

**SECTION 15504**  
**VIBRATION ISOLATION**

**PART 1 - GENERAL**

**1.01 DESCRIPTION OF WORK**

- A. Provide a complete system of vibration isolation for each item of HVAC, Plumbing and Drainage, and Electrical equipment and apparatus as specified herein, as shown on the Drawings and as needed for a complete and proper installation. Product specific requirements are contained herein; Section 15501, General Provisions for Heating, Ventilating and Air Conditioning Work, shall be referred to for general requirements.

**1.02 RELATED SECTIONS**

- A. Division 3 Sections  
B. Division 15 Sections  
C. Division 16 Sections

**1.03 SUPPLEMENTAL SUBMITTALS**

- A. Product Data: Submit Manufacturer's Product Data for the vibration isolating supports required for each item of HVAC, Plumbing and Drainage, and Electrical equipment.
1. Submit schedule showing manufacturers' mounting sizes and guarantee deflections.
- B. Shop Drawings: Submit Shop Drawings for the vibration isolating supports required for each item of HVAC, Plumbing and Drainage, and Electrical equipment, showing details of intermediate structural steel members and method of attachment required for installation of vibration isolating devices.
- C. Manufacturer's certification as specified in the Field Quality Control Article.
- D. Maintenance data.

**1.04 SUPPLEMENTAL QUALITY ASSURANCE**

- A. Manufacturer's Regulating Requirements: Contractors shall determine vibration isolation sizes and locations per the criteria defined in Article 3.02.C.

- B. Per Section MC 301.10 of the 2014 NYC Mechanical Code, where vibration isolation of equipment and appliances is employed, supplemental restraint shall be used to accomplish the support and restraint.

## **PART 2 - PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Approved manufacturers:

Mason Industries, Inc.  
Vibration Eliminator Co.  
Vibration Mountings & Controls Inc.  
Korfund Dynamics Co.

### **2.02 MATERIALS**

- A. Spring Mounts

1. **Housed Spring Mounts:** Spring type mounts shall consist of cast telescoping housings containing one or more steel springs. The mount shall be provided with built-in leveling bolt(s), resilient inserts of neoprene to act as guides for upper and lower housings and with ribbed neoprene acoustical pads bonded to the bottom of the lower housing. The lower housing shall have slotted holes in the base, to permit fastening of the mount to the floor.
2. **Free standing spring mounts** shall be laterally stable without housing. Each mount shall be provided with a leveling bolt, a ribbed neoprene pad on the underside of the base, and means of securing the spring base to the floor when specified. Free standing spring mounts shall be used where a floating pad system or an inertia block is specified.

- B. **Neoprene-in-Shear Mounts:** Each neoprene-in-shear type mount shall consist of a steel top plate and steel base plate completely enclosed in oil resistant neoprene. Top plate shall have a threaded bolt hole for attachment of equipment to mount. Base plate shall have bolt holes, to permit fastening of the mount to the floor when specified. Underside of base plate shall have ribbed, neoprene construction. Single neoprene-in-shear mounts shall have a maximum deflection of 0.25". Double neoprene-in-shear mounts shall have a maximum deflection of 0.50".
- C. **Hanger Type Isolators:** Hanger type isolators shall consist of a steel housing incorporating a single or

double neoprene-in-shear element or a steel spring, or a combination of these two isolators, as needed to achieve the required static deflection. Provide threaded rods for attachment of hanger to overhead structure and to equipment.

D. Steel Bases

1. Integral structural steel bases for equipment shall be rectangular in shape, and each member shall be of wide flange beam or channel shaped cross-section. Bases for equipment having motors in the X or Y position may be of "L" shape configuration. Depth of section shall be equal to minimum of 1/10th of the longest span of the equipment. Built-in adjustable motor slide rails shall be provided as an integral part of the base. Joints shall be continuously welded.
2. Structural steel bases under equipment shall be wide flange beams of size specified, or shown on the Drawings. Two beams shall be provided for larger equipment, one under each side along the length of the unit and extending 6" beyond the ends. A steel bearing plate, 3/8" thick, shall be welded to the top flange of the beams at the location of each vibration isolator. The isolator shall be bolted to the bearing plate.

E. Inertia Blocks: An inertia block shall consist of a rectangular shaped reinforced concrete block on which pumping equipment shall be mounted and which shall be supported on spring isolators above the floor. The pouring form for the block shall be made of 6" (minimum height) steel channels welded together and shall include reinforcing bars running in two directions, welded in place or welded wire fabric. Anchor bolts for the pump's base shall be secured within the pouring form. The number and location of brackets for mounting isolating springs shall be determined by vibration isolation manufacturer. Pouring form shall include space for the pump inlet base elbow. Design and fabrication of the pouring form, including all of its parts, shall be the responsibility of the vibration isolation manufacturer. Pump support shall be designed to provide 95% (minimum) vibration isolation.

F. Floating Pad System: Floating pad system shall be constructed in the manner indicated on the Drawings and as specified. The floating pad shall be isolated from the building structure by means of 2" high neoprene isolators, factory bonded to the underside of 1/2" thick exterior grade plywood. Placement and

density of isolators shall be in accordance with load requirements and with recommendation of vibration isolation manufacturer. Line interior face of the curb with 1" thick light density cork. Cover the plywood form with a sheet of polyethylene film, overlapping the cork boards and curbs. Pour a lightweight concrete slab on top of the polyethylene film, inside the corkboards. After the concrete has set, remove the excess polyethylene film, and fill the joint between the slab and the curb with a mastic seal.

### **PART 3 - EXECUTION**

#### **3.01 PREPARATION**

- A. For vibration isolation equipment installed indoors, all metal parts, including rails and bases, shall be painted at the factory with one coat of primer paint and one coat of aluminum paint. Other means or rust resisting painting may be accepted, subject to prior approval.
- B. Vibration isolation equipment installed outdoors shall have all steel parts hot dipped galvanized, all bolts cadmium plated, and all springs cadmium plated and neoprene coated.
- C. Vibration isolation equipment installed outdoors shall be designed and installed to resist wind loads in accordance with the NYC Building Code.

#### **3.02 SUPPLEMENTAL INSTALLATION**

- A. At each equipment location, provide the required deflection under the imposed load to produce uniform loading and deflection even when equipment weight is not evenly distributed. Jack inertia blocks and bases into position and wedge in place before spring loading; leveling bolts shall not be used as jacking screws. After equipment is in place and springs are loaded through leveling bolts, remove wedges and jacks. Isolators shall be suitable for the lowest operating speed of the equipment.
- B. Where the floor is waterproofed or finished with waterproof cement, install vibration isolation in such manner that the waterproofing is not damaged.
- C. Isolation equipment shall be in accordance with the following table:

<u>Lowest RPM</u>	<u>Inches Deflection</u> (Min.)	<u>% Efficiency</u> (Min.)	<u>Type</u>
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1750 & over	.25	95	Single neoprene- in-shear
1200-1749	.50	95	Double neoprene- in-shear
1000-1199	.75	95	Spring
570-999	1.25	90-95	Spring
520-569	1.5	90	Spring
330-519	2.0	80-90	Spring
Up to 329	3.5	80	Spring

D. Air cooled condensers located on a roof or floor above grade shall be installed on vibration isolators providing a minimum isolation efficiency of 90 percent at fan motor RPM with a maximum static deflection of 4" and shall incorporate a leveling device and resilient pad having a minimum thickness of 1/4". Refer to Sections MC 928.3.7 and MC 928.3.8. Vibration cutoff switches shall be provided.

E. Per Section MC 928.3.3, the minimum horizontal isolation required for equipment piping shall be installed as follows:

1. Metal piping connected to power driven equipment shall be resiliently supported from or on the building structure from the power driven equipment for a distance of the maximum of 50 pipe diameters or the first three pipe hangers, whichever is the longest length. The isolators shall be pre-compressed spring and neoprene type hangers. Pre-compressed spring and neoprene type hangers must also be used in all transverse braced isolated locations. Horizontal runs in all other locations throughout the building shall be isolated by spring and neoprene hangers that need not be pre-compressed. Floor supported piping shall rest on isolators such as Mason Industries SLR spring mounts (or approved equal).

The resilient isolators shall have a minimum static deflection of 1" for all piping with a 4" or larger in actual outside diameter and 1/2" (12.7 mm) for piping with less than 4" in actual outside diameter.

Piping connected to fluid pressure-reducing valves shall be resiliently isolated for a distance of 50 pipe diameters from pressure reducing valves and isolators shall provide a minimum static deflection of 1/2".

- F. Per Section MC 928.3.6, compressors and drives located on a floor other than a floor on grade shall be mounted on vibration isolators having a minimum isolation efficiency of 90 percent at the lowest disturbing frequency. Each isolator shall incorporate a leveling device and a resilient pad having a minimum thickness of 1/4".

### 3.03 SCHEDULE

- A. Provide vibration isolation supports for HVAC equipment as indicated in this schedule. Contractor shall submit a schedule for approval by Engineer of Record indicating the type of support for each item of Plumbing & Drainage Equipment and each item of Electrical Equipment.

<u>Equipment</u>	<u>Location</u>	<u>Type of Support</u>
A.C. single zone unit (vertical)	floor mounted	springs on 6" W.F. beams

### 3.04 FIELD QUALITY CONTROL

- A. On completion of the vibration isolation system herein specified, the representative of the vibration isolation manufacturer shall inspect the completed systems and report in writing any installation error, improperly selected isolation devices, or any other faults that could affect performance. Submit report indicating steps taken to properly complete the isolation work. Both of these reports shall be reviewed by the Authority for final approval.

**END OF SECTION**

LIST OF SUBMITTALS

<u>SUBMITTAL</u>	<u>DATE SUBMITTED</u>	<u>DATE APPROVED</u>
Product Data:	_____	_____
1. Manufacturers Product Data		
2. Installation Instructions		
3. Schedule		
Shop Drawings:	_____	_____
1. Assembly-type Drawings including Equipment Support		
2. Deflection Details		
Manufacturer's Certification:	_____	_____
Maintenance Data:	_____	_____
1. Maintenance Manual		

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