

PART 1 - GENERAL

- 1.1 REFERENCES
- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.
 - .2 Canada Green Building Council (CaGBC)
 - .1 LEED Canada-NC-2009, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package For New Construction and Major Renovations.
 - .3 Canadian Standards Association (CSA International)
 - .4 Green Seal Environmental Standards (GSES)
 - .1 Standard GS-11-2008, 2nd Edition, Environmental Standard for Paints and Coatings.
 - .5 National Fire Code of Canada (NFCC 2005)
 - .6 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
 - .1 SCAQMD Rule 1113-A2007, Architectural Coatings.
 - .2 SCAQMD Rule 1168-A2005, Adhesive and Sealant Applications.
- 1.2 ACTION AND INFORMATIONAL SUBMITTALS
- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Product Data:
 - .1 Provide manufacturer's printed product literature, specifications and datasheets for piping and equipment and include product characteristics, performance criteria, physical size, finish and limitations.
 - .3 Sustainable Design Submittals:
 - .1 LEED - NC-2009 Submittals: in accordance with Section 01 35 21 - LEED Requirements.
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1.3 QUALITY ASSURANCE .1 Sustainability Standards Certification:
.1 Low-Emitting Materials: provide listing of sealants and coatings used in building, comply with VOC and chemical component limits or restriction requirements.

1.4 DELIVERY, STORAGE AND HANDLING .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
.2 Delivery and Acceptance Requirements:
.1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
.3 Packaging Waste Management: remove for reuse or return of pallets, crates, padding, banding, and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal and Section 01 35 21 - LEED Requirements.

PART 2 - PRODUCTS

2.1 MATERIAL .1 Paint: zinc-rich to CAN/CGSB-1.181.
.1 Primers, Paints, and Coatings: in accordance with manufacturer's recommendations for surface conditions.
.2 Primer: maximum VOC limit to Standard GS-11 to SCAQMD Rule 1113.
.3 Paints: maximum VOC limit to Standard GS-11 to SCAQMD Rule 1113.
.2 Sealants: in accordance with Section 07 92 00 - Joint Sealants.
.1 Sealants: maximum VOC limit to SCAQMD Rule 1168.
.3 Sealants: maximum VOC limit to SCAQMD Rule 1168.

- 2.1 MATERIAL .4 Adhesives: maximum VOC limit to SCAQMD Rule
(Cont'd) 1168.
- .5 Fire Stopping: in accordance with Section
07 84 00 - Fire Stopping.

PART 3 - EXECUTION

- 3.1 APPLICATION .1 Manufacturer's Instructions: comply with
manufacturer's written recommendations,
including product technical bulletins,
handling, storage and installation
instructions, and datasheets.
- 3.2 CONNECTIONS TO .1 In accordance with manufacturer's
EQUIPMENT instructions unless otherwise indicated.
- .2 Use valves and either unions or flanges for
isolation and ease of maintenance and
assembly.
- .3 Use double swing joints when equipment
mounted on vibration isolation and when piping
subject to movement.
- 3.3 CLEARANCES .1 Provide clearance around systems, equipment
and components for observation of operation,
inspection, servicing, maintenance and as
recommended by manufacturer and National Fire
Code of Canada.
- .2 Provide space for disassembly, removal of
equipment and components as recommended by
manufacturer without interrupting operation of
other system, equipment, components.
- 3.4 DRAINS .1 Install piping with grade in direction of
flow except as indicated.

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- 3.4 DRAINS
(Cont'd)
- .2 Install drain valve at low points in piping systems, at equipment and at section isolating valves.
 - .3 Pipe each drain valve discharge separately to above floor drain.
 - .1 Discharge to be visible.
 - .4 Drain valves: NPS 3/4 gate or globe valves unless indicated otherwise, with hose end male thread, cap and chain.
- 3.5 AIR VENTS
- .1 Install air vents to CSA B139 at high points in piping systems.
 - .2 Install isolating valve at each automatic air valve.
 - .3 Install drain piping to approved location and terminate where discharge is visible.
- 3.6 DIELECTRIC
COUPLINGS
- .1 General: compatible with system, to suit pressure rating of system.
 - .2 Locations: where dissimilar metals are joined.
 - .3 NPS 2 and under: isolating unions or bronze valves.
 - .4 Over NPS 2: isolating flanges.
- 3.7 PIPEWORK
INSTALLATION
- .1 Install pipework to CSA B139.
 - .2 Screwed fittings jointed with Teflon tape.
 - .3 Protect openings against entry of foreign material.
 - .4 Install to isolate equipment and allow removal without interrupting operation of other equipment or systems.
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3.7 PIPEWORK
INSTALLATION
(Cont'd)

- .5 Assemble piping using fittings manufactured to ANSI standards.
- .6 Saddle type branch fittings may be used on mains if branch line is no larger than half size of main.
 - .1 Hole saw (or drill) and ream main to maintain full inside diameter of branch line prior to welding saddle.
- .7 Install exposed piping, equipment, rectangular cleanouts and similar items parallel or perpendicular to building lines.
- .8 Install concealed pipework to minimize furring space, maximize headroom, conserve space.
- .9 Slope piping, except where indicated, in direction of flow for positive drainage and venting.
- .10 Install, except where indicated, to permit separate thermal insulation of each pipe.
- .11 Group piping wherever possible.
- .12 Ream pipes, remove scale and other foreign material before assembly.
- .13 Use eccentric reducers at pipe size changes to ensure positive drainage and venting.
- .14 Provide for thermal expansion as indicated.
- .15 Valves:
 - .1 Install in accessible locations.
 - .2 Remove interior parts before soldering.
 - .3 Install with stems above horizontal position unless indicated.
 - .4 Valves accessible for maintenance without removing adjacent piping.
 - .5 Install globe valves in bypass around control valves.
 - .6 Use ball valves at branch take-offs for isolating purposes except where specified.
 - .7 Install butterfly valves on condenser water systems only.

3.7 PIPEWORK
INSTALLATION
(Cont'd)

- .15 Valves: (Cont'd)
 - .8 Install butterfly valves between weld neck flanges to ensure full compression of liner.
 - .9 Use chain operators on valves NPS 2 1/2 and larger where installed more than 2400 mm above floor in Mechanical Rooms.
- .16 Check Valves:
 - .1 Install silent check valves on discharge of pumps and in vertical pipes with downward flow and as indicated.
 - .2 Install swing check valves in horizontal lines on discharge of pumps and as indicated.

3.8 SLEEVES

- .1 General: install where pipes pass through masonry, concrete structures, fire rated assemblies, and as indicated.
 - .2 Material: schedule 40 black steel pipe.
 - .3 Construction: use annular fins continuously welded at mid-point at foundation walls and where sleeves extend above finished floors.
 - .4 Sizes: 6 mm minimum clearance between sleeve and uninsulated pipe or between sleeve and insulation.
 - .5 Installation:
 - .1 Concrete, masonry walls, concrete floors on grade: terminate flush with finished surface.
 - .2 Other floors: terminate 25 mm above finished floor.
 - .3 Before installation, paint exposed exterior surfaces with heavy application of zinc-rich paint to CAN/CGSB-1.181.
 - .6 Sealing:
 - .1 Foundation walls and below grade floors: fire retardant, waterproof non-hardening mastic.
 - .2 Elsewhere:
 - .1 Provide space for firestopping.
 - .2 Maintain fire rating integrity.
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- 3.8 SLEEVES .6 Sealing: (Cont'd)
(Cont'd)
- .3 Sleeves installed for future use: fill with lime plaster or other easily removable filler.
- .4 Ensure no contact between copper pipe or tube and sleeve.
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- 3.9 ESCUTCHEONS .1 Install on pipes passing through walls, partitions, floors, and ceilings in finished areas.
- .2 Construction: one piece type with set screws.
 .1 Chrome or nickel plated brass or type 302 stainless steel..
- .3 Sizes: outside diameter to cover opening or sleeve.
 .1 Inside diameter to fit around pipe or outside of insulation if so provided.
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- 3.10 PREPARATION .1 Install firestopping within annular space
FOR FIRE STOPPING between pipes, ducts, insulation and adjacent fire separation in accordance with Section 07 84 00 - Fire Stopping.
- .2 Uninsulated unheated pipes not subject to movement: no special preparation.
- .3 Uninsulated heated pipes subject to movement: wrap with non-combustible smooth material to permit pipe movement without damaging fires topping material or installation.
- .4 Insulated pipes and ducts: ensure integrity of insulation and vapour barriers.
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- 3.11 FLUSHING OUT .1 Before start-up, clean interior of piping
OF PIPING SYSTEMS systems in accordance with requirements of Section 01 74 11 - Cleaning supplemented as specified in relevant mechanical sections.
- .2 Preparatory to acceptance, clean and refurbish equipment and leave in operating
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- 3.11 FLUSHING OUT OF PIPING SYSTEMS (Cont'd) .2 (Cont'd)
condition, including replacement of filters in piping systems.
- 3.12 PRESSURE TESTING OF EQUIPMENT AND PIPEWORK
- .1 Advise Departmental Representative 48 hours minimum prior to performance of pressure tests.
 - .2 Pipework: test as specified in relevant sections of heating, ventilating and air conditioning work.
 - .3 Maintain specified test pressure without loss for 4 hours minimum unless specified for longer period of time in relevant mechanical sections.
 - .4 Prior to tests, isolate equipment and other parts which are not designed to withstand test pressure or media.
 - .5 Conduct tests in presence of Departmental Representative.
 - .6 Pay costs for repairs or replacement, retesting, and making good. Departmental Representative to determine whether repair or replacement is appropriate.
 - .7 Insulate or conceal work only after approval and certification of tests by Departmental Representative.
- 3.13 CLEANING
- .1 Clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.
 - .2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal and Section 01 35 21 - LEED Requirements.