

## SECTION 05 46 00

### TOPR RETROFIT STEEL ROOF FRAMING SYSTEM

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
  - 1. TopR system.
  - 2. Thermal Insulation.
  - 3. CoolR metal roofing.
  
- B. Related Sections:
  - 1. Division **[01 Section "General Requirements".]** [\_\_\_\_\_.]
  - 2. Division **[07 Section "Thermal Insulation".]** [\_\_\_\_\_.]
  - 3. Division **[07 Section "CoolR Metal Roofing".]** [\_\_\_\_\_.]
  - 4. Division **[07 Section "Sheet Metal Flashing and Trim".]** [\_\_\_\_\_.]
  - 5. Division **[07 Section "Roof Specialties".]** [\_\_\_\_\_.]
  - 6. Division **[07 Section "Roof Accessories".]** [\_\_\_\_\_.]
  - 7. Division **[07 Section "Joint Sealants".]** [\_\_\_\_\_.]
  - 8. Division **[26 Section "SolR Collectors".]** [\_\_\_\_\_.]

##### 1.2 REFERENCES

- C. American Iron and Steel Institute (AISI) ([www.steel.org](http://www.steel.org)) - Specification for the Design of Cold-Formed Steel Structural Members.
  
- D. American Society of Civil Engineers (ASCE) ([www.asce.org](http://www.asce.org)) 7 - Minimum Design Loads for Buildings and Other Structures.
  
- E. ASTM International (ASTM) ([www.astm.org](http://www.astm.org)):
  - 1. A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - 2. A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
  - 3. C665 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Wood Frame and Light Construction Buildings.
  - 4. C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.

##### 1.3 SYSTEM DESCRIPTION

- A. Retrofit Steel Roof Framing System:
  - 1. Material Thickness: 16 gage.
  - 2. Punch-out size and location: Determined by existing roof panel; verify on site.
  - 3. Height: **[2] [3-1/2]** inches. Determined by existing roof panel; verify on site.
  - 4. Deflection Limiter: Provide additional subframe members between existing purlins when required by system design.
  
- B. Design Requirements; design roof system to withstand:
  - 1. Live and dead loads in accordance with **[ASCE 7.] [Building Code.]** [\_\_\_\_\_.]
  - 2. Movement caused by an ambient temperature range of **[120] [\_\_]** degrees F and a surface temperature range of **[160] [180] [\_\_]** degrees F.

- C. Performance Requirements: Tests shall be conducted by or witnessed by a recognized independent laboratory or independent professional engineer. Test reports shall be signed and sealed by a independent professional engineer.
1. Retrofit Subframe member shall be tested for the following minimum moment reduction (amplification) factor used in determining the nominal flexural strength of a purlin in negative (positive) bending supporting a through fastened panel system with a subframe attached.
    - a. 16 ga. (33 ksi min.) Subframe over 16 ga. Purlins, Uplift: R-Value = 0.779
    - b. 16 ga. (50 ksi min.) Subframe over 16 ga. Purlins, Uplift: R-Value = 0.902
    - c. 16 ga. (33 ksi min.) Subframe over 16 ga. Purlins, Gravity: A-Value = 1.646

#### 1.4 SUBMITTALS

- A. Submittals for Review:
1. Shop Drawings: Indicate framing layout, fastenings, and pertinent details.
  2. Product Data: Indicate framing sizes, materials, finishes, and accessories.
- B. Quality Control Submittals:
1. Certificate of Compliance: Certificate from Professional Structural Engineer responsible for system design that system was designed in accordance with Contract Document requirements, applicable Building Code, and generally accepted engineering practices.
  2. Engineering Data: Calculations indicating wind uplift and deadload capacity of roof system and fastening requirements to meet loading, sealed by registered professional engineer responsible for system design.
- A. Sustainable Design Submittals:
1. Recycled Content: Certify recycled content of metal roofing; indicate recycled content percent and whether pre-consumer or post-consumer.

#### 1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Minimum **[2]** **[\_\_]** years **[documented]** experience in work of this Section.
- B. Installer Qualifications: Minimum **[5]** **[\_\_]** years **[documented]** experience in work of this Section.
- C. Calculate structural properties of roof system in accordance with AISI Specifications.
- D. Design framing under the direct supervision of a Professional Structural Engineer experienced in the work of this Section and licensed in the State in which the Project is located.

#### 1.6 DELIVERY, STORAGE AND HANDLING

- A. Store framing members off ground, with one end elevated.
- B. Protect framing members from damage and corrosion.

### PART 2- PRODUCTS

#### 2.1 MANUFACTURERS

- A. Contract Documents are based on products by:

Sheffield Metals International  
5467 Evergreen Parkway  
Sheffield Village, OH 44054  
Voice: (800) 283-5262 or (440) 934-8500  
Fax: (440) 934-8506

1. Products: TOPR

## 2.2 MATERIALS

- A. Galvanized Steel Sheet:
  1. ASTM A653/A653M or A1011/A1011M, minimum yield strength of 33 ksi, G60 coating class, 16 gage minimum.
  2. Recycled content: Minimum 25 percent, classified as post consumer.
- B. Insulation: ASTM C665, unfaced glass fiber batts, or ASTM C1289, **[foil]** [\_\_\_\_] faced rigid polyisocyanurate.
- C. Metal Roofing System: Specified in Section **[07 61 00.]** [\_\_ \_\_\_\_].

## 2.3 ACCESSORIES

- A. Fasteners: Self-drilling, self-tapping, corrosion-resistant coated steel screws, type and length to suit project design requirements.

## 2.4 FABRICATION

- A. Verify existing metal roof panel profile prior to fabrication of subframes.
- B. Roll form subframes in longest practical lengths.
- C. Fabricate subframes to hat-shaped profile, custom punched to fit existing roof panel profile.
- D. Provide deflection limiters when project design dictates attachment points between existing purlins.
- E. Web Height: **[Manufacturer's standard.]** [\_\_] inches.
- F. Punch base flange to receive fasteners for attachment to existing roof framing.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Verify that existing roof framing is acceptable to receive new roof framing system.
- B. Do not remove existing metal panel fasteners unless they substantially interfere with placement of new framing system.

### 3.2 INSTALLATION OF FRAMING SYSTEM

- A. Install framing system in accordance with manufacturer's instructions and approved Shop Drawings.
- B. When system design requires attachment points between existing purlins, install deflection limiters as required by engineering and recommended by system manufacturer.
- C. Locate subframes directly over existing roof framing members.
- D. Screw attach subframes through base flange to existing framing members or to deflection limiters when used. Space fasteners in accordance with system design or as directed by manufacturer.

### 3.3 INSTALLATION OF INSULATION

- A. Friction fit insulation between framing members.
- B. Butt insulation to adjacent construction. Butt ends and edges.
- C. Carry insulation continuously over or under pipes, conduits, boxes, and other components.
- D. Ensure complete insulation coverage without voids.
- E. Do not install more insulation than can be covered with metal panels on same day.

### 3.4 INSTALLATION OF METAL ROOFING

- A. Install roofing system as specified in Section **[07 61 00.]** [\_\_ \_\_\_\_.]

END OF SECTION