TREMCO

Designing Tremco High Performance Metal Standing Seam

# TremLock VP Roof Systems

TremLock VP roof system is a factory roll formed metal roof system that is manufactured from standard 24 gauge Galvanized steel. The Galvanized panel is coated with Kynar 500®/Hylar® 5000. Rib sealant is installed at the factory to ensure water tightness.

The TremLock VP metal roof system can be specified as a new or retrofit roof system for architectural applications on roof slopes of 1/2:12 and greater. Its versatile structural standing seam design and aesthetically pleasing appearance make it suitable for almost any roof configuration and complex geometrics.

| Features: | Benefits: |
|---|---|
| • Factory installed rib sealant | • Ensures weather tightness and eliminates leaks through the vertical ribs |
| • Permanently seamed together in the field | • Provides single membrane, monolithic roof |
| • Continuous roof-to-fascia design | • Clean, neat appearance |
| • Installed with movable clips at all intermediate roof, structurals, ridge and panel transitions | • Accommodates thermal movement |
| • UL approved | • May result in lower insurance premiums |

## Finish/Color:

Galvalume® finish. Also available in low-gloss colors with full strength, 70% Kynar 500 and Hylar 5000 high performance coating. (Refer to color chart for availability and colors.)



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# TremLock VP Roof Systems

## PART 1
## GENERAL INFORMATION
## METAL ROOF SYSTEM

Drawings and general provisions of the Contract, including general and supplementary conditions and Division 1 specifications, apply to work specified in this section.

### 1.01 DESCRIPTION OF WORK

A. This work involves installation of a new, sloped metal roof system supported by new primary structural member supports as a retrofit for an existing building roof and/or a new metal roof system supported by sloped decking on new buildings.

B. The scope of the metal roof system is indicated in drawings and by provisions of this section. This section defines the roof structural members and supplementary structural framing required to support roof-mounted equipment, metal roof panels, steel deck, roof insulation, roof trims and transitions, roof mounted equipment curbs, pipe flashings, sealants, fasteners and miscellaneous flashings, closures and accessories directly related to the pre-engineered metal roof system.

C. Manufacturer's standard components and details shall be used provided components, accessories and complete structure conform to the requirements and design appearance shown.

### 1.02 QUALITY ASSURANCE

A. Design Criteria: (All based on "Latest Edition").

1. For structural steel members, comply with AISC "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings."
2. For light gauge steel members, comply with AISI "Specification for the Design of Cold Formed Steel Structural Members."
3. Design secondary members and covering materials for applicable loads and combination of loads in accordance with MBMA "Recommended Design Practices Manual."
4. For welded connections, comply with AWS "Structural Welding Code."
5. Design: The roof system shall be designed to support the specific loads in accordance with <governing building code and year> which shall meet or exceed, the County Climatic Data, as published in the MBMA Low Rise Building Systems Manual. The basic design gravity loads are indicated on the drawings, and wind uplift loads shall be calculated from a basic wind speed of <_____> miles per hour in accordance with <governing building code and year>. Components of the roof system shall meet the design loads as described above, and applied in load combinations as specified in <governing building code and year>, without exceeding allowable working stresses.
6. Wind Uplift: Metal roof system shall be a system that has been tested and approved by UL-Class 90. The system also shall have been tested and approved for a ____ psf load in accordance with the U.S. Army COE as meeting the "Test Method for Structural Performance of Standing Seam Roof Systems by Uniform Static Air Pressure Difference" as outlined in the U.S. Army COE Guide Specification 07416.

B. Supplier: A single supplier shall furnish the system specified in this section and shall be a firm that is and has been for a period of at least twenty (20) years prior to bid date, engaged in the manufacturing of pre-engineered metal roof systems.

C. Installer: The metal roof system installer shall be a firm regularly engaged in the installation of metal roofing systems for a minimum period of five (5) years continuously prior to bid date. The contractor shall be an authorized and franchised dealer of the metal roofing system manufacturer capable of showing successful installation similar to the work required for this project.

D. Fabrication Criteria: Clearly and legibly mark each piece and part of assembly to correspond with previously prepared erection drawings, diagrams and instruction manuals.

E. Manufacturer must be certified under current AISC-MB category.

### 1.03 SUBMITTALS

A. Production Data: The Manufacturer shall submit manufacturer's product information, specifications and installation instructions for building components, accessories and foil-faced insulation.

B. Shop Drawings: The Manufacturer shall submit complete erection drawings showing roof framing, transverse cross-sections, covering and trim details and accessory installation details to indicate proper assembly of building



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components.

C. Structural Certification: The Manufacturer shall submit written certification prepared and signed by a Professional Engineer employed by the Manufacturer, registered to practice in the state of _____ verifying that the metal roof system design meets indicated loading requirements and codes of authorities.

D. The Manufacturer shall submit certification verifying that metal roofing system has been tested and approved by UL-Class 90.

E. The Manufacturer shall submit certification verifying that the roof system has been tested and approved by the U.S. Army COE as meeting the “Test Method for Structural Performance of Standing Seam Roof Systems by Uniform Static Air Pressure Difference” as outlined in the U.S. Army COE Guide Specification 07416.

F. Installer Certification: The Contractor shall submit certification one week prior to bid date proving the metal roof systems installer has been certified by attending a specific installation training course and passing a written exam. The metal roof installer must be regularly installing metal roofing systems of same or equal construction to the system specified.

G. Samples: For any systems other than the basis of this specification, the contractor shall submit two (2) samples each of the following for architect’s review. Samples will be used to evaluate the quality of the finished roofing system.
   1. 12-inch long by actual width of roofing, and steel deck with required finishes.
   2. Fasteners for application of roofing, deck, siding and soffit panels.
   3. Sealants, closures and clips.
   4. 12-inch long minimum by 12-inch wide minimum of actual standing seam side lap seams for both sides of a typical panel.
   5. Length and width as required for actual standing seam roof panel and lap seam including stiffeners and fasteners and side lap seams for both sides of a typical panel.

H. The Manufacturer shall submit certification verifying that the roof system has been tested and approved in accordance with the Factory Mutual Test Procedure as FM 1- _____.

## 1.04 DELIVERY, STORAGE AND HANDLING

Deliver and store prefabricated components, sheets, panels and other manufactured items so they will not be damaged or deformed. Stack materials on platforms or pallets and cover with tarpaulins or other suitable weathertight ventilated covering. Store metal sheets or panels so that water accumulations will drain freely. Do not store sheets or panels in contact with other materials which might cause staining.

## 1.05 WARRANTY

Note: Copies of actual warranty forms must be submitted for the specifier to evaluate and ensure conformance to warranty coverage requirements in this specification.

A. Provide manufacturer’s written weathertightness warranty against leaks in roof panels arising from, or caused by, ordinary wear and tear under normal weather and atmospheric conditions. Warranty shall be signed by both the metal roofing system manufacturer and the metal roofing system contractor. Warranty shall duplicate terms of Tremco Inc., Beachwood, OH.

Optional Warranty (replace A above)

A. Provide manufacturer’s written weathertightness warranty against leaks in roof system, including trims, flashings and penetrations arising from, or caused by, ordinary wear and tear under normal weather and atmospheric conditions. Coverage shall be for the full contract amount of the manufacturer’s installed roof system. Roof shall be inspected by trained third party inspectors during installation and prior to warranty being issued. Installer shall be certified through a specific installation training school. Warranty shall be signed by both the metal roofing system manufacturer and the metal roofing system contractor. Warranty shall duplicate terms of Tremco Inc., Beachwood, OH.

Optional Warranty

B. Provide manufacturer’s standard written warranty against perforation of metal roof panels due to corrosion under normal weather and atmospheric conditions. Warranty shall be signed by metal roofing system manufacturer. Warranty shall duplicate terms of Tremco Inc., Beachwood, OH.

Painted Roof Panels (replace B above)

B. Provide manufacturer’s standard written paint film warranty on finish film integrity and color retention. The finish will not crack, check, peel, flake, blister or chalk in excess of ASTM D4214, number eight rating, or fade in excess of five units per ASTM D 2244, under normal

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atmospheric conditions. Warranty shall be signed by metal roof system manufacturer. Warranty shall duplicate terms of Tremco Inc., Beachwood, OH.

Painted Roof Panels

C. Inspection and Report Services: The owner is responsible for an annual roof inspection. The manufacturer shall provide notification and a checklist for the annual inspection. The owner can contact the metal roof system manufacturer or his authorized agent to perform an inspection of the entire roof system. Based on the inspection, a written report to the Owner detailing all conditions requiring maintenance and repair will be provided. Cost of Inspection and Report Service shall be included in the contract amount.

D. Manufacturer's Certification: Submit written certification signed by the manufacturer one week prior to bid date stating that the metal roof system manufacturer will provide, if required, warranties and Inspection and Report Service specified herein. NOTE: Samples of actual warranty forms shall be submitted with the bid.

## 1.06 JOB CONDITIONS:

A. Protection:
   1. Provide special protection on newly completed roofing to avoid unusual wear and tear during installation.
   2. Protect building walls, rooftop units, windows and other vulnerable components during installation.

B. Environmental Requirements:
   1. Comply with roofing manufacturer recommendations for allowable weather conditions during installation. Also, consider the effect of high winds during installation of the roofing system.
   2. Comply with local EPA and OSHA requirements as published by local, state and federal authorities.

## 1.07 COORDINATION

A. Prior to ordering of materials, a pre-roofing conference will be held with the approved roofing contractor, general contractor, owner and the architect to discuss the specified roofing system and its proper application.

B. Coordinate application of the roofing system with other trades to ensure the installation is weathertight and in accordance with all approved details and warranty requirements.

## 1.08 INSPECTIONS AND JOB CONTROL

A. A qualified technical representative of the manufacturer shall provide technical assistance to ensure compliance with the specifications and make recommendations when unforeseen conditions become apparent to the specifier or inspector.

B. As soon as all construction under this section, as well as any construction which could in any way affect construction under this section, has been completed, a final inspection of the roofing system shall be made. Note: See specification 1.05 Warranties for potential inspection requirements.

## 1.09 MAINTENANCE INSTRUCTIONS

A. When the warranty is issued, instructions shall detail the preventative maintenance required and shall list harmful substances that may damage the roofing.

# PART 2
# PRODUCTS

## 2.01 BASIS OF SPECIFICATION

Specification is based on Tremco Inc. TremLock VP standing seam roof system.

## 2.02 GENERAL INFORMATION

A. Manufacturer: Provide metal roof system by Tremco Inc. or a pre-approved subject equivalent to the requirements indicated on drawings and specified herein. TremLock VP manufactured by Tremco Inc., Beachwood, Ohio.

B. Approval Process: Any manufacturer seeking approval for this project must submit the following items to the architect two (2) weeks prior to the bid date.
   1. Proof of required UL-Class 90 and COE Test Certification.
   2. Samples of roof panels and panel clips.
   3. Complete warranty information.
   4. Complete product description, details and information for the roof system.
   5. Air Infiltration: @ 12.0 psf ASTM E-1680-95 0.0026 cfm/ft$^2$
   6. Water Penetration: @ 12.0 psf ASTM E-1646-95 No leakage



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7. Provide test results showing specified panel assembly passing ASTM E2140-01 Standard Test Method for Water Penetration of Metal Roof Panel System by Static Water Pressure Head. (Hydrostatic Roof System Test)
8. Factory Mutual: FM 1-60, FM 1-105

## 2.03 MATERIALS

A. Hot-Rolled Structural Shapes: ASTM A36 or A529.

B. Tubing or Pipe: ASTM A500, Grade B; ASTM A501; or ASTM A53.

C. Members Fabricated from Plate or Bar Stock: 50,000 psi minimum yield strength; ASTM A529, A570, or A572 or A607.

D. Members Fabricated by Cold Forming: ASTM A607 or A570, Grade 50.

E. Galvanized Steel Sheet: ASTM A653 with G90 coating; “Class” to suit building manufacturer’s standards.

## 2.04 STRUCTURAL FRAMING COMPONENTS

A. Secondary Framing: Z-purlins, eave struts and hat sections to be a minimum 16-gauge cold-formed sections formed from pre-painted steel.

B. Vertical Posts: Vertical support posts to be 16- or 14-gauge galvanized steel formed in an open “C” shape.

C. Bolts: ASTM A-307 or A-325 as necessary for design loads and connection details. Provide zinc-plated or cadmium-plated units.

D. Fabrication: Shop-fabricate to the size and section with bearing plates and other plates, as required, for erection. All required holes for anchorage or connection shall be pre-drilled or prepunched to the template dimensions.

1. Shop connections welded.
2. Field connections bolted.

E. Structural Painting:

1. All structural steel (except vertical posts, longitudinal and lateral bracing) shall be prime painted as temporary protection against ordinary atmospheric conditions. Subsequent finish painting, if required, shall be performed in the field.
2. Prior to painting all steel shall be cleaned of loose rust, loose mill scale, dirt and other foreign material. Unless otherwise specified, the fabricator shall NOT sandblast, flame clean or pickle prior to painting.
3. Factory-paint all steel with one coat of gray primer paint formulated to equal or exceed the performance requirements of Federal Specification SSPC Paint-25.

F. Secondary Structural Members - Steel

1. Clean all steel per SSPC-SP8 or SSPC-SP10.
2. Apply one coat of coil-applied polyester primer to a minimum coating thickness of 0.5 mil.

## 2.05 ROOFING AND SIDING

A. General: Provide roofing sheets, roll-formed to the profile as indicated and specified. Provide flashings, closures, metal expansion joints, ridge covers, roof panel mounting clips, trims and transitions and other sheet metal accessories factory-formed and finished. Material and finish shall be as specified.

1. Allowances for thermal expansion: Pre-engineered metal roof system (including trim conditions) shall be designed, fabricated and installed to allow relative movement between roof panels and trims and purlins, due to thermal expansion and contraction. The roof system must allow for expansion and contraction without causing damage to the system or the system components. The roof panel splice design shall allow panels to expand and contract without damage to splices and panels. Roof panels are pre-punched to provide minimal through-panel fastener locations. Roof panel splices must be staggered (from 1/2:12 up to 2:12 slopes) or in-line (over 2:12 slope) to ensure a continuous unbroken panel through each seam.

B. Roof panels shall be 24-gauge by 1’-4” nominal width, roll-formed, galvanized steel (42,000 psi min. yield), sheet-coated on both sides with a 1.25 ounce zinc coating, G-90 conforming to ASTM A525. Panels lengths shall be the maximum possible to minimize splices. Panels shall have two (2) major corrugations 2” high (2” including seam) 16” o.c. and minor flutes spaced 4” o.c. maximum between and parallel to major corrugations. Panels may be ordered without longitudinal flutes if desired. (Fluting reduces slight waviness commonly referred to as “oil canning.”)

1. Roof Panel Finish: Provide manufacturer’s Low Gloss full-strength 70% Kynar 500/ Hylar 5000 shop-applied fluoropolymer fin-

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ish to roof panels.

a. Clean galvanized steel with an alkaline compound, then treat with a zinc phosphate conversion coating and seal with a chromic acid rinse.
b. Apply to exterior surfaces of pretreated, galvanized steel a fluoropolymer coating system supplied to provide a total dry film thickness of 0.90 mils minimum. Color shall be as selected by architect from manufacturer's standards.
c. Interior finish of roof panels shall be the same as exterior finish or may be polyester color coat at manufacturer's option.

2. Physical characteristics of exterior coating:
   a. The physical characteristics of the exterior coating shall provide resistance to failure through cracking, checking, crazing, spotting or loss of adhesion.
   b. The physical characteristics of the exterior coating shall be measured by the following laboratory weather-simulating tests to obtain test results justifying the manufacturer's 20-year warranty:
      1. Humidity Resistance at 100° F and 100% RH in accordance with ASTM D-2247.
      2. Salt Spray Resistance at 5% Salt Fog per ASTM B-117.
      3. Reverse Impact Resistance in accordance with ASTM D-2794.
      4. Resistance to Accelerated Weathering in an Atlas, Model XW-R, Dew Cycle Weather-O-Meter in accordance with ASTM D-3361.
      5. Resistance to Dry Heat.
      6. Abrasion Resistance in accordance with ASTM D-968 (55 liters of sand per one mil of paint).
      7. Chemical/Acid/Pollution Resistance in accordance with ASTM D-1308 and G87.
      8. Gloss finish shall be maintained evenly over the entire surface in accordance with ASTM D-523.
3. Roof Panel Side Laps: Panels shall be designed to be interlocking seams, with a return leg on the lower edge of the female rib to increase panel strength under wind-uplift loading. Factory-applied sealant shall be provided in the female portion of the seam.
4. Roof Panel Splices: Roof panels shall be prepunched or predrilled and prenotched at end splices. Panels shall be prepunched or predrilled at low eave end to match prepunched or predrilled holes in each structural member. Prepunching or predrilling and prenotching may be done in the field provided hole locations are carefully controlled. Accurate hole locations ensure accurate modular spacing of roof panel side laps and accurate alignment of holes at splices. Splices shall occur directly over secondary structural members in order to fully support splices under roof loading and to prevent splice failure caused by cantilevering of splices beyond supports.

C. Standing Seam Roof Panel Mounting Clip: Galvalume, steel clip base with sliding mechanism to allow movement without binding. Galvalume clip base shall be prepunched or predrilled for mounting to roof structural members or deck. Sliding clip tab shall be designed to lock into and become an integral part of the roof panel seam. Provisions shall be incorporated into mounting clip assembly to keep sliding clip tab centered on mounting clip during installation of roof panels.
   1. For slopes under 40 ft. in length, an optional fixed clip may be used.

D. Sheet Panel Fasteners: manufacturer's standard system of self-drilling screws, bolts, nuts, self-locking rivets, self-locking bolts, splice plates and other suitable fasteners designed to withstand design loads.
   1. Provide metal-backed EPDM washers under heads of fasteners bearing on weather side of panels.
   2. Use stainless steel, Galvalume-headed or painted fasteners for exterior application and galvanized or cadmium plated fasteners for interior applications. Lockrivets, where required, shall be aluminum or stainless steel.
   3. Locate and space fasteners for true vertical and horizontal alignment. Use proper type fastening tools to obtain controlled uniform compression for positive seal without rupture of the EPDM washer.

E. Sealing Tape: 99% solids, pressure-sensitive, polyisobutylene compound tape with release paper backing. Not less than 1" wide and 1/8" thick, non-sag, nontoxic, nonstaining and permanently elastic.

F. Joint Sealant: One-part elastomeric; polyurethane or polysulfide as recommended by building manufacturer.



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## 2.06 SHEET METAL ACCESSORIES

A. General: Unless otherwise indicated, provide coated steel accessories with coated steel roofing (same or compatible material). Provide painted accessories with painted roof panels.

1. Gutters: Formed in sections not less than ten (10) feet in length, complete with end pieces, outlet tubes and special pieces that may be required. Join sections with riveted and soldered or sealed joints. Unless otherwise indicated, provide expansion joint with cover plate where indicated. Furnish gutter supports spaced at maximum 32" o.c., constructed of same metal as gutters. Provide aluminum or stainless steel, wire ball strainers at each outlet. Gutters shall be 26-gauge, roll-formed or shop broken, galvanized steel, coating G90 in accordance with ASTM A-525. Finish to match roof fascia and rake. Gutter outlet tubes shall be fabricated as indicated on drawings. Gutter size and configuration shall be as indicated on drawings.
2. Downspouts: Formed in sections not less than ten (10) feet in length complete with any special pieces that may be required. Join sections with riveted and soldered or sealed joints. Downspouts shall be 26-gauge, roll-formed or shop broken, galvanized steel, coating G90 in accordance with ASTM. Finish shall match fascia. Gutter straps shall be spaced 8' o.c. maximum and be same material as gutter. All strap edges shall be rolled or smooth.
3. Roof Curbs: Provide manufacturer's standard roof curb units for roof mounted equipment as indicated to adequately support equipment. Roof curbs shall be aluminum, thickness based on design load requirements, and shall provide for a weathertight seal with standing seam roof system. Crickets shall be provided on high side of curbs for proper drainage as an integral part of roof curb design. All curbs shall be internal flanged.

## 2.07 THERMAL INSULATION:

A. Blanket Insulation: Not less than 0.6 lb per cubic foot density, thickness as indicated, glass fiber blanket with U.L. flamespread classification of 25 or less. Two-inch-wide continuous vapor-tight edge tabs.

1. The vapor barrier seam rating shall be .02 to 0.1 vinyl-aluminum foil laminate or aluminum foil Kraft paper laminate.

B. Rigid Board Insulation: When specified, insulation board shall be rigid polyisocyanurate foam plastic.

1. The vapor retarder seam rating shall be .02 to 0.1 vinyl-aluminum foil laminate or aluminum foil Kraft paper laminate.

C Thermal Spacer Blocks: Provide 1/2" thick high density, extruded polystyrene board stock strips by width required on underside of roof sheets extending across top of structural members or deck system.

D. Location:

1. Provide fiberglass blankets with integral vapor barrier over entire existing roof area as indicated. Insulation shall be installed over structural members, parallel to panel ribs, abutting, double-rolled with side tabs stapled together. Install in continuous, unbroken lengths to extent possible. End seams shall be staggered, stapled and taped. Thickness shall provide a minimum tested "R" value of <___> based on ASTM C236.

# PART 3
# EXECUTION

## 3.01 GENERAL

Metal roofing system shall be installed in strict conformance with manufacturer's instructions. System shall comply with UL-Class 90 wind uplift. Roof panels shall be installed to allow for relative movement between roof panels, ridge, gables and other components of the roof system.

## 3.02 ERECTION

A. Z-purlins and Girts (secondary structural members): Provide rake or gable Z-purlins with tight fitting closure channels and fascias. Secure Z-purlins to structural framing.

B. Decking Requirements:

1. The steel deck and the VSR roof panel are not considered safe work platforms until completely secured to the structural members. Walk-boards or other safety equipment, as required by safety standards, shall be provided by the erecting contractor to provide worker safety during panel installation.
2. Steel deck and insulation boards shall be

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positioned and aligned by installing the starting panels against the end wall trim clips and the sidewall eave structural member.

3. Steel deck shall be placed with edges up and corrugations perpendicular to secondary structural members; splices always shall occur over secondary structural members.
4. Vapor retarder shall be installed with six-inch minimum side laps and splices.
5. All panel clips and bearing plates shall be positioned as shown on manufacturer's erection drawings.

## 3.03 ROOFING

A. Provide weatherseal under ridge cap/flash and seal roof panels at eave and rake with rubber, EPDM or other closures to exclude water.

B. Roof Sheets: Secure roof panels to structural members by means of a sliding clip fastened to the structural members and securely locked into panel seam. Sliding clip shall be centered in mounting clip.

1. Panel shall be field seamed using manufacturer's standard machine seaming device. Cracking or splitting of metal or cracking, peeling, blistering or other damage to panel coating shall not be acceptable. Panels shall be fastened securely to eave structural members and sealed watertight.
2. Panel end splices shall consist of pre-punched and prenotched roof panels bolted together with a backup plate. Splices shall be tight and flat. Fishmouthing of panels between fasteners is not acceptable.

C. Sheet Metal Accessories: Install gutters, roof curbs, ventilators, louvers and other sheet metal accessories in accordance with manufacturer's recommendations for positive anchorage to building and weathertight mounting.

D. Thermal Insulation: Install in accordance with manufacturer's published directions, concurrently with installation of roof panels. Install blankets, straight and true, in one-piece lengths with both sets of tabs sealed to provide a complete vapor barrier. Install retainer strips at each longitudinal joint, straight and taut, nesting with roof rib to hold insulation in place.

E. Dissimilar Materials: Where aluminum surfaces come in contact with ferrous metal or other incompatible materials, keep aluminum surfaces from direct contact to others by applying the following:

1. One coat of zinc chromate primer, FS TT-P-645, followed by two coats of aluminum paint, SSPC-Paint 101.
2. In lieu of two coats of aluminum paint, apply one coat of high build bituminous paint, SSPC-Paint 12, applied to a thickness of 1/16" over zinc chromate primer.
3. Back-paint aluminum surface where impractical to paint other surface.
   a. One Coat Aluminum or approved equal.