



REVISION STATUS

Issue	Revision	Prepared	Reviewed	Approved
01	A	2017-01-01 JR Thompson	2017-01-01 V S Pathy	2017-01-01 V S Pathy

AMENDMENT RECORD

Revision	Date	Pages	Reason for amendment



SCOPE

This document prescribes the minimum equipment holdings essential for the operation of a training organisation preparing candidates for third party certification. It details the minimum equipment for the following NDT inspection methods.

1. Ultrasonic Testing including Time of flight Diffraction (TOFD) and Phased Array
2. Radiography (Conventional)
3. Eddy Current Testing
4. Magnetic Particle Inspection (Multi-sector)
5. Liquid Penetrant Inspection (Multi-sector)
6. Visual Testing

GENERAL

The ATO shall hold sufficient relevant test equipment, probes, reference blocks, calibration blocks, etc., to provide for a stated number of students on any one training course.

Details of designated training equipment must be submitted to upon request.

The ATO shall, as far as practicable, maintain all such equipment in a serviceable condition and provide for its maintenance and overhaul as necessary.

Existing ATOs are to record any changes in equipment holdings too. If a significant reduction in equipment holdings is planned, this may result in a change in the scope of approval and must be notified beforehand.

Ultrasonic Testing

- A5.1.1. At least one ultrasonic flaw detector and a full range of probes appropriate to the techniques to be trained, including any special purpose probes where required.
- A5.1.2. Calibration blocks and reference blocks appropriate to the techniques to be trained.

Time of Flight Diffraction

- A5.1.3. TOFD data collection instrument, including specific connecting cables for data to be displayed on a computer.
- A5.1.4. Computer with compatible software to interact where necessary with the TOFD instrument and read the TOFD data.
- A5.1.5. TOFD scanner to include probe jig and line encoder.
- A5.1.6. A pair of 5 MHz transducers with matching wedges producing centre beam refracted angles of 45°, 60° and 70°.



A5.1.7. BS 2704 type A2 or BS EN 12223 calibration block no. 1.

A5.1.8. Connecting cables for all parts of the equipment.

A5.1.9. Water-based couplant.

Guidance Note: Where necessary the equipment may be loaned/hired by the equipment manufacturer or employer of students for use during training.

Phased Array

A5.1.10. Sufficient UT Phased Array (PA) data collection instruments, enabling data to be displayed on a computer, for the maximum number of students that the ATO will register for any one course.

A5.1.11. Computer(s) with compatible software to interact where necessary with the PA instrument(s) and read the acquired PA data.

A5.1.12. PA scanner(s) to include probe jigs and line encoders

A5.1.13. BS 2704 type A2 or BS EN 12223 calibration block no. 1

A5.1.14. Connecting cables for all parts of the equipment

A5.1.15. Water based couplant

A5.1.16. Transducer sets (62 and/or 32 element – 2.5 and/or 5 MHz)) for each PA instrument:

A5.1.17. Appropriate wedges and adaptors

Radiography

A5.1.18. At least one X-ray tube with a KV range appropriate to the materials to be tested.

A5.1.19. For gamma radiography (where appropriate) an Iridium 192 source, with suitable container and projection mechanism.

A5.1.20. A range of Image Quality Indicators (IQI).

A5.1.21. Lead letters and numbers.

A5.1.22. Blocking off compounds and liquids where appropriate.

A5.1.23. Aluminium (Al) and/or Copper (Cu) and/or Lead (Pb) filters where appropriate.

A5.1.24. Densitometer.

A5.1.25. Film viewers, including at least one high intensity viewer.

A5.1.26. Radiation monitor(s) (with traceable calibration).

A5.1.27. Stepped blocks for making exposure curves.

A5.1.28. Caliper or other device for measuring material thickness.

A5.1.29. Darkrooms for film processing and film preparation/viewing.



- A5.1.30. Viewing aids, such as magnifiers.
- A5.1.31. A manual and/or automatic processing unit incorporating thermostatically controlled developing tank, stop bath, rinsing, fixing and washing tanks.
- A5.1.32. Thermostatically controlled drying cabinet.
- A5.1.33. Channel and clip type film hangers in the common sizes.
- A5.1.34. Intensification screens in the common sizes/materials.
- A5.1.35. Flexible and rigid type cassettes.
- A5.1.36. Darkroom timer.
- A5.1.37. Safelights.

Eddy Current Testing

Wrought Products and Welds

- A5.1.38. At least one standard single frequency impedance plane instrument and one analogue meter display instrument.
- A5.1.39. Where training incorporates bolt hole testing, one dynamic rotating probe assembly and compatible instrument.
- A5.1.40. Where training is offered for multi frequency boiler tube inspection, one dual frequency impedance plane instrument suitable for testing of the examination samples held.
- A5.1.41. Absolute and differentially wound standard and shielded pencil and spade probes, suitable for testing ferritic and austenitic steels and aluminium alloys.
- A5.1.42. A selection of encircling, internal, bolthole and comparative coil types.
- A5.1.43. Calibration blocks, appropriate to all probe and material types.
- A5.1.44. Where examination of specific components, i.e. Automated/semi-automated testing of steel tubes/condenser tubes, coils/probes and test equipment together with reference test pieces containing relevant holes/notches.

Tube Testing

- A5.1.45. One impedance plane, dual frequency two-channel flaw detector with the ability to mix channels manually. The flaw detector to carry a valid annual certificate of calibration.
- A5.1.46. One two-channel chart recorder having a minimum chart width of 50 mm, with a speed of between 25-50 mm/sec and a nominal 500 Hz frequency response.
- A5.1.47. Calibration tubes type A, B and D from draft inspection ESI 98-15 and produced in test sample material. Tubes to be 25 mm external diameter and 18 g thickness.
- A5.1.48. Eddy current probes of the air cored bobbin type. A minimum of one of each of:



- Diameter 20 mm minimum 24 kHz nominal frequency and differential mode.
- Diameter – appropriate to be a sliding fit through a plastic inlet insert and having a flexible (brush type) centring device. 24 kHz nominal and absolute.

A5.1.49. Appropriate cabling.

Magnetic Particle Testing (multi-sector)

A5.1.50. A 1,500 Amp (minimum) bench or freestanding transformer with AC or DC output (and half wave rectified AC) with a current flow adapter and prods, magnetic flux flow adapter and an ink reservoir with feed.

A5.1.51. AC/DC Electromagnetic Yokes with articulated legs and pole pieces.

A5.1.52. Permanent magnets with pole piece adaptors suitable for all applications.

A5.1.53. Various rigid and flexible coils, threading bars etc.

A5.1.54. Inspection areas or booths equipped with suitable background lighting for visible and UV (A) viewing of samples.

A5.1.55. Independent or combined photometer & radiometer for measuring the intensity of visible and black light.

A5.1.56. Demagnetising equipment.

A5.1.57. Flux measuring and comparison gauges to BS recommendations.

A5.1.58. Sutherland Flask or Crowe Receiver for measuring solid content of magnetic ink.

A5.1.59. Dry Powder dispensers

A5.1.60. Supplies of detection media including non-fluorescent, fluorescent and dry powder.

A5.1.61. Artificially or naturally cracked blocks/specimens for performance checking.

Liquid Penetrant Testing (multi-sector)

A5.1.62. An effective component cleaning/degreasing facility for thorough cleaning of specimens.

A5.1.63. A penetrant line comprising:

A5.1.63.1. Water washable penetrant tank

A5.1.63.2. Post-emulsifiable penetrant tank

A5.1.63.3. Emulsifier tank

A5.1.63.4. Water rinsing station with spray nozzle

A5.1.63.5. Drying station

**Visual Testing (multi-sector)**

- A5.1.64. Surface table (of Suitable size for largest measurement)
- A5.1.65. V Blocks
- A5.1.66. Block mounted pointers/ sensors
- A5.1.67. In addition the following shall be provided in adequate quantities (dependent on the number of trainees)
- A5.1.68. Squares, Rules, Protractors
- A5.1.69. Micrometer
- A5.1.70. Verniers
- A5.1.71. External Calipers
- A5.1.72. Dial reading bore gauge
- A5.1.73. Hand magnifiers (X2,X5)
- A5.1.74. Lupes with metric scales no greater than X7
- A5.1.75. Mirrors – various sizes up to 50mm diameters with fixed and articulating heads
- A5.1.76. Light sources – penlights, flashlights, bespoke sources to power intrascope and fibrescope
- A5.1.77. Indirect viewer – either fibrescope or endoscope with forward and side viewing lenses
- A5.1.78. Photometer
- A5.1.79. Weld gauges, weld profiles, surface comparator