

**DIVISION 7 THERMAL & MOISTURE PROTECTION****07 61 13 Standing Seam Sheet Metal Roofing****Part 1 - GENERAL****1.1 Scope of Standard**

- A. This standard provides general guidance concerning the specific preferences of Texas State University for Standing Sheet Metal Roofing.
- B. Texas State University recognizes that project conditions and requirements vary, thus precluding the absolute adherence to the items identified herein in all cases. However, unless there is adequate written justification, it is expected that these guidelines will govern the design and specifications for Texas State University projects.
- C. Roof systems shall be designed by, and with plans and specifications sealed by, a Licensed Architect or Engineer in accordance with ASCE 7, the International Building Code, and the International Plumbing Code.
- D. Roof edge assemblies and attachment shall be provided in compliance with the most recent edition or version of the SPRI/ANSI ES-1 Standard.

**1.2 RELATED WORK SPECIFIED ELSEWHERE**

- A. Rough Carpentry
- B. Roof Deck
- C. Roof Insulation
- D. Flashing and Sheet Metal
- E. Roof Specialty and Accessory Items
- F. Lightning Protection

**1.3 SYSTEM DESCRIPTION**

- A. The intent of the specification is for the Contractor to provide a copper standing seam metal roofing system on a steep roof with a minimum slope of 5:12 over an approved substrate and to furnish a 20-Year No Dollar Limit Total System Manufacturer's Warranty on the form approved herein upon completion of the project.

**1.4 Design Requirements**

- A. Work described in this section includes a pre-formed or job fabricated copper metal roofing system complete with clips, perimeter and penetration flashing, closures, and fascia metal.
- B. Steep-sloped roofs
  - 1. The standing seam assembly shall have excellent architectural appeal with a minimum 2-inch high double-lock standing seams and approximately 11-inch wide panels. The use of transverse seams shall be avoided.

2. Copper panels and flashings shall be a minimum of 20 oz. copper.
  3. Systems employing snap-on battens or snap together panels are not acceptable.
  4. Flashings, trim, and related roof components shall be copper.
  5. The roof shall have a full secondary moisture protection barrier consisting of a self-adhering base sheet applied to the approved substrate.
- C. Safe Roof Access
1. Roofs are not intended to be accessible to the public, except as may be required by the International Building Code.
  2. Provide access for authorized persons to all roof sections, either by a roof hatch with a contiguous ladder, an access door, stairs, or an exterior mounted ladder.
  3. All roof sections shall have OSHA compliant permanent safety tie-offs wherever roof edges are not protected by parapet walls meeting approved height requirements.
- D. Lightning Protection.
1. Lightning protection systems shall be integrated into the roofing system with proper flashing or all penetrations.
  2. All materials used in the anchorage of the lightning protection cables or rods shall be fully compatible with the copper roofing system and approved by the manufacturer.

## 1.5 DESIGN AND PERFORMANCE CRITERIA

- A. Thermal Expansion and Contraction:
1. Completed metal roofing and flashing system shall be capable of withstanding expansion and contraction of components caused by changes in temperature without buckling, producing excess stress on the structure, anchors, or fasteners, or reducing performance ability.
  2. The design temperature differential shall not be less than 180 degrees F.
  3. Interfaces between panels and clips shall provide for unlimited thermal movement in each direction along the longitudinal direction.
  4. Locations of metal roofing rigid connectors shall be at roof ridge unless otherwise approved by the Project Architect and designed per job conditions by specified manufacturer.
- B. Uniform Wind Uplift Load Capacity:
1. Installed roof system shall withstand negative (uplift) design wind loading pressures complying with the following criteria. Anchor clips shall not be installed closer than the spacing given in Section 3.2 C.
    - a. Design Code: ASCE 7-98, Method 2 for Components and Cladding



H. ASTM E1680: **Static pressure air infiltration (roof panels):**

<u>Pressure</u>	<u>Leakage Rate</u>
1.57 PSF	0.0012 cfm/sq.ft.
6.24 PSF	0.0001 cfm/sq.ft.
20.0 PSF	0.0011 cfm/sq.ft.

I. ASTM E1646: Static pressure water infiltration (roof panels):

<u>Pressure</u>	<u>Result</u>
5 Gal/Hr per S.F. and Static Pressure of 20.0 PSF for 15 minutes	No Leakage

J. Water penetration (dynamic pressure): No water penetration, other than condensation, when exposed to dynamic rain and 70 mph wind velocities for not less than five minutes duration, when tested in accord with principles of AAMA 501.1.

K. Capacities for gauge span or loading other than those tested may be determined by interpolation of test results within the range of test data. Extrapolation for conditions outside test range (other than for material type; see Section 1.4.D) are not acceptable.

## 1.6 PERFORMANCE STANDARDS

- A. American Iron and Steel Institute (AISI): 1996 Ed. Specification for the Design of Cold-Formed Steel Structural Members.
- B. American Society of Civil Engineers (ASCE): ASCE 7-98 Minimum Design Loads for Buildings and Other Structures.
- C. Sheet Metal and Air Conditioning Contractors National Association (SMACNA): 2003 Architectural Sheet Metal Manual, 6th edition.
- D. NRCA, National Roofing Contractors Association, Steep Roofing Manual, 2006 Edition.

## 1.7 Reference Standards

- A. American Society for Testing and Materials (ASTM):
  1. A240-96, Specification for Heat Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels
  2. B101-96, Specification for Lead-Coated Copper Sheet and Strip for Building Construction
  3. B370-92, Specification for Copper Sheet and Strip for Building Construction
  4. D1056-91, Specification for Flexible Cellular Materials - Sponge or Expanded Rubber
  5. D3575-84, Test Methods for Flexible Cellular Materials made from Olefin Polymers
  6. E1592-95, Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference

7. E1646-95, Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference
  8. E1680-95, Standard Test Method for Rate of Air Leakage through Exterior Metal Roof Panel Systems
- B. Underwriters' Laboratories (UL):
1. UL-263 Fire Tests of Building Constructions and Materials.
  2. UL-580 Tests for Uplift Resistance of Roof Assemblies.
  3. UL-790 Tests for Fire Resistance of Roof Covering Materials.

### 1.8 Contractor Requirements

- A. The roofing contractor shall be experienced in commercial, institutional, and industrial metal roofing systems with a minimum of five (5) years experience and who is certified by the metal roofing system manufacturer as qualified to install the manufacturer's systems.
- B. Contractor must be certified by manufacturer specified as supplier of structural standing seam system and obtain written certification from manufacturer that installer is approved for installation of specified system. If requested, contractor must supply owner with a copy of this certification.
- C. The Contractor shall have demonstrated its proficiency by having a satisfactory record of performance in the following areas:
1. On-time completion of previous work of a similar size and scope.
  2. No history of litigation, claims, or lawsuits relating to past or ongoing performance that may affect current performance.
  3. Proven safety record as demonstrated by company documentation and workers compensation insurance Experience Modifier.
  4. Positive record of post-completion warranty service to clients.
- D. The roofing contractor shall maintain a full-time, non-working, non-changing, English-speaking Supervisor/Foreman on the job site during all phases of roofing and sheet metal work and at any time roofing work is in progress. A copy of the construction documents shall be in the possession of the Supervisor/Foremen and on the roof at all times.

### 1.9 Submittals

- A. Submittals shall be provided in accordance with the General Conditions of the Contract. Provide a submittal cover sheet identifying the project by name and number and listing the following columns for review by the design professional with a separate sheet for each roof section.
1. Specification section
  2. Description of brand and product

3. "Accepted"
  4. "Rejected"
  5. "Resubmit"
  6. "Comments"
- B.* Provide a place for the design professional's signature.
- C.* Manufacturer's Letter of Certification: Provide a letter from the roofing material manufacturer using the exact language on the attached letter and listing all materials comprising any part of the roof assembly and stipulating that such materials are acceptable to the manufacturer and will be covered under the manufacturer's 20-Year No Dollar Limit Total Roof System Guarantee.
- D.* Shop Drawings: Show roofing system with flashings and accessories in plan, sections, and details. Include metal thicknesses and finishes, panel lengths, joining details, anchorage details, flashings and special fabrication provisions for termination and penetrations; thermal expansion provisions and special supports. Indicate relationships with adjacent and interfacing work. Indicate fastener types and spacing, and provide fastener pullout values.
- E.* Product Data: Include manufacturer's detailed material and system description, sealant and closure installation instructions, engineering performance data and finish specifications. Indicate fastener types and spacing; and required fastener pullout values.
- F.* Design Loads: Submit copy of manufacturer's minimum design load ratings according to ASCE 7-98, Method 2 for Components and Cladding.
- G.* Design Test Reports: Provide certified test reports from an independent testing laboratory to show compliance with the performance criteria specified in Section 1.9. **For system comparison purposes, tests performed on steel panels shall be acceptable for the specialty material specified herein.**
1. ASTM E1592-95: Test results must clearly demonstrate compliance with the following requirements:
    - a.* The ultimate test failure load shall be reduced by the safety factor specified in Section 1.9 to determine the **allowable working load** for the panel system.
    - b.* The proposed system has been tested to insure that the **allowable working load** of the panel system meets or exceeds the specified negative wind uplift pressures listed in Section 1.9 of this specification for all roof zones.
    - c.* The test results are applicable for the thickness, width, and profile specified. Results are not applicable for systems that are thicker or wider than the system which was tested. If the tested material was not the specialty material specified herein (for instance, the tested material was galvalume steel), then the test results shall be reduced by the ratio of the yield strength (Fy) of the specified material to the tested material.

- d. The results must clearly show that the allowable clip spacing meets or exceeds the requirements specified in Section 3.2.C for all roof areas. Clip spacing shall not be reduced for any roof zone from that which is specified.
2. UL 580: The test report shall clearly show a rating of Class 90 over the same substrate as specified for this project. The clip spacing as tested for UL approval must be in compliance with the required clip spacing specified for this project in Section 3.2.C.
3. UL 790: The test report shall clearly show a rating of Class A roofing material.
4. UL 263: The panel system shall clearly be shown as approved for use in an UL Construction Assembly which conforms to the construction of this project.
5. Samples: Provide full-scale mock-ups of the following materials and system components: roof underlayment, edge flashing, metal panel clips, metal panels, eave, rake, ridge cap, gutter, downspout, and any other unique conditions. Samples shall be of identical material type, thickness, panel width, and material grade/alloy/temper as the system specified for this project.

### **1.10 Quality Assurance**

- A. **Manufacturer Qualifications:** The roofing system manufacturer shall have a minimum of five years experience in manufacturing metal roofing systems in the United States.
- B. **Manufacturer Inspections:** As part of the roofing assembly, the roofing system manufacturer shall provide quality control inspections by an authorized representative as outlined below:
  1. Manufacturer shall make at least three inspections, including at the beginning of construction, at approximately 50% completion, and at 100% roof completion. The inspections shall be provided at no additional cost to the owner.
  2. Manufacturer shall notify the Owner in advance of such inspections and provide a copy of each inspection report to the Owner within seven (7) days of the inspection.
  3. Manufacturer shall report to the Owner in writing any failure or refusal of the Contractor to correct unacceptable practices called to the Contractor's attention by the Manufacturer.
  4. Manufacturer shall confirm, after completion of the project and based on the Manufacturer's observations and tests, that the Manufacturer has observed no application procedures in conflict with the specifications other than those that have been previously reported and corrected.
- C. **Pre-application Roofing Conference:** Following the approval of submittals, and prior to the delivery of any roofing materials, conduct a pre-roofing conference with the following parties present:
  1. Owner's representative
  2. Architect's representative
  3. General contractor's representative

4. Roofing contractor's Project Manager, Superintendent, and both roofing and sheet metal foremen
  5. Roofing material manufacturer's representative
  6. Mechanical contractor representative
  7. Plumbing contractor representative
  8. Masonry, EIFS, plaster, or fireproofing contractor's representative
  9. Glazing or skylight representative
- D. Objectives of the pre-roofing conference shall include:
1. Ensure that the Contractor's field supervisors have read and understand the plans and specifications.
  2. Review roofing system requirements (drawings, specifications, and other contract documents).
  3. Review foreseeable methods and procedures related to roofing work, including coordination of other trades.
  4. Tour representative areas of roofing substrates (decks), inspect and discuss condition of substrate, roof drains, curbs, penetrations, and other preparatory work performed by other trades.
  5. Review required submittals. Review and finalize construction schedule related to roofing work and verify availability of materials, Contractor's personnel, equipment, and facilities needed to progress and avoid delays.
  6. Review required inspection and testing procedures.
  7. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions, including possibility of temporary roofing (if not a mandatory requirement).
  8. Review notification procedures for weather or non-working days and requests for time extensions.
  9. Prepare minutes of conference, including decisions and agreements (or disagreements) reached, and furnish copy of record to each party attending.

### **1.11 Delivery, Storage, and Handling.**

#### **A. Manufacturer's responsibility:**

1. Deliver products to the site with seals and labels intact in manufacturer's original containers, dry and undamaged.
2. Protect components during fabrication and packing from mechanical abuse, stains, discoloration, and corrosion.

3. Provide protective interleaving between contact areas of exposed surfaces to prevent abrasion during shipment, storage, and handling.

**B. Installer's responsibility:**

1. Store materials off ground providing for drainage; under cover providing for air circulation; and protected from wind movement, foreign material contamination, mechanical damage, cement, lime or other corrosive substances.
2. Handle materials to prevent damage to surfaces, edges and ends of roofing sheets and sheet metal items. Damaged material shall be rejected and removed from the site.
3. Protect panels from wind-related damages.
4. Inspect materials upon delivery. Reject and remove physically damaged or marred material from project site.
5. Store roof insulation, rolled goods, membrane materials, lumber, and fasteners in covered storage trailers or enclosed containers. Storing such materials with covered tarpaulins, plastic covers, or other temporary coverings is not acceptable. Store all rolled goods on end on pallets.
6. Metal roof panels may be stocked on the roof immediately prior to use. Other materials may not be stocked on the roof but shall be brought to the roof the day of application, and unused materials other than panels shall be removed at the end of the day and returned to proper storage.
7. Handle and store materials or equipment in such a manner as to avoid damage or permanent deflection of the roof deck or substrate.

**1.12 Project Site Conditions**

- A. Weather Condition Limitations: Means and method is the responsibility of the Contractor. Time extensions for inclement weather shall be granted, when applicable, within the terms of the General Conditions of the Contract.
- B. Proceed with roofing work only when existing and forecasted weather conditions will permit the unit of work to be installed in accordance with the manufacturer's recommendations and warranty requirements.
- C. Do not expose vulnerable materials to water or sun damage in quantities greater than can be weatherproofed during the same day. Insulation becoming wet due to rain shall be removed and replaced.
- D. Determine that work of other trades will not hamper or conflict with necessary fabrication and storage requirements for pre-formed metal roofing system.
- E. Protection:
  1. Provide protection or avoid traffic on completed roof surfaces.
  2. Do not overload roof with stored materials.

3. Support no roof-mounted equipment directly on roofing system.
- F. Ascertain that work of other trades which penetrates the roof is made watertight and is in place and approved prior to installation of roofing.

### **1.13 Warranties**

- A. Texas State University shall receive ONE (1) WARRANTY from manufacturer of roof panels and modified roofing assembly covering ALL of the following criteria. Multiple warranties are NOT acceptable.
1. The warranty shall consist of a 20-Year Manufacturer's No Dollar Limit Total System Weathertight Guarantee including coverage for all trim, flashings, and penetrations associated with the standing seam roof area.
  2. Twenty-year coverage on finish including checking, crazing, peeling, chalking, fading, and/or adhesion.
  3. Warranty shall commence on date of substantial completion.
  4. Installer shall provide manufacturer with 2-year warranty covering roofing system installation and watertightness.
  5. ONE manufacturer shall provide a single warranty for standing seam roof areas, membrane roof areas, and transitions between the two material types.

## **Part 2 - PRODUCTS**

### **2.1 Standing Seam Roofing System**

- A. General:
1. Whenever a particular make of material, trade name, and/or manufacturer's name is specified herein, it shall be regarded as being indicative of the minimum standard of quality required.
  2. Product names for the metal roof panel system and waterproofing materials used in this section shall be based on performance characteristics and shall form the basis of the contract documents.
- B. Materials:
1. Panel material: 20 oz. per square foot copper, H01 or H02 temper, smooth as per ASTM B370-92.
- C. Finish on surfaces:
1. Exposed and unexposed surfaces for uncoated panels shall be as-shipped from the mill.
- D. Characteristics:
1. The same panel profile from a single manufacturer shall be used for ALL standing seam roof areas.

2. Configuration: Standing seams incorporating mechanically interlocked, concealed anchor clips allowing unlimited thermal movement, and of configuration which will prevent entrance or passage of water.
  - a. Panel/Cap configuration must of multiple layers of copper surrounding anchor clip for prevention of water infiltration and increased system strength designed to limit potential for panel blow-off.
  - b. Profile of panel shall have stiffeners to clear hardware. These will also absorb thermal stresses, reduce oil canning in panel, and increase load carrying capacity.
  - c. Exposed fasteners, screws, and/or roof mastic are unacceptable and will be rejected. System configuration only allows for exposed fasteners at panel overlap (if required) and trim details (as per manufacturer's guidelines).
  - d. Panels must be furnished in lengths as shown on plans.
  - e. Panels: panels shall be formed from a single piece of metal. Panels formed from multiple pieces of joined metal are unacceptable. All performance tests must be applicable for the greatest panel width of the panels. Panels must be designed to accommodate thermal expansion and contraction while fixed at the middle of the panel.
3. Seam must be 2-3/8-inch minimum height for added upward pressures and aesthetic appeal. Seam shall have continuous anchor reveals to allow anchor clips to resist positive and negative loading and allow unlimited expansion and contraction of panels due to thermal changes. Integral (not mechanically sealed) seams are not acceptable.
  - a. Concealed Standard Anchor Clips: Clips must be 16-gauge stainless steel, alloy 316L, ONE (1) piece clip with projecting legs for additional panel alignment and provision for unlimited thermal movement in each direction along the longitudinal dimension.
  - b. Two-piece (2) clips must provide adequate movement.
  - c. Clip design must isolate sealant in panel cap from clip to insure that no sealant damage occurs from the clip during expansion and contraction.
  - d. Clip must maintain a clearance between panel and substrate for proper ventilation to help prevent condensation on underside of panel and eliminate the contact of panel fastener head to panel.
4. Standing Seam Panel Width: Approximately 11 inches.
5. Stiffening ribs: Located in flat of panel to minimize oil canning and telegraphing of structural members.
6. Replaceability: Panels shall be of a symmetrical design with configuration such that individual panels may be removed for replacement without removing adjacent panels.
7. Panel ends shall be panned at ridge, headwall, and hip conditions where applicable.

8. Panel length: Full length without joints, including bends.
9. Gable anchor clips: Standing Seam style 16-gauge stainless steel alloy 316L.
10. Fasteners:
  - a. Concealed fasteners: Fasteners designed for cementitious wood fiber decks such as Tectum as manufactured by Olympic, Deckfast, Buildex or as tested and approved by metal panel manufacturer.
  - b. Exposed fasteners: Series 410 stainless steel screws or 1/8-inch diameter stainless steel waterproof rivets. All exposed fasteners shall be factory painted to simulate material/color of the standing seam panels.
11. Closures: Factory precut closed cell foam meeting ASTM D1056 and/or D3575, enclosed in metal channel matching panels when used at hip and ridge.
12. Provide all miscellaneous accessories for complete installation.

## 2.2 Accessory Products

- A. Membrane Underlayment:
  1. Base Sheet: 45mil, W.R. Grace, Vycor, barrier membrane.
  2. Slip Sheet: minimum 5 lb/ 100 sq. ft. rosin-sized building paper.
- B. Sealant:
  1. Acceptable product: Sonolastic 150 with VLM.
    - a. Other products to be submitted shall meet the following criteria.
      - 1). 100% Elongation
      - 2). Federal specification TT-S-001534A, Type II, Class A, Type Non-sag
      - 3). Federal specification TT-S-00230C, Type II, Class A
      - 4). ASTM C920, Type S, Grade NS, Class 25. Use NT, M, A, G and O
      - 5). Corps of Engineers CRD-C-541, Type II, Class A
      - 6). JIS A5758, Type F, Class 20LM, Type 25HM
      - 7). ISO 11600, Class F, Type 20 LM, Type 25HM
  2. Colors: As selected by Architect from sealant manufacturer's standard selection.
- C. Bearing Plates:
  1. Install bearing plates directly over rigid board insulation/underlayment at each anchor clip location.
  2. Bearing plates shall be 3 inches x 5 inches x 16-gauge (minimum) galvanized steel.

3. Bearing plates shall be pre-punched with a hole pattern matching that of the panel anchor clips. Slotted holes are acceptable.
- D. Thermal Spacers: Where panels attach directly to purlins, provide thermal spacers recommended by panel manufacturer.
- E. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil (0.4-mm) dry film thickness per coat exposed edges of flashing.
- F. Form flashing components from full single width sheet in minimum 10'-0" sections. Provide mitered corners, joined using closed end stainless steel pop rivets and joint sealant.
- G. Fabricate roofing and related sheet metal work in accord with approved shop drawings and applicable standards.
- H. Safety Tie-offs: Provide OSHA approved safety tie-offs properly flashed and anchored into the structure suitable for providing fall-protection for workers on the roof.

## **PART 3 - EXECUTION**

### **3.1 Preparation**

- A. Inspection: Examine the alignment and placement of the building structure and substrate. Correct any objectionable warp, waves, or buckles in the substrate before proceeding with installation of the pre-formed metal roofing. The installed roof panels will follow the contour of the structure and may appear irregular if not corrected.
- B. Establish straight side and crosswise benchmarks.
- C. Use proper size and length fastener for strength requirements. Approximately 5/16 inch is allowable for maximum fastener head size beneath the panel.
- D. Rectangular Roofs shall be checked for square and straightness. Gable ends may not be straight; set a true line for the gable clips and flashing with string line.
- E. Measure the roof lengthwise to confirm panel lengths, overhangs, and coverage of flashings at eaves and ridges, and verify clearances for thermal movement.

### **3.2 Roofing and Flashing Installation**

- A. All details will be shown on manufacturer's shop drawings to successful bidder; install roofing and flashings in accordance with approved shop drawings and manufacturer's product data, within specified erection tolerances.
- B. Prepare roof for the installation of standing seam panels, including installing all underlayments and/or temporary waterproofing materials as required in this specification and bid documents.
- C. Directly over the prepared roof substrate, install one-piece panel anchor clips. All anchor clips will be set on 16-gauge galvanized pre-punched bearing plates to distribute the loads on the board insulation. All anchor clips will be fastened into the structural roof substrate based on the spacing pattern certified and tested by the roofing material manufacturer for the required wind uplift rating. This clip spacing must be followed to ensure integrity of the completed installation. These have been determined based on the uplift calculations for the specified roof and the test results of ASTM E1592.
- D. Installation of Roof Panels: Roof panels can be installed by starting from either end and working toward the opposite end. Due to the symmetrical design of the specified panel system, it is also acceptable to start from the middle of the roof and work toward each end.
  - 1. A stainless steel pop rivet shall be secured through the anchor reveal of the panel leg and extend into the arms of the panel clip located at the ridge of the system. This is done at each arm of the clip along the ridge. The panel is then anchored at both sides of the clip.
    - a. Be sure to capture all drilling debris during this operation with a rag or cloth placed on the panels at the drilling operation.

- b. Panels are not securely attached to the roof until fixed to the anchor clip. To avoid damage and injury, all panels shall be fixed to the anchor clip immediately as they are installed.
2. To install the panels, hook one side of the ridge over the panel edge and rotate over the opposite panel leg. For ease of installation, start at one end of the panel and work toward the opposite end.
  3. A hand crimping tool is used to crimp the seam around the top of two adjacent panels.
  4. Seams shall then be permanently seamed with manufacturer's mechanical seamer.
  5. At the end of each day's work, seams shall be mechanically seamed or hand crimped (crimp 4 inches every 8 feet) to reduce the possibility of wind damage prior to completion of the project.
  6. Uninstalled panels which are temporarily stored on the ground or roof shall be secured in place at the end of each day's work to prevent possible damage or injury.
- E. Isolate dissimilar metals and masonry or concrete from metals with bituminous coating. Use gasketed fasteners where required to prevent corrosive action between fastener, substrate, and panels.
  - F. Limit exposed fasteners to extent indicated on shop drawings.
  - G. Anchorage shall allow for temperature expansion/contraction movement without stress or elongation of panels, clips, or anchors. Attach clips to structural substrate using fasteners of size and spacing as determined by manufacturer's design analysis to resist specified uplift and thermal movement forces.
  - H. Seal laps and joints in accordance with roofing system manufacturer's product data.
  - I. Coordinate flashing and sheet metal work to provide weathertight conditions at roof terminations. Fabricate and install in accordance with standards of SMACNA Sheet Metal, 6<sup>th</sup> Edition.
  - J. Provide for temperature expansion/contraction movement of panels at roof penetrations and roof mounted equipment in accordance with system manufacturer's product data and design calculations.
  - K. Installed system shall be true to line and plane and free of dents and physical defects. In light gauge panels with wide flat surfaces, some oil canning may be present. Oil canning does not affect the finish or structural integrity of the panel and is therefore not cause for rejection.
  - L. Maximum variation from true planes or lines shall be 1/4 inch in 20 feet and 3/8 inch in 40 feet or more.
  - M. Form joints in linear sheet metal to allow for 1/4 inch minimum expansion at 20'-0" o.c. maximum and 8'-0" from corners.

- N. At joints in linear sheet metal items, set sheet metal items in two 1/4-inch beads of butyl sealant. Extend sealant over all metal surfaces. Mate components for positive seal. Allow no sealant to migrate onto exposed surfaces.
- O. Remove damaged work and replace with new, undamaged components.
- P. Touch-up exposed fasteners using paint furnished by roofing panel manufacturer and matching exposed panel surface finish.
- Q. Clean exposed surfaces of roofing and accessories after completion of installation. Leave in clean condition at date of substantial completion. Touch up minor abrasions and scratches in finish.

**MANUFACTURER'S CERTIFICATION OF MATERIALS**

(ROOFING MATERIAL MANUFACTURER'S LETTERHEAD)

Date

«OWNERREP»

«OWNERTITLE»

«OWNERCOMPANY»

«OWNERADDRESS»

«OWNERCITY» «OWNERZIP»

Subject:

Dear «OWNERREP»,

We are pleased to offer to supply the roofing materials for the roofing project named above. We hereby certify that (Name of Contractor) is an approved roofing contractor/applicator with our firm for the term or type of warranty stipulated below.

The conditions stipulated and representations in this letter are made by us as an inducement to you to use our materials on your roofing job. We propose to furnish roofing materials necessary to provide a watertight roofing assembly on the above project. We hereby represent to you that if our materials are selected for use on your job complying with our standard specifications, upon specific further request, we will issue a twenty (20) year "No dollar Limit" material and labor guarantee on the entire roofing assembly, including insulation system and flashings, on the form required in these specifications, so long as the assembly consists of the materials listed below. We approve the following materials for use as components of the roofing assembly we offer to guarantee, and such materials are approved as components of a roof assembly using our materials whether or not we issue a manufacturer's guarantee:

**(List specifically by brand name, material number, and ASTM designation)**

**Metal Roofing System and components**

**Roofing underlayment and secondary moisture protection**

**Roof insulation**

**Mastics and adhesives**

**Roof or insulation fasteners**

**Wood, carpentry, or lumber**

**Other miscellaneous components, expansion joints, drains, vents, flashings and sheet metal**

**Special requirements or installation conditions not published in standard specifications**

In addition, we will provide such inspections as we deem necessary. By means of this letter, we also certify that the contractor listed above has applied for the required warranty and made the necessary payment to cause issuance of the warranty. In the event that anything arises during the course of this transaction, including, but not limited to, failure by the contractor to make full payment for the warranty, or quality assurance issues, which might jeopardize issuance of this warranty, we will notify you, the owner, in writing timely to give you the chance to rectify such problems and cause issuance of the warranty as stipulated above.

Yours very truly,

COMPANY NAME

Signed by  
Authorized Representative

**CONTRACTOR'S CERTIFICATE OF GUARANTEE**

TO: «OWNERREP»  
PROJECT: «PROJSITE»  
«SITEADDRESS»  
«SITECITY» «SITEZIP»

OWNER: «OWNERCOMPANY»

EFFECTIVE DATE:

We, the undersigned, hereby GUARANTEE all of the work performed and materials either placed and/or supplied by the undersigned under this contract against defective workmanship and/or materials for a period of two (2) years following the date of completion and the Owner's acceptance of the work performed in accordance with the General Conditions of the Specifications, and the contract for this project.

Upon notice by the Owner, the undersigned Contractor will replace faulty workmanship and/or materials furnished or installed by the undersigned contractor which may be evidenced during the guarantee period without cost or charge to the Owner, whether or not such faulty workmanship results in moisture leaks. Faulty workmanship and materials shall include but not be limited to the following:

Leaks in the roofing system or components installed as part of this job  
Faulty attachment or leaks resulting from metal roofing, sheet metal, flashings or any other components furnished under this contract  
Flaws or deficiencies in the metal finish.  
Flaws or deficiencies in sealants  
Flaws or deficiencies in the underlayment or secondary moisture protection.

We agree to inspect the roof with the Owner or Owner's representative within sixty (60) days prior to the expiration of this warranty. If defects as noted above are not corrected by the expiration date of this guarantee, this guarantee shall be extended until such time as all defects present at the time of the inspection noted above have been corrected to the Owner's satisfaction. In case the undersigned Contractor fails to remedy such defects within a reasonable period of time following notice, the Owner may furnish such materials or labor as may be necessary to bring or restore the work to the standards originally specified and the undersigned Contractor agrees to reimburse the Owner fully and promptly for all costs incurred in obtaining such compliance. Correction of defects in workmanship and materials shall not, however, relieve the Owner of responsibility for normal and routine maintenance and cleaning of the roof, and the Contractor shall not be held responsible for routine maintenance.

Certified this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

CONTRACTOR:  
BY:  
TITLE:  
DATE:

**END OF SECTION 07 61 13**