1. GENERAL

1.01 SECTION INCLUDES

.1 This section provides minimum acceptance requirements for vibration isolation for all electrical equipment, conduit, and piping.

1.02 RELATED REQUIREMENTS

.1 Concrete work is described in Division 03 and Section 26 05 29.

.2 [Acoustic Consultant's report.]

.3 [Section 13 48 13 – Manufactured Sound and Vibration Control Components: floating floor for mechanical and generator rooms to minimize sound and vibration transmission to spaces below.]

.4 Section 26 12 16 – Dry-Type, Medium-Voltage Transformers.

.5 Section 26 22 13 – Low-Voltage Distribution Transformers.

.6 Section 26 32 13.13 – Diesel-Engine-Driven Generator Sets.

.7 Section 26 32 13.16 – Gas-Engine-Driven Generator Sets.

1.03 SUBMITTALS

.1 All outdoor mounted equipment shall be restrained for the highest wind speed as specified by the project's structural engineer, the governing building code(s) or the authority having jurisdiction.

.2 Submit shop drawings for all devices specified herein and as indicated and scheduled on the drawings. Submittals shall indicate full compliance with the device specification in Part 2. Any deviation shall be specifically noted and subject to engineer approval. Submittals shall include device dimensions, placement, attachment, and anchorage requirements.

1.04 CLOSEOUT SUBMITTALS

.1 Submit a letter from vibration isolation manufacturer to certify correct installation of products, as specified in Part 3 of this Section.

1.05 QUALITY ASSURANCE

.1 All vibration isolation systems shall be by one manufacturer.

.2 Unless otherwise directed by the local authority having jurisdiction, the following codes and standards will apply:

.1 International Building Code 2009.

.2 American Society of Civil Engineers 7-05.

.3 Ontario Building Code, Latest Edition.

.3 Manufacturer's Qualifications: Firms regularly engaged in manufacture of vibration control products of type, size, and capacity required, whose products have been in satisfactory use in similar service for not less than 5 years.

2. PRODUCTS

2.01 MANUFACTURERS

.1 Vibro-Acoustics.

.2 Kinetics Noise Control.

.3 BVA Systems.

.4 Vibron Limited.

.5 Mason Industries.

2.02 VIBRATION ISOLATION

.1 Springs: All springs shall have a minimum additional travel to solid equal to 50% of the rated deflection. All springs except internal nested springs shall have an outside diameter not less than 0.8 of the compressed height of the spring. Ends of springs shall be square and ground for stability. Laterally stable springs shall have kx/ky ratios of at least 0.9. All springs shall be fully colour-coded to indicate capacity – colour striping is not considered adequate.

.2 Corrosion Protection: All springs shall be powder-coated enamel. Housings shall be hot dipped galvanized, powder-coated enamel, or painted with rust-resistant paint.

.3 Isolators:

.1 Vibration Isolation Pads: Type N – Neoprene pad type isolators, 10 mm (3/8") minimum thick, ribbed on both sides.

.1 Type NSN – Sandwich neoprene pad type isolators, with 10 mm (3/8") minimum thick ribbed neoprene pads bonded to each side of a 3.5 mm (10 ga) minimum galvanized metal plate. Isolator pads shall be selected to ensure that deflection does not exceed 20% of isolator free height.

.2 Rubber-in-Shear Floor Mounts: Type RD – "Double-deflection" neoprene isolators, with neoprene-coated metal surfaces, and top and bottom surfaces ribbed. Isolators shall have bolt holes in the base.

.3 Restrained Spring Floor Mounted Isolators: Type CSR – Laterally stable, vertically restrained spring isolators with welded steel housings and heavy top plates for supporting equipment. Springs shall be supported either with a neoprene cup or a metal base plate complete with a ribbed neoprene pad, minimum 6 mm (1/4") thick, bonded to the base plate. Housings shall include vertically restraining limit stops. Minimum clearance around the restraining bolts and between the housing and the spring shall be 13 mm (1/2"). Top plate and restraining bolts shall be out of contact with the housing during normal operation and neoprene grommets shall be incorporated to minimize short-circuiting of restraining bolts. For outdoor applications, housing must be hot-dip galvanized. For indoor applications, powder-coated finish for the housing is acceptable.

3. EXECUTION

3.01 GENERAL

.1 Coordinate size, doweling, and reinforcing of concrete equipment housekeeping pads and piers with vibration isolation manufacturer to ensure adequate space and prevent edge breakout failures. Pads and piers must be adequately doweled into structural slab.

.2 Coordinate locations and sizes of structural supports with locations of vibration isolators (e.g., roof curbs, cooling towers, air-cooled chillers, etc.).

.3 Isolated equipment, duct and piping located on roofs must be attached to the structure. Intermediate supports between the restraint and structure that are not attached to the structure must be approved by the restraint manufacturer.

3.02 VIBRATION ISOLATION

.1 Ensure housekeeping pads have adequate space to mount equipment and isolator housings and shall also be large enough to ensure adequate edge distance for isolator anchors.

.2 Select and locate vibration isolation equipment to give uniform loading and deflection, according to weight distribution of equipment.

.3 Engine-generator set silencers and associated exhaust piping shall be supported with Type SHR isolators with a minimum 40 mm (1-1/2 in) static deflection.

.4 Equipment Isolation:

						Floor Span								
			Slab on Grade			**Up to 6 m (20 ft)**			**6 m to 9 m (20 ft to 30 ft)**			**9 m to 12 m (30 ft to 40 ft)**		
Eqpm Type	**HP and Other**	**RPM**	**Base Type**	**Isolator Type**	**Min. Defl.**	**Base Type**	**Isolator Type**	**Min. Defl., in.**	**Base Type**	**Isolator Type**	**Min. Defl., in.**	**Base Type**	**Isolator Type**	**Min. Defl., in.**
Transformers and UPS's														
All	All	All	N/A	NSN	3 mm (0.12")	N/A	NSN	3 mm (0.12")	N/A	NSN	3 mm (0.12")	NM	RD/NSN	6 mm (0.25")
Engine-Driven Generators														
All	All	All	N/A	CSR	19 mm (0.75")	N/A	CSR	38 mm (1.50")	N/A	CSR	64 mm (2.50")	N/A	CSR	89 mm (3.50")
Notes: (1) Units that are suspended overhead shall use isolation hangers in place of floor mounted isolators with equal or greater deflection. (2) Floor spans are defined as the distance between structural support columns or walls.														

.5 There shall be no rigid contact of isolated equipment with shaft walls, floor slabs, partitions, or non-flexible conduits connections.

.6 Where recommended by the manufacturer, isolator base plates shall be bolted to the structure or foundation. Bolting shall incorporate neoprene bushings and washers.

3.03 SITE TESTS AND INSPECTIONS

.1 After installation, arrange and pay for the vibration isolation product manufacturer, or representative, to visit the site to verify that the vibration isolation systems are installed and operating properly, and shall submit a certificate so stating. Verify that isolators are adjusted, with springs perpendicular to bases or housing, adjustment bolts are tightened up on equipment mountings, and hangers are not cocked.

End of Section