SECTION 23 0549 - SEISMIC RESTRAINTS FOR SUSPENDED UTILITIES AND EQUIPMENT

PART 1 - GENERAL

1.01 SUMMARY

A. This section covers seismic restraints for suspended utilities including HVAC Ductwork, HVAC Piping, Plumbing, Electrical Systems (conduits, cable tray, bus duct, etc.), Fire Suppression Systems and Fuel Piping.

B. Anchorage calculations are required for all equipment in accordance with IBC 2006.

1.02 RELATED SECTIONS

A. Drawings and General Provisions of the Contract apply to this section.

1.03 SEISMIC BRACING

A. 2006 International Building Code Section 1631 Earthquake Loads

B. ASCE 7-05 Chapter 13 (Formulas 13.3.1, 13.3-2 and 13.3-3)

C. 2006 International Building Code Chapter 17 Structural Tests and Special Inspections.

1.04 SUBMITTALS

A. Seismic restraints shall be designed by a registered structural engineer in accordance with the 2006 IBC and ASCE 7-05. Those systems and components that require seismic restraints are noted in section 1.04.

B. Submittals shall include appropriate details and reflect actual job site conditions. Submittal shall be wet stamped by a registered structural engineer specialized in the design of seismic restraints and licensed in the state where the project is located.

C. Job site conditions not covered by the manufacturer's design manual shall be engineered on an individual basis and all calculations and details shall be wet stamped by a registered structural engineer specialized in the design of seismic restraints and licensed in the state where the project is located.

D. Submit seismic bracing layouts for all suspended utilities on shop drawings wet stamped by a registered structural engineer specialized in the design of seismic restraints and licensed in the state where the project is located. The basis for the layouts shall be the utility contractors shop drawings, and the addition of the bracing locations shall be the responsibility of this section.

E. Layout drawings to include:

1. All vertical support and seismic bracing locations.

2. All vertical support and seismic bracing connections to the structure (Anchorage Manufacturer, Quantity and Size for each location).

3. Vertical Support and brace arm reactions at all connection points to the structure (for the Structural Engineer of Record use in checking suitability of the building structure).

4. Type and size of brace member.

5. Reference installation detail numbers for vertical support and seismic bracing.

6. Maximum Transverse and Longitudinal brace spacing for each utility.

7. Seismic accelerations each utility has been designed to resist.

8. Suspended utility maximum weight per lineal foot (lbs/1f) or maximum pipe/conduit size at all seismic locations.

9. Maximum all threaded rod size at all seismic locations.

1.05 SPECIFICATION QUALITY ASSURANCE & SPECIAL INSPECTION

A. Where the Component Importance Factor (Ip) is greater than 1.0 for any mechanical, electrical, component or system, that system is considered to be a "Designated Seismic System" per Chapter 17 of the 2006 IBC. Each Contractor responsible for the construction of a Designated Seismic System shall submit a written "statement of responsibility", per the 2006 IBC (Section 1706), to the building official and owner prior to the commencement of work on the system or component.

B. Install Identification tags at all seismic brace locations to include the following:

1. The specific seismic forces (g force) the location was designed to resist.

2. Maximum brace reaction to the structure.

3. Maximum pipe/conduit size the brace location was designed for (individually suspended items).

4. Maximum weight (lbs/1f) the brace location was designed for (trapeze utility locations).

5. Maximum weight the brace location was designed for (all suspended equipment).

6. Nomenclature that matches location identification as marked on plan set layout.

C. Upon completion of construction a Quality Assurance Representative of the seismic force resisting system manufacturer/designer shall review the installation of the seismic-force-resisting system and provide documentation indicating conformance to shop drawing seismic restraint layout.

D. Special Inspection will be required on Designated Seismic Systems per the Statement of Special Inspections submitted at time of permit application and/or Section 1705.3 and Section 1707.8 of the 2006 IBC.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers & Materials

1. Acceptable Manufacturers:

a. ISAT (International Seismic Application Technology)

b. Unistrut

c. Tolco

d. B-line

2. Material Requirements:

a. All manufacturer specific components that are part of the seismic resistance system must be strength tested by independent structural test facility, with test reports available upon request. (Tests by the component manufacturer are not acceptable.)

b. All anchors utilized as part of the component anchorage and/or seismic anchorage must comply with Section 13.4.2 of the ASCE 7.05. Specifically all anchors must be tested for seismic applications in conformance with ACI 355.2.

2.02 SPECIFICATION DEVIATIONS

A. Any contractor or manufacturer wishing to deviate from the project code requirements must submit in writing the following:

1. Deviation requested

2. Reason for the deviation to include code or local jurisdiction allowances.

3. Cost impact for deviation

B. A manufacturer's letter of exception will not be considered acceptable justification for deviations. Deviations citing differences between SMACNA and IBC/ASCE exclusions as reasoning for deviation will not be considered.

PART 3 - EXECUTION

3.01 INSTALLATION

A. All seismic bracing shall be installed per the manufacturer's instruction sheet supplied in each bracing kit.

B. Torque each anchor bolt in accordance with manufacturer's instruction sheet supplied with each bracing kit.

END OF SECTION 23 0549