1. GENERAL

2. PRODUCTS

2.01 PIPING HANGERS AND SUPPORTS

.1 Pipe hanger and support materials, including accessories, are to be, unless otherwise specified, in accordance with Manufacturers Standardization Society (MSS) Standard Practice Manual SP-58, Pipe hangers and Supports-Materials, Design and Manufacture, and where possible, MSS designations are indicated with each product specified below. Conform to following requirements:

.1 unless otherwise specified, ferrous hanger and support products are to be electro-galvanized;

.2 hangers and supports for insulated piping are to be sized to fit around insulation and insulation jacket.

.2 Hangers and supports for horizontal suspended piping as follows:

.1 adjustable steel clevis hanger – MSS Type 1;

.2 adjustable swivel ring band hanger – MSS Type 10;

.3 adjustable roller hanger – MSS Types 41, 43, and/or 45, with MSS Type 39 steel protection saddle.

.3 Supports for horizontal pipe on vertical surfaces as follows:

.1 steel offset pipe clamp – Anvil Fig. 103 or Myatt Fig. 170;

.2 heavy-duty steel pipe clip – MSS Type 26;

.3 single steel pipe hook – Myatt Fig. 156;

.4 epoxy coated steel pipe stays are not permitted.

.4 Floor supports for vertical risers as follows:

.1 copper tubing riser clamp – MSS Type 8;

.2 heavy-duty steel riser clamp – MSS Type 8.

.5 Supports for vertical piping on vertical surfaces as follows:

.1 steel offset pipe clamp – Anvil Fig. 103 or Myatt Fig. 170;

.2 heavy-duty steel pipe bracket or soil pipe bracket – MSS Type 26;

.3 extension split pipe clamp – MSS Type 12;

.4 epoxy coated steel pipe stays are not permitted.

.6 Base support for vertical risers in excess of 6 m (20') high extending out from base mounted equipment is to consist of a base elbow support with flange.

.7 For horizontal pipe on racks, Unistrut or equal galvanized steel pipe racks with pipe securing hardware as follows:

.1 standard galvanized steel U-bolts/clamps supplied by rack manufacturer;

.2 adjustable roller chair – MSS Type 44 with MSS Type 39 steel protection saddle.

.8 Special hangers and supports for various applications as follows:

.1 vibration isolated riser supports – black steel riser clamps as specified above, complete with neoprene–steel–neoprene sandwich type vibration isolation pads between clamp and floor;

.2 for groups of pipes having same slope – MSS Type 32 welded steel brackets, Anvil Fig. 46 universal trapeze assemblies, or Unistrut or equal support assemblies, all with U-bolts, clamps, etc., to secure pipes in place;

.3 for sections of piping connected to vibration isolated equipment – hangers and supports as specified above but complete with MSS Type 48 spring cushions;

.4 for piping on existing roof – Portable Pipe Hangers (Canada) Inc. "PP" Series prefabricated portable pipe support system components to suit pipe, complete with required accessories including bases, galvanized structural steel frames, and galvanized steel pipe hangers and supports conforming to MSS SP-58;

.5 for piping on new roofs – Lexcor "Flash-Tite" or Thaler Roofing Specialties Products Inc. "MERS" Series insulated aluminum support risers with diameter, height, securement method and flashing to suit the application, channel type aluminum cross members, and galvanized steel pipe hangers and supports conforming to MSS SP-58, complete with all required accessories;

.6 for glass drain and vent piping – special padded hangers supplied by pipe supplier;

.7 for plastic piping – generally as specified above but in accordance with pipe manufacturer's recommendations;

.8 for fire protection piping – generally as above but ULC listed and/or FM approved, and in accordance with Chapter requirements of NFPA Standard applicable to piping system;

.9 for bare horizontal copper piping – generally as above but factory vinyl coated to prevent direct copper/steel contact;

.10 for bare copper vertical piping – corrosion resistant ferrous clamps with flexible rubber gasket type material (not tape) to isolate pipe from clamp;

.11 insulation protection shields to and including 40 mm (1-½") dia. – MSS Type 40 galvanized steel shields with ribs to keep shield centred on hanger.

.9 Hanger rods are to be electro-galvanized carbon steel (unless otherwise specified), round, threaded, to ASTM A36, complete with captive machine nuts with washers at hangers, sized to suit loading in accordance with Table 3 in MSS SP-58, but in any case, minimum 9.5 mm (3/8") diameter.

.10 Manufacturers:

.1 E. Myatt & Co. Inc.;

.2 Anvil International Inc.;

.3 Empire Industries Inc.;

.4 Hunt Manufacturing Ltd.;

.5 Unistrut Canada Ltd.;

.6 Nibco Inc. "Tolco";

.7 Taylor Pipe Supports.

3. EXECUTION

3.01 INSTALLATION OF FASTENING AND SECURING HARDWARE

.1 Provide fastening and securing hardware required for mechanical work to maintain installations attached to structure or to finished floors, walls, and ceilings in a secure and rigid manner capable of withstanding dead loads, live loads, superimposed dead loads, and any vibration of installed products.

.2 Use fasteners compatible with structural requirements, finishes and types of products to be connected. Do not use materials subject to electrolytic action or corrosion where conditions are liable to cause such action.

.3 Where floor, wall or ceiling construction is not suitable to support loads, provide additional framing or special fasteners to ensure proper securement to structure that is to support the products. Provide reinforcing or connecting supports where required to distribute loading to structural components.

.4 Obtain written consent before using explosive actuated fastening devices. If consent is obtained, comply with requirements of CAN/CSA Z166.1 and CAN/CSA Z166.2.

.5 Do not attach fasteners to steel deck without written consent from the Consultant.

3.02 INSTALLATION OF PIPE HANGERS AND SUPPORTS

.1 Provide required pipe hangers and supports.

.2 Provide any additional structural steel channels, angles, inserts, beam champs and similar accessories required for hanging or supporting pipe. Unless otherwise shown or specified, hang or support pipes from structure only.

.3 For insulated pipe, size hanger or support to suit diameter of insulated pipe and install hanger or support on outside of insulation and insulation finish.

.4 Support requirements for underground piping are as follows:

.1 support underground pipe, unless otherwise specified, on a well compacted bed of dry, natural, undisturbed earth free from rocks or protrusions of any kind, or on compacted material as specified;

.2 support underground service piping penetrating building exterior walls or foundations to prevent pipe damage if minor building settlement occurs;

.3 ensure bedding and supports for underground pipes are flat and true and allowances are made for pipe hubs, couplings, or other protrusions so no voids are left between pipe and bedding.

.5 Unless otherwise shown or specified, hang and/or support horizontal pipe above ground by means of hangers and/or supports specified in Part 2 of this Section. Unless otherwise shown or specified, hangers for suspended pipe less than or equal to 25 mm (1") dia. are to be clevis type or adjustable ring type, and hangers for suspended pipe greater than or equal to 40 mm (1-½") dia. are to be adjustable clevis type.

.6 Space hangers and supports in accordance with following:

.1 cast iron pipe – hang or support at every joint with maximum 2.4 m (8') spacing;

.2 plastic pipe – conform to pipe manufacturer's recommended support spacing;

.3 glass pipe – conform to pipe manufacturer's recommended support spacing and support requirements;

.4 copper and steel pipe – hang or support at spacing in accordance with following schedule:

Pipe dia.	Max. Spacing Steel	Max. Spacing Copper
to 25 mm (1")	2.4 m (8')	1.8 m (6')
40 mm (1-½")	2.7 m (9')	2.4 m (8')
50 mm (2")	3.0 m (10')	2.7 m (9')
65 mm (2-½")	3.6 m (12')	3.0 m (10')
75 mm (3")	3.6 m (12')	3.0 m (10')
90 mm (3-½")	3.6 m (12')	3.6 m (12')
100 mm (4")	4.2 m (14')	3.6 m (12')
250 mm (10")	6.0 m (20')	
300 mm (12")	6.7 m (22')	

.5 flexible grooved pipe/coupling joint piping – as above but with not less than one hanger or support between joints;

.7 Where pipes change direction, either horizontally or vertically, provide a hanger or support on horizontal pipe not more than 300 mm (12") from elbow, and where pipes drop from tee branches, support tees in both directions not more than 50 mm (2") on each side of tee.

.8 When pipes with same slope are grouped and a common hanger or support is used, space hanger or support to suit spacing requirement of smallest pipe in group and secure pipes in place on common hanger or support.

.9 Provide roller hangers or supports for heat transfer piping greater than or equal to 150 mm (6") diameter and conveying a material 75°C (170°F) or greater to facilitate pipe movement due to expansion and contraction, and at each hanger or support tack weld a steel protection saddle to pipe to protect piping insulation.

.10 Unless otherwise shown or specified, support vertical piping by means of supports specified in Part 2 of this Section, spaced in accordance with following:

.1 support vertical pipes at maximum 3 m (10') intervals or at every floor, whichever is lesser;

.2 for sections of vertical piping with a length less than 3 m (10'), support pipe at least once;

.3 for vertical cast iron plain end pipe (mechanical joint type), secure riser or pipe clamp around pipe under a flange integral with pipe for vertical support purposes, or provide a length of hub and spigot pipe to facilitate proper support;

.4 for vertical steel pipe risers in excess of 3 m (10'), weld shear lugs to pipe to carry load;

.5 for vibration isolated piping risers, provide rubber-steel-rubber vibration isolation pads between riser clamps and floor.

.11 Support piping on the roof as follows:

.1 on existing roof – provide support members as specified in Part 2 of this Section spaced as per schedule above and of a type to suit the application, and, for each support, carefully scrape away roofing gravel, bed support in a heavy covering of roofing mastic, then scrape gravel back up around support and secure pipes to supports;

.2 on new roof – supply manufactured roof supports as per Part 2 of this Section to accommodate piping involved and support spacing specified above, and hand supports to roofing trade on roof for installation as part of roofing work, then secure piping in place on supports.

.12 Each hanger, support or securement for horizontal bare copper tubing is to be plastic coated to prevent direct contact between pipe and ferrous hanger. Each wall or floor clamp for vertical bare copper piping is to be isolated from pipe by means of strips of flexible rubber inserts. Use of painted ferrous hangers and supports, including those painted with copper coloured paint, is not acceptable. Site application of tape or other types of isolation is not acceptable.

.13 For insulated horizontal piping less than or equal to 40 mm (1-½") diameter, provide galvanized steel insulation protection shields between insulation and hanger or support. Install shields immediately after pipe is insulated.

.14 Do not support piping from steel deck without written consent from Consultant.

3.03 EQUIPMENT BASES AND SUPPORTS

.1 Unless otherwise specified or required, set floor mounted equipment on minimum 100 mm (4") high reinforced concrete housekeeping pads 200 mm (8") clear of equipment on each side and end, or a minimum of 200 mm (8") from centreline of equipment anchor bolts to edge of the base, whichever is larger. Conform to following requirements:

.1 supply dimensioned drawings and equipment base templates, and provide anchor bolts for proper setting and securing of equipment on pads;

.2 place anchor bolts during concrete pour and be responsible for required levelling, alignment, and grouting of equipment;

.3 as a minimum, use wire mesh reinforcement, however, for pads for large heavy equipment, use reinforcement as per structural drawing details.

.2 For equipment not designed for base mounting, where required, provide welded, cleaned and prime coat painted structural steel stands or supports conforming to following requirements:

.1 provide stands and supports, except those for small equipment, designed by a structural engineer registered in jurisdiction of the work, and submit stamped and signed design drawings with calculations as shop drawings for review;

.2 flange bolt steel stands to concrete housekeeping pads;

.3 seismically restrained stands and supports in accordance with applicable requirements.

.3 Where indicated on mechanical drawings, provide welded, cleaned and prime coat painted structural steel platforms, designed by a structural engineer registered in the jurisdiction of the work, for service access to equipment. Submit stamped and signed design drawings with calculations as shop drawings for review. Conform to following requirements:

.1 platforms in accordance with OHSA requirements and adequately sized, braced, anchored, and, as required, seismically restrained;

.2 flooring equal to Fisher & Ludlow "Tru-Weld" Type 19-4, Borden type W/B (19-W-4), welded steel bar type grating;

.3 support legs constructed of welded Schedule 40 black steel pipe with welded steel cross-bracing, securely anchored and sway braced;

.4 safety guard rails, constructed from minimum 32 mm (1-¼") dia. Schedule 40 black steel pipe, for all platforms and complete with vertical stanchions at maximum 1.2 m (48") centres, top and intermediate horizontal railing, and toe plates at floor;

.5 vertical ladders constructed of Schedule 40 black steel pipe, 25 mm (1") dia. for equal height rungs, 40 mm (1-½") for stringers, anchored to floors and walls and sway braced as required;

.6 ships ladders, used wherever space conditions permit, of welded steel construction, climbing at an approximate 60° angle, and complete with channel iron stringers, open grate equal height risers approximately 165 mm (6-½") wide and factory made by grating manufacturer, handrails, and suitable anchoring and support.

3.04 CONCRETE WORK FOR MECHANICAL EQUIPMENT BASES AND PADS

.1 Unless otherwise specified in Division 03, provide poured concrete work, including reinforcing and formwork, required for mechanical equipment bases/pads. Perform concrete work in accordance with requirements specified in Division 03.

.2 Unless otherwise specified in Division 03, concrete is to be minimum 20,700 kPa ready-mix concrete in accordance with CAN/CSA-A23.1 and the Ontario Building Code.

.3 Submit for review, dimensioned shop drawings, prepared and stamped by a professional structural engineer registered in the jurisdiction of the work, for concrete pads or bases for support of large, heavy equipment. Indicate on shop drawings total weight of pad or base as well as equipment it is provided for, and concrete reinforcing.

.4 Ensure that bases and pads are keyed into the structure to meet seismic restraint requirements where applicable.

End of Section