



Contribution ID: 248

Type: **not specified**

Optimal design of DMA probe for austenitic stainless steel weld of CFETR vacuum vessel

Monday, 17 September 2018 11:00 (2 hours)

As to the ultrasonic testing of argon arc seam of 50mm austenitic stainless steel China Fusion Engineering Test Reactor(CFETR) vacuum vessel mock-ups, there are some limitations if we adopt the traditional ultrasonic probe or linear array phased array probe. In this paper, we designed a Dual Matrix Array(DMA) probe based on the CIVA, and then analyze the optimal principle of the probe parameters. The results show that the DMA probe's signal to noise ratio much higher compared to the traditional probe, and the surface blind area is reduced . The defect detection rate meets the requirements of relevant standards. The research result has much reference value for the application of phased array ultrasonic testing in austenitic stainless steel welding joint.

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Session Classification: P1