

## CONCRETE PIPES

Reinforced concrete pipes used in water supplies are classified as P1, P2, and P3 with test pressure of 2.0, 4.0 and 6.0 Kg/cm<sup>2</sup> respectively. For use on gravity mains the working pressure should not exceed 2/3 of the test pressure. For use on pumping mains the working pressure should not exceed half of the test pressure. Generally concrete pipes have corrosion resistant properties similar to those of prestressed concrete pipe although they have their own features which significantly affect corrosion performance. Concrete pipes are made by centrifugal spinning or vibratory processes.

Centrifugally spun pipes are subjected to high rotational forces during manufacture with improved corrosion resistance properties. The line of development most likely to bring concrete pressure pipes into more general acceptance is the use of P.S.C pipes which is widely used to replace reinforced concrete pipes.

**Laying and Jointing:** The concrete pipes should be carefully loaded, transported and unloaded avoiding impact. The use of inclined planes or chain pulley block is recommended. Trench shall provide free working space on each side of the pipe which shall not be greater than 1/3 the dia of the pipe but not less than 15 cm on either side.

Laying of pipes shall proceed upgrade of a slope. If the pipes have spigot and socket joints the socket ends shall face upstream. The pipes unevenness as possible along the inside of the pipe. Where the natural foundation is inadequate the pipes shall be laid in a concrete cradle supported on proper foundations or any other suitably designed structure. If a concrete cradle is used the depth of the concrete below the bottom of the pipes shall be at least 1/4 the internal diameter of pipe with the range of 10-30 cm. It shall extend up the sides of the pipe at least to a distance of 1/4 the dia for larger than 300mm. The pipe shall be laid in the concrete bedding before the concrete has set.

Trenches shall be back filled immediately after the pipe has been laid to the depth of 300mm above the pipe subject to the condition that the jointing material has hardened (say 12 hours at the most) The backfill material shall be free from boulders, roots of trees etc. The tamping shall be by hand or by other hand operated mechanical means. The water content of the soil shall be as near the optimum moisture content as possible. Filling of the trench shall be carried on simultaneously on both sides of the pipe to avoid development of unequal pressures. The back fill shall be rammed in 150 mm layers upto 900mm above the top of the pipe.]

Joints may be of any of the following types.

- i) Bandage joint
- ii) Spigot and socket joint (rigid and semiflexible)
- iii) Collar joint (rigid and semiflexible)
- iv) Flush joint (Internal and external)

For more details of jointing procedures reference may be made to IS 783-1985.

In all pressure pipe lines the recesses at the ends of the pipe shall be filled with jute braiding dipped in hot bitumen. The quantity of jute and bitumen in the ring shall be sufficient to fill the recess in the pipe when pressed hard by jacking or any other suitable method.

The number of pipes that shall be jacked together at a time depends upon the dia of the pipe and the bearing capacity of soil. For small pipe upto 250mm dia, six pipes can be jacked together at a time. Before and during jacking care should be taken to see that there is no offset at the joint. Loose collar shall be set up over the joint so as to have an even caulking space all round and into this caulking space shall be rammed a 1:1.5 mixture of cement and sand just sufficiently moistened to hold together in the form of a cold when compressed in the hand. The caulking shall be so firm that it shall be difficult to dirve the point of a penknife into it. The caulking shall be employed at both the ends in a slope of 1:1. In the case of non-pressure pipes the recess at the end of the pipes shall be filled with cement mortar 1:2 instead of jute braiding soaked in bitumen. It shall be kept wet for 10 days for maturing.

**Pressure Test:**When testing the pipe line hydraulically, the line shall be kept filled completely with water for a week. The pressure shall then be increased gradually to full test pressure as indicated in 6.4.4.2 and maintained at this pressure during the period of test with the permissible allowance incidated therein.

For further details reference may be made to IS 458-1971.