



Technical Discussion on Pressure Vessel Post Weld Heat Treatment

The Heat Exchange Institute's Standards for Tray type Deaerators specifies that carbon steel deaerator and storage tank pressure vessels shall undergo post weld heat treatment. This requirement is in accordance with NACE (National Association of Corrosion Engineers) recommendations as specified in NACE Standard RP0590-96.

Post weld heat treatment is the process of heating a vessel to a sufficient temperature to relieve the residual stresses resulting from mechanical forming and welding. This process is typically accomplished by heating the vessel to 1100° F - 1200° F. The length of time is determined by the ASME code and will vary depending on the thickness of the material. Relieving these stresses will minimize, if not eliminate the formation of stress cracks during the life of the pressure vessel.

The two methods that can be used to heat treat are, (A) in furnace PWHT and (B) local PWHT. If in furnace PWHT is not available or a tank is too large to put in a furnace, thermal wrapping can be used to apply local PWHT to the vessel.

In the case of deaerators where there are significant stainless steel internal parts, single stage PWHT can be used after L grade stainless steel internal parts are installed. An alternative to single stage PWHT is two stage PWHT. In this procedure, no stainless internals are installed before PWHT and the closing head is left off until after PWHT. After PWHT, the stainless steel internals are installed and the closing head is welded onto the tank. Local PWHT is then applied to the closing seam.

Post weld heat treatment is performed after all welding and fabrication is complete. Typically a notice is stenciled on the vessel to alert the owner or installing contractor that the vessel has been heat treated and no further welding should be done on the vessel.