

Evaluation on the hardness and microstructures of T91 reheater tubes after post-weld heat treatment

Abstract

Reheater and superheater tubes are vulnerable to high temperature upset condition, undergoing severe creep deformation or even final rupture. In general, boiler tubes in power plants have finite life because of prolonged exposure to high temperature, stress, aggressive environment, corrosive degradation, etc. Recently, several works on the failure investigation of reheater and superheater tubes of the power plants in Malaysia have been reported [1–6]. In order to have continued operations under higher temperatures and pressures for a long period of operation, uses of suitable boiler tube material in thermal power plants are required. In particular, a chromium–molybdenum–vanadium steel tube (SA213-T91) has been available in the market since two decades ago and was co-developed by the Combustion Engineering and the Oak Ridge National Laboratory in the late 1970s[7]. The SA213-T91 material has better creep and high temperature strengths than those of the widely used materials such as T11 and T22.

Keywords; Hardness; Microstructure; Post-weld heat treatment; Reheater tube