NDT STATUS OF PF1 COIL WELDS

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The poloidal field coil PF1 is one of the subsystems of the ITER magnetic system. PF1 coil consists of 8 double pancakes (DPs) interconnected PF1 coil contacts joints. The PF1 coil uses liquid helium as a cooling system, which is fed into contact junctions through helium inlets (HI).

ULTRASONIC TESTING (UT) OF PF1 CONTACT JOINTS

The use of traditional UT is not subject to the implementation of the reasons:
- geometric complexity
- profile welds absence
- of the necessary scanning area
- UT Procedure ITER_ID TU45WL approved by IO ITER

EN ISO 5817 (level B)
Quality levels for imperfections

EN ISO 17635
General rules for UT

EN ISO 16810
EN ISO 17640
Testing techniques

EN ISO 22825
Reference block

EN ISO 11666
Acceptance levels

Detectable of UT indications in arc-welds using the UT with PA Technology

Detection of imperfections welding relatively equivalent area of 8DH ±2mm, equivalent square 4.1 mm²

Ultra of bimetallic blank Cu/SS using the Wheel Probe with PA Technology

ITER UT Requirement (6.16 mm FBH) for explosion welding Cu/SS can be formed when weld border will be gotten another welding technology without big "tooths"

VISUAL (VT) AND RADIOGRAPHIC (RT) TESTINGS OF PF1 HI WELD

The full-penetration and differences in material thickness weld:
- Dimensions: 36.4*28.4*6.2mm
- Performed of AISI 316LN steels
- Welding process TIG
- Welding type MW
- Level of quality B by EN ISO 5817

VT Procedure ITER_ID QCTAXT approved by IO ITER

RT Procedure ITER_ID QUSYBE approved by IO ITER

VT and RT results of the root of the HI weld

NDT is capable to detect both surface imperfections and internal indications, both volumetric and plane defects of all types of PF1 welds.

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