NATO STANDARD

ALogP-33

NATO REQUIREMENTS FOR CALIBRATION SUPPORT OF TEST & MEASUREMENT EQUIPMENT

Edition A Version 1
DECEMBER 2017

NORTH ATLANTIC TREATY ORGANIZATION

ALLIED LOGISTIC PUBLICATION

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NORTH ATLANTIC TREATY ORGANIZATION (NATO)

NATO STANDARDIZATION OFFICE (NSO)

NATO LETTER OF PROMULGATION

1 December 2017

1. The enclosed Allied Logistic Publication ALogP-33, Edition A, Version 1, NATO REQUIREMENTS FOR CALIBRATION SUPPORT OF TEST & MEASUREMENT EQUIPMENT, which has been approved by the nations in the Life Cycle Management Group, is promulgated herewith. The agreement of nations to use this publication is recorded in STANAG 4704.

2. ALogP-33, Edition A, Version 1, is effective upon receipt.

4. This publication shall be handled in accordance with C-M(2002)60.

Edvardas MAŽEIKIS
Major General, LTUAF
Director, NATO Standardization Office

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RESERVED FOR NATIONAL LETTER OF PROMULGATION

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RECORD OF RESERVATIONS

CHAPTER	RECORD OF RESERVATION BY NATIONS
Note: The reservations listed on this page include only those that were recorded at time of promulgation and may not be complete. Refer to the NATO Standardization Document Database for the complete list of existing reservations.	

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RECORD OF SPECIFIC RESERVATIONS

[nation]	[detail of reservation]

Note: The reservations listed on this page include only those that were recorded at time of promulgation and may not be complete. Refer to the NATO Standardization Document Database for the complete list of existing reservations.

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CHAPTER 1 DETAILS

1.1 DOCUMENTATION

To enable interoperability, the following calibration documentation must be available for every item:

1.1.1 Calibration results, upon request

1.1.2 Calibration certificate upon request

1.1.3 Calibration label

For examples of Templates / Formats, see Annexes.

1.2 LANGUAGE REQUIREMENTS

Language of calibration documentation shall be English or -if bilingual -English and language of country performing calibration.

1.3 CALIBRATION CERTIFICATE

Calibration certificates according to this AP must have a defined structure. For easy reading and understanding, informational elements are separated by fixed headings. For easy reference, headings shall remain unchanged:

1.3.1 Instrument data:
Part Nr., NATO Stock Nr., Serial-No., Manufacturer

1.3.2 Customer information

1.3.3 Workorder No., Date of Calibration, Calibration Interval (if set up by the customer)

1.3.4 Laboratory Data:
Laboratory Name, Address, phone/ fax / e-mail, date, authorized signature(s), number of pages

1.3.5 Description of calibrated item

1.3.6 Calibration procedure

1.3.7 Place of calibration

1.3.8 Environmental conditions

1.3.9 Used standards with manufacturer, type, serial-No.

1.3.10 Calibrated due date (calibration interval if agreed with the customer)

1.3.11 Calibration results with, where appropriate, the units of measurement

1.3.12 Uncertainty of measurements (if required)

1.3.13 Statement of conformity (if required)

1.3.14 Traceability statement

1.3.15 Notes / Results

1.4 DATA SHEET

1.4.1 An equipment data sheet states the required calibration specification of the equipment and has to be provided by the instruments owner upon request.

1.4.2 The data sheet may reduce or enhance manufacturer's datasheet to reduce costs and duration of calibration or to pinpoint instruments specific features.

1.5 MEASUREMENTS RESULTS

1.5.1 All measurement results have to be recorded.

1.5.2 Measurement results must be accessible upon request to determine and evaluate a useable and economic calibration interval.

1.5.3 Measurement Results shall be used for measurement, analysis and improvement (according to ISO 9001)

1.6 CALIBRATION LABEL

1.6.1 When instrument passed calibration and the process is finished, the instrument has to be marked with a calibration label for quick reference.

1.6.2 The calibration label has to show at least (minimum requirement):

1.6.2.1 Performing laboratory / Stamp

1.6.2.2 Item / Workorder Identification field

1.6.2.3 Date of Calibration / Calibration Due Date (calibration interval if agreed with the customer)

ANNEX A Calibration Certificate (Template / Example)

1. Example Calibration Certificate

Calibration facility Designation, element, address

Space for accreditation remarks

CALIBRATION CERTIFICATE

If Calibration Certificate is bilingual, text in english is binding.

□Original **□New version - replaces calibration certificate dated**

Object	{###}
Manufacturer	{###}
Type	{###}
Serial number	{###}
Equipment number	{###}
Material number	{###}
Customer	{###}
Work order number	{###}
Date of calibration	{###}
Calibration interval in accordance with customer's requirements	{###}
Number of pages:	{###}

This calibration certificate documents the traceability to national standards, which realize the units of measurement according to the International System of Units (SI).

The user is obliged to have the object recalibrated at appropriate intervals.

This calibration certificate may not be reproduced other than in full except with the permission of the issuing calibration laboratory.

The expanded uncertainty assigned to the measurement results is obtained by multiplying the standard uncertainty by the coverage factor k = 2. It has been determined in accordance with DAkkS-DKD-3. The value of the measurand lies within the assigned range of values with a probability of 95 %.

Date :	Head of the calibration laboratory	Person in charge
	{Name}	{Name}

{Adress} {contact information: Telefon, email}

{Calibration facility}

page {###} of {###} to calibration certificate dated{###} workorder: {###}

1. Calibrated Object/calibration procedure

a) Calibrated object

{###}

b) Measurands and calibration procedure

{###}

c) Measurement conditions

{###}

2. Reference manual

{###}

3. Place of calibration Kalibrierung

{###}

4. Environmental conditions

{###}

5. Standards used/Measuring equipment with information on traceability to national standards and date of next calibration

{###}

6. Implemented measures

{###}

7. Calibration results

a) Depiction of measuring results/Specifications

{###}

b) Conformity assessment

{###}

c) Uncertainty of measurements

{###}

8. Additional information

{###}

2.Example (German Defence Standard VG 96910)

KALIBRIERZENTRUM DER BUNDESWEHR

Streitkräftebasis

Kalibrierlabor spezielle Waffensysteme

KALIBRIERSCHEIN | *CALIBRATION CERTIFICATE*

Sofern der Kalibrierschein zweisprachig erstellt wurde, ist der Text in englischer Sprache verbindlich.

Gegenstand: *Object*	Drehmomentschlüssel
Hersteller: Manufacturer	Stahlwille Eduard Wille GmbH & Co. KG, Wuppertal
Typ: Type	Manoskop 730 (Nr. 730/20)
Serialnummer: *Serial number*	608049071
Equipmentnummer: *Equipment number*	11716696
Materialnummer: *Material number*	12 193 9160
Auftraggeber: *Customer*	Luftfahrtamt der Bundeswehr Abt. Flugsicherheit Bw Luftwaffenkaserne Wahn 51147 Köln
Auftragsnummer: *Work order number*	123 456 789
Datum der Kalibrierung: *Date of calibration*	15. Oktober 2015
Kalibrierintervall nach Vorgaben des Auftraggebers: *Calibration interval in accordance with customer's requirements*	Entfällt / n/a
Anzahl der Seiten: *Number of pages*	4

Dieser Kalibrierschein dokumentiert die Rückführung auf nationale Normale zur Darstellung der Einheiten in Übereinstimmung mit dem internationalen Einheitensystem (SI) und DIN EN ISO/IEC 17025.

Für die Einhaltung einer angemessenen Frist zur Wiederholung der Kalibrierung ist der Benutzer verantwortlich.

Dieser Kalibrierschein darf nur vollständig und unverändert weiterverbreitet werden. Auszüge oder Änderungen bedürfen der Genehmigung des ausstellenden Kalibrierlaboratoriums.

Angegeben ist die erweiterte Messunsicherheit, die sich aus der Standardmessunsicherheit durch Multiplikation mit dem Erweiterungsfaktor $k = 2$ ergibt. Sie wurde gemäß DAkkS-DKD-3 ermittelt. Der Wert der Messgröße liegt mit einer Wahrscheinlichkeit von 95% im zugeordneten Werteintervall.

This calibration certificate documents the traceability to national standards, which realize the units of measurement according to the International System of Units (SI) and ISO/IEC 17025.

The user is obliged to have the object recalibrated at appropriate intervals.

This calibration certificate may not be reproduced other than in full except with the permission of the issuing calibration laboratory.

The expanded uncertainty assigned to the measurement results is obtained by multiplying the standard uncertainty by the coverage factor k = 2. It has been determined in accordance with DAkkS-DKD-3. The value of the measurand lies within the assigned range of values with a probability of 95%.

Datum: *Date*	Leiter des Kalibrierlabors: *{Head of the calibration laboratory}*	Bearbeiter: *Person in charge*
16. Oktober 2015	####	####
	{Vorname Name} {Dienstgrad/Rank}	{Vorname Name} {Dienstgrad/Rank}

Kalibrierzentrum der Bundeswehr – Kalibrierlabor Spezielle Waffensysteme – Bleibergstraße 1 – 53894 Mechernich
KalZBwKalLabSpezWaSys@bundeswehr.org – Tel +49 2443 496 5530 – Fax +49 2443 496 5101

STREITKRÄFTE BASIS

KalZBw-FO-0001, Rev. 3.0.3

1. Kalibriergegenstand/Kalibrierverfahren *Calibrated Object / calibration procedure*

a) Kalibriergegenstand *Calibrated object*

A triggering torque wrench (torque wrench) type II A according to DIN EN ISO 6789: 2003 for an application range from 40 N m to 200 N m was presented for calibration. The calibration object includes a plug-in head with ½ inch drive.

The torque wrench, plug-in head and connector quadrant are marked: "1D61-607 (IKK 92-11-16)".

b) Messgrößen und Kalibrierverfahren *Measurands and calibration procedure*

The triggering torque is determined at fixed default values.

The calibration procedure is described under 7 a.

The measured value is recorded SI-coherently Newtonmeter (N m).

c) Messbedingungen *measurement conditions*

The measuring conditions meet the requirements of DIN EN ISO 6789: 2003.

2. Bezugsdokumentation *Reference manual*

In accordance with DIN EN ISO 6789: 2003 an adapted calibration procedure was used.

Details on the sequence can be found under point 7.

3. Ort der Kalibrierung *Place of calibration*

53894 Mechernich, Bleibergstraße 1

4. Umgebungsbedingungen *EnviroN mental conditions*

Ambient temperature 21,3° C, relative humidity 33 %.

5. Verwendete Normale/Messeinrichtungen mit Angabe der Rückführung auf nationale Normale und Datum der nächsten Kalibrierung
Standards used / Measuring equipment with information on traceability to national standards and date of next calibration

Funktion Function	Hersteller Manufacturer	Modell Model	S/N S/N	EquiNr Equipment	Kalibriert bis Due date
Torque Sensor	Schatz AG	5413-1030/100 BW	1003811	100 123 456	Juli 2016
Display Unit	Schatz AG	5413-2355/6 BW	1003793	100 123 457	NPC

6. Durchgeführte Maßnahmen *Implemented measures*

Determining the input state:

- Check for cleanliness ---------- (i.O.)
- Check for adjustability ---------- (i.O.)
- Check the plug-in head and connection ---------- (i.O.)
- Readability of the scale ---------- (i.O.)
- Setting to minimum value for delivery ---------- (i.O.)

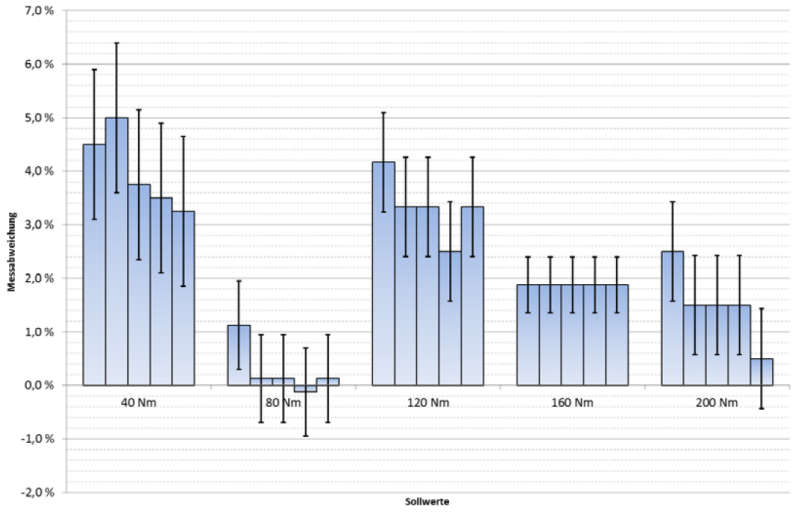
Calibration

7. Messergebnisse *Calibration results*

a) Darstellung der Messergebnisse/Spezifikationen *Depiction of measuring results / Specifications*

In the case of subsequent results, the calibration object was initially loaded with the maximum permissible torque five times. This was followed by a recording according to DIN EN ISO 6789: 2003, point 6.3.

Nominal values	Specifications		Readouts					Average	Expanded Measurement uncertainty	Conformity assessment
	lower	upper	Deviations							
200 N m	192,0 N m	208,0 N m	205 N m	203 N m	203 N m	203 N m	201 N m	203,0 N m	1,9 N m	i.O.
			2,5 %	1,5 %	1,5 %	1,5 %	0,5 %	1,5 %	0,93 %	
120 N m	115,2 N m	124,8 N m	125 N m	124 N m	124 N m	123 N m	124 N m	124,0 N m	1,2 N m	?
			4,2 %	3,3 %	3,3 %	2,5 %	3,3 %	3,3 %	0,93 %	
40 N m	38,4 N m	41,6 N m	41,8 N m	42,0 N m	41,5 N m	41,4 N m	41,3 N m	41,6 N m	0,58 N m	?
			4,5 %	5,0 %	3,8 %	3,5 %	3,2 %	4,0 %	1,40 %	
80 N m	76,8 N m	83,2 N m	80,9 N m	80,1 N m	80,1 N m	79,9 N m	80,1 N m	80,2 N m	0,66 N m	i.O.
			1,1 %	0,1 %	0,1 %	-0,1 %	0,1 %	0,3 %	0,82 %	
160 N m	153,6 N m	166,4 N m	163 N m	163 N m	163 N m	163 N m	163 N m	163,0 N m	0,85 N m	i.O.
			1,9 %	1,9 %	1,9 %	1,9 %	1,9 %	1,9 %	0,52 %	



b) Konformitätsbewertung *Conformity assessment*

For the results under 7a, the conformity assessment is exclusively based on the mean value of the measurement series. The following identifiers are used:

i.O. The measured value, including the established extended measurement uncertainty, is within the specification limits. The measurement result is at least 95 % likely to conform to the specifications.

? The measured value itself is within the specification limits, but the extended measurement uncertainty overlaps the specification limits so that no assured conformity statement can be made.

?! The measured value itself is outside the specification limits, but the extended measurement uncertainty overlaps the specification limits so that no assured conformity statement can be made.

! The measured value, including the established extended measurement uncertainty, is outside the specification limits. The measurement result is at least 95% likely not to conform to the specifications.

c) Messunsicherheiten *Uncertainty of measurements*

The extended uncertainty of measurement, which results from the standard uncertainty of measurement by multiplication with the expansion factor $k = 2$, is given. It was determined according to DAkkS-DKD-3 (JCGM100:2008). The value of the measured variable is with a probability of 95% in the assigned interval.

8. Weitere Hinweise *Additional information*

n/a

ANNEX B Example Calibration Label

NATO Stock Number 7530-12-179-6585

Calibration Laboratory **1**	
Model/NSN **2**	Serial **3**
Date Calibrated **4**	Date Due **5**
Work order **6**	

Key

1 Calibration laboratory and address information
2 Model/NATO Stock Number (the material number shall be entered)
3 Serial number
4 Date calibrated
5 Date due
6 Work order No.

ALogP-33(A)(1)