

1. PART 1 – GENERAL

1.1 Related section

- .1 Section 230529E – Hangers and supports for HVAC piping and equipment.

1.2 References

- .1 National Fire Protection Association (NFPA):
 - .1 NFPA-13, Standard for installation sprinklers.
- .2 National Building Code of Canada (NBC)-2005.
- .3 SMACNA 1338 "Seismic restraint manual guidelines for mechanical systems", including addendum no. 1.
- .4 ASTM E – 488.
- .5 ASHRAE – Applications handbook.

2. PART 2 – PRODUCTS

2.1 General

- .1 Size and shape of bases type and performance of vibration isolation as indicated.
- .2 Each mechanical and electrical contractor is responsible for the seismic controls related to this discipline.

2.2 Seismic control measures

- .1 General:
 - .1 Following systems and/or equipment to remain operational during and after earthquakes or similar events:
 - .1 Water, oil, air and gas piping.
 - .2 HVAC fans, duct works and equipment.
 - .2 Seismic control systems to work in every direction.
 - .3 Fasteners and attachment points to resist same maximum load as seismic restraint.
 - .4 Drilled or power driven anchors and fasteners not permitted.
 - .5 No equipment, equipment supports or mounts to fail before failure of structure.
 - .6 Supports of cast iron or threaded pipe not permitted.
 - .7 Seismic control measures not to interfere with integrity of firestopping.
- .2 Static equipment:
 - .1 Anchor equipment to equipment supports. Anchor equipment supports to structure.
 - .2 Suspended equipment:
 - .1 Use one or more of following methods depending upon site conditions:
 - .1 Install tight to structure.
 - .2 Cross brace in every direction.
 - .3 Brace back to structure.
 - .4 Cable restraint system.
 - .3 Seismic restraints:
 - .1 Cushioning action gentle and steady.
 - .2 Never reach metal-like stiffness.

- .3 Vibration isolated equipment:
 - .1 Seismic control measures not to jeopardize noise and vibration isolation systems. Provide 6 to 9 mm clearance during normal operation of equipment and systems between seismic restraint and equipment.
 - .2 Incorporate seismic restraints into vibration isolation system to resist complete isolator unloading.
- .4 Piping systems:
 - .1 Fire protection systems: to NFPA 13.
 - .2 All other piping systems: hangers longer than 300 mm braced at each hanger.
 - .3 Compatible with requirements for anchoring and guiding of piping systems.
- .5 Bracing methods:
 - .1 Approved by Engineer hired by the contractor at his own expenses.
 - .2 Structural angles or channels.
 - .3 Cable restraint system incorporating grommets, shackles and other hardware to ensure alignment of restraints and to avoid bending of cables at connection points. Incorporate neoprene into cable connections to reduce shock loads.

3. PART 3 – EXECUTION

3.1 Manufacturer's instructions

- .1 Compliance:
 - .1 Comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 Installation

- .1 Seismic control measures to meet requirements of NBC.
- .2 Install vibration isolation equipment in accordance with manufacturers instructions and adjust mountings to level equipment.
- .3 Ensure piping, ducting and electrical connections to isolated equipment do not reduce system flexibility and that piping, conduit and ducting passage through walls and floors do not transmit vibrations.
- .4 Block and shim level bases so that ductwork and piping connections can be made to rigid system at operating level, before isolator adjustment is made. Ensure that there is no physical contact between isolated equipment and building structure.

3.3 Field quality control

- .1 Manufacturer's Field Services:
 - .1 Arrange with manufacturer's representative to review work of this Section and submit written reports to verify compliance with Contract Documents.
 - .2 Manufacturer's Field Services: consisting of product use recommendations and periodic site visits to review installation:
 - .3 Submit manufacturer's reports to Departmental Representative within five (5) days of manufacturer representative's review.
 - .4 Make adjustments and corrections in accordance with written report.
- .2 Inspection and Certification:
 - .1 Experienced and competent sound and vibration testing professional engineer to certify the protection devices for HVAC systems after start up and TAB of systems.