

## 05590 STEEL FRAMED EQUIPMENT SUPPORTS

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*Specifier: This is a new section, for work not previously covered in 05500 Metal Fabrications. There is a requirement, 2.02 Z. Field Supports, in 15711 Induced Draft Cooling Towers, for a steel framed support that follows FBC. If the cooling tower is the only item of equipment in the Work that needs a framed support, the 15711 specification is almost adequate. However, 15711 should be edited to require that the vertical supports be round pipe – not angles or WF shapes, for proper flashing. If other equipment needs such supports, this section will serve as a handy specification that can be referred to in as many equipment sections as needed.*

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### PART 1 GENERAL

#### .1 RELATED REQUIREMENTS

- A. Coordinate framed equipment supports with other parts of the Work.
  - 1. The lead section (roof membrane) for the entire Roof Assembly 07522
  - 2. Other Roof Assembly components Div 07

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*Specifier: Some of the sections for equipment that may need framed supports when installed on a roof (or even at ground level) are listed below (3. through 10.). Delete inapplicable cases. Be sure to add other equipment sections that have items that need to be elevated for roofing maintenance or for servicing from below the equipment and its related piping, etc. At some ground level equipment installations it will be necessary to provide raised supports for servicing from below. Coordinate carefully with mechanical engineers.*

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- 3. Air-cooled condensing units for insulated cold storage rooms 15650
- 4. Air-cooled condensing units 15670
- 5. Cooling towers 15711
- 6. Packaged air conditioning units 15770
- 7. Exhaust fans 15821
- 8. Unit ventilators 15836
- 9. Air handling units 15855
- 10. Air moving equipment 15861

#### .2 REFERENCES

- A. American Society for Testing and Materials (ASTM) Specifications for:
  - 1. A123–02 Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - 2. A307–04 Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
  - 3. A325–06 Structural Bolts, Steel, Heat Treated, 120/105 ksi Min. Tensile Strength.
  - 4. A500–03a Cold-Formed Welded and Seamless Carbon Steel Structural Tubing.
  - 5. A501–05 Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
  - 6. A992–06a Structural Steel Shapes.

#### .3 DEFINITIONS

- A. Roof Assembly: Defined in 07522.
- B. HVHZ: High velocity hurricane zone, defined in FBC to include Miami-Dade County,

- C. Equipment support: Open structural steel structures of beams and flashable legs that hold equipment a distance above the roof membrane sufficient for both roofing maintenance and for servicing the equipment and its piping from below.
- D. Piping supports, specified in 07721: Flashable curb-like structures that securely support pipes and conduit crossing the roof.

#### .4 QUALITY ASSURANCE

- A. Wind pressure diagrams: Tables on the Drawings, prepared by the A/E (a professional engineer registered in Florida) show maximum positive and negative ( $\pm$ ) wind pressures based on American Society of Civil Engineers (ASCE) 7, Minimum Design Loads for Buildings and Other Structures, for a wind speed of 146 mph; exposure category C; wind load classification III, and wind load importance factor of 1.15.
- B. Equipment shapes, sizes, weights and heights above grade: Provide to A/E. A/E will follow ASCE 7 requirements in its calculations, which will be supplied to the Contractor.
- C. Design and fabricate steel equipment supports for resistance to overturning from HVHZ winds, following calculations of A/E for each item of rooftop equipment.
  - 1. Follow American Institute of Steel Construction (AISC) Manual of Steel Construction, 13<sup>th</sup> Ed.
  - 2. Follow American Welding Society (AWS) Structural Welding Code, AWS D1.1.
  - 3. Shop Painting: Follow Society for Protective Coatings (SSPC) SP, PS, CS & PA Standards and Specifications.

#### .5 SUBMITTALS

Follow 01330

- A. Shop Drawings. Design and detail each equipment support to support rooftop equipment and to resist the calculated overturning wind forces at its location,.
  - 1. Show method of fastening to structural deck to counter wind forces.
  - 2. Show the shape and method of fastening vertical members to structure below.
  - 3. Show the roof insulation depth where each support is located. Also show the resulting clear dimension from top of the roof membrane to the bottom of the lowest horizontal member of the equipment support.
  - 4. Submit for approval of Contractor and equipment installer before fabricating.

### PART 2 PRODUCTS

Follow 01600

#### .1 FRAMED ROOF EQUIPMENT SUPPORTS

- A. Function and Performance. Provide open-sided structural steel frames with round or square tubular legs that support items of rooftop equipment at least 18 in. clear above the roof membrane, with ample clearance for roof maintenance and for installing and maintaining piping, ducts, conduit and wiring that serves rooftop equipment.
  - 1. Roof equipment supports, when fastened to supported equipment, shall withstand the calculated wind uplift and toppling effect of HVHZ wind forces.
- B. Description.
  - 1. Horizontal members: Bolted galvanized steel shapes: ASTM A992 (60,000 lb/in<sup>2</sup> yield point, min.) or ASTM A36 (36,000 lb/in<sup>2</sup> yield point, min.). Welding may be used in sub-assemblies within the support assembly

2. Vertical members: Round galvanized structural tubing steel, welded to horizontal members, with welded base plates drilled for bolting to roof structure: ASTM A501 or ASTM A500, Grade B or C (42,000 lb/in<sup>2</sup> yield point, min.) or ASTM A501 .
  - a. Vertical members shall accommodate circular (or square) stainless steel roof flashings. Do not use angle, WF, or other steel shapes for vertical members in roof equipment support assemblies.
3. Restraint brackets and base flange attachments: Galvanized steel; ASTM 7.
4. Welding electrodes: AWS A5. 1-69, Class E60 and E70 for manual welds.
5. Galvanizing: Hot dip after fabrication; ASTM A123, Grade 75 to 95, 3.0 oz/ft<sup>2</sup> min.
6. Bolts: ASTM A325 (105 lb/in<sup>2</sup> yield point, min.), at least 5/8 in. diameter, with nuts and washers, hot dip galvanized.

## .2 ACCESSORIES

- A. Repair of Galvanizing: Compound with high metallic zinc content such as Galvaneal, Galvicon, or Z.R.C.
- B. Shop prime coat: SSPC SP 1 solvent cleaning and SP 12.01 zinc-rich primer.
- C. Isolation sheets: Provide neoprene or EPDM separators between dissimilar metals that are in contact.
- D. Concrete expansion bolts for fastening to concrete structure: Galvanized steel self-drilling type as produced by Philips Drill or Rawl Plug.

## .3 FABRICATION

- A. Fabricate ferrous items following the A/E's calculated loads, AISC Manual, AWS Code, SSPC standards, and approved shop drawings.
  1. Grind and buff smooth rough edges, sharp corners, and welded joints. Repair damaged galvanized surfaces with hot or cold applied galvanizing repair compound.
  2. Shop painting: Shop-prime zinc coating with 1 coat of primer, ready for field painting.

## PART 3 EXECUTION

### .1 INSTALLATION

Follow 01700

- A. Erect and install steel framed supports following approved shop drawings and producer's directions. Touch up cleaned welds, galvanizing, and abrasions to shop coat. ///