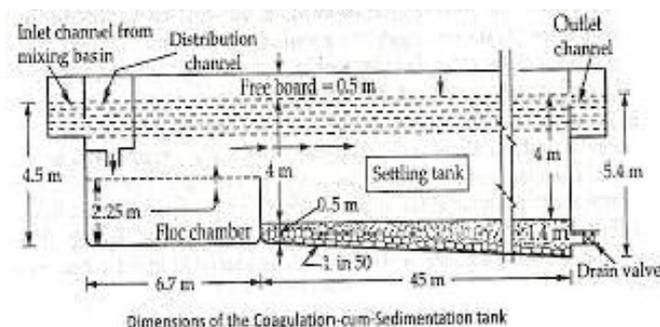


SEDIMENTATION AIDED WITH COAGULATION:

When water contains fine clay and colloidal impurities which are electrically charged are continually in motion and never settle down due to gravitational force. Certain chemicals are added to the water so as to remove such impurities which are not removed by plain sedimentation. The chemical form insoluble, gelatinous, flocculent precipitates absorb and entangle very fine suspended matter and colloidal impurities during its formation and descent through water. These coagulants further have an advantage of removing colour, odour and taste from the water. Turbidity of water reduced upto 5-10 ppm and bacteria removes up to 65%. The following are the mostly used Coagulants with normal dose and PH values required for best floc formation .

- | Coagulant | PH Range | Dosage mg/l |
|--|------------|-------------|
| 1. Aluminium sulphate $Al_2(SO_4)_3 \cdot 18 H_2O$ | 5.5 – 8.0 | 5 – 85 |
| 2. Sodium Aluminate, $Na_2Al_2O_4$ | 5.5 – 8.0 | 3.4 – 34 |
| 3. Ferric Chloride ($FeCl_3$) | 5.5 – 11.0 | 8.5 – 51 |
| 4. Ferric Sulphate $Fe_2(SO_4)_3$ | 5.5 – 11.0 | 8.5 – 51 |
| 5. Ferric Sulphate $FeSO_4 \cdot 7H_2O$ | 5.5 – 11.0 | 8.5 - 51 |

Coagulants are chosen depending upon the PH of water. Alum or Aluminium sulphate is normally used in all treatment plants because of the low cost and ease of storage as solid crystals over long periods. The dosage of coagulants, which should be added to the water, depends upon kind of coagulant, turbidity of water, colour of water, PH of water, temperature of water and temperature of water and mixing & flocculation time. The optimum dose of coagulant required for a water treatment plant is determined by a Jar test. For starting the experiment first of all the sample of water is taken in every jar and added the coagulant in a jar in varying amounts. The quantity of coagulant added in each jar is noted. Then with the help of electric motor all the paddles are rotated at a speed of 30-40 R.P.M. for about 10 minutes. After this the speed is reduced and paddles are rotated for about 20-30 minutes. The rotation of paddles is stopped and the floc formed in each Jar is noted and is allowed to settle. The dose of coagulant which gives the best floc is the optimum dose of coagulants.



The coagulants may be fed or allowed to enter either in powder form called dry feeding or in solution form called wet feeding. The mixing of coagulant with the water to form the floc by the following methods.

1. Centrifugal pump
2. Compressed air
3. Hydraulic jump
4. Mixing channel
5. Mixing basins with baffle walls
6. Mixing basins with mechanical means

Now a day's some firms manufacture combined unit comprising of feeding, mixing, flocculator and clarifier device.

Sedimentation with Coagulation:

Water enters in this tank through central inlet pipe placed inside the deflector box. The deflector box deflects the water downwards and then it goes out through the holes provided sides of the deflector box. The water flows radially from the deflector box towards the circumference of the tank, where outlet is provided on the full periphery. All the suspended particles along with floc settle down on the slopy floor and clear water goes through outlet. The sludge is removed by scrapper which continuously moves around the floor with very small velocity. Disinfection and repainting is to be carried out once in a year before monsoon. Sludge pipes are to be flushed and kept clean. Bleaching powder may be used to control the growth of algae on the weirs. Scrapper mechanism should be oiled and greased periodically.