Appendix I

Steam Pipe Cost

It is decided to tap steam at 17 bar from steam turbine and to use as a fuel in AAVAR system. For this, the cast steel pipe line of 6 inch size is designed for 17 kg/cm^2, 340°C and 12.3 tonne/hr and selected pipe material is A106 Grade-B Seamless Schedule 40 IBR (Carbon steel). The cost of cast steel pipe is 35000 ₹/tonne.

For selected pipe, following dimensions are considered.

$D_o = 6.63$ inch

$D_i = 6.07$ inch

$L = 1$ km

Volume of pipe line per meter length

$$V = \frac{\pi}{4}\left(D_o^2 - D_i^2\right) \times 1$$

$V = 0.0036$ m^3

Density of pipe material

$\rho = 7850$ kg/m^3

Mass of pipe per meter length

$m = \rho \times V$

$m = 28.3$ kg/m

Cost of pipe per meter length

$= m \times 35$

=990 ₹/meter

Including transportation charges

Cost=1008 ₹/meter