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Level 2

Management of the control and calibration of inspection, measuring and test equipment

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Issue record

Issue	Date	Comments
1	March 2011	Supersedes: NR/L3/MTC/ME0172
2	Sept 2011	Supersedes Issue 1. Reference documentation updated. Appendix A.3 - periodicities added for rail depth gauge validation block, and rail head repair depth gauge, new item thermit pre-heaters added. Appendix A.4 re-written. Appendix A.6 – Live line tester and LOWS system added. Appendix A.7 – IMTE category for crimping tools pull test changed from A to B, requirement to record test for gauges (FPL and Clamplock) removed, requirement to record tests and IMTE categories for signal arm gauges and spring balance clarified. Appendix A.8 – reference to CAL211 added for height and stagger gauges.

Compliance

This Network Rail standard is mandatory and shall be complied with by Network Rail and its contractors if applicable from 03 December 2011 except for those parts of Infrastructure Maintenance that do not currently have access to Ellipse to allow population of the calibration database as defined in clause 4, in which case, the compliance date for using the calibration database on the portal shall be 05 March 2012.

When this standard is implemented, it is permissible for all projects that have formally completed GRIP Stage 3 (Option Selection) to continue to comply with the issue of any relevant Network Rail standards current when GRIP Stage 3 was completed and not to comply with requirements contained herein, unless stipulated otherwise in the scope of this standard.

Reference documentation

BS 870:2008	<i>Specification for external micrometers</i>
BS 887:2008	<i>Precision Vernier callipers. Requirements and test methods.</i>
BS 939:2007	<i>Specification for engineers' squares (including cylindrical and block squares).</i>
BS 959:2008	<i>Specification for internal micrometers (including stick micrometers).</i>
BS 2795:1981	<i>Specification for dial test indicators (lever type) for linear measurement.</i>

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BS 4372:1968	<i>Specification for engineers' steel measuring rules.</i>
BS 4484 -1:1969	<i>Specification for measuring instruments for constructional works. Metric graduation and figuring of instruments for linear measurement.</i>
BS EN 837-1:1998	<i>Pressure gauges. Bourdon tube pressure gauges. Dimensions, metrology, requirements and testing.</i>
BS EN 837-3:1998	<i>Pressure gauges. Diaphragm and capsule pressure gauges. Dimensions, metrology, requirements and testing.</i>
BS EN 12668-1:2010	<i>Characterisation and verification of ultrasonic examination equipment instruments.</i>
BS EN 15317:2007	<i>Characterisation and verification of ultrasonic thickness measuring equipment.</i>
BS EN ISO 6789:2003	<i>Assembly tools for screws and nuts. Hand torque tools. Requirements and test methods for design conformance testing, quality conformance testing and recalibration procedure.</i>
BS EN ISO/IEC 17025:2005	<i>General requirements for the competence of testing and calibration laboratories.</i>
NR/L2/SIG/10660	<i>Implementation of signalling maintenance specifications.</i>
NR/L2/TEL/30028	<i>Installation of operational telecommunications equipment.</i>
NR/L2/TRK/0032	<i>Joining of rails by aluminothermic welding.</i>
NR/L2/TRK/0053	<i>Inspection and repair procedures to reduce the risk of derailment at switches.</i>
NR/L2/TRK/0132	<i>Maintenance arc welding of rails, switches and crossings</i>
NR/L2/TRK/3011	<i>Continuous welded rail (CWR) track.</i>
NR/L3/ELP/27237	<i>Overhead line work instructions.</i>
NR/L3/RMVP/0201	<i>Calibration work instruction manual</i>
NR/L3/SIG/11303	<i>Signalling installation handbook (Formerly RT/E/S/11303)</i>
NR/SP/SIG/10064	<i>General instructions for S&T staff working on signalling equipment.</i>
NR/SP/SIG/11231	<i>Signalling maintenance testing handbook.</i>
NR/SP/TRK/055	<i>Rail testing: Ultrasonic procedures (Formerly RT/CE/S/055)</i>
ESI 98-7:Issue 1:1982	<i>Electrical Supply Industry Standard – Nominal (0°) compression wave probes for contact testing.</i>
ESI 98-8:Issue 1:1982	<i>Electrical Supply Industry Standard – Low frequency single crystal shear wave, angle probes.</i>
ESI 98-2:Issue 1:1979	<i>Electrical Supply Industry Standard – Single and twin crystal probes.</i>

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1 Purpose

This standard provides for the control and calibration of inspection, measuring and test equipment (IMTE) and specific tools. Examples of IMTE and specific tools are:

- Track Level Gauges
- Signalling measuring instruments
- Electrification & Plant Height and Stagger gauges
- Torque Wrenches

2 Scope

This standard specifies processes to identify, register and calibrate all IMTE. It is applicable when new IMTE is brought into use and to IMTE already in use. It is also applicable to IMTE obtained indirectly (e.g. as part of project works).

This standard is applicable to all functions within Network Rail that either directly or indirectly use IMTE on Network Rail infrastructure, including safety critical work.

Appendix A specifies categories of IMTE that require calibration or checking before use; the standard that each item shall be calibrated to; and/or, the checks that are made before each item is used.

Contractors that use IMTE on Network Rail infrastructure are not included within the scope of this standard. However, they are expected to have processes in place to control their IMTE.

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3 Roles and responsibilities

RACI Details	Resources				
Process Task	Local Manager	Nominated Person	Current Holder / User	Competent Tester	Contracts and Procurement
5.1.1	R A	R			
5.1.2		R A			
5.1.3		R A			R
5.1.4		R A			
5.1.5		R A			
5.1.6		R A	I		
5.2.1		R A			
5.2.2		R A			
5.2.3		R A			
5.2.4		R A	I		
5.2.5		I	R A		
5.2.6		R A			
5.2.7		R A			
5.2.8		R A			
5.2.9	R A	R			
5.2.10		R A			
5.2.11		R A			
5.2.12		R A	I		
5.2.13		R A			
5.3.1	R A	R			
5.3.2	A			R	
5.3.3	A	R		R	
5.3.4	A			R	
5.3.5	A	R		R	
5.3.6		R A	I		
5.4.1			R A		
5.4.2	I		R A		
5.4.3			R A		
5.4.4			R A		
End RACI					

Table 1. RACI Details

KEY

- R.** Responsible: the individual(s) who perform an activity – responsible for action/implementation. Although usually only one, Rs can be shared;
- A.** Accountable: the individual who is ultimately accountable including yes/no decision and power of veto. Only one A can be assigned;
- C.** Consulted: the individual(s) to be consulted prior to a final decision being made or action taken – two-way communication;
- I.** Informed: the individual(s) who need to be informed after a decision is made or action is taken – one-way communication.

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4 Definitions

Accredited Calibration House

Organisation that can demonstrate compliance with BS EN ISO/IEC 17025 or is UKAS registered

Calibration

The act of verification that the IMTE is measuring within its designated accuracy, by comparison to a standard traceable to National Standards

Calibration certificate

Document raised by an external calibrator unique to a particular item of IMTE listing the parameters calibrated, the results obtained, including those that are outside of the equipment's specifications. It shows evidence of traceability of calibrated equipment used back to national standards, including the identification of equipment used in calibration

Calibration database

Record of all IMTE maintained by a Nominated Person for all the users, depots, vehicles or other locations serviced by the Nominated Person containing:

- unique reference number (where the default is the serial number);
- IMTE type;
- manufacturer's model number (if available);
- IMTE Category;
- current holder/vehicle/location;
- calibration interval;
- last calibration date;
- next calibration due date

Infrastructure Maintenance shall use the Calibration database on the Portal.

NOTE A guide to using the Calibration database is available by pressing the 'Help' button on the front page of the Calibration Register which is available via the Maintenance Registers found in the Portal. To register as a user, press the Request Access button on the Maintenance Registers application list and raise a call with IT Help.

Calibration label

Label securely fixed to an item of IMTE showing the equipment's serial number, when it was calibrated, the next calibration date, identification of the calibrator and the calibration class

Calibration record

Paper or computer record uniquely related by description and serial number to an item of IMTE detailing the calibration interval, previous calibration dates, next calibration due date, and short comments

Category A IMTE

Equipment calibrated to the manufacturer's specifications by an accredited calibration house or original equipment manufacturer (OEM)

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Category B IMTE (can be calibrated as for category A)

Equipment subject to internal Network Rail comparison checks, using where appropriate, a master instrument, and carried out by a technically competent person.

Category C IMTE

Equipment that is robust in nature and/or used for non-critical measurements confirmed as fit for purpose by a check carried out by a technically competent person. The check confirms that the IMTE is functioning and has suffered no damage or defect that would give rise to incorrect measurement.

NOTE With certain instruments or gauges a brief check prior to immediate use by the current holder may suffice alternatively the check may be at a set frequency

Current holder / user

Technically competent person using IMTE to measure and record various values

Externally calibrated

Equipment that has been calibrated by an accredited calibration house or OEM

Internal comparison check

An accuracy check of IMTE against a calibrated master to check that measurements taken are as indicated within a specified tolerance

Local Manager

The manager responsible for the staff that uses IMTE. Typically this would be the Functional Maintenance Engineer, Depot Engineer etc.

Master

Calibrated equipment or instrument held for reference purposes solely for performing internal comparison checks

Nominated Person

Technically competent person specifically nominated who:

- maintains the calibration database;
- controls the integrity and availability of IMTE within their care;
- controls the calibration of IMTE within the calibration system

Tester

A technically competent person who performs internal accuracy checks and comparisons against master instruments or gauges.

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5 Procedure

5.1 Selection and procurement of IMTE

5.1.1 The Local Manager shall assess their IMTE requirements to make sure they have ownership for all IMTE within their area of responsibility and identify Nominated Persons to procure and manage the calibration and checking of IMTE.

5.1.2 The Nominated Person shall confirm that the specification of the IMTE to be procured is compatible with the tolerances required for the work on which the IMTE is to be used.

5.1.3 IMTE shall be procured with a certificate of calibration traceable to national standards. This requirement shall be stated on all purchase orders.

5.1.4 On receipt, all new IMTE shall be registered with the appropriate Nominated Person. The Nominated Person shall check that it is received with a current calibration certificate.

5.1.5 The Nominated Person shall add the IMTE to the calibration database and attach an "IMTE number", and either an "IMTE checked" or an "IMTE calibrated" label. The label shall state the date of the last calibration/check and the date next due for checking/calibration.

5.1.6 The Nominated Person shall issue the IMTE to the allocated holder.

5.2 Control and calibration of IMTE

5.2.1 The Nominated Person shall monitor the IMTE database on a monthly basis. All IMTE items shall be categorised as Category A, Category B or Category C, as specified in Appendix A.

5.2.2 The Nominated Person shall determine which items of IMTE under their control require calibration/checking within the next month. Calibration/checking frequencies shall be as specified in Appendix A.

NOTE The Nominated Person should monitor calibration and checking results to make sure that the frequency of calibrations and checks required by Appendix A are appropriate for the instrument and/or work environment. Any recommendations for change should be made to the RMVP Standards Steering Group chair

5.2.3 The Nominated Person shall recall or withdraw from service any Category A IMTE or Category B IMTE due for calibration or checking.

NOTE It may be necessary to supply calibrated temporary replacements to users, or a float of instruments may be maintained on a cyclic basis.

5.2.4 The Nominated Person shall inform the allocated current holder of the calibration and checking requirement.

5.2.5 The current holder shall promptly return the IMTE to the Nominated Person. Where this does not occur in a timely fashion, the request shall be escalated by the Nominated Person to the current holders' line manager.

5.2.6 Where the IMTE is calibrated within Network Rail, the Nominated Person shall follow the process specified in 5.3.

5.2.7 Where IMTE is not calibrated within Network Rail, the Nominated Person shall arrange dispatch and receipt with the supplier and follow up accordingly. IMTE shall

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be suitably packaged to facilitate safe transit to and from the calibration service provider.

NOTE It is intended that the approved national contract will be utilised for the external calibration service

5.2.8 Where IMTE has failed calibration or checking, it shall be returned to the Nominated Person who shall determine if it can be re-calibrated or re-tested. If the IMTE cannot be re-calibrated or re-tested, it shall be disposed of in an environmentally acceptable manner. Where IMTE can be re-calibrated or re-tested, the Nominated Person shall label it with a "do not use" label and segregate the IMTE in a locked quarantine store pending appropriate action.

5.2.9 Where IMTE has failed calibration or checking, the Nominated Person shall report this to the relevant Local Manager who shall evaluate the need to retest any work that the IMTE has been used on and record the decision.

NOTE The decision to retest should be based on the required measurement accuracy, the IMTE error discovered and the result obtained compared to any minimum/maximum required values.

5.2.10 Where IMTE passed the calibration or checking test, the IMTE shall be labelled with the last and next calibration date (if this has not already been done in the case of externally calibrated equipment).

5.2.11 Where IMTE passed the calibration or check test, test results shall be provided to confirm fitness for purpose. For externally calibrated IMTE, certificates shall be available electronically when requested via the internet.

5.2.12 Where IMTE passed the calibration or check test, the Nominated Person shall return the IMTE to the holder.

5.2.13 The calibration status shall be recorded in the calibration database. The calibration certificate and/or the associated test results from the calibration or check shall be filed. A calibration or check record of the calibration or check test results, including subsequent calibrations or checks, shall be retained locally for 6 years from issue, or when superseded.

5.3 Calibration carried out within Network Rail

5.3.1 The Local Manager shall identify competent tester(s) to perform comparison checks where required. The Nominated Person shall maintain a list of competent testing staff.

5.3.2 All comparison testing of IMTE carried out by Network Rail staff shall be done by comparison with a master instrument capable of a greater accuracy of measurement across all ranges for which the instrument under calibration is to be used.

5.3.3 The master instrument used for undertaking these comparison checks shall be listed on the calibration database and controlled.

5.3.4 The method of comparison used shall be as specified in NR/L3/RMVP/0201. In order of preference, this shall be a manufacturer-approved calibration specification, a Network Rail work instruction, or a calibration supplier best practice.

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5.3.5 On completion of the comparison check, the Nominated Person shall check that labels are correctly applied, update the calibration database, and file any associated test results.

5.3.6 Details of the test results shall be made available to the IMTE holder if requested.

5.4 Use of IMTE

5.4.1 Holders and users of IMTE shall check IMTE prior to use to confirm that it has an in date calibration or check label, and that if the IMTE is category C, that a pre use check is performed as per Appendix A.

5.4.2 Any problems revealed by the pre use check shall be raised by the holder or user with the Local Manager and resolved before the IMTE is used.

5.4.3 Any items of IMTE that fail the pre use check shall be placed in quarantine.

5.4.4 The user of the IMTE shall record the serial number of the IMTE on the test result sheet to provide traceability.

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Appendix A.1 General IMTE calibration requirements

Item	Usage	Reference	Accuracy Specified	Accuracy Required	Comments	Calibrated Equipment: Measurements Recorded	Testing Regime	Test to be Recorded	IMTE Category
Cable Locator / Cable Avoidance Tools	Presence of cables		Not specified	N/A	Perform functional check prior to use	No	Annual external check.	Yes	A
	Depth of cables		Not specified	± 150mm					
Callipers	Measuring rail web thickness			± 0.5mm		N/A	Check against engineer's rule annually.	Yes	B
Engineer's rule	Measurement of rail extension	NR/L2/TRK/3011		± 1.0mm	Engineer's Steel Rule to BS 4372 machine divided to be used	N/A	Check for damage on each occasion used.	No	C
	Measurement of rail gap for welding	NR/L2/TRK/0032	± 0.5mm	± 0.5mm	Engineer's Steel Rule to BS 4372 machine divided to be used	N/A	Check for damage on each occasion used.	No	C
Rail thermo-meter	Determination of rail temperature	NR/L2/TRK/3011		± 2.0°C	Annual comparison checks against a master thermometer or replace. No WI required.	N/A	Where multiple thermometers used check consistency of readings during use.	No	B
Rule, steel	Measuring lateral rail position			± 1.0mm		N/A	Check for damage on each occasion used.	No	C

IMTE Category A = calibrated by an accredited calibration house or OEM)

IMTE Category B = calibrated as IMTE Cat A, or by internal comparison check.) For full definition of each IMTE Category – see Section 4 Definitions

IMTE Category C = Fit for purpose check carried out by competent person)

The accuracy limits shown in this table are for guidance purposes only. The accuracy required for particular IMTE is in accordance with the relevant manufacturers specification