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PART 1 - GENERAL**1.1 GENERAL**

- .1 All drawings and all sections of the specifications shall apply to and form an integral part of this section.

1.2 WORK INCLUDED

- .1 All fans shall be installed with base mount c/w rail and spring isolation or hung c/w rail, intermediate side spring isolation. Note this shall be in addition to internal isolation of individual equipment.

1.3 REFERENCE STANDARD

- .1 Provide and install vibration isolation necessary to isolate and restrain mechanical equipment so that Average Noise Criteria Curves as outlined in the current ASHRAE Handbook are not exceeded.
 - .1 Vibration, Isolation
 - .1 Springs shall be designed in accordance with the Society of Automotive Engineer's Handbook Supplement 9 entitled "Manual on Design and Application of Helical and Spiral Springs - SAE".
 - .2 ASTM A526/A526M, Specification for Steel Sheet, Zinc Coated (Galvanized) by the Hot-Dip Process, Commercial Quality.
 - .3 Neoprene isolation shall be tested to ASTM specification stating "No.", minimum and maximum Tensile strength, minimum and maximum Elongation at break.
 - .2 Sound Attenuation
 - .1 ASTM C423, Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
 - .2 ASTM E90 Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.
 - .3 ASTM E477, Methods of Testing Duct Liner Materials and Prefabricated Silencers for Acoustical and Airflow Performance.

1.4 SUBMITTALS

- .1 Obtain relevant mechanical equipment information and provide shop drawings isolator locations, load on each isolator and installation instructions.
- .2 Obtain relevant drawing information provide shop drawings for review.
 - .1 Expansion contraction are expressed at two points, (1) at point of connection and (2), new piping supply or new piping return main movement at the same time. Note installation of compensators does not delete the need for expansion loops indicated on the drawing.
 - .2 Guide and anchor locations
- .3 Shop drawings shall have:
 - .1 Stamp and signature of manufacturer's technical representative.
 - .2 Under Engineer's Seal indicating all:
 - .1 Expansion joints, anchors, pipe guides and rollers as required for a complete installation to each system. Shop drawing to identify conditions with method of installation.

1.5 GENERAL REQUIREMENTS

- .1 Vibration isolation equipment and materials shall be supplied by single Agent, except where isolators are factory installed on the exterior.

1.6 INSPECTION

- .1 Provide inspection services by vibration isolation equipment and materials manufacturer's representative after final installation and provide written report to the Contract Administrator that installation is in accordance with specifications and manufacturer's recommendations.

1.7 ACCEPTABLE MANUFACTURERS

- .1 Manufacturers whose product are approved in principle but subject to requirements of drawings and specifications are:
 - .1 Metraflex, Amber-Booth, Korfund, Vibro-Acoustics, Vibron, Industrial Acoustics Company.

PART 2 - PRODUCTS

2.1 VIBRATION ISOLATORS

- .1 Spring Hangers: (VI -1 + 1A)
 - .1 Hangers capable of a 10° misalignment without binding shall be provided unless otherwise specified.
 - .1 (Type VI - 1)
 - .1 Vibration hangers shall contain a steel spring and 0.3" deflection element in series.
 - .2 (Type VI - 1A)
 - .1 Vibration hangers shall be pre-compressed to the rated deflection so as to keep the piping or equipment at a fixed elevation during installation. A release mechanism shall free the spring once the installation is subject to it's full load. Deflection shall be indicated by scale.
- .2 Spring Mounts: (VI - 2)
 - .1 Closed spring mounts to be colour coded and be selected with a working deflection between 0.3 and 0.6 of solid deflection.
 - .1 Incorporate neoprene side stabilizers with a minimum 6mm (1/4") clearance.
 - .2 Isolators located outdoors shall have hot-dipped galvanized housings and neoprene coated springs.
 - .3 When spring isolation mounts are required on equipment with operating weights substantially different from the installed weights, they shall have adjustable limit stops.
 - .4 Complete with levelling devices, 6 mm (1/4") neoprene acoustic pads or as required and zinc chromate plated hardware.
- .3 Neoprene Pads: (VI - 3)
 - .1 Provide physical properties, ageing tests, compression set, low temperature limits, tear test bath oil and oven.
 - .2 Where a ribbed pad is used, the height of the ribs shall not exceed 0.7 times the width of the rib. Steel inter-layers shall be used to distribute the load in a multi-layered unit.

2.2 FLEXIBLE PIPE CONNECTIONS

- .1 Pipe Connections:
 - .1 (Type FPC - 1)
 - .1 Flexible pipe connector shop drawing data shall include maximum allowable temperature and pressure rating, overall face-to-face length 456 mm (18") long unless otherwise noted, live length, hose wall thickness, hose convolutions per unit length and per assembly, fundamental frequency of assembly braid structure and total number of wires in braid.
 - .2 Construct with stainless steel inner hose and braided exterior sleeve for steel piping.
 - .3 Construct with bronze inner hose and braided exterior sleeve for copper piping.
 - .4 No steel wires or rings shall be used as pressure reinforcement.
 - .5 Use connectors suitable for minimum 862 kPa (125 Psi) WSP and 232°C (450°F), and 1380 kPa (200 Psi) WOG and 121°C (250°F) flanged of NPT.
 - .6 NSF rated on pool and domestic system.

PART 3 - EXECUTION

3.1 EXPANSION COMPENSATORS

- .1 Installation of piping loop to be as recommended by Division 15205 technical representative c/w written report.

3.2 PIPE ALIGNMENT GUIDE

- .1 Installation of pipe alignment guides relative to piping loop to be as recommended by Division 15205 technical representative c/w written report.

PART 4 - SCHEDULES

TABLE 7 – VIBRATION ISOLATION & ATTENUATION

Equipment Mark	Base Mount	Spring Hung	Spring Mount	Neoprene	Flex Connection		Anchor Alignment Guide	Remarks
					D	P		
Exhaust/Return/Relief Fan(s)	✓		✓	✓	✓	✓		A, B, C
Condensing Units	✓			✓		✓	✓	D, E

Remarks

- A - Provide canvas flex connection each side of fan.
- B - Provide uni-strut arrangement.
- C - Provide neoprene bridge as part of the base arrangement.
- D - Provide fixed alignment guide at base so unit remains true during operation.
- E - At contact point to uni-strut.

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