

## **SECTION 4 - PIPING AND SPECIALITIES**

### **4-01 GENERAL**

The Tender Drawings indicate generally routes of all piping and the Contractor shall provide all fittings and accessories necessary for satisfactory installation and operation of the systems.

All piping shall be grouped wherever practicable and shall be erected to present a neat appearance. Pipes shall be parallel to each other and parallel or at right angles to structural members of the building and shall give maximum possible headroom.

All pipe drops shall be truly vertical. No joints shall be formed in the thickness of walls, floors or ceilings. the Contractor shall be responsible for ascertaining the thickness of plaster and other wall finishes, skirting heights, cill lengths and floor finishes.

Piping shall not pass in front of doorways or windows and shall be generally arranged so that its bottom is at least 75 mm above finished floor level and at least 25 mm from finished wall faces. Sufficient space shall be allowed for accessibility for servicing.

All drain piping shall pitch down in direction of flow. All drains from such items as drip pans of air conditioners shall spill over and open sight drain, floor drain or other acceptable discharge points and terminated 150 mm above the drainage.

Approved pipe fittings shall be used and bending of pipes will not normally be allowed.

All 90° elbows used shall be of long radius type, except where space limitations restrict the use of long radius.

Piping shall not be installed passing through ductwork or directly under electric light fixtures.

### **4-02 REFRIGERANT PIPING AND SPECIALITIES**

Refrigerant piping shall be copper tubing, type L (minimum), bright annealed, dehydrated and sealed, soft tempered tubing shall be used where bending is required and where flare joints are used, hard drawn tubing shall be used where no bending is required and silver-brazed joints are used, and for all tubing larger than 20 mm. Copper tube joints shall be brazed, except joints on lines 17 mm or smaller which may be flared. Fittings for flare joints shall be standard 'SF' forged brass flare-type with short shank flare units. Fittings for

brazed joints shall be wrought copper or forge brass seat fittings. Cast seat type fittings will not be allowed for brazed joints.

Purge valves, 15mm, shall be packless diaphragm type refrigerant purging valves, mounted on a branch from the suction line before it returns to the condensing unit. Discharge from valve shall be provided with removable seal cap. Valves shall be forged brass, 35 kg/cm<sup>2</sup> working pressure.

Strainers shall be installed into refrigerant line on the inlet side of each expansion valve. Strainers may be an integral part of the expansion valve. Strainers shall be rated at 35 kg /cm<sup>2</sup> working pressure.

Sight glasses shall be double-port glass "see through" type with colour-indicating moisture indicator and cover cap on each side. Sight glass shall be provided in liquid line immediately preceding each refrigerant expansion valve and in the liquid line leaving the condenser. Rating shall be 35 kg /cm<sup>2</sup> working pressure.

Flexible pipe shall be of seamless bronze construction with bronze wire braid covering, copper ferrules and standard copper tube ends. Tube ends shall be attached to the hose, braid and ferrules with high temperature zinc alloys.

#### 4-03 **CONDENSATE DRAIN PIPING**

All condensate drain piping including fittings shall be of uPVC, Class E, as per BS 3505 as manufactured by Dadex Eternit Limited, Pakistan or approved equal.

#### 4-04 **PIPE SLEEVES**

All pipe opening through walls, floor slabs shall have sleeves with internal diameter at least 50 mm larger than the outside diameter of the pipe of the insulation passing through the sleeve.

Pipes passing through walls shall be provided with sleeves of galvanized standard weight steel pipe or 20 gauge G.I. sheet with ends flush with wall surfaces.

Pipes passing through floor slabs or roof shall be provided with galvanized steel pipe sleeves projecting 75 mm above finished floor level. Space between pipe and sleeve shall be packed with fibreglass atleast 1.5 lb/ft<sup>3</sup> density and sealed. All openings on roof shall be sealed water tight.

#### 4-05 **MEASUREMENT AND PAYMENT**

##### Measurement:

Measurement of acceptably completed works of this item will be made on the basis of actual running length in feet of piping along center line of pipe, and acceptably furnished, installed, tested and commissioned. No separate measurement will be made for fittings, accessories, flanges, welding, hangers, supports, roller supports, nuts, bolts etc.

##### Payment:

Payment will be made for acceptable measured quantity of piping on the basis of unit rate per foot length quoted in the Bill of Quantities. The unit rate shall include cost of all fittings, flanges, associated accessories, hangers, supports, nuts, bolts, welding etc. and shall constitute full compensation for all the works related to this item.