

Title: Calibration of Electromagnets and Permanent Magnets

1 Scope

Work Instruction for the calibration of electromagnets and permanent magnets for materials testing. To be used in the absence of a manufacturers calibration instruction.

2 Preparation

Calibration shall be carried out using Category 'A' master instruments as required.

Equipment required:

- 4.5 kg Test Weight (e.g. 90mm piece of full CEN 56E1 (113A) rail profile)
- 18 kg Test Weight (e.g. 360mm piece of full CEN 56E1 (113A) rail profile)
- Flux Foil Indicator Strips

The flux foil indicator strips shall have the appropriate certificate of calibration traceable through United Kingdom Accreditation Service and shall be rechecked at intervals of no more than 5 years.

Test Weights to be marked with the following; date tested (weight checked), application (AC weight / DC weight), minimum weight requirement (4.5kg / 18kg) and next test date (5 years from test date). Test weight shall be recorded as Category 'B' equipment in the Calibration Database.

3 Method

3.1 Equipment Condition Checks

3.1.1 Check that the magnet identification number is clearly visible and, for electromagnets, that the electrical safety tag is in date.

3.1.2 Check the physical condition of the magnet for damage, particularly the condition of the pole faces. If the magnet has adjustable leg ends, their ability to move and/or rotate shall be confirmed.

NOTE 1 Permanent magnets should be complete with a keep.

NOTE 2 Field strength can be checked either by test weight or flux indicator strip.

3.2 Checking Field Strength Using Test Weights

3.2.1 Open the pole spacing of adjustable AC Electromagnets to 150mm; open the pole spacing of adjustable DC Electromagnets and permanent magnets to 75mm

3.2.2 Connect electromagnets to a suitable power source.

3.2.3 Apply the poles of AC Electromagnets to the 4.5kg test weight; apply the poles of DC Electromagnets and permanent magnets to the 18kg test weight.

3.2.4 With electromagnets energised, check that the test weight can be lifted and held for 5 seconds.

3.2.5 Record results on the calibration form Appendix A. Calibration result sheets shall be retained for audit purposes.

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3.3 Checking Field Strength Using Flux Indicator Strips

3.3.1 Open the pole spacing of adjustable AC Electromagnets to 150mm; open the pole spacing of adjustable DC Electromagnets and permanent magnets to 75mm.

3.3.2 Connect electromagnets to a suitable power source.

3.3.3 Apply the poles to a suitable piece of rail and position the flux indicator strip central to, and with its major axis in line with, the poles of the magnet.

3.3.4 With electromagnets energised, apply magnetic ink and allow 3 seconds before checking.

3.3.5 Three indications shall be visible.

3.3.6 Record results on the calibration form Appendix A. Calibration result sheets shall be retained for audit purposes.

4 References

Appendix A. Electromagnets and Permanent Magnets Calibration Result Sheet.

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