Analysis of the Effect of PWHT on the Microstructure Composition in Dissimilar Welded Joints of ASTM A-105 & A387 Gr 6 Materials with Buttering Inconel 625

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Abstract:

The amount of petroleum produced in Indonesia shows a decline in lifting, which causes the supply of petroleum to be unfulfilled for domestic needs. To cover domestic needs, import activities are needed from oil-producing countries such as Saudi Arabia and several countries in the African region. The price of petroleum is greatly influenced by the content of Sulfur and TAN. The lower the TAN and Sulfur content, the higher the price of petroleum (sweet crude) and vice versa, the higher the sulfur and TAN content (sour crude) the more economical the value of the petroleum. Therefore, Indonesia must start developing petroleum processing technology to process sour crude types, of course by upgrading materials in the domestic Petroleum Processing Industry or Refinery with pipe materials that are resistant to high Sulfur and TAN content so that there is no material corrosion caused by the high acid content of the processed petroleum. The use of different materials between Columns and Pipes requires special techniques with the application of PWHT and the use of Buttering on welded joints. Therefore, the research took the topic of Analysis of the Impact of PWHT on the Quality of Welded Joints with Inconel 625 Buttering at the Nozzle Outlet Crude Distillation Unit. This research was conducted to see the impact of the use of Inconel buttering with PWHT treatment. There is no difference between the research results and the Schaeffler diagram approach. There is a difference between the Rosenthal approach and the research results, especially in the width of each microstructure phase. PWHT for DMW A105-A387 Gr 5 equipped with Inconel 625 Buttering is recommended to be carried out to maintain material strength and facilitate the welding process while maintaining material quality at temperature range 720 ~ 746℃ for 2hours.

Keywords:

Dismaterial Weld, welding, microstructure, mechanical properties, Post Weld Heat Treatment (PWHT), Buttering.