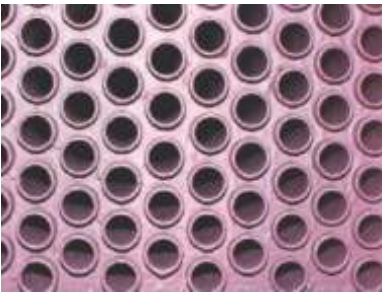
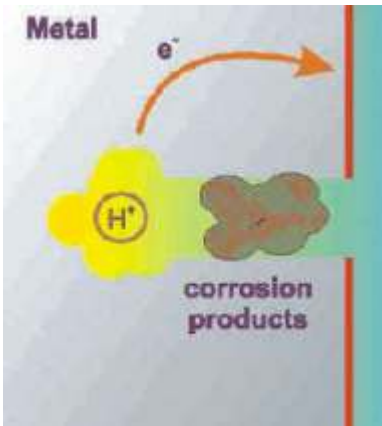


# Condenser Tube Sheet Repair

Application by ProCoat Specialities Pvt. Ltd.

## ThistleBond

A Division of E. Wood Ltd., U.K.



Condenser Tube Sheet of cooling water system of power generation and other industries using sea water as a cooling medium, face severe corrosion problem. Sea water though it is abundant and free but on other side leads to a major effect on metal substrate which in turn reflects in damage to costly equipments. Sea water consists of corrosive constituents like sodium salts (chloride, sulphate, nitrate, bicarbonate), salts of heavy metals, silica, dissolved gases (like  $O_2$ ,  $CO_2$ , hydrogen, ammonia, sulfurous gases), suspended particles, fouling, bio-forms. All the above will take an active participation in corrosion. Moreover, salinity, PH, temperature variation, velocity of sea water flow also adds to effective role in increasing rate of corrosion over condenser tube sheet. Research in this area, of condenser tube sheet corrosion, also shows that undulations of tube sheet surface will enhances the corrosion rate.

The difference in metallurgy of the tube & sheet, when in contact with seawater under influence of flow rate, temperature, chlorinity will lead to bi-metallic (galvanic) corrosion (corrosion is in principle, partial or complete wearing away, dissolving, or softening of any metal substance by chemical action) initially as pitting (localized corrosion of metal surface, confined to a point or small area, that takes form of cavities or pits). These pittings propagate in different shapes and irregular directions and ultimately results in larger cavities and metal loss. Concentration of pitting are mainly around tubes. This corrosion problem can be successfully stopped and the life of tube sheet can be extended substantially by rectifying existing damage and by providing an effective protective coating over the entire tube sheet surface.

ProCoat Specialities with ThistleBond "Ceramic Carbide" range of products can provide extended life expectancy coating system which will effectively resist

- Oxidation, as Ceramic Carbide by its nature offers more resistance to reduction reaction and more over the final products has excellent resistance to most corrosive chemicals even in aggressive environments.
- Ingress of vapour, water and corrosive molecules by offering a complex matrix structure over surface along with uniform coating surface.
- Propagation of pittings and cavities as ceramic carbide products offers an outstanding resistance to abrasion, wearing, impact and impingement loads and factors.
- Relative movements of tubes and sheet.
- Turbulence with extreme non-porous, low friction surface.

ThistleBond's R&D evolved the Flexiblised Ceramic Carbide Systems which will absorb differential movements of tubes & sheet effectively without disbandment as these products are flexible after full cure. Therefore, the desired properties like corrosion resistance & flexibility of ThistleBond products provides a long term solution to tube sheet corrosion.

### Surface Preparation

By mechanical means like grinding, wire wheel, wire brush etc., or by sand blasting to SA 2.5 standard or near white metal finish after plugging the tubes with suitable corks or rubber plugs. This enhances surface profile giving rough surface good for adhesion.

## Rebuilding of pittings & cavities over tube sheet and protective rebuilding around tube heads

'Flexibilised Ceramic Carbide Compound' which is a high performance solvent free flexible poly ceramic product based on complex blend of high molecular weight and urethane polymers blended with inert pigments and silicas reacted with an amine accelerated isocyanate resin which produces a system with optimum physical and mechanical strength. This product will be applied over the pitted and around each tube periphery. This application will protect repaired area from impact of sea water, abrasion from suspended particles and corrosion from chlorinity nature of sea water. It will absorb the differential movements of tube & sheet with its flexibility.

## Final Protective Coating over Tubesheet surface

Once resurfacing of tube sheet is completed, a final protective coating should be given with 'Flexibilised Fluid Ceramic Carbide Compound' over entire surface. This protective coating will provide an outstanding resistance against impingement, entrainment, cavitation and erosion from corrosive sea water.

### Distributor catering to your needs



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