SECTION 13 34 21
RETROFIT STEEL ROOF FRAMING SYSTEM

TopHat Subframe guide specification. Revised November 2026. Also available as Section 05 46 00. Bracketed items [ ] are options for the specifier. Current version: https://www.tophatframing.com/tophat-subframe-csi-specification.html

Part 1: General

1.1 Summary

A. Section includes:

1. Light gage steel retrofit roof framing system.
2. [Insulation.]
3. [Metal roofing.]

B. Related sections:

1. Division 01: Administrative, procedural, and temporary work requirements.
2. Section [07 61 00 - Sheet Metal Roofing] [_____ - _____]: Metal roofing system.
3. Section [__ ____ - _____]: Roof accessories.

1.2 References

A. American Iron and Steel Institute (AISI): Specification for the Design of Cold-Formed Steel Structural Members.

B. American Society of Civil Engineers (ASCE) 7: Minimum Design Loads for Buildings and Other Structures.

C. ASTM International (ASTM):

1. A653/A653M: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
2. C665: Standard Specification for Mineral Fiber Blanket Thermal Insulation for Wood Frame and Light Construction Buildings.
3. 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] [14] gage.
2. Punch-out size and location: determined by existing roof panel; verify on site.
3. Height: [2] [3-1/2] [__] inches.
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] [__] degrees F.

C. Performance requirements: tests shall be conducted or witnessed by a recognized independent laboratory or independent professional engineer. Test reports shall be signed and sealed by an 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 (50 ksi min.) subframe over 16 ga purlins, uplift: R = 0.920
    b. 16 ga subframe over 16 ga purlins, gravity: A = 1.672

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 the professional structural engineer responsible for system design that the 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 dead load capacity of roof system and fastening requirements to meet loading, sealed by the registered professional engineer responsible for system design.
    3. Mill certificates for steel, on request.

C. Sustainable design submittals:
    1. Recycled content: certify recycled content of framing; indicate recycled content percent and whether pre-consumer or post-consumer.

1.5 Quality assurance

A. Manufacturer qualifications: minimum 10 years [documented] experience manufacturing retrofit roof framing.

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 the 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:

TopHat Framing Systems
Winston-Salem, North Carolina
Phone: 330-931-9201
Email: info@tophatframing.com
Web: www.tophatframing.com

B. Substitutions: [Under provisions of Division 01.] [Not permitted.]

2.2 Materials

A. Galvanized steel sheet:
    1. ASTM A653/A653M, minimum yield strength of 50 ksi, G90 coating class, 16 gage minimum.

2. Domestically produced steel.

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 the same day.

3.4 Installation of metal roofing

A. Install roofing system as specified in Section [07 61 00.] [__ ____.]

END OF SECTION