

SUBJECT : **MINIMUM EQUIPMENT REQUIREMENTS FOR ATO**

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SIGNATURE : _____

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0	03-04-2015	F. Buijsen
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LIST OF CHANGES	
REV	CHANGES
0	Issued
1	Added information for Digital Radiography

1 SCOPE

This document prescribes the minimum equipment holdings essential for the operation of a training organisation preparing candidates for qualification, relative to the methods for which ATO approval is requested.

2 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 the NANDTB 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 to NANDTB. 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.

3 EQUIPMENT LIST

3.1. Ultrasonic testing

3.1.1 At least one digital ultrasonic flaw detector and a full range of probes appropriate to the techniques to be trained, including any special purpose probes where required.

3.1.2 At least one digital ultrasonic thickness detector and a full range of probes appropriate to the techniques to be trained, including any special purpose probes where required.

3.1.3 Calibration blocks and reference blocks appropriate to the techniques to be trained.

Phased Array

3.1.4 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

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

3.1.6 PA scanner(s) to include probe jigs and line encoders

3.1.7 Special Phased array general purpose calibration blocks and reference standards covering the applications

3.1.8 Connecting cables for all parts of the equipment

3.1.10 Water based couplant

3.1.11 Transducer sets for each PA instrument:

32 element 5 MHz ~0.6 mm pitch

32 element ~2.5 MHz

64 element 5 MHz ~0.6 mm pitch

3.1.12 Appropriate wedges and adaptors

3.2. Radiography

- 3.2.1 At least one X-ray tube with a KV range appropriate to the materials to be tested.
 - 3.2.2 For gamma radiography (where appropriate) an source, with suitable container and projection mechanism.
 - 3.2.3 An X-ray beam centring device.
 - 3.2.4 A range of Image Quality Indicators (IQI).
 - 3.2.5 Lead letters and numbers.
 - 3.2.6 Blocking off compounds and liquids where appropriate.
 - 3.2.7 Copper and lead filters where appropriate.
 - 3.2.8 Densitometer.
 - 3.2.9 Film viewers, including at least one high intensity viewer.
 - 3.2.10 Radiation monitor.
 - 3.2.11 Stepped blocks for making exposure curves.
 - 3.2.12 Caliper or other device for measuring material thickness
 - 3.2.13 Separate darkrooms for film processing and film preparation/viewing.
 - 3.2.14 Viewing aids, such as magnifiers.
 - 3.2.15 An automatic processing unit incorporating thermostatically controlled developing tank, stop bath, rinsing, fixing and washing tanks.
 - 3.2.16 Lead and calcium tungstate screens in the common sizes.
 - 3.2.17 Darkroom timer.
 - 3.2.18 Safelights.
- Digital radiography
- 3.2.19 At least one digital X-ray system with a KV range appropriate to the materials to be tested.
 - 3.2.20 at least one either CR or DR image carrier system.
 - 3.2.21 at least one scanner/computer necessary to evaluate the obtained digital image (Diconde).

3.3. Eddy Current testing

- 3.3.1 At least one standard single frequency impedance plane instrument and one analogue meter display instrument.
- 3.3.2 Where training incorporates bolt hole testing, one dynamic rotating probe assembly and compatible instrument.
- 3.3.3 Where training is offered for multi frequency inspection, one dual frequency impedance plane instrument suitable for testing of the examination samples held.
- 3.3.4 Absolute and differentially wound standard and shielded pencil and spade probes, suitable for testing ferritic and austenitic steels and aluminium alloys.
- 3.3.5 A selection of encircling, internal, bolthole and comparative coil types.
- 3.3.6 Calibration blocks, appropriate to all probe and material types.

3.4. Magnetic Particle testing

- 3.4.1 A 1,500 Amp bench or freestanding transformer with AC or DC with a current flow adapter, magnetic flux flow adapter and an ink reservoir with feed.
- 3.4.2 AC/DC Electromagnetic Yokes with articulated legs and pole pieces.
- 3.4.3 Permanent magnets with pole piece adapters suitable for all applications.
- 3.4.4 Various rigid and flexible coils, threading bars etc.
- 3.4.5 Inspection area or Booth equipped with black out facilities for visible and UV(A) viewing of samples.
- 3.4.6 Independent or combined photometer & radiometer for measuring the intensity of visible and black light.
- 3.4.7 Demagnetising equipment.
- 3.4.8 Flux measuring and comparison gauges.
- 3.4.9 Sutherland Flask or Crowe Receiver for measuring solid content of magnetic ink.
- 3.4.10 Powder dispensers
- 3.4.11 Supplies of detection media including non-fluorescent, fluorescent and dry powder.
- 3.4.12 Artificially or naturally cracked blocks/specimens for performance checking.

3.5. Penetrant testing

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

3.5.1.2 A penetrant line comprising:

3.5.1.3 Water washable penetrant tank

3.5.1.4 Post emulsifiable penetrant tank

3.5.1.5 Emulsifier tank

3.5.1.6 Water rinsing station with spray nozzle

3.5.1.7 Drying station

3.5.1.8 Dust storm cabinet

Aerosol penetrant inspection kits comprising:

3.5.2 Penetrant remover/degreaser

3.5.3 fluorescent penetrant, different levels of sensitivity

3.5.4 colour contrast dye penetrant

3.5.5 Developer

3.5.6 Inspection area or Booth equipped with black out facilities for visible and UV(A) viewing of samples.

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

3.5.8 Artificial flaws (TAM panel) or other means of process control of penetrant line.

3.7. Thermographic testing

3.7.1 At least one thermographic camera instrument.

3.7.2 Heat and/or cooling devices

3.7.3 Temperature gages

3.8 Shearography testing

3.8.1 Shearographic inspection system

3.8.2 Means for applying load to the part such as: Flash lamps/ Vacuum boxes/Resonance systems