



Procedure 03-8083-P09

Magnetic Permeability Inspection



MAGNETIC PERMEABILITY INSPECTION

1.0 Purpose:

To establish the method for verification of Magnetic Permeability for the Prototype Vacuum Vessel Segment for the National Compact Stellarator Experiment.

2.0 Scope:

To determine the overall Magnetic Permeability of the nickel chromium alloy area, stainless steel area and welded joints that make up the Prototype Vacuum Vessel Segment.

3.0 References:

- National Compact Stellarator Experiment (NCSX) Specification NCSX-CSPEC-121-01-01.
- ASTM A800, Supplementary Requirement S1.

4.0 Equipment:

- Severn Engineering Co. Permeability Indicator

5.0 Procedure:

** Under no circumstances bring another magnet in contact with the indicator magnet. This will disturb the calibration of the Indicator to such an extent that it will need recalibration.

** Do not jerk the Indicator away from the test material.

1. Clean area to be tested from metal filings, chips, dirt or any other foreign material.
2. Layout inspection grid as per details on Route Card.
3. Select appropriate insert as per Section 3.2.1.3 of NCSX-CSPEC-121-01-01 and screw firmly into place.
4. Bring the end of the magnet projecting from the opening in the bottom of the case into contact with the material being tested/ area of concern.
5. Move the indicator away in a direction normal to the contact surface.
6. If the material being tested has a higher permeability than that of the insert, the magnet will first break contact with the insert as the Indicator is moved away. Only full, complete breaks should be considered as indicative of a higher permeability than the test material. Proceed to Step #9.
7. If the material being tested has a lower permeability than that of the insert, the magnet will first break contact with the test material as the Indicator is moved away.
8. Interchange inserts to determine the range that the test material falls within.
9. Document findings on Form F034, Dimensional Inspection Report.
10. Repeat steps 3 through 9 until all grid sections have been inspected.