



QUALITY DOCUMENTS

Q.P. NUMBER 7

CALIBRATION AND CONTROL OF
TEST AND MEASURING 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:

S. Young

Title: Quality Manager

Date: 01/01/16

Authorised / Approved by:

R. Thompson

Title: Executive Manager

Date: 01/01/16



DOCUMENT AMENDMENTS AND UPDATES

Date amended	Section Amended	Amendment made	Name of person inserting change
01.01.16	5.12	Text inserted	S. Young
	Appendix 4	Text inserted	

All changes are hi-lighted.

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

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1.0 **SCOPE**

- 1.1 To detail how the Company controls the calibration/control check function.
- 1.2 Also to identify the responsibilities for calibration and control checks.
- 1.3 To identify the equipment that is subject to external calibration.
- 1.4 To identify the equipment that is subject to internal control checks.

2.0 **RESPONSIBILITIES**

- 2.1 The Quality Manager is responsible for the function of internal control checks and external calibration.
- 2.2 The Quality Manager devolves the responsibility for the internal control check activity to an appropriately trained and authorised member of the Technical Department (Appendix 1).

3.0 **OBJECTIVES**

- 3.1 To ensure the monitoring and measurement equipment is identified and calibrated/control checked at designated intervals against International or National Standards. Where this is not applicable, the means of calibration/control check is noted. All instruments in the calibration/control check system are identified in order to identify their calibration/control check status.

4.0 **EXTERNAL CALIBRATION PROCESS**

- 4.1 External calibration will be undertaken annually, determined from the yearly planning list which is now maintained electronically. An extract is shown at Appendix 2.
- 4.2 Each month, the Quality Supervisor will email a recall list of equipment due for external calibration to the appropriate technical staff member. That person will then bring the item of equipment to the Quality Department.
- 4.3 The Quality Supervisor will send the item of equipment to the relevant external calibration body with a Purchase Order No (see QP 2).
- 4.4 On receipt of the calibrated equipment the Quality Manager is responsible for ensuring a technical review of the external calibration certificate is carried out by an appropriately qualified Level 3 by over-stamping and counter-signing.



- 4.5 If any discrepancies are found on the external calibration certificate this will be investigated by the Quality Manager, normally by contacting the originator of the certificate.
- 4.6 The certificate is filed electronically on the Lavender network and archived on Quality Docman. A copy of the certificate is also emailed to the appropriate training centre if the equipment is not held in the UK and a record of the email retained by the Quality Supervisor.

5.0 INTERNAL CONTROL CHECK PROCESS

- 5.1 Internal control checks shall be carried out in accordance with, and at intervals defined within, the relevant Work Instruction (Appendix 3).
- 5.2 All Work Instructions will be subject to Document Control as identified in QP9.
- 5.3 The Quality Supervisor will identify equipment due for control checks at the beginning of each month and compile the relevant control check forms and issue them to the appropriate technical staff member by email.
- 5.4 The staff member will carry out control checks and complete the appropriate forms.
- 5.5 Once completed, the forms are returned to the Quality Department and filed electronically on the Lavender network by the Quality Supervisor who will scan the results or calibration certificate and link these via hyperlink to the relevant item of equipment listed on the yearly list.

Note: It should be noted that some equipment is subject to both external calibration and internal control checks – see Appendix 4 & 5.

- 5.6 Equipment subject to internal calibration in accordance with WI 2 and WI 3 is subject to recall by the Quality Supervisor and is listed on the yearly planning list.
- 5.7. Internal Magnetic and Penetrant control checks are carried out weekly in Penistone and prior to commencement of each course at all other training centres. Each training centre retains the completed forms at their own location.
- 5.8 All candidates at Oceaneering will use their own or Oceaneering's equipment which is checked under Oceaneering's own system of control checks and checked by Lavender International at the annual internal audit.
- 5.9 At the present time a British, European or National Standard for the calibration of Eddy Current equipment does not exist. It is considered that sufficient control over Eddy Current equipment performance is achieved by



the use of sensitivity settings and the regularly demonstrated ability to consistently locate defects in training and examination samples.

- 5.10 Ultrasonic sets are not subject to external calibration controls. Proof of calibration is when the probe and set combination pass tests described in prevailing standards. For this reason we have implemented timebase and amplifier linearity checks into the Ultrasonics training course so that every set is continually assessed by each student in line with BS EN standards. These calibration checks are recorded in the student Daily Training Assessment Workbook. The serial number of the UT set, the student carrying out the checks and the date of the checks are recorded on QD 285 to ensure traceability. QD 285 forms are filed on the network by the Quality Department and hyperlinked to the Master Calibration List.
- 5.11 A master 'control' set of Ultrasonic probes is maintained from which the master reports are produced. These are kept separately from the probes used for training and examination purposes. These are checked every 12 months and records maintained by the UT Department. The same set of probes will be used by our own personnel when doing examinations at other examination centres and the records of the checks carried out during the examination retained by that particular centre.
- 5.12 Proprietary test blocks held by the UT departments in all locations are normally purchased complete with certificates of conformity from their manufacturer or supplier. Those that are manufactured by ourselves and/or supplied from other industrial sources would not be furnished with such certificates of conformity. However, as we are not using them for calibration purposes to test or certificate product, but merely for training and examination purposes, it is not vital that periodic checks are conducted on all such test blocks.

They are in fact used as "comparators" and the effect on examination results is not considered to be problematic as by and large we are looking for the determination of applicable defects in master specimens both for training and examination.

Copies of certificates of conformity supplied with such items are provided to the Quality Manager for maintenance in accordance with QP9. Test blocks are visually checked for damage and their suitability each time they are used. Certificates of conformity for test blocks purchased prior to the beginning of 2016 cannot be guaranteed to be available on Docman but all future purchases shall follow this system. All test blocks shall be uniquely numbered and detailed on the master equipment list which is maintained and updated by the Quality function.



- 5.13 Students who are attending UT Critical Sizing courses and examinations are required to bring their own calibrated sets and calibration certificates which will be copied and kept in their portfolio.
- 5.13 It is the individual tutor's responsibility to control the issue and collection of UT, TOFD and Phased Array licence keys to students on a daily basis and this information is recorded on the UTOFD/PA Licence Key Allocation Register (QD 184). An inventory of all licence keys is taken every six months and the list is updated by the UT Department. The up to date list is then issued to and maintained by the Quality Department.

6.0 INVALIDATION OF CALIBRATION

- 6.1 It is Company Policy that any measurement standards or equipment found to be outside acceptable tolerances with respect to measurement capability has a Defect Log entry compiled for that item and arrangements made to have the item repaired. (QD 181, Appendix 6)

- 6.2 Equipment that is found to be outside acceptable measurements limits or beyond its calibration interval shall be withdrawn from use and labelled "DO NOT USE".

This label shall not be removed until satisfactory status has been established through repair adjustment and calibration – utilising known and traceable standards.

- 6.3 Equipment, once received from calibration, reviewed and placed back into service, shall not be tampered with in any way that may invalidate the current calibration. If any person is found to have tampered with calibrated equipment they shall be subject to Company Disciplinary Procedure.
- 6.4 During handling, calibration and storage, all measuring equipment shall be protected in an appropriate manner to ensure damage does not occur.

7.0 TRAINING

- 7.1 All Company personnel required to perform calibration/control check functions receive training in the requirements of relevant Work Instruction during their period of induction training (see Work Instruction WI 16).

8.0 RECORDS

- 8.1 The Quality Manager shall maintain records of all measurement standards and measuring equipment used by the company for inspection, measuring and test purpose.



- 8.2 These records are required to demonstrate that the equipment used is capable of performing measurements within designated limits.

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**APPENDIX 1****AUTHORISATION OF STAFF TRAINED
TO CARRY OUT EQUIPMENT CONTROL CHECKS**

List of Equipment	Works Instruction	Authorised Personnel
Transmission Densitometer	2	P Hall, R Roberts, A Greenwood, T Dart, W Villarosa
Effectiveness of Radiographic Processing	3	P Hall, R Roberts, A Greenwood, T Dart
MPI Unit Ammeters	4	D Miller, P Oliver, P Hall, C Sykes, S Cunningham, P Lavender, W Villarosa, A Waller, C Boreham, R Wood, IA Griffin, D Pitteris, TJ Armitt
Plant Performance check on MPI Units	5	D Miller, P Oliver, P Hall, C Sykes, S Cunningham, P Lavender, W Villarosa, A Waller, C Boreham, R Wood, IA Griffin, D Pitteris, TJ Armitt
Ambient White Light Illumination	5 & 7	D Miller, P Oliver, P Hall, C Sykes, S Cunningham, P Lavender, W Villarosa, A Waller, C Boreham, R Wood, IA Griffin, D Pitteris, TJ Armitt
Black Lights	6	D Miller, P Oliver, P Hall, C Sykes, S Cunningham, P Lavender, W Villarosa, A Waller, C Boreham, R Wood, IA Griffin, D Pitteris, TJ Armitt

Signed: 
D.H. Lavender
Co-Managing Director

Date: 01.10.15



APPENDIX 2

YEARLY LIST (EXAMPLE)

EQUIPMENT	SN	LOCATION	JAN	FEB	MAR	APRIL	MAY	JUN	JULY	AUG	SEPT	OCT	NOV	DEC
Penistone - MT & PT														
BENCH UNIT	564	UNIT 7						EXT						
BENCH UNIT	M102	UNIT 7										EXT		
BENCH UNIT	7080	Unit 3	EXT											
WHITE LIGHT METER	(000)462	UNIT 7		EXT										
WHITE LIGHT METER	(0)910000249	UNIT 8		EXT										
WHITE LIGHT METER	(000)461	UNIT 3									EXT			
WHITE LIGHT METER	(0)61203548	UNIT 7	EXT											
BLACK & WHITE LIGHT METER	7174	UNIT 7										EXT		
BLACK & WHITE LIGHT METER	8126	UNIT 7			EXT									
BLACK & WHITE LIGHT METER	7831	UNIT 7	EXT											
BLACK & WHITE LIGHT METER	8101	UNIT 7										EXT		
FIELD/ GAUSS METER	RFM 036	UNIT 7						EXT						
TANGENTIAL FIELD METER	2021	UNIT 7										EXT		
LIFTING WEIGHT	06/03/09-06	UNIT 7											EXT	
PENETRANT WASH STATION	M132	UNIT 7										EXT		
Penistone - Conductivity														
CONDUCTIVITY METER 3000	108384/10	GRIFF UNIT 3						EXT						
CONDUCTIVITY METER 3000	105547/05	ANDY UNIT 8									EXT			
CONDUCTIVITY METER 100	NC6001/95	GRIFF UNIT 3						EXT						
CONDUCTIVITY METER SIGMOR 100	12	ANDY UNIT 8									EXT			
Penistone - Radiography														
DENSITOMETER	40924	UNIT 7		INT			INT			INT			INT	
DENSITOMETER	40925	UNIT 7		INT			INT			INT			INT	
DENSITOMETER	40920	UNIT 7		INT			INT			INT			INT	
DENSITOMETER	459804	UNIT 7		INT			INT			INT			INT	
DENSITOMETER	291208	UNIT 7		INT			INT			INT			INT	
DENSITOMETER	291204	UNIT 7		INT			INT			INT			INT	
DENSITOMETER	450810	UNIT 7		INT			INT			INT			INT	
DENSITOMETER	500818	UNIT 7		INT			INT			INT			INT	
DENSITOMETER	40932	UNIT 7		INT			INT			INT			INT	
DENSITOMETER	150807	UNIT 7		INT			INT			INT			INT	
DENSITOMETER	E301320	UNIT 8		INT			INT			INT			INT	
DENSITOMETER	E301305	UNIT 9		INT			INT			INT			INT	
DENSITOMETER	E301319	UNIT 10		INT			INT			INT			INT	
DENSITOMETER	409625	GARY E UNIT 8		INT			INT			INT			INT	
EFFECTIVENESS OF RADIOGRAPHS	N/A	UNIT 7	INT	INT	INT	INT	INT	INT	INT	INT	INT	INT	INT	INT
POCKET RADIATION METER	11105	UNIT 7					EXT							
POCKET RADIATION METER	10437	UNIT 7					EXT							
RAD SURVEY METER	2296	UNIT 7										EXT		
RAD SURVEY METER	X00161	UNIT 7						EXT						
Greece - MT & PT														
HEME 1000	C.O.A.1	Greece		EXT										
B&W Light Meter	6390	Greece								EXT				
FIELD/ GAUSS METER	3480	Greece									EXT			
RAD SURVEY METER	2503									EXT				



APPENDIX 3

WORK INSTRUCTIONS

<u>WI No</u>	<u>Equipment Covered</u>
WI 2	Transmission Densitometers
WI 3	Effectiveness of Radiographic Processing
WI 4	MPI Unit Ammeters
WI 5	Plant performance check on MPI equipment
WI 7	Pre-inspection checks prior to penetrant inspection in accordance with BS EN ISO 3452-1

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APPENDIX 4
INVENTORY OF COMPANY EQUIPMENT REQUIRING
EXTERNAL CALIBRATION CONTROL

Equipment	Serial Numbers			
	UK	USA	Australia	Greece
Clip on Ammeters	900107 MLF	7035085	02600577	2005087887
Bench Units	J&A 564 J&A SBU M102 J&A 7080			
Penetrant Wash Station	M132			
B&W Light Meters	7174 7847 8126 8101 1448	8049	1150 7831	ES26390
White Light Meters	091000249 000462 000461 061203548 100305743			
Field/Gauss Meters	F12-536 F11-028	F12-496	D149	3480
Tangential Field Meter	MF300H 2021			
Pocket Radiation Monitors	10437 11105			
Radiation Survey Meters	2296 X00161			D0000210
Conductivity Meters	108394/10 105547/05 NC6001/95 Sigmor 100 -12			
Lifting Weight Calibrated every 10 years	06/03/09-06	159		
Micrometer	4022986			



APPENDIX 5
INVENTORY OF COMPANY EQUIPMENT REQUIRING
INTERNAL CONTROL CHECKS

Equipment	Serial Numbers			
	UK	USA	Australia	Greece
Bench Units	J&A 564 J&A SBU M102 J&A 7080	M153	M142	
Yokes	G3 3946 3947 JY1-0143 00232 A442 A443 A525 0721 0720	6862 8901 20893	1488 1487 1489 19992 19991 19990 19993 NW6548 NW6551	
Black Lights	VU3-004 VU3-005 VU3-006 VU3-007 176006 1932497 192993	VU3-057	1932499 VU3-003 176006 1932497 192993	
Permanent Magnets	PM1 PM2			
Densitometers	150807 450810 500818 459804 141113 291208 409625 291204 040932 040925 040920 040924 E301320 E301305 E301319		141129 141113 141114 281411 281413 281414 91504 501408 2811727	330825



APPENDIX 6

DEFECT LOG (EXAMPLE)

Equipment	Ser No	PO NUMBER	Date sent for recal	Date sent for repair	Sent to	Reason	Date returned	Cal cert received	Comments
Levy Hill B&W Light Meter	7830			Oct 09	J&A				Irreparable - replacement ordered 17.02.10
White Light Meter	000461		26.01.10		J&A	Annual calibration	08.02.10	Yes	
Levy Hill B&W Light Meter	7831		26.01.10		J&A	Annual calibration	26.03.10	Yes	needs new circuit board PO 8507
Field Meter (Greece)	3480		26.01.10		J&A	Annual calibration	08.02.10	Yes	
Gauss Meter	96-243			10.02.10	J&A	Pointer broken			Irreparable - replacement ordered 17.02.10
PAT Tester			15.02.10		PASS	Annual calibration		Yes	
Yoke	A525			03.03.10	J&A	No power getting through	08.03.10		PO 8505
Yoke	A442			03.03.10	J&A	Loose connexion	08.03.10		PO 8505
Clip on Ammeter	CM-3347		26.02.10		J&A	Annual calibration	26.03.10	Yes	
Yoke	00232 (1674)			15.04.10	J&A	No power getting through	23.04.10		Delivered by Steve D Delivery note no. 0268
Radiograph viewer				20.04.10	Brian (Testrade contact)	Not working	20.04.10		Delivered by Steve D Delivery note no. 0269
Big viewer				20.04.10	Brian (Testrade contact)	Not working	20.04.10		Delivered by Steve D Delivery note no. 0269
Yoke	0634			28.04.10	J&A	Loose connexion			Irreparable - replacement received 13.05.10
Light Meter (Dubai)	7982		28.04.10		J&A	Annual calibration	13.05.10	Yes	Delivered by Steve D Delivery Note no. 0270
Conductivity Meter (Griff)	108394/10		10.05.10		David G Jones	Annual calibration	17.05.10	Yes	PO 8577
Yoke	A442				J&A	Loose connexion	28.05.10		Repair PO 8604
Light Meter	8078		13.05.10		J&A	Annual calibration	26.05.10	Yes	sent by TNT