

SECTION 21 0548 - VIBRATION AND SEISMIC CONTROLS FOR FIRE SUPPRESSION PIPING AND EQUIPMENT

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Inertia bases.
- B. Vibration isolators.

1.02 RELATED SECTIONS

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

1.03 SUBMITTALS

- A. Product Data: Provide schedule of vibration isolator type with location, load, and deflection on each.
- B. Shop Drawings: Indicate inertia bases and locate vibration isolators, with static and dynamic load on each. Detail bases and select based on lowest operating speed of equipment. Indicate seismic control measures, with load calculations, spacing, location and strut types.
- C. Manufacturer's Instructions: Indicate installation instructions with special procedures and setting dimensions.

1.04 REFERENCES

- A. NFPA 13, 2007 - Standard for the Installation of Sprinkler Systems, National Fire Protection Association.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Isolation Technology, Inc.
- B. Kinetics Noise Control, Inc.
- C. Mason Industries
- D. Korfund/VMC
- E. Amber-Booth

F. Vibration Eliminator Company

2.02 INERTIA BASES

A. Structural Bases (Type R):

1. Construction: Welded structural steel with gusseted brackets, to support equipment and motor, with motor slide rails.
2. Design: Sufficiently rigid to prevent misalignment or undue stress on machine, and to transmit design loads to isolators and snubbers.

B. Concrete Inertia Bases (Type I):

1. Construction: Structural steel channel perimeter frame, with gusseted brackets and anchor bolts, reinforcing; concrete filled.
2. Mass: Minimum of 1.5 times weight of isolated equipment.
3. Connecting Point: Reinforced to connect isolators and snubbers to base.
4. Concrete: Minimum 3000 psi concrete.

2.03 VIBRATION ISOLATORS

A. Open Spring Isolators (Type S, SP):

1. Springs: Minimum horizontal stiffness equal to 75 percent vertical stiffness, with working deflection between 0.3 and 0.6 of maximum deflection. Color code springs for load carrying capacity.
2. Spring Mounts: Provide with leveling devices, minimum 0.25 inch thick neoprene sound pads, and zinc chromate plated hardware.
3. Sound Pads: Size for minimum deflection of 0.05 inch meet requirements for neoprene pad isolators.
4. For Exterior and Humid Areas: Hot dipped galvanized housings and neoprene coated springs.

B. Restrained Open Spring Isolators (Type SS):

1. Springs: Minimum horizontal stiffness equal to 75 percent vertical stiffness, with working deflection between 0.3 and 0.6 of maximum deflection. Color code springs for load carrying capacity.

2. Spring Mounts: Provide with leveling devices, minimum 0.25 inch thick neoprene sound pads, and zinc chromate plated hardware.
3. Sound Pads: Size for minimum deflection of 0.05 inch, meet requirements for neoprene pad isolators.
4. Restraint: Provide heavy mounting frame and limit stops.
5. For Exterior and Humid Areas: Hot dipped galvanized housings and neoprene coated springs.

C. Closed Spring Isolators (Type CS):

1. Type : Closed spring mount with top and bottom housing separated with neoprene rubber stabilizers.
2. Springs: Minimum horizontal stiffness equal to 75 percent vertical stiffness, with working deflection between 0.3 and 0.6 of maximum deflection. Color code springs for load carrying capacity.
3. Housings: Incorporate neoprene isolation pad meeting requirements for neoprene pad isolators, and neoprene side stabilizers with minimum 0.25 inch clearance.
4. For Exterior and Humid Areas: Hot dipped galvanized housings and neoprene coated springs.

D. Restrained Closed Spring Isolators (Type CR):

1. Type : Closed spring mount with top and bottom housing separated with neoprene rubber stabilizers.
2. Springs: Minimum horizontal stiffness equal to 75 percent vertical stiffness, with working deflection between 0.3 and 0.6 of maximum deflection. Color code springs for load carrying capacity.
3. Housings: Incorporate neoprene isolation pad meeting requirements for neoprene pad isolators, and neoprene side stabilizers with minimum 0.25 inch clearance and limit stops.
4. For Exterior and Humid Areas: Hot dipped galvanized housings and neoprene coated springs.

E. Spring Hanger (Type H, HS):

1. Springs: Minimum horizontal stiffness equal to 75 percent vertical stiffness, with working deflection between 0.3 and 0.6 of maximum deflection. Color code springs for load carrying capacity.

2. Housings: Incorporate neoprene isolation pad meeting requirements for neoprene pad isolators.
3. Misalignment: Capable of 20 degree hanger rod misalignment.
4. For Exterior and Humid Areas: Hot dipped galvanized housings and neoprene coated springs.

F. Neoprene Pad Isolators (Type P):

1. Rubber or neoprene waffle pads.
 - a. Hardness: 30 durometer.
 - b. Thickness: Minimum 1/2 inch.
 - c. Maximum Loading: 50 psi.
 - d. Rib Height: Maximum 0.7 times width.
2. Configuration: Single layer.
3. Configuration: 1/2 inch thick waffle pads bonded each side of 1/4 inch thick steel plate.

G. Rubber Mount or Hanger (Type M): Molded rubber designed for 0.4 inch deflection with threaded insert.

H. Glass Fiber Pads: Neoprene jacketed pre-compressed molded glass fiber.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions. No metal-to-metal contact will be permitted between fixed and floating parts.
- B. Bases:
 1. Set steel bases for 1 inch clearance between housekeeping pad and base.
 2. Set concrete inertia bases for 2 inches clearance between housekeeping pad and base.
 3. Adjust equipment level.
- C. On closed spring isolators, adjust so side stabilizers are clear under normal operating conditions.

- D. Prior to making piping connections to equipment with operating weights substantially different from installed weights, block up equipment with temporary shims to final height. When full load is applied, adjust isolators to load to allow shim removal.
- E. Support piping connections to equipment mounted on isolators using isolators or resilient hangers as follows:
1. Up to 4 Inches Pipe Size: First three points of support.
 2. 5 to 8 Inches Pipe Size: First four points of support.
 3. 10 inches Pipe Size and Over: First six points of support.
 4. Select three hangers closest to vibration source for minimum 1.0 inch static deflection or static deflection of isolated equipment. Select remaining isolators for minimum 1.0 inch static deflection or 1/2 static deflection of isolated equipment.

3.02 FIELD QUALITY CONTROL

- A. Inspect isolated equipment after installation and submit report. Include static deflections.

3.03 SCHEDULES

- A. Refer to the following table:

Equipment Type	Slab on Grade			Structural Spans up to 30-Feet Between Columns		
	Base Deflection	Isolator	Min.	Base Deflection	Isolator	Min.
In-line pump (floor-mounted)	----	S	0.75"	----	S	1.50"
In-line pump (suspended)	----	----	----	----	H	1.50"
Engine driven equipment	----	S,SP	0.75"	I	S,SP	2.50"
Air compressors (base-mounted)	----	S,SP	0.75"	I	S,SP	.50"

END OF SECTION 21 0548