1. GENERAL

1.1 Quality Assurance

.1 Welding materials, fabrication standards and labour qualifications must conform to ANSI/ASME B31.1, ANSI B16.25, ASME Section IX, and the Provincial Board of Labour Regulations latest current editions.

.2 Use welders fully qualified and licensed by Provincial Authorities.

.3 Non-specified pipe joining and pipe fitting methods such as T-drill and press fit are not permitted in any piping system covered under Division 23.

2. PRODUCTS

2.1 Pipe

	Service	Material
.1	Hot water and glycol heating to 120°C (250°F)	Steel, Sch.40, ASTM A53, Grade B heating to 120°C (250°F)
.2	Equipment drains and overflows	Sch.40, galvanised steel, ASTM A120
		Type L hard copper ASTM B88M

2.2 Fittings and Joints

	Service	Material	Joint
.1	Hot water and glycol heating 120ºC (250°F)	Banded malleable iron, 1033 kPa (150 psi), up to 50 mm	Screwed
		Steel, same schedule as pipe, for sizes 50 mm and larger	Welded
		Cast steel mechanical	Grooved, Victaulic Brand or Grinnel Gruv-Lok only
.2	Equipment drains and overflows	Galvanised banded malleable iron	Screwed
		Wrought copper, bronze	50-50 solder
		Cast brass	Screwed

.3 Use factory fabricated butt welded fittings for welded steel pipes.

.4 Use long radius elbows for steel and cast iron water piping, including grooved mechanical fittings.

2.3 Unions, Flanges and Couplings

.1 Size 50 mm and under: 1033 kPa (150 psi) malleable iron, bronze to iron ground joint unions for threaded ferrous piping, air tested for gas service, all bronze for copper piping.

.2 Sizes 65 mm and over: 1033 kPa (150 psi) forged steel welding neck flanges for ferrous piping, 1033 kPa (150 psi) bronze slip-on flanges for copper piping. Gaskets shall be 1.5 mm (1/16 in) thick performed synthetic rubber bonded asbestos.

.3 Flange bolting: For systems up to 120°C (250°F), use carbon steel stud bolts, semi-flushed and heavy hex nuts, ASTM A307-GrB. For systems up to 215°C (420°F), use alloy steel bolts ASTM A193-GrB7, and semi-finished heavy hex nuts ASTM A194-Gr2H.

.4 Where permitted by the Contract Administrator, use grooved mechanical couplings to engage and lock grooved or shouldered pipe ends and to allow for some angular deflection, contraction and expansion. Couplings consist of malleable iron housing-clamps, C-shaped composition sealing gasket EPDM Grade E and steel bolts. Use galvanised couplings for galvanised pipe. All grooved mechanical couplings and fittings shall have a minimum working pressure of 1033 kPa (150 psi). Victaulic brand or Grinnel Gruv-Lok only.

3. EXECUTION

3.1 Preparation

.1 Ream pipes and tubes. Clean off scale and dirt, inside and outside, before assembly. Remove welding slag or other foreign material from piping.

.2 Protect all steel pipes when stored on site from external conditions and ensure protective coating remains intact. If in the opinion of the Contract Administrator, deterioration of the protective coating has instigated corrosion, all rust must be removed down to bare metal and prime coated with red oxide paint.

3.2 Connection

.1 Screw joint steel piping up to and including 40 mm. Weld piping 65 mm and larger, including branch connections. Screw or weld 50 mm piping for liquid systems, weld 50 mm piping for air and gas systems.

.2 Make screwed joints with full cut standard taper pipe threads with approved non-toxic joint compound applied to male threads only.

.3 Make joints for plain end pipe with gasket and clamp type mechanical fastener.

.4 Clamp cast iron water pipe at fittings with 20 mm rods and properly anchor and support.

.5 Use grooved mechanical couplings and mechanical fasteners, only where permitted by the Contract Administrator.

.6 Use galvanised couplings with galvanised pipe.

.7 Make connections to equipment, specialty components, and branch mains with unions or flanges.

.8 Provide dielectric type connections wherever joining dissimilar metals in open systems. Brass adapters and valves are acceptable.

.9 Use insulating plastic spacers for copper pipe installation in metal studs.

3.3 Route and Grades

.1 Route piping in orderly manner and maintain proper grades. Install to conserve headroom and interfere as little as possible with use of space. Run exposed piping parallel to walls. Group piping wherever practical at common elevations. Install concealed pipes close to the building structure to keep furring to a minimum.

.2 Slope water piping 0.2% and provide hose bibb drains at low points.

.3 Equip low points with 20 mm drain valves and hose nipples.

.4 Provide air collection chambers with manual air vent at all high points of system. Collection chambers to be 25 mm dia. or line size whichever is greater and 150 mm high minimum. Square tees may only be used to assist with complete venting and draining.

.5 Make reductions in water pipes with eccentric reducing fittings installed to provide drainage and venting. Top flat for water pipes

.6 Grade horizontal drainage and vent piping 2% minimum, unless noted otherwise.

.7 Pipe the discharge from all relief valves, safety valves, vents, drains, equipment blowdowns, water columns and overflows to the nearest building drain. Pipe to glycol recovery tanks for a glycol based system.

3.4 Installation

.1 Install piping to allow for expansion and contraction without unduly stressing pipe or equipment connected.

.2 Provide clearance for proper installation of insulation and for access to valves, air vents, drains and unions.

.3 Install piping material specified as inside the building to 2400 mm outside of building.

3.5 Welded Pipe Branch Connections

.1 Make branch connections according to the following schedule.

Legend:

T: Forges tee or reducing tee

S: Socolet

W: Weldolet

HYDRONIC PIPING

HEADER PIPE SIZE (mm)	BRANCH PIPE SIZE (mm)												
	15	20	25	30	40	50	65	75	100	150	200	250	300
15	T												
20	T	T											
25	T	T	T										
30	T	T	T	T									
40	T	T	T	T	T								
50	S	S	S	T	T	T							
65	S	S	S	S	T	T	T						
75	S	S	S	S	S	T	T	T					
100	S	S	S	S	S	T	T	T	T				
150	S	S	S	S	S	W	T	T	T	T			
200	S	S	S	S	S	W	W	W	T	T	T		
250	S	S	S	S	S	W	W	W	W	T	T	T	
300	S	S	S	S	S	W	W	W	W	W	T	T	T

END OF SECTION