemically treated, commercial or lock-forming quality.
 - c. Steel Finishes: siliconized modified polyester, fluorocarbon, or plastisol finish. Epoxy primer baked both sides, .2-.25 mils thickness as approved by finish coat manufacturer. Weathering finish as referred by National Coil Coaters Association (NCCA).

(SMP finishes will be used)

Property	Test Method	SMP	Fluoro-carbon*	Plastisol*
Pencil Hardness	ASTM D-3363 NCAA II-2	F-H	HB-H	not applicable
Bend	ASTM D-4145 NCAA II-19	2-T	O-T	O-T
Cross-Hatch Adhesion	ASTM D-3359	no loss of adhesion	no loss of adhesion	no loss of adhesion
Gloss (60° angle)	ASTM D-523	90+/-5%	25+/-5%	30+/-10%
Reverse Impact	ASTM D-2794		no crack- ing or loss of adhesion	no crack- ing or loss of adhesion
Nominal Thickness	ASTM D-1005			
primer			0.2 mils	0.2 mils
topcoat			0.8 mils	0.8 mils
total			1.0 mils	1.0 mils
				4.2 mils/5

*Subject to minimum quantity requirements

d. Colors shall be as specified.

B. Miscellaneous Metals and Flashings:

1. Zinc-Coated Steel Sheet: ASTM A526, 0.20% copper, 26 gage (0.0179"); designation G90 hot-dip galvanized, mill phosphatized.
2. Aluminum Sheet: ASTM B209, alloy 3003-H14; 0.040" or 0.050"; C22A41 clear anodized finish.

2.3 RELATED MATERIALS

- A. Metal Primer: Zinc chromate type.
- B. Plastic Cement: ASTM D 4586
- C. Sealant: Specified in Section 07900 or on drawings.
- D. Fasteners:
 - 1. Corrosion resistant screw fastener as recommended by metal manufacturer. Finish exposed fasteners same as flashing metal.
 - 2. Fastening shall conform to Factory Mutual I-90 requirements or as stated on section details, whichever is more stringent.

PART 3 - EXECUTION

3.1 PROTECTION

- A. Protect contact areas of dissimilar metals with heavy asphalt or other approved coating, specifically made to stop electrolytic action.

3.2 GENERAL

- A. Install work watertight, without waves, warps, buckles, fastening stress, or distortion, allowing for expansion and contraction.
- B. Fastening of metal to walls and wood blocking shall comply with SMACNA Architectural Sheet Metal Manual, Factory Mutual I-90 wind uplift specifications and/or manufacturer's recommendations whichever is of the highest standard.
- C. All accessories or other items essential to the completeness of sheet metal installation, whether specifically indicated or not, shall be provided and of the same material as item to which applied.
- D. Metal fascia and copings shall be secured to wood nailers at the bottom edge with a continuous cleat. Cleats shall be at least one gauge heavier than the metal it secures.

3.3 INSPECTION

- A. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, cant strips and reglets are in place, and nailing strips located.
- B. Verify membrane termination and base flashings are in place, sealed, and secure.
- C. Beginning of installation means acceptance of existing conditions.
- D. Field measure site conditions prior to fabricating work.

3.4 MANUFACTURED SHEET METAL SYSTEMS

- A. Installing Contractor shall be responsible for determining if the sheet metal systems are in general conformance with roof manufacturer's recommendations.
- B. Furnish and install manufactured sheet metal systems in strict accordance with manufacturer's printed instructions.
- C. Provide all factory-fabricated accessories including, but not limited to, fascia extenders, miters, scuppers, joint covers, etc.

3.5 SHOP FABRICATED SHEET METAL

- A. Installing Contractor shall be responsible for determining if the sheet metal systems are in general conformance with roof manufacturer's recommendations.
- B. Metal work shall be shop fabricated to configurations and forms in accordance with recognized sheet metal practices.
- C. Hem exposed edges.
- D. Angle bottom edges of exposed vertical surfaces to form drip.
- E. All corners for sheet metal shall be lapped with adjoining pieces fastened and set in sealant.
- F. Joints for gravel stop fascia system, cap flashing, and surface-mount counterflashing shall be formed with a 1/4" opening between sections. The opening shall be covered by a cover plate or backed by an internal drainage plate formed to the profile of fascia piece. The cover plate shall be embedded in mastic, fastened through the opening between the sections and loose locked to the drip edges.
- G. Install sheet metal to comply with Architectural Sheet Metal manual, Sheet Metal and Air Conditioning Contractor's National Associations, Inc.

3.6 FLASHING MEMBRANE INSTALLATION

- A. DRIP EDGE DETAIL [Detail #RML-2S]
 - 1 Accessories: Joint covers, seam sealant, seam tape, fasteners, and other accessories shall be included.
 - 2. Install continuous cleat fasten 6" O.C. Fasten flange to hat channel 1 1/4" O.C. with seam tape between metal edge and roof membrane.
 - 3. Install new metal edge hooked to continuous cleat.
 - 4. Metal edge pieces shall be overlapped a minimum of 2", or butted at ends with internal drainage plate or sealed batten cover.

B. RAISED METAL EDGE DETAIL [Detail #RML-3S, RML-4S, RML-5S]

1. Accessories: Joint covers, seam sealant, seam tape, fasteners, and other accessories shall be included.
2. Install continuous cleat fasten 6" O.C. Fasten flange to hat channel 1 1/4" O.C. with seam tape between metal edge and roof membrane.
3. Install new metal edge hooked to continuous cleat.
4. Metal edge pieces shall be overlapped a minimum of 2", or butted at ends with internal drainage plate or sealed batten cover.

C. 2-PIECE COPING CAP DETAIL [Detail #RML-28]

1. Accessories: Joint covers, seam sealant, seam tape, caulking, fasteners, and other accessories shall be included.
2. Install continuous cleats on both sides of wall and fasten 6" O.C. Fasten coping cap pieces together at hat channel/cleat 1 1/4" O.C. with seam tape between coping cap pieces.
3. Install new coping cap pieces hooked to continuous cleat.
4. Metal edge pieces shall be overlapped a minimum of 2", or butted at ends with internal drainage plate or sealed batten cover.

D. SURFACE MOUNTED COUNTERFLASHING [Detail #RML-25S]

1. Accessories: Joint covers, seam sealant, seam tape, caulking, fasteners, and other accessories shall be included.
2. Install counterflashing by fastening 6" O.C. Provide 2" minimum vertical undershot at flashing and counterflashing union.
3. Adjacent counterflashing pieces shall overlap a minimum of 1/2"

E. REGLET MOUNTED COUNTERFLASHING [Detail #RML-38S]

1. Accessories: Joint covers, seam sealant, seam tape, caulking, fasteners, and other accessories shall be included.
2. Secure counterflashing with lead wedges completely covered with caulking and provide 2" minimum vertical undershot at flashing and counterflashing union.
3. Adjacent counterflashing pieces shall overlap a minimum of 1/2"

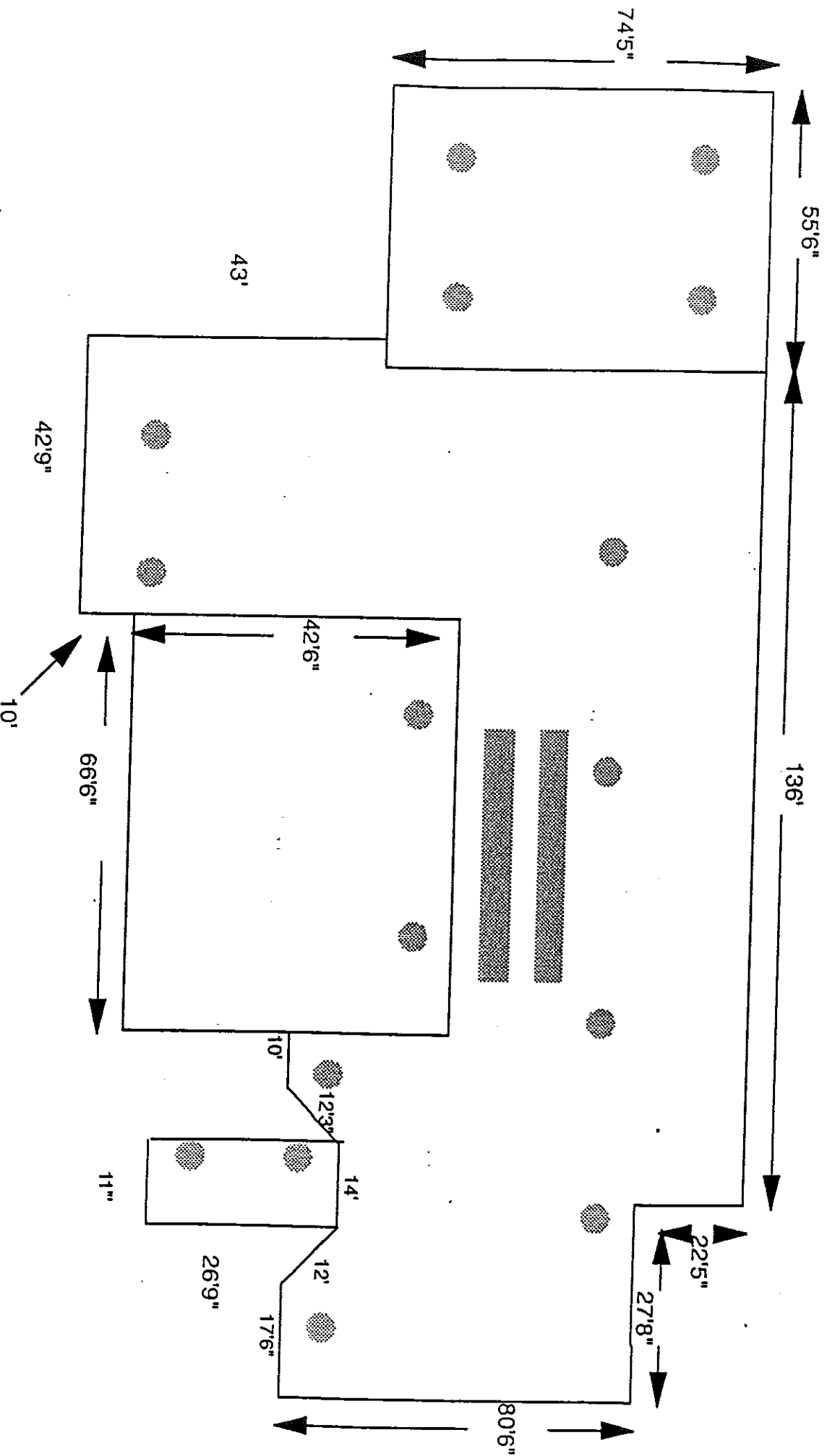
F. EXPANSION JOINT DETAIL [Detail #RML-23C]

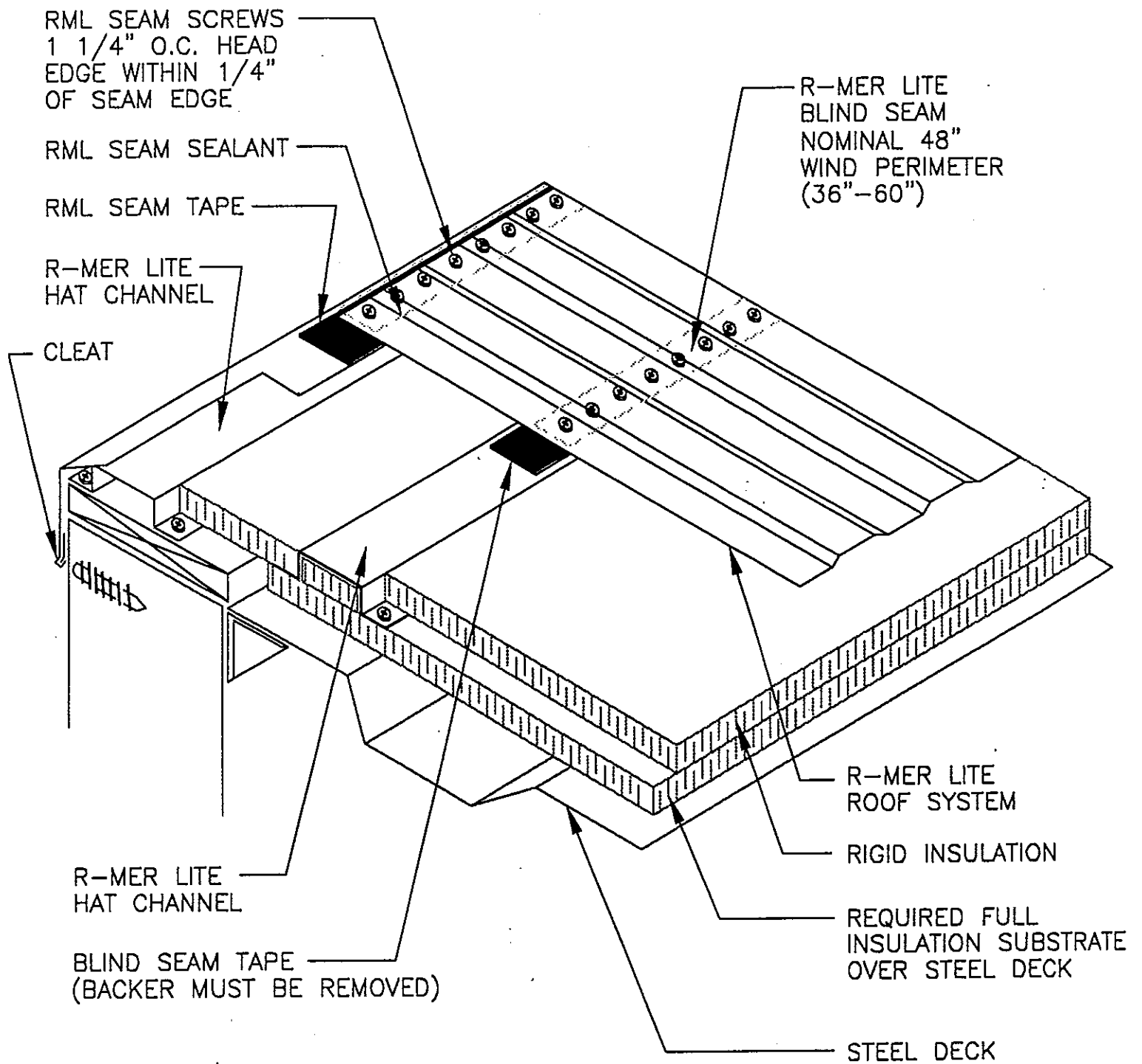
1. Accessories: Joint covers, seam sealant, seam tape, caulking, fasteners, and other accessories shall be included.
2. Install continuous cleats on one side of wall and fasten 6" O.C. Fasten expansion joint on other side of wall 6" O.C.
3. Install new expansion joint hooked to continuous cleat.
4. Expansion joint pieces shall be overlapped a minimum of 2".

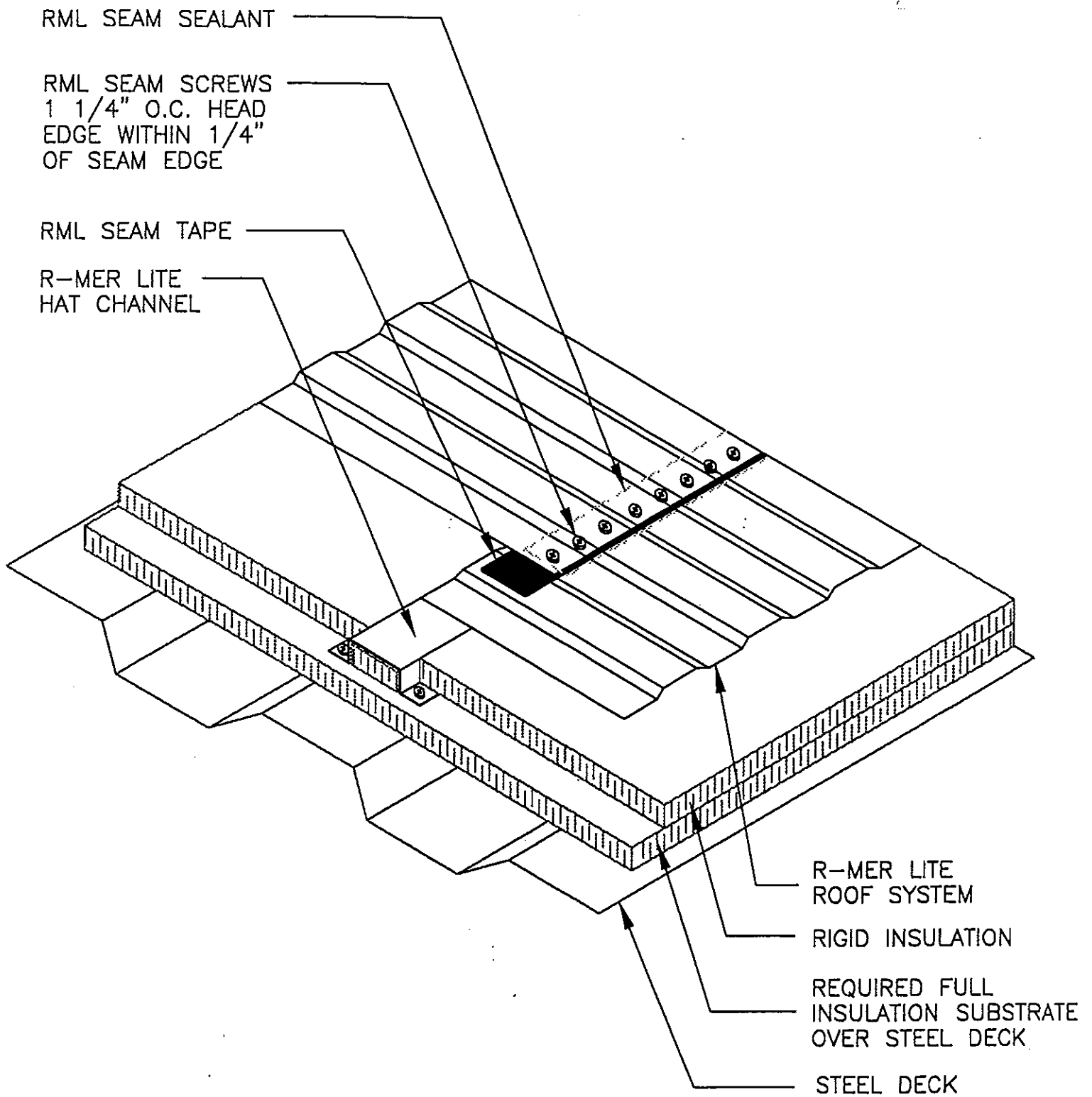
END OF SECTION

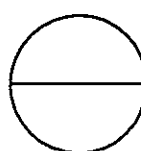
MANCHESTER REGIONAL ACADEMY

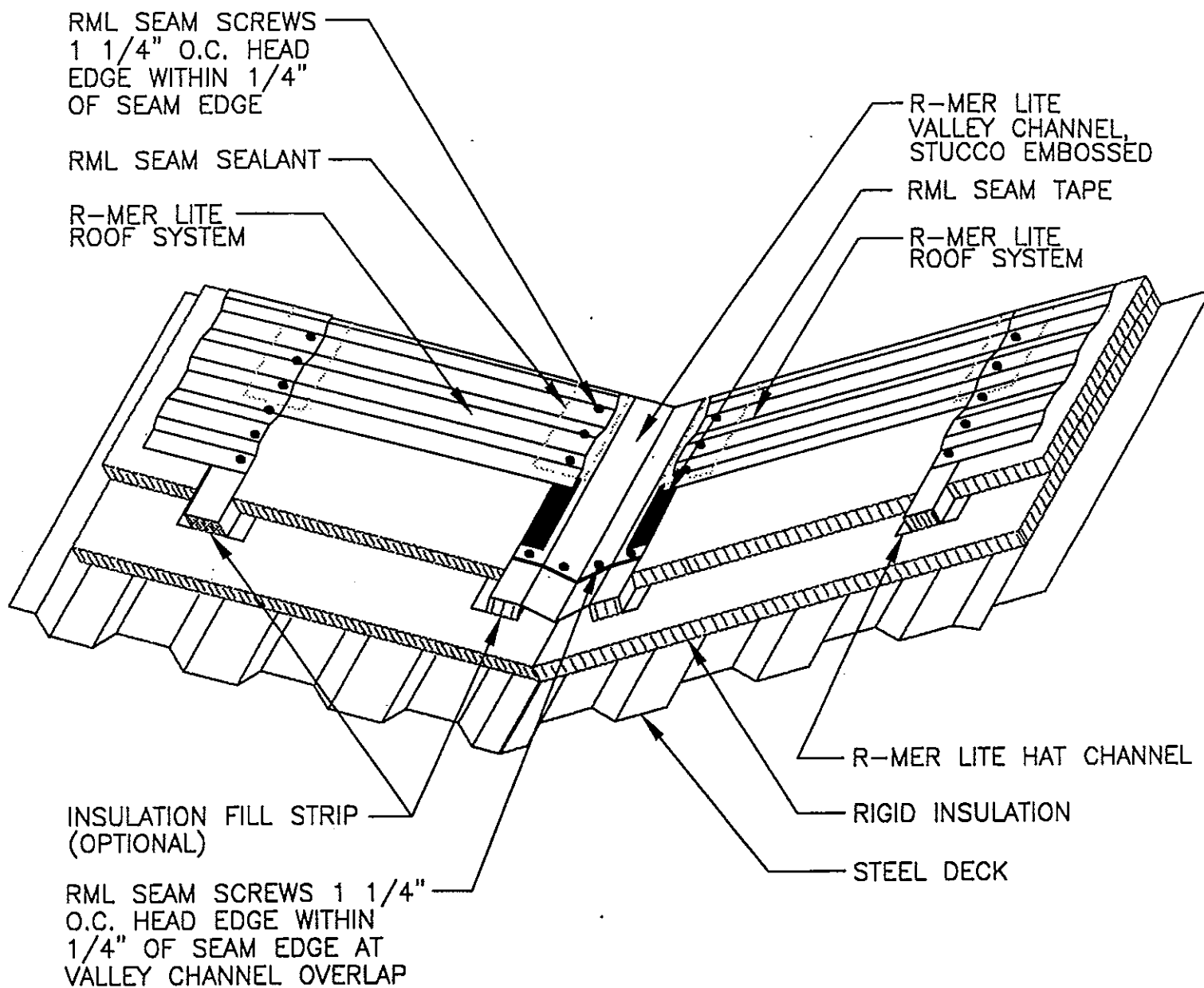
ROOF DRAWING



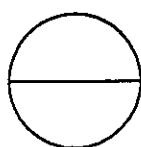




 **TYPICAL R-MER LITE ROOF SYSTEM**
N.T.S.

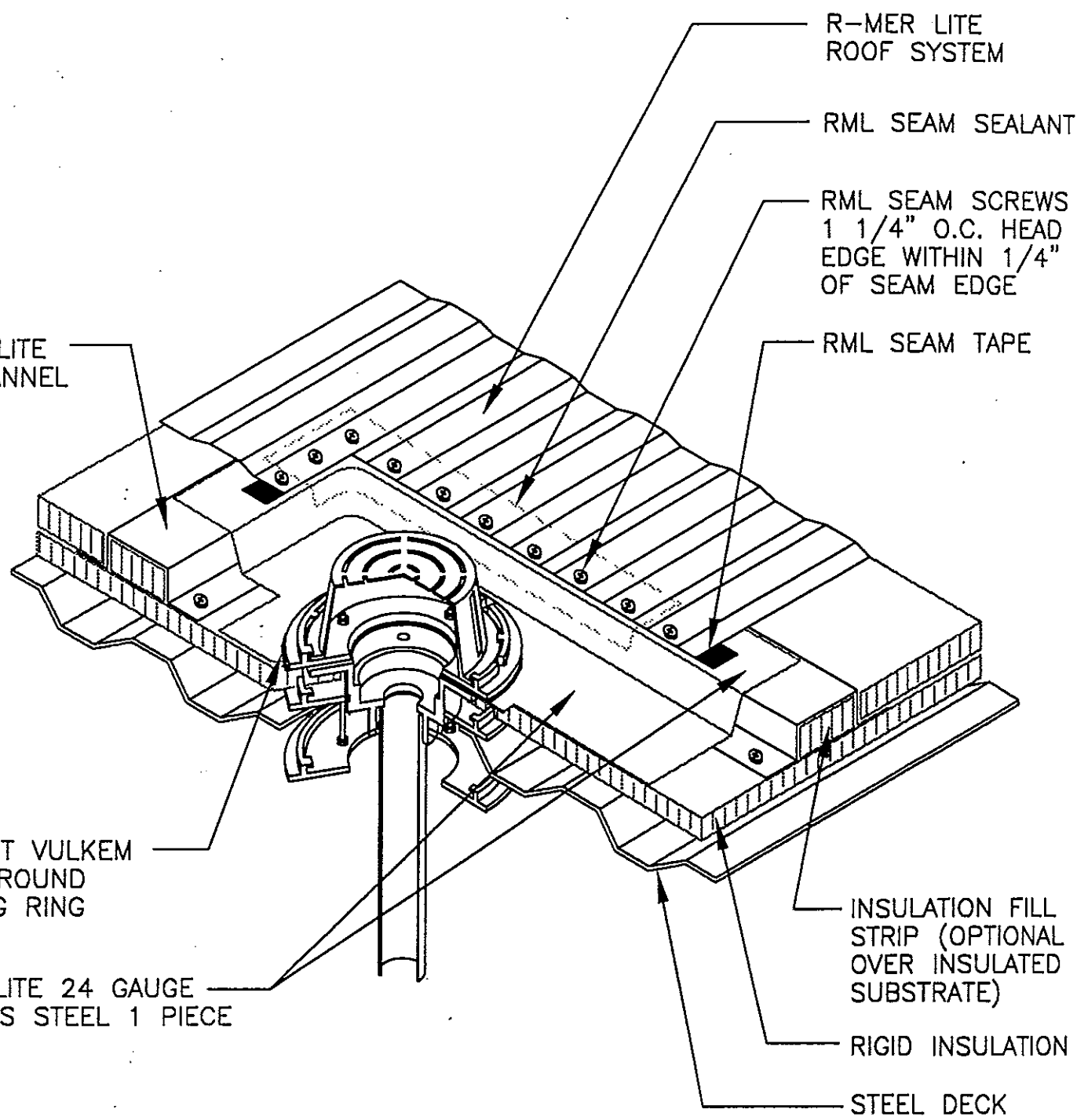


*NOTE: ALL FASTENERS IN VALLEY
COATED WITH SEALANT



TYPICAL VALLEY DETAIL

N.T.S.

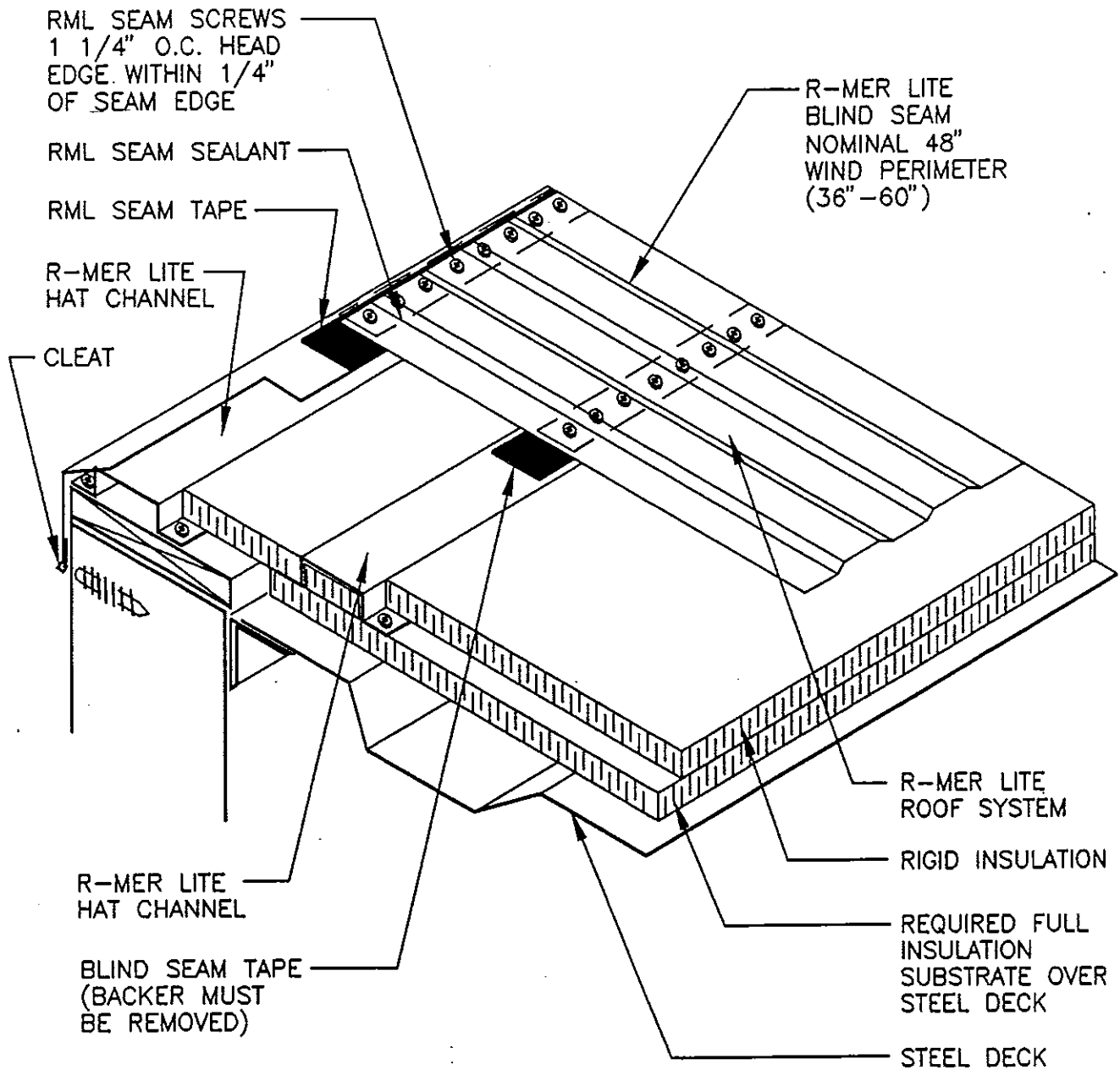


R-MER LITE DRAIN PAN
 N.T.S.

DRIP EDGE DETAIL ON STEEL DECK

2S

NOTE: MINIMUM SLOPE = 1/4" PER FOOT



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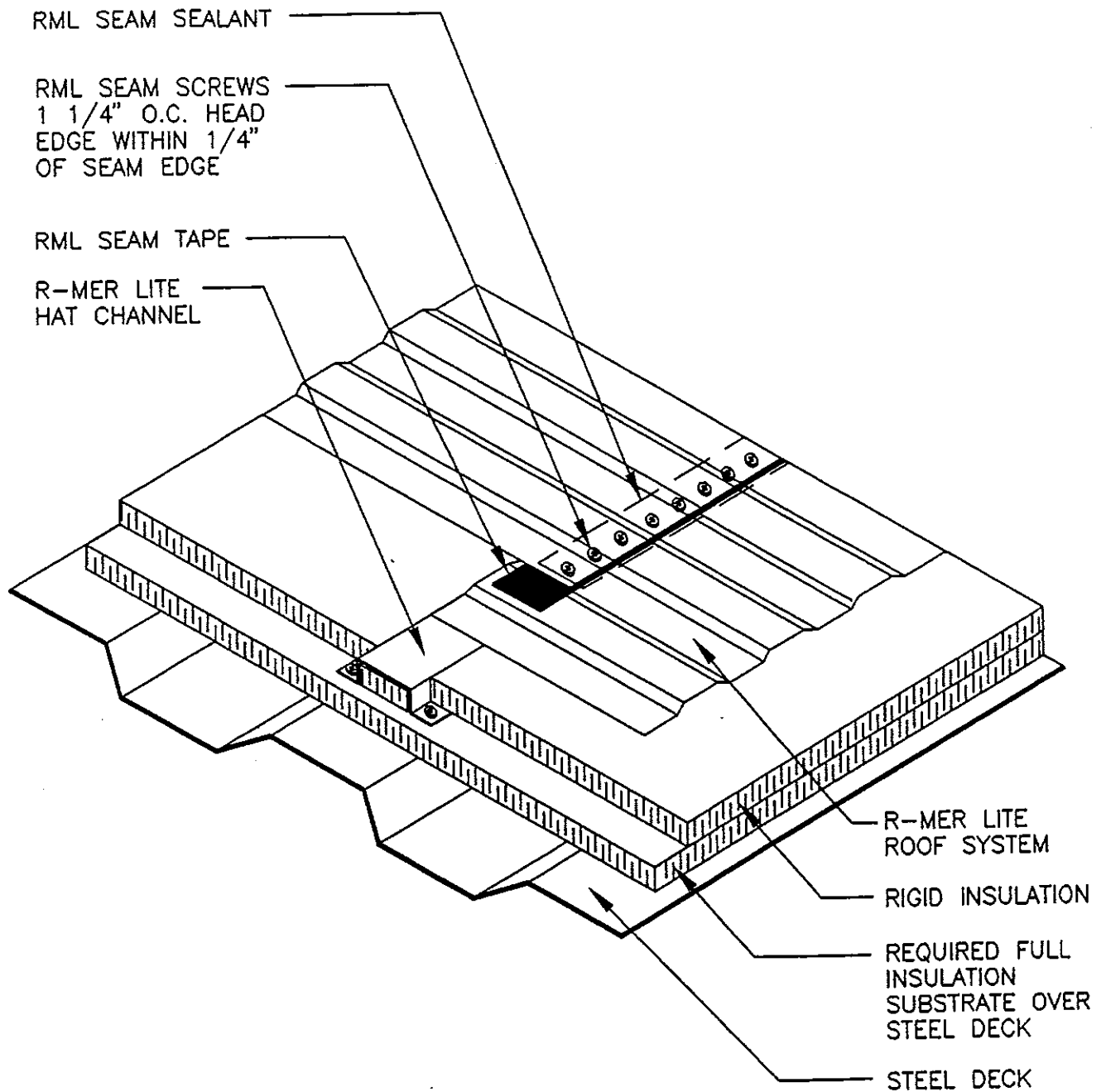
DATE:

ROOF AREA:

TYPICAL R-MER LITE ROOF SYSTEM ON STEEL DECK

15

NOTE: MINIMUM SLOPE = 1/4" PER FOOT

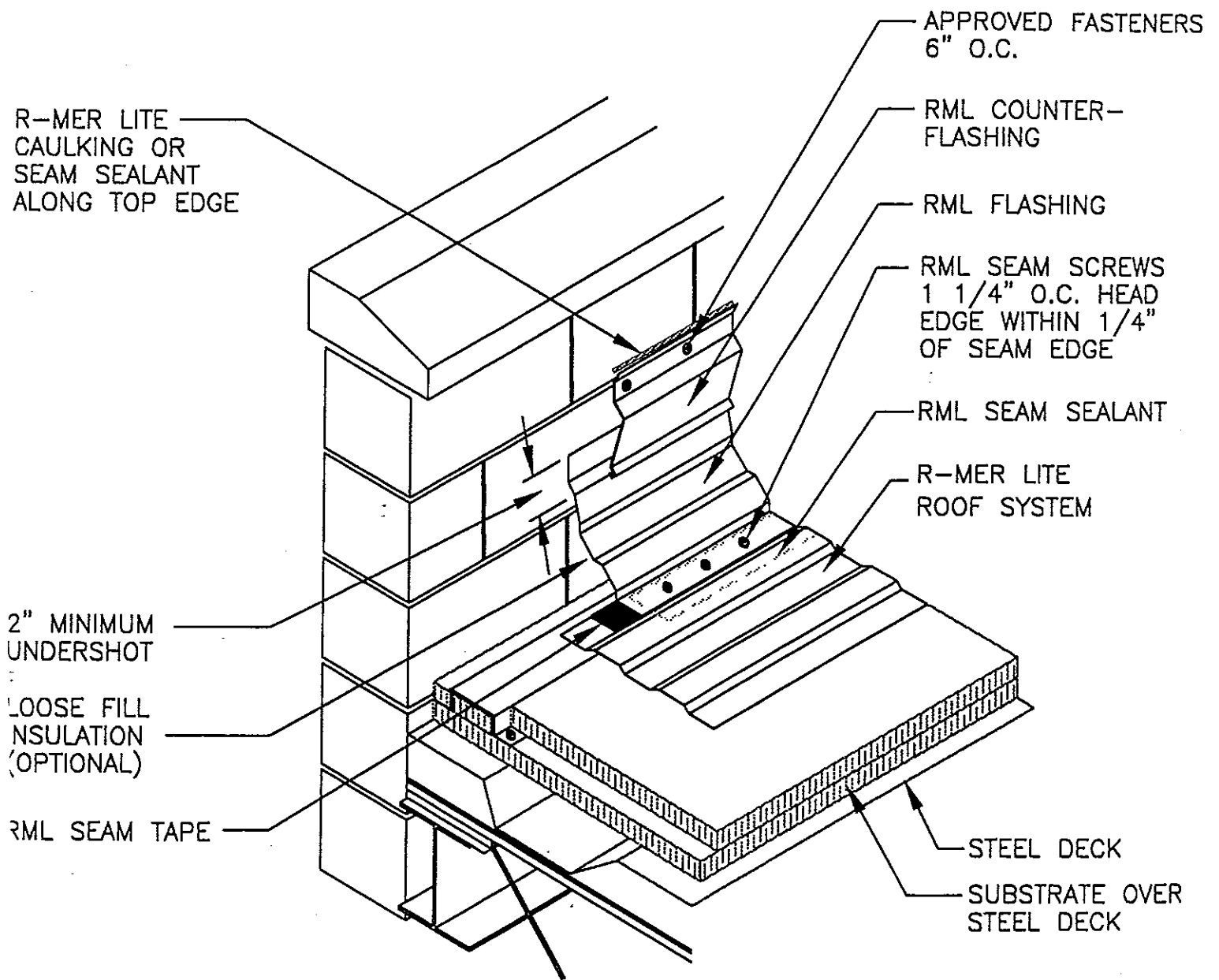


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DATE:

ROOF AREA:



BRICK WALL-COUNTERFLASHING
 N.T.S.