



QUALITY DOCUMENTS

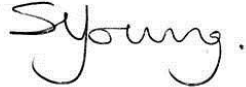
W.I. NUMBER 05 ALL SITES

PLANT PERFORMANCE CHECK ON
MAGNETIC PARTICLE INSPECTION
EQUIPMENT



This document forms an integral part of the Company Quality system, and adherence to the requirements specified within are mandatory upon all Company personnel and upon any subcontractor required to work in accordance with it.

This is a controlled document and must not be altered in any way without authorisation from the Company Quality Manager.

Issued by: 

Title: Quality Manager

Date: 01.10.15

Authorised / Approved by: 

Title: Co-Managing Director

Date: 01.10.15



DOCUMENT AMENDMENTS AND UPDATES

Date Amended	Section Amended	Amendment made	Name of person inserting change
01.10.15	6.1	Text changed	S. Young

Changes are hi-lighted

Copies of this document are sent to PCN/BINDT/Lavender Greece.

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1.0 SCOPE

- 1.1 This Work Instruction describes the requirements to ensure that all equipment used for magnetic particle inspection is working in a satisfactory manner.

2.0 RESPONSIBILITIES

- 2.1 The Quality Manager has the responsibility for the control of and amendments made to this Works Instruction in accordance with QP 9 Document Control.
- 2.2 It is the responsibility of Level 3 staff to ensure that persons working to this instruction are suitably trained and certified.

3.0 OBJECTIVES

The main objective is to ensure that any variations that occur within the day to day use of all equipment are detected and where necessary acted upon to ensure no product impact.

4.0 APPLICABLE DOCUMENTS

- a) QP7 - Calibration and Control of Test and Measuring Equipment
- b) BS EN ISO 9934 – 1

5.0 EQUIPMENT USED FOR CALIBRATION

- a) Functional test piece for current flow TP1.
- b) Functional test piece for magnetic flow TP4.
- c) Radiometer/Photometer.
- d) AC Yoke.
- e) Residual field (Gauss) meter.

6.0 FREQUENCY OF CONTROL CHECKS

- 6.1 These checks shall be carried out at intervals as specified in Table 1 or whenever repair work has been carried out on the magnetisation equipment prior to use. However in locations where examinations are not run weekly these checks shall be carried out **prior to commencement of each course** and the logs amended and signed as appropriate by the AEC.



7.0 TRAINING AND QUALIFICATION

- 7.1 All AQB personnel who carry out these checks are trained on the process as part of their Internal NDT Tutor Training (WI 16) and/or are currently certified as PCN or SNT Level 2.
- 7.2 Training of these personnel is to be carried out by a PCN or ASNT Level 3.
- 7.3 The records of all personnel certified to carry out these checks must be retained by administration indefinitely.

8.0 ADMINISTRATION

- 8.1 It is the responsibility of the Quality Manager to ensure that the control checks are carried out by a suitably qualified operator and that the results are recorded in Table 2 and filed on a weekly basis.

9.0 EQUIPMENT CHECKS

- 9.1 Functional check of Bench unit-Initial calibration using TP1
 - a) Current flow, Set machine to AC.
 - b) De-magnetise and degrease TP1.
 - c) Clamp TP 1 between headstocks.
 - d) Whilst applying ink increase the current until an indication can be seen at hole number 1. Record the current value in table 5.
 - e) Repeat b) to d) for all 3 holes.
- 9.2 Functional check of Bench unit-Initial calibration using TP4 (COIL)
 - a) Coil, set machine to AC.
 - b) De-magnetise and degrease TP4.
 - c) Place TP4 on the bottom of the inside surface of the coil.
 - d) Whilst applying ink increase the current until an indication can be seen at hole number 1. Record the current value in table 5.
 - e) Repeat b) to d) for all 5 holes.
- 9.3 Functional check of Bench unit-Initial calibration using TP4 (MF)
 - a) Set machine to Mag Flow.
 - b) De-magnetise and degrease TP4.
 - c) Clamp TP4 between headstocks.
 - d) Whilst applying ink increase the magnetic flow until an indication can be seen at hole number 1. Record current in table 5.
 - e) Repeat b) to d) for all 5 holes.



9.4 Functional test

- a) At a frequency in accordance with Table 1 the bench unit will be evaluated against the baseline generated using 9.1 to 9.3 above. The current required to show all holes in TP1 and TP4 shall be checked and recorded on Table 3.
- b) This shall be no more than the current required at the initial calibration to create the baseline.
- c) Demagnetise and degrease the test pieces
- d) Position the test piece accordingly and apply the required current from the baseline for each test piece and each hole.
- e) Failure to obtain a satisfactory build-up of particles is unacceptable and the machine shall not be used until the source of the failure is identified, rectified and a satisfactory test carried out.
- f) The log shall be endorsed with the maximum number of indications to be seen with each test piece and technique.

9.5 Residual field meter

The residual field meter shall be checked at the frequency as stated in Table 1 as follows.

- a) Check for obvious damage.
- b) Check that the needle is at zero when held horizontally
- c) With the meter in a vertical plane and the centre line horizontal, check that the needle does not move more than ± 1 gauss.

9.6 UV-A lamp intensity

The intensity of the UV-A lamp shall be checked at intervals stated in Table 1 using a suitably calibrated radiometer.

- a) Inspect the lamp for cracked or broken filters (not necessary for LED lamps). Clean and remove any dust when cold.
- b) The lamp shall be allowed to warm up for 15 minutes to achieve full intensity (not necessary for LED lamps).
- c) Position the Radiometer under the axis of the lamp from 380 mm and measure the maximum intensity.
- d) A minimum of $1200\mu\text{W}/\text{cm}^2$ is required for the lamp to be used. Any lamp giving a lower value shall be quarantined until a new bulb giving an acceptable reading is fitted.



9.7 White light levels

The white light level shall be checked in the darkened area and in any area where non-fluorescent inspection is to be carried out at a frequency as stated in Table 1.

- a) The ambient white light in the darkened area is checked by positioning the photometer under the axis of the UV-A beam from 400mm. The maximum white light level for this check is 20 Lux.
- b) The ambient white light level when using non-fluorescent particles is a minimum of 500 Lux and is checked at the surface where inspection is to be carried out. Hand held lamps may be used to obtain the minimum level of 500 Lux.

9.8 Equipment, Contact pads and cleanliness

At the frequency specified in Table 1 all equipment shall be visually checked to ensure fitness for purpose, that all inspection areas are clean and fit for use and that the contact pads on the bench unit are not worn or frayed. Any equipment that is deemed not fit for purpose shall be reported to Quality immediately and identified with an out of use label.

9.9 AC Yokes

All AC Yokes shall be checked at the frequency stated in Table 1 to ensure that they are fit for use and that they can lift the 4.5kg weight.

- a) All Yokes shall be serialised and if fit for use Table 2 identified with a tick.
- b) All Yokes shall be capable of lifting the 4.5kg weight with a pole spacing of 300mm.
- c) Any Yoke not capable of lifting this weight shall be removed from service, identified with an out of use label and Quality informed immediately.

- 9.10 In addition to the plant performance test all equipment such as wander leads control switches and gauze pads shall be inspected for signs of wear and either repaired or replaced as necessary.

10.0 **RECORDING RESULTS**

- 10.1 Results shall be recorded in Table 2 (QD 166 Process Control Checks - Magnetic) and Table 3 (QD 147 Bench Unit Function Test Piece Baseline) below. These tables may be amended to reflect equipment used in remote locations.

- 10.2 In event of Non Conformance the system shall be investigated to correct the problems and plant use shall only continue after satisfactory readings have been achieved.



11.0 **PROCESS CONTROL CHECKS**

11.2 The following process control checks shall be carried out when using Fluorescent Magnetic particles at the frequency detailed in Table 1.

TABLE 1

CHECK	WEEKLY	ANNUALLY
UV Lamp Efficiency	*	
Residual Field Meter	*	
Functional Test	*	
Equipment	*	
Cleanliness	*	
Ambient White Light	*	
Contact Pads	*	
Verification White Light	*	
AC Yoke lifting power	*	
Tank Cleaned		* and when Ink changed



Table 2

PROCESS CONTROL CHECKS – MAGNETIC (QD 166)

Week Commencing		Location	
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Equipment/Process Checked		Value	Result
Ambient White Light (20 Lux Max)			
UVA Lamp (1200µW/cm ² @ 400mm)			
TP1 AC	Hole 1		
TP1 AC	Hole 2		
TP1 AC	Hole 3		
TP4 AC Mag Flow	Hole 1		
TP4 AC Mag Flow	Hole 2		
TP4 AC Mag Flow	Hole 3		
TP4 AC Mag Flow	Hole 4		
TP4 AC Mag Flow	Hole 5		
Gauss Meter (± 1 Gauss)			
Cleanliness & House Keeping		Accept/ Reject	
Contact Pads			
Booths			

White Light for Interpretation (500 lux minimum, if minimum is not met re-test with head torch if applicable)							
Booth	1	2	3	4	5	6	7
Value							
Value with head torch							

Yoke Lift Test (minimum 4.5KG weight must be lifted)									
Serial No.									
Accept/ Reject									

Sign or Stamp	
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Table 3
Bench Unit Functional test piece baseline (QD 147)

Date	Machine Type	Serial Number

TP1 Current Flow

Hole Number	Waveform	
	AC	HWDC
1		
2		
3		

TP4 Magnetic Flow

Hole Number	Waveform	
	AC	HWDC
1		
2		
3		
4		
5		

TP4 Coil

Hole Number	Waveform	
	AC	HWDC
1		
2		
3		
4		
5		

Sign or Stamp	
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