

TUBULAR GAUGE GLASS - CORROSION

In steam boiler service, corrosion of gauge glass presents a variety of problems: this is because the temperature of saturated steam increases with the steam pressure resulting in an increased rate of attack (a flat transparent gauge glass can be protected using a mica shield but this is not possible where tubing is concerned)

Chemical treatment of boiler feed waters to reduce steel corrosion will produce an alkalinity of the water at Ph values between 10 and 11, sometimes higher, leading to further increases in the rate of wear of the glass. Fortunately, the water in contact with the gauge glass, being furnished largely by condensate through the upper connection to the boiler, will be less alkaline than that in the boiler

This condensate, by flowing over the glass, dissolves minute quantities of silica. These small quantities of silica in solution inhibit the attack of the boiler water in the glass to a considerable extent. The fresh condensate entering the gauge will often attack the glass in upper areas, more than in the lower part of the gauge, where the temperature is lower and where the degree of saturation of silica is greater. This effect is particularly noticeable in the case of tubular gauge glasses

Apart from the boiler pressure, which determines the saturation steam temperature, the other factors determining corrosive rate of attack are:

- 1.Speed of condensate flow into the gauge
- 2.The amount of circulation of water between the gauge column and boiler through the lower connection
- 3.The temperature drop between the boiler and the gauge column
- 4.Details of boiler operating routine

Because of these variables, between one boiler installation and another, it is not possible to state specific steam pressures at which the rate of glass corrosion becomes unacceptably high. In general, it is found that tubular type gauges are not suitable at pressures beyond 300 to 350 psi

TYPICAL PROPERTIES

This graph illustrates how the rate of attack increases with the temperature and concentration of NaOH

