

**SECTION 220548.13 VIBRATION CONTROLS FOR PLUMBING PIPING AND EQUIPMENT**

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
  - 1. Elastomeric isolation pads.
  - 2. Post-installed concrete anchors.
  - 3. Concrete inserts.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings:
  - 1. Detail fabrication and assembly of equipment bases. Detail fabrication including anchorages and attachments to structure and to supported equipment. Include adjustable motor bases, rails, and frames for equipment mounting.
  - 2. Vibration Isolation Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment. Include adjustable motor bases, rails, and frames for equipment mounting.

1.3 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Show coordination of vibration isolation device installation for plumbing piping and equipment with other systems and equipment in the vicinity, including other supports and restraints, if any.
- B. Welding certificates.
- C. Field quality-control reports.

1.4 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct testing indicated, be an NRTL as defined by OSHA in 29 CFR 1910.7 and be acceptable to authorities having jurisdiction.
- B. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.1/D1.1M, "Structural Welding Code - Steel."

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire/Smoke Resistance: All components that are not constructed of ferrous metals must have a maximum flame-spread index of 25 and maximum smoke-developed index of 50 when tested by an NRTL in accordance with ASTM E84 or UL 723, and be so labeled.
- B. Component Supports:
  - 1. Load ratings, features, and applications of all reinforcement components must be based on testing standards of a nationally recognized testing agency.

### 2.2 ELASTOMERIC ISOLATION PADS

- A. Elastomeric Isolation Pads:
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. CADDY; brand of nVent Electrical plc.
    - b. Korfund.
    - c. VMC GROUP.
    - d. Vibration Eliminator Co., Inc.
  - 2. Fabrication: Single or multiple layers of sufficient durometer stiffness for uniform loading over pad area.
  - 3. Size: Factory or field cut to match requirements of supported equipment.
  - 4. Minimum deflection as indicated on Drawings.
  - 5. Pad Material: Oil- and water-resistant rubber.
  - 6. Infused nonwoven cotton or synthetic fibers.
  - 7. Load-bearing metal plates adhered to pads.
  - 8. Sandwich-Core Material: Resilient and elastomeric.
    - a. Infused nonwoven cotton or synthetic fibers.

### 2.3 POST-INSTALLED CONCRETE ANCHORS

- A. Mechanical Anchor Bolts:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Cooper B-line; brand of Eaton, Electrical Sector.
    - b. Hilti, Inc.
    - c. Mason Industries, Inc.
    - d. Unistrut; Atkore International.

2. Drilled-in and stud-wedge or female-wedge type in zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E488/E488M.

**B. Adhesive Anchor Bolts:**

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Cooper B-line; brand of Eaton, Electrical Sector.
  - b. Hilti, Inc.
  - c. Mason Industries, Inc.
  - d. Unistrut; Atkore International.
2. Drilled-in and capsule anchor system containing PVC or urethane methacrylate-based resin and accelerator, or injected polymer or hybrid mortar adhesive. Provide anchor bolts and hardware with zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E488/E488M.

**C. Expansion-type anchor bolts are not permitted for equipment in excess of 10 hp that is not vibration isolated.**

1. Undercut expansion anchors are permitted.

**2.4 CONCRETE INSERTS**

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  1. Cooper B-line; brand of Eaton, Electrical Sector.
  2. Hilti, Inc.
  3. Mason Industries, Inc.
  4. Unistrut; Atkore International.
- B. Provide preset concrete inserts that are prequalified in accordance with ICC-ES AC466 testing.
- C. Comply with ANSI/MSS SP-58.

**PART 3 - EXECUTION**

**3.1 INSTALLATION OF VIBRATION-CONTROL DEVICES**

- A. Provide vibration-control devices for systems and equipment where indicated in Equipment Schedules or Vibration-Control Device Schedules, where indicated on Drawings, or where the Specifications indicate they are to be installed on specific equipment and systems.

- B. Coordinate location of embedded connection hardware with supported equipment attachment and mounting points and with requirements for concrete reinforcement and formwork specified in Section 033000 "Cast-in-Place Concrete."
- C. Installation of vibration isolators must not cause any stresses, misalignment or change of position of equipment or piping.
- D. Comply with requirements in Section 077200 "Roof Accessories" for installation of roof curbs, equipment supports, and roof penetrations.
- E. Equipment Restraints:
  - 1. Install snubbers on plumbing equipment mounted on vibration isolators. Locate snubbers as close as possible to vibration isolators and bolt to equipment base and supporting structure.
  - 2. Install resilient bolt isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inch.
- F. Piping Restraints:
  - 1. Comply with requirements in MSS SP-127.
  - 2. Space lateral supports a maximum of 40 feet o.c., and longitudinal supports a maximum of 80 feet o.c.
  - 3. Brace a change of direction longer than 12 feet.
- G. Install bushing assemblies for anchor bolts for floor-mounted equipment, arranged to provide resilient media between anchor bolt and mounting hole in concrete base.
- H. Install bushing assemblies for mounting bolts for wall-mounted equipment, arranged to provide resilient media where equipment or equipment-mounting channels are attached to wall.
- I. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.
- J. Post-Installed Concrete Anchors:
  - 1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify Project structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
  - 2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
  - 3. Mechanical-Type Anchor Bolts: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
  - 4. Set anchors to manufacturer's recommended torque, using a torque wrench.
  - 5. Install zinc-coated steel anchors for interior and stainless steel anchors for exterior applications.

3.2 ACCOMMODATION OF DIFFERENTIAL MOTION

- A. Provide flexible connections in piping systems where they cross structural joints and other point where differential movement may occur. Provide adequate flexibility to accommodate differential movement as determined in accordance with ASCE/SEI 7. Comply with requirements in Section 221116 "Domestic Water Piping" and Section 221119 "Domestic Water Piping Specialties" for piping flexible connections.

3.3 ADJUSTING

- A. Adjust isolators after system is at operating weight.
- B. Adjust limit stops on restrained-spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.

END OF SECTION 220548.13