

 Eskom	Standard	Technology
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Title: **Process Calibration
Equipment Standard**

Unique Identifier: **240-56355535**

Alternative Reference Number: **N/A**

Area of Applicability: **Engineering**

Documentation Type: **Standard**

Revision: **2**

Total Pages: **7**

APPROVED FOR AUTHORISATION

☒ TECHNOLOGY ENGINEERING
DOCUMENT CENTRE ☎ X4962

Next Review Date: **March 2022**

Disclosure Classification: **CONTROLLED
DISCLOSURE**

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PCM Reference: 240-56355828

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1. INTRODUCTION

This document contains information regarding the Process Calibration Equipment Standard.

2. SUPPORTING CLAUSES

2.1 SCOPE

2.1.1 Purpose

To ensure a uniform approach to the control and maintenance of the respective Generation BU process calibration equipment used in the calibration of process measuring instruments and the verification of process measurements at non nuclear power stations.

2.1.2 Applicability

- a. This document covers all process calibration equipment used in the calibration of process measuring instruments and the verification of process measurements.
- b. For the purpose of this document the following are not considered to be process measurement instruments:
 - Electrical measuring instruments and protection equipment, except electrical transmitters and receivers signalling non-electrical quantities.
 - Workshop and mechanical measuring instruments. (E.g. vernier, calliper, and dynamometer).
 - Laboratory instruments or instruments for testing or research. (Instruments that are not permanently installed on line).

2.1.3 Generation

- C&I Maintenance.

2.1.4 Engineering

- C&I Engineering.
- C&I Contractors.

2.1.5 Projects

- C&I Projects.

2.2 NORMATIVE/INFORMATIVE REFERENCES

Parties using this document shall apply the most recent edition of the documents listed in the following paragraphs.

2.2.1 Normative

[1] 36-100: Rev 0, Management of Control and Instrumentation.

2.2.2 Informative

None.

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2.3 DEFINITIONS

Definition	Description
Accuracy	The degree of correctness, with which the result of a measurement represents the true value of a quantity, usually expressed in terms of percentage 'error'.
Authorised person	A person who has been accredited by SANAS to calibrate process calibration equipment in an Eskom or national metrology laboratory.
Calibration (process calibration equipment)	A comparison between a process calibration equipment item and a measuring standard of higher accuracy to detect, correlate, adjust, and document the accuracy of the item being compared.
Controlling (process calibration equipment)	To ensure that the supply, provision, servicing, calibration, handling, and documentation of process calibration equipment are done in an orderly and efficient way.
Error	The variation between the observed value and the true value of any measurement.
Maintaining (process calibration equipment)	Regular servicing and repair of process calibration equipment as needed according to the specification of the OEM to keep it in good order and to keep it operating within the tolerances specified for it.
National measuring standard.	Measuring standards held by the NML as part of the CSIR and designated as national measuring standards in terms of the Measuring Units and National Measuring Standards Act No 76 of 1973, including amendment Act 24 of 1998. Such measuring standards are the physical realisation of a measuring unit.
Process calibration equipment	Measuring instruments and standards used to check the operation of process measuring instruments under test conditions.
Process measurements	Measurement of process parameters made by process measuring instruments. The process parameters most commonly measured in Eskom are level, temperature, pressure and flow.
Process measuring instruments	Measuring devices, transmitters, signal converters, indicators, recorders, automatic controllers, and control elements of permanent installation on the plant and used to monitor and/or control (manually or automatically) process parameters.
Traceability	Traceability implies that each process calibration equipment item is regularly checked against another standard of higher accuracy up to the level of an accepted national measuring standard, and that these checks are documented and repeated often enough to ensure that there is reasonable confidence in the accuracy recorded.

2.4 ABBREVIATIONS

Abbreviation	Description
BU	Business Unit
C&I	Control and Instrumentation
CSIR	Formerly known as the Council for Scientific and Industrial Research
EN	European Standard
IEC	International Electrotechnical Commission
IP	Ingress Protection
JB	Junction Box
LCP	Local Control Panel
LCS	Local Control Station

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Abbreviation	Description
MWP	Megawatt Park
NML	National Metrology Laboratory
OEM	Original Equipment Manufacturer
SANAS	South African National Accreditation System
SANS	South African National Standard

2.5 DISCLOSURE CLASSIFICATION

Controlled disclosure: controlled disclosure to external parties (either enforced by law, or discretionary).

2.6 ROLES AND RESPONSIBILITIES

- The Lead Design Engineer shall be responsible to ensure that this standard is implemented on new projects.
- The Design Review Team checks compliance to this standard during the various stages of review as part of the project lifecycle model (PLCM).

2.7 PROCESS FOR MONITORING

This document will be reviewed as per the next review date or earlier if warranted.

2.8 RELATED/SUPPORTING DOCUMENTS

None.

3. PROCESS CALIBRATION EQUIPMENT STANDARD

3.1 REQUIREMENTS

3.1.1 Calibration Service

- a. Each BU responsible for the calibration and verification of process measuring instruments is responsible for a calibration service.
- b. The calibration service shall establish and maintain an effective system for controlling and maintaining calibrated process calibration equipment. This system shall be designed to ensure that all process calibration equipment have the capability of making measurements within the limits designated as appropriate in each case. It shall also minimise the risk of serious consequences arising from inaccuracies by prompt detection of deficiencies and timely action for their correction.

3.1.2 Instruction

- a. Process calibration equipment shall be calibrated at regular intervals. The intervals shall be determined in accordance with the duties, stability, usage of the item and also the OEM's recommended intervals. They shall be such that re-calibration occurs prior to any probable change in accuracy, which would have a significant effect on the use of the equipment. Depending on the results of preceding calibrations, the calibration period may be shortened or lengthened to ensure compliance with the following requirements:

Any item of process calibration equipment,

- whose calibration period has lapsed;
- which has failed during calibration;

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- which is suspected or known to be outside its accuracy limits;
- which shows signs of physical damage that may affect its accuracy;

Or

- which has a broken seal.

shall be withdrawn from service until its serviceability has been checked.

- Stickers with the words: Due for calibration on° and a date shall be placed on each item of process calibration equipment, to indicate to the user when it must be returned to a calibration facility (Metrology laboratory) for re-calibration.
- Process calibration equipment shall be sealed with a device that will provide an indication of unauthorised interference or adjustment. If the seal is broken, the instrument shall be regarded as faulty and withdrawn from service.
- All process calibration equipment shall be calibrated using measurement standards that are traceable, except where they have been derived from acceptable values of natural physical constants. In South Africa the traceability should be linked to a SANAS accredited laboratory.
- Process calibration equipment shall be calibrated and used in an environment controlled to the extent necessary to ensure valid measurement. Temperature, rate of change of temperature, humidity, lighting, vibration, dust control, cleanliness and other factors affecting measurement accuracy shall be taken into account. When pertinent, these factors shall be continuously monitored and recorded and, when necessary, compensatory corrections shall be applied to measurement data. Both the original and corrected data shall be recorded.
- The accuracy of the process calibration equipment used for the calibration of process measuring instruments and the verification of process measurements shall be greater than that of the item to be calibrated or verified.
- The accuracy of the measuring standard used for the calibration of process calibration equipment shall be greater than that of the item to be calibrated. After calibration, 'as found' together with as left' data shall accompany the item of when it is returned to the user department. Any item found to be out of tolerance shall be clearly identified so that the user department will be able to re-check process-measuring instruments calibrated with the inaccurate instrument.
- Only authorised persons may perform the maintenance and adjustment of process calibration equipment covered by this standard.

3.2 RECORDS

- All BU's shall keep an asset register of process calibration equipment. This register should contain all process calibration equipment under the control of the respective departments within the BU.
- Calibration records shall be kept for all process calibration equipment reflected in the asset register. These records shall demonstrate that each item is capable of performing measurements within the designated limits. When process calibration equipment is found to be outside these limits, the extent of error must be recorded and corrective action shall be taken.
- All records of the maintenance, repair and calibration of process calibration equipment shall be certified by an authorised person.
- Calibration records shall be kept for at least three calibration periods, or longer where considered necessary.
- Any foreign process calibration equipment (e.g. Contractor equipment) used for the calibration of process measuring instruments or the verification of process measurements shall adhere to this standard. As a minimum, the verification of valid calibration records shall be recorded in writing.

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4. AUTHORISATION

This document has been seen and accepted by:

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5. REVISIONS

Date	Rev.	Compiler	Remarks
November 2012	0	E. Motsoatsoe	Draft Document for review created from 36-782.
February 2012	1	E. Motsoatsoe	Final Document Approved for Publication.
February 2017	1.1	J. Geustyn	Final Draft Document Approved for Publication.
March 2017	2	J. Geustyn	Final Rev 2 Document for Authorisation and Publication

6. DEVELOPMENT TEAM

The following people were involved in the development of this document:

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7. ACKNOWLEDGEMENTS

E. Motsoatsoe.

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