PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The requirements of the General Conditions, Supplementary Conditions and the following specification sections apply to all Work herein:
1. Section 26 00 10 - General Requirements
2. Section 26 00 20 - Scope of Work
3. Section 26 08 13 - Testing
4. Section 26 22 13 - Low-Voltage Dry-Type Distribution Transformers
5. Section 26 22 14 - Harmonic Mitigating Transformers (HMT)
6. Section 26 32 13 - Electric Generators

1.2 SUMMARY

A. Furnish and install foundation vibration isolation and associated equipment for vibrating and rotating equipment, etc. as specified herein and as indicated on the Drawings.

B. Provide seismic restraints for all electrical equipment.

C. Provide seismic bracing systems in conformance with the special inspections criteria in CBC Chapter 17.

1.3 REFERENCE STANDARDS

A. All vibration isolation devices and all components shall be designed, manufactured and tested in accordance with the latest applicable industry standards.

B. All equipment and material to be furnished and installed on this Project shall be in accordance with the requirements of the authorities having jurisdiction, and suitable for its intended use on this Project.

C. All equipment shall meet the requirements of CBC seismic zone 4.

1.4 SUBMITTALS

A. The following submittal data shall be furnished according to the General Conditions and Section 26 00 10 and shall include, but not be limited to:
1. Vibration Isolation Equipment* including:
   a. Isolation mounting deflections.
   b. Spring diameters, compressed spring heights at rated load; solid spring heights, where steel spring isolation mountings are used.
   c. Equipment operating frequencies.
   d. Calculations showing that the spring surge frequency is not coincided with any forcing frequencies/harmonics of the equipment to be mounted.
2. Installation Drawings: The Subcontractor shall submit vibration isolation and seismic restraint Shop Drawings for the electrical equipment specified herein to the Structural Engineer, Architect and Engineer prior to installation of any of the equipment restraints or systems. Shop Drawings shall indicate plan locations and the structural load at each isolator. Shop Drawings shall indicate the construction loading and the normal operating condition loading. Calculations shall be included with the Shop Drawings and shall be a similar format to facilitate review.

B. All items or equipment listed above with asterisks (*) shall be certified by the manufacturer using Manufacturer Certification “MCA” as set forth in Section 26 00 10. See Section 26 00 10 for certification requirements.

C. Seismic restraint calculations certified by a Professional Structural or Civil engineer registered in California.

D. Certification of compliance from each seismic bracing system manufacturer in conformance with CBC Section 1708.

1.5 WARRANTY

A. Comply with the requirements of the General Conditions and Section 26 00 10.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. If it complies with these Specifications, vibration isolation and seismic restraint devices manufactured by one of the following manufacturers will be acceptable:
1. Amber/Booth Company
2. Korfund Dynamics Corporation
3. Mason Industries, Inc.
4. Vibration Eliminator Company
5. Vibration Mounting and Controls, Inc.

2.2 GENERAL

A. All vibration isolators and seismic restraint devices shall be furnished with zinc electroplated hardware to prevent corrosion and bolt freeze up and to maintain attractive appearance. To prevent corrosion, steel or cast iron housing shall be treated by phosphating and painting while aluminum housing shall be etched in Chromi Coat solution and painted.

B. Neoprene-in-shear isolation mounting assemblies shall utilize bare neoprene elements with unit type design molded in oil resistant neoprene. The neoprene shall be compounded to meet the following:
1. Not greater than seventy (70) durometer.
2. Minimum tensiles strength of 2000 psi.
3. Minimum elongation of three hundred percent (300%).
4. Maximum compression at twenty-five percent (25%) of original deflection.

C. The isolation and seismic restraint devices and channel frames shall be products of a single vibration isolation and seismic control manufacturer. Submittal data shall include size, type, load and deflection of each isolator selected and shall clearly outline procedures for setting and adjusting all isolation devices. The isolation manufacturer's representative shall maintain an adequate stock of springs and isolators of the type used so that any changes required during construction and checking can be accomplished promptly. Complete installation instructions including details and sizing of anchor devices or plates required shall be furnished by supplier. After installation, the isolation manufacturer's representative shall check the various isolators and restraints and certify that they have been installed in accordance with his recommendations.

D. The Electrical Subcontractor shall coordinate the vibration isolation and seismic control supports with the manufacturers of the equipment to be isolated. Prior to submitting detailed Shop Drawings to the Engineer for review, the equipment manufacturer shall approve the Shop Drawings in writing. See Section 26 00 10.

E. Each isolation and seismic restraint device shall have a permanently attached identification tag indicating location and service of the isolation device.

F. Engine Generator Set:
1. Floor-mounted spring isolators for seismic and restrained service
2. Built-in resilient limit stops shall limit upward, downward, and horizontal travel to a maximum of 1/4 inch
3. Trapped holes in top plate for bolting to equipment
4. Mounting holes in bottom plate for bolting to concrete housekeeping pad
5. Neoprene pad between bottom plate of isolator housing and bottom of spring isolator
6. Mason Industries type SLR

G. Dry Type Transformers - Suspended:
1. Hanger rod neoprene isolators
2. 45 degrees slack seismic restraint cables
3. Neoprene element with a projecting bushing to prevent steel-to-steel contact
4. Steel retainer box encasing the neoprene element

5. Rod shall be able to swing 15 degrees before contacting resilient bushing
6. Mason Industries type HD neoprene hanger and type SCB seismic cable brace

H. Dry Type Transformers – Floor Mounted:
1. Floor-mounted bridge bearing neoprene mounts with all directional seismic capability
2. Two separated and opposing molded bridge-bearing neoprene elements contained in a ductile iron casting
3. Mounting holes in bottom plate for bolting to concrete housekeeping pad
4. Mason Industries type BR

PART 3 EXECUTION

3.1 INSTALLATION OF ELECTRIC GENERATING SYSTEM VIBRATION ISOLATION

A. Electric generating system engine/generators shall be installed on Mason Industries type SLR or Engineer approved equal, spring vibration isolators for a minimum of 2" static deflection, constructed of spring steel pads and anchored as required.

3.2 INSTALLATION OF TRANSFORMER VIBRATION ISOLATION

A. Transformers 150 KVA and Greater:
1. Individual transformers 150 KVA and greater shall be vibration isolated with steel spring isolation mounting assemblies utilizing bare springs with the spring diameter not less than 0.8 of the loaded operating height of the spring. Each isolator shall be designed and installed so that the ends of the spring remain parallel. The spring specified minimum deflection from loaded operating height shall be 50% of the rated deflection.
2. Each transformer shall be mounted on an integral one piece structural base, reinforced as necessary, to prevent flexure of the base. The structural frame shall be drilled and tapped, as necessary, to receive the transformer so that the frame shall act as a template.
3. The structural steel integral base shall be supported on steel spring mountings with a minimum static deflection of 1.5" (±10%). These mountings shall be positioned in accordance with the weight distribution to ensure adequate deflection and vibration isolation. Housing or snubbing devices shall not be used to contain the isolator springs. Isolator types shall be as follows or as approved:
   a. Type SLR - Mason Industries Inc.
4. A minimum 0.75" thick neoprene-in-shear pad at a maximum loading of 50 psi shall be provided between the spring isolator and the floor.

B. Mounting Transformers Less Than 150 KVA:
1. Each transformer shall be either floor mounted or hung from structural members on an integral one-piece base of frame, reinforced as necessary, to prevent flexure.
2. The structural base/frame shall be supported by neoprene mountings with a minimum static deflection of 3/8”. Isolator types shall be as follows or equal:
   a. Floor Mounts:
      1) Type BR – Mason Industries
   b. Hung Mounts:
      1) Type HD – Mason Industries

3.3 FIELD TESTING

A. Refer to 26 08 13 for additional testing requirements for equipment installed with vibration isolation.

END OF SECTION