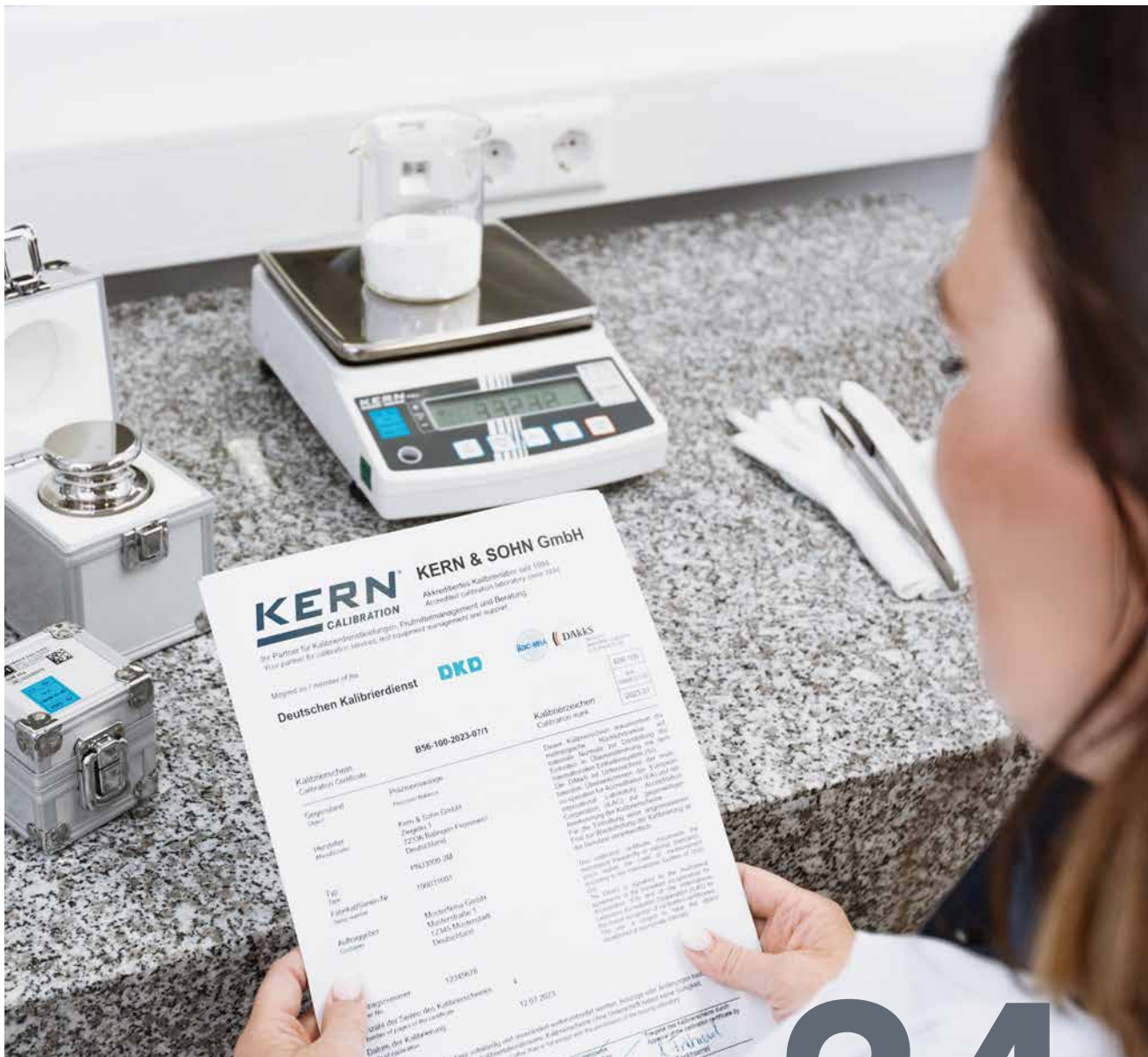


EN

**Accredited Calibration and Verification Service
for Balances, Test Weights, Force Measurement and more**

TEST SERVICE

PROFESSIONAL MEASURING



Accredited calibrations according to
DIN EN ISO/IEC 17025:2018 norms for balances,
weights, force, volumes of solid bodies, densities
of solid bodies, temperature, humidity.
➤ kern-lab.com

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The heart of calibration and verification^{*1}

The principle

Every electronic measuring device will only give correct results if it is checked regularly, i.e. calibrated correctly and adjusted when required. An electronic balance, test weight or another measuring device is only a reliable measuring and checking tool if it is calibrated and this calibration is documented as part of a quality procedure.

DAkkS calibration (DAkkS = German calibration service) documents traceability to the national standard and this then meets the standard requirements of QM systems. DAkkS calibrations are valid internationally.

Calibration of measuring devices

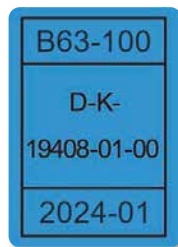
Measuring “correctly” is of elementary significance, as it is not unusual for inaccurate or “wrong” measurements to have expensive economic consequences. Calibration or establishing the accuracy of checking equipment is carried out by accredited laboratories throughout the world in accordance with the DIN EN ISO/IEC 17025 standard. On an international level, the EA (European co-operation for Accreditation) and ILAC (International Laboratory Accreditation Cooperation) monitor the upholding of the highest quality standards. In Germany this is carried out by DAkkS (Deutsche Akkreditierungsstelle).

What does calibration mean?

Determining and documenting the deviation from true, actual measure value of the value displayed by a measuring device or of the value given by checking equipment.



Recalibration information (optional)



DAkkS calibration mark

When should you carry out DAkkS calibration?

DAkkS calibration is always necessary, when checking equipment is to be used in a QM process (e.g. in accordance with ISO 9000ff, TS 16949, VDA, FDA, GLP, GMP, ...). The operator controls the use of checking equipment and periodic recalibration time intervals themselves. DAkkS calibration certificates are recognised internationally.

Deutsche Akkreditierungsstelle (DAkkS)

The German accreditation body (DAkkS) is the successor to the German calibration service (DKD) in terms of accreditation systems. On the basis of EC regulation no. 765/2008, the accreditation point of the German calibration service (DKD) was transferred to the German accreditation body (DAkkS) with effect from 17.12.2009. From a metrological viewpoint there is no difference between the DAkkS calibration and the previous DKD calibration.

Who needs a DAkkS calibration certificate?

In the context of standard requirements for monitoring checking equipment, every company with a Quality Management system is obliged to test and document its measuring equipment at regular intervals. A DAkkS calibration certificate fulfils this obligation.

The KERN calibration laboratory (D-K-19408-01-00)

KERN has a highly-automated laboratory with DAkkS accreditation according to DIN EN ISO/IEC 17025 in the field of balances, test weights, force measurement, humidity and temperature. By using the most modern calibration technology with high-end calibration robots in fully air-conditioned laboratories, the measurement uncertainty and process times are reduced to a minimum, and also the quality of the calibration is increased. As an accredited and certified calibration service provider with decades of experience, we offer you an extensive range of services, which will leave no demand unfulfilled. The accreditation applies to the extent specified in the appendix to the certificate D-K-19408-01-00.

Calibration or verification

DAkkS calibration is possible for every balance in perfect condition. DAkkS calibration is a private service for ensuring high quality requirements according to DIN EN ISO 9000ff and other standards, e.g. in production and research. Verifying is only possible for balances with EC type approval marked with a green **M**.

More interesting facts at: www.kern-lab.com

^{*1} The “initial verification” for new balances is called conformity assessment according to NAWID: 2014/31/EU, a verification corresponds to the “reverification”.

All you need to know about calibration and verification*¹



DAkkS calibration

(area not regulated by law)

Why?

DAkkS calibration is always necessary when checking equipment (balance or test weight) is to be used in a QM process (e.g. to ISO 9000ff, GS 9000, TS 16949, VDA 6.1, FDA, GLP, GMP, ...)

What?

Any checking equipment in proper condition can be DAkkS calibrated.

How?

Determination of accuracy throughout the world by a laboratory which is accredited to DIN EN ISO/IEC 17025. Traceability to internationally recognised standards. The DAkkS calibration certificate confirms both the metrological characteristics of the checking equipment and the general requirements for the ► *monitoring of checking equipment* (eg. ISO 9000ff).

Where?

Internationally recognised. This is monitored by EA (European co-operation for Accreditation) and ILAC (International Laboratory Accreditation Cooperation), and in Germany, for example the DAkkS (Deutsche AkkreditierungsStelle GmbH) – German accreditation point.

When?

The operator controls the use of checking equipment and periodic recalibration time intervals themselves.

Verification*¹

(area regulated by law)

Why?

Applications with mandatory verification of balances and test weights include commercial trade when the price of a commodity is determined by weighing, the manufacture of pharmaceuticals in pharmacies, the production of pre-packaged goods and in medical applications.

What?

You can only verify balances which have official buildtype approval and test weights which conform to ► *OIML* standards.

How?

Testing to verification permissible error limits (for details on tolerances see page 14) to protect the consumer. When introducing balances and weights onto the market, they are subject to EU directives. The subsequent monitoring of the market is regulated at a national level, in Germany through the MessEG (Weights and Measures Act) and MessEV (Verification ordinance).

Where?

EC Declaration of Conformity with CE marking is valid as “Initial verification” throughout Europe. Reverification and national declarations of conformity are only recognised on a national level.

When?

The legislative body governs the use of balances and test weights as well as time intervals for re-verification. National specifications apply here.

*¹ The “initial verification” for new balances is called conformity assessment according to NAWID: 2014/31/EU, a verification corresponds to the “reverification”.

KERN test services at a glance

Calibration of balances inhouse (at KERN)

With the shortest calibration time in the KERN calibration laboratory of maximum 4 working days after receipt of order, this gives you almost uninterrupted use of your balances within your production process.

Calibration of balances on site (at the customer)

Calibration of your balances at your site. This on-site testing service is metrologically recommended, as the balance is in its field of use and can be calibrated without any possible transportation problems. Minimized downtime and personal contact with our expert are the major benefits of this service. We would be pleased to give you more information and agree a date with you.

Calibration of weights

Here too, with its short process times, KERN is unbeatable. The most modern calibration robots calibrate your test weights with only the slightest ► *measuring uncertainty*, according to international directives of OIML R111 and thereby ensuring a reliable weighing result. Recommended recalibration period 1 year. On-site calibration of your weights according to OIML classes M1 – M3 (10 kg – 50 kg) can also offer you an affordable alternative. We would be pleased to come to your premises and calibrate your test weights with our mobile **MACOS calibration system**.

Calibration of force

Through the force-measurement accreditation from KERN (in Newtons), DAkkS calibration of your force-measuring devices means that we can meet the highest requirements. With test stands and measuring procedures designed for this purpose, our specialists can calibrate your checking equipment to the latest test methodology in our laboratory.

Calibration of temperature and humidity

With the shortest calibration time in the KERN calibration laboratory of maximum 4 working days after receipt of order, this gives you almost uninterrupted use of your measuring devices within your production process.

Volume determination

When calibrating every new weight in OIML class E1 you must also establish its volume. This is necessary for the correction of air buoyancy. Accredited volume determination in our laboratories is an integral part of our high-end demands.

Reconditioning of weights

KERN gets your weights back up to standard, **regardless of the manufacturer**. Whether it is adjustment, marking, sand blasting or lacquering. The aim here is compliance and long-term stability. Special arrangements on request.

Magnetic characteristics

By measuring sensitivity/and magnetisation KERN gains reliable evidence regarding the magnetic characteristics of your test weights. “Magnetic” weights can distort the weighing result when you are using the balance.

Factory calibration

The testing of measuring devices for accuracy in accordance with a recognised but not accredited process without proof of metrological traceability – this is the difference when compared with DAkkS calibration.

Digital Calibration Certificate (DCC)

The “Digital Calibration Certificate (DCC)” created by the PTB can be downloaded on www.kern-lab.com/dcc. You will find further information on page 22.

The paperless calibration certificate as PDF can be downloaded at the calibration download on www.kern-lab.com.

Reverification service for balances and test weights

The reverification of balances and weights is regulated on a national level and can therefore only be offered for balances and weights used in Germany. For reverification kindly contact the agencies in your country.

Database supported management of checking equipment

Information on your checking equipment which has been calibrated by us is stored in our database. In this way it is possible to make trend calculations. You therefore get an overview of long-term stability and trend behaviour of your checking equipment.

Reminder service

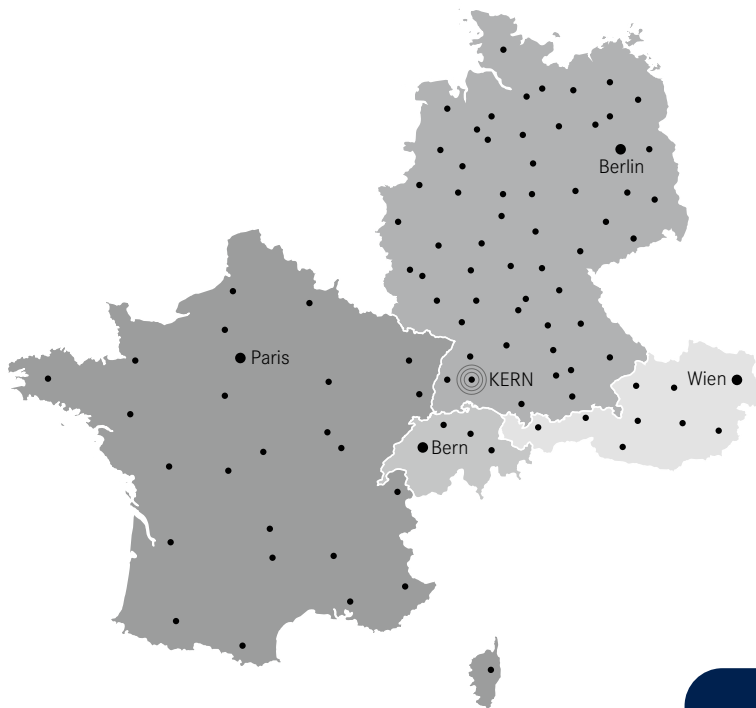
The continuous recalibration of your checking equipment is an integral part of the reliable management of checking equipment. You can depend on KERN to support you, and KERN will remind you in good time when the next recalibration is due.

This service is free of charge to you!

Collection and delivery service

Why not let us transport your checking equipment correctly. We will collect your checking equipment from you and then deliver it quickly and safely.

The balance



a) KERN on-site calibration (we visit you)

In Germany, the accredited calibration laboratory of KERN has a close-knit network of employees, who can carry out on-site calibration of balances up to 50 tonnes.

This on-site testing service is metrologically recommended, as your balance is in its field of use and can be calibrated without any possible transportation problems.

Lower downtime and personal contact with our expert are the major benefits of this service.

This KERN calibration service is also independent of the brand. Preparatory maintenance work by arrangement. Prices for on-site calibration on request.

Tell us your desired date with indication of the scales to be tested or enter your inquiry directly in our offer generator on www.kern-lab.com. One of our calibration employees will then contact you immediately and discuss the calibration procedure with you at your premises – uncomplicated and competent.

ADVANTAGES OF THE ON-SITE CALIBRATION:



- + Calibration in the field of use
- + Minimization of measuring uncertainty and guarantee of process accuracy strictly according to EURAMET cg-18
- + No risk of damage during transportation
- + Low downtime
- + Direct and personal contact with the service technician
- + Cross-brand servicing, basic inspection and adjustment by a specialist
- + You tell us when you would like us to come
- + Device training for qualified users



phone: +49 7433 9933-400

e-Mail: testservices-onsite@kern-sohn.com

Calibration of balances

Any balance will only give correct results if it is checked regularly, i.e. calibrated correctly and adjusted when required. A balance is only a reliable measuring device and checking tool if it is calibrated and this calibration is documented. The issued calibration certificates with accreditation symbol are proof of the metrological traceability to national and international standards, as required by the DIN EN ISO 9000 and DIN EN ISO/IEC 17025 standards, amongst others. KERN recommends a recalibration period of one year. The standard does not give a defined recalibration period. KERN recommends a recalibration every 6 months with intensive (daily) use and a recalibration every 12 months with normal (weekly) use.

ADVANTAGES OF THE IN-HOUSE CALIBRATION:



- + Short calibration time: Test time in the laboratory is only four working days
- + Competence: Calibration laboratory, which complies with the highest standards in the area of metrology
- + Management of the recalibration calendar for your individual measuring instrument is possible
- + Cross-brand service: Measuring devices from any manufacturer can be calibrated independently
- + Repair: Any necessary repairs can be carried out immediately, if desired



b) Calibration at the KERN factory (you send your balance to us)

Recommended for new devices and for balances which can be affordably transported, as then there is no need to travel for on-site calibration. Necessary repairs can be carried out at the same time, quickly and comprehensive.

The process is as follows:

- Day 1: Send your balance to the KERN calibration laboratory in Balingen.
- Day 2 to 3: Evaluation and calibration of your balance by our specialists.
- Day 4: After positive evaluation your balance is returned.

Recalibration

• Typical industrial recalibration times

may be recommended as follows:

- daily use of the measuring instrument (once or several times): Recalibration period of 6 months
- weekly use of the measuring instrument (or less frequently): Recalibration period of 12 months

- **Recalibration prices:** Prices can be found in the price list. Costs for cleaning, function testing and any necessary adjustment or for the production of special holders to carry out the calibration will be calculated separately.



Minimum weight of sample (in use)

What is the lightest item you can weigh on your balance, while still achieving accurate and reliable weighing results? What exactly is the limit?

The KERN minimum sample weight protocol accounts for the established minimum sample weight of your balance and its location of installation and use with the relative ► **measuring uncertainty**. With various safety coefficients and required weighing accuracy (process accuracy), depending on standard or quality-related requirements on the balance being used.

The higher the selected safety coefficient, the higher the safety when using the balance in a particular process. Typical perturbations when using the balance e.g. small fluctuations in temperature are taken into account. In easily predictable conditions in a professional environment of use, KERN recommends a safety coefficient of 3. For critical processes, a correspondingly higher factor should be selected. The minimum sample weight protocol contains a diagram as well as a table, from which you can ascertain the minimum sample weight for your balance, depending on the process.

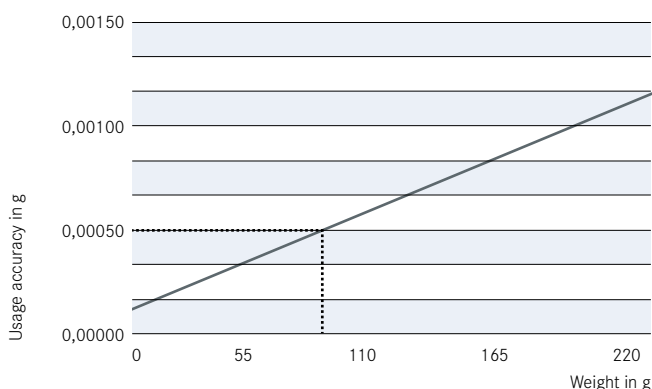
Safety coefficients and required process accuracy for the minimum sample weight:

Usage accuracy

As the calibration of a balance is a snapshot, there must be a statement relating to how the measuring instrument behaves in operation in the location of use, or to what extent the measuring uncertainty may change. This is because with daily use, the measuring uncertainty of a balance increases due to various influences. These influences must be recorded and rated ...

... and this is how:

By accepting that the same environmental conditions (e.g. draughts, vibrations, ...) as they were at the point of calibration are present at the location of the balance and estimated room temperature fluctuations of X Kelvin (°C) with a temperature coefficient assigned in the balance (in ppm/K), the result is a particular accuracy of use. You can establish this accuracy of use in accordance with EURAMET/cg-18.



Example:

Balance with 220 g.

At 82.5 g the usage accuracy is 0.0005 g.

$\hat{=}$ 0.000606 %

Required process accuracy	Safety coefficient			
	1	3	5	10
0,1 %	0,0985 g	0,2983 g	0,5021 g	1,0297 g
0,2 %	0,0491 g	0,1480 g	0,2480 g	0,5021 g
0,5 %	0,0196 g	0,0590 g	0,0985 g	0,1979 g
1,0 %	0,0098 g	0,0294 g	0,0491 g	0,0985 g
2,0 %	0,0049 g	0,0147 g	0,0245 g	0,0491 g
5,0 %	0,0020 g	0,0059 g	0,0098 g	0,0196 g
10,0 %	0,0010 g	0,0029 g	0,0049 g	0,0098 g

Adjustment at the location of installation

Why?

Adjustment at the location of installation is necessary, as the measuring results of balances depend on the local gravitational force (gravitational acceleration) and therefore depend on the location of use. KERN can carry this out just before shipping at the factor, individually to suit the location of installation.

What are the advantages of carrying out adjustment at the location of installation?

- The balance gives reliable measurement results at the location of installation.
- No time-consuming on-site adjustment necessary.
- You do not need a Service Engineer or any additional weights.
- The balance is ready for immediate use.

For adjustment to the location of installation you need the value for gravitational acceleration at the location of installation, which KERN can calculate using the point of use. The procedure is suitable for balances with a resolution of <60,000 d. For higher resolutions we recommend a balance with an internal adjusting weight or adjustment with a calibrated adjusting weight at the location of installation.

Pricing table for adjustment at the location of installation

Area	KERN	Price
[Max] ≤ 5 kg	961-247	41,-
[Max] > 5 – 50 kg	961-248	50,-
[Max] > 50 – 350 kg	961-249	59,-
[Max] > 350 – 1500 kg	961-250	94,-
[Max] > 1500 – 2900 kg	961-251	125,-
[Max] > 2900 – 6000 kg	961-252	250,-
[Max] > 6000 – 12000 kg	961-253	285,-

KERN
CALIBRATION

KERN & SOHN GmbH
Kalibrierlabor seit 1994.
Calibration laboratory since 1994.
Ihr Partner für Kalibrierdienstleistungen, Prüfmittelmanagement und Beratung.
Your partner for calibration services, test equipment management and support.

Justage auf den Aufstellungsort
Adjustment to the place of use

Kalibriergegenstand: Calibration object	IFB 30K5DM	Die Justage auf den Aufstellungsort wurde vom Kunden erwünscht. Die Waage wurde mit rückführbaren Normalen auf die angegebene Gravitation justiert. Gegen eine weitere Justage ist die Waage <u>nicht</u> gesichert. The adjustment to the place of use was requested by the customer. The balance was adjusted using weights which are traceable to the national standards. The weighing instrument is <u>not</u> secured against a re-adjustment.
Hersteller Manufacturer	KERN & SOHN GmbH Ziegelei 1 72336 Balingen Germany	
Seriennummer Serial no.	DB1234567	
Auftragsnummer Order No.	2023-12345678	
Auftraggeber Customer	Mustermann GmbH Musterstr. 1 12345 Musterstadt Deutschland	
Ort der Justage Place of adjustment	KERN & SOHN GmbH Ziegelei 1 72336 Balingen-Frommern Deutschland	

Certificate of conformity

Konformitätszertifikat / Certificate of conformity
ausgestellt für: / issued for:

Typ: Type	PNJ 3000-2M	Serien-Nr.: Serial number	WX161234567	Inventar-Nr.: Inventory number	-
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Dieses Konformitätszertifikat bescheinigt die Gültigkeit der folgenden Konformitätsaussagen auf Basis der Messergebnisse des Kalibrierscheins.

This conformity certificate documents the validity of the following statements of conformity based on the measurement results of corresponding calibration certificate.

Konformitätsaussagen: / Statements of conformity:

A) Die im Rahmen der Kalibrierung festgestellten Anzeigeabweichungen der Waage (siehe Seite 4) liegen unter den angegebenen Mess- und Umgebungsbedingungen und unter Berücksichtigung der erweiterten Messunsicherheiten (Überdeckungswahrscheinlichkeit 95%) innerhalb der Toleranz. Die angegebene Messunsicherheit berücksichtigt bereits unter anderem die Einflüsse der Wiederholbarkeit und der aufermittelten Belastung, weshalb eine separate Bewertung dieser Parameter nicht durchgeführt wurde.

The errors of indication determined during calibration (ref. page 4) are under given measurement and environmental conditions and considering the expanded measurement uncertainty (coverage probability 95%) within the specification. The given measurement uncertainty already includes the effects of repeatability and eccentricity. Therefore, those parameters have not been assessed separately.

Nr. No.	Prüflast Test load	Anzeige Indication	Abweichung Error	erw. Unsicherheit exp. uncertainty	Toleranz Tolerance	Konformität Conformity ¹⁾
1	500 g	500.01 g	0.01 g	0.016 g	0.050 g	✓
2	1000 g	1000.01 g	0.01 g	0.016 g	0.050 g	✓
3	1500 g	1500.01 g	0.01 g	0.016 g	0.050 g	✓
4	2000 g	2000.01 g	0.01 g	0.017 g	0.100 g	✓
5	3000 g	3000.02 g	0.02 g	0.018 g	0.100 g	✓

¹⁾ Bewertungskriterium: | [Abweichung] | + [erw. Unsicherheit] ≤ [Toleranz]
Assessment criterion: | [Error] | + [exp. uncertainty] ≤ [Tolerance]

Zusammenfassung / Summary

Zum Zeitpunkt der Prüfung lagen die im Rahmen dieses Kalibrierscheins ermittelten Messergebnisse innerhalb der Toleranz.

At the time of testing, all measurement results determined in the context of this calibration certificate were within the tolerance.

Für einen anderen Verwendungsort, bei anderen Umgebungsbedingungen oder nicht bestimmungsgemäßer Verwendung der Waage kann Gültigkeit der oben aufgeführten Konformitätsaussagen nicht garantiert werden.

The validity of the statements of conformity cannot be guaranteed for different places of use, environmental conditions or improper use.

With a certificate of conformity you get a statement about whether the balance meets your defined requirements. In conjunction with a calibration certificate with accreditation symbol it serves as documented proof that the balance fulfils the required process demands. When doing this the process owner for the balance can select from different temperature specifications – depending on its individual requirements:

Conformity evaluation on the basis of the:	KERN		Price
Usage accuracy*	relative	969-511	on request
	absolute	969-512	
Calibration results*	relative	969-513	on request
	absolute	969-514	
Measurements as manufacturer or customer specification	other manuf. cust. spec. KERN device	969-515 969-516 969-517	on request on request 21,-

relative = % / absolute = g

*as supplement to the certificate with accreditation symbol
(For details see www.kern-lab.com)

Calibration and verification prices for electronic balances

Accredited initial calibration and recalibration of balances at the KERN factory

Checking equipment	Initial calibration	Price € excl. of VAT ex works	Recalibration	Price € excl. of VAT ex works
Weighing range				
Analytical balances				
[Max] ≤ 5 kg	963-101	191,-	963-101 (R)	193,-
[Max] > 5 kg	963-102	240,-	963-102 (R)	245,-
High resolution precision balances (>500.000d)				
[Max] ≤ 5 kg	963-103	162,-	963-103 (R)	163,-
[Max] > 5 kg – 50 kg	963-104	184,-	963-104 (R)	186,-
[Max] > 50 kg – 350 kg	963-105	205,-	963-105 (R)	210,-
Precision balances / industrial scales				
[Max] ≤ 5 kg	963-127	98,-	963-127 (R)	99,-
[Max] > 5 kg – 50 kg	963-128	118,-	963-128 (R)	119,-
[Max] > 50 kg – 350 kg	963-129	146,-	963-129 (R)	147,-
[Max] > 350 kg – 1500 kg	963-130	205,-	963-130 (R)	210,-
[Max] > 1500 kg – 2900 kg ¹⁾	963-131	275,-	963-131 (R)	275,-
[Max] > 2900 kg – 6000 kg ¹⁾	963-132	550,-	963-132 (R)	550,-
[Max] > 6000 kg – 12000 kg ¹⁾	963-133	620,-	963-133 (R)	630,-
Hanging scales / crane scales				
[Max] ≤ 5 kg	963-127H	98,-	963-127H(R)	99,-
[Max] > 5 kg – 50 kg	963-128H	118,-	963-128H(R)	119,-
[Max] > 50 kg – 350 kg	963-129H	138,-	963-129H(R)	139,-
[Max] > 350 kg – 1500 kg	963-130H	245,-	963-130H(R)	250,-
[Max] > 1500 kg – 2900 kg	963-131H	375,-	963-131H(R)	375,-
[Max] > 2900 kg – 6000 kg	963-132H	620,-	963-132H(R)	630,-
[Max] > 6000 kg – 12000 kg ^{2) 3)}	963-133H	870,-	963-133H(R)	880,-
Additional services				
Preparation for recalibration (cleaning, adjustment, function test)			969-003R	24,-
Minimum weight of sample (for details see page 9 or internet)			969-103	10,-
Express service with delivery time 48 hours, per scale			962-116(R)	52,-
Express shipping			in GER only	-

¹⁾ Floor scales & axle load scales only (Price per weighing panel). Please ask for further details. ²⁾ On request ³⁾ Processing time 4 working days

i Calibration prices for on-site calibration on request, for more information see page 6.

Verification⁶⁾ prices for electronic balances

Checking equipment	Initial verification ⁶⁾	Price € excl. of VAT ex works	Reverification ⁷⁾	Price € excl. of VAT ex works
	KERN		KERN	
Electronic balances, class I, [Max] ≤ 5 kg ⁴⁾	965-201	150,-	950-101R	235,-
Electronic balances, class I, [Max] > 5 kg ⁴⁾	965-202	150,-	950-102R	305,-
Electronic balances, class II, [Max] ≤ 5 kg ⁴⁾	965-216	85,-	950-116R	120,-
Electronic balances, class II, [Max] > 5 kg – 50 kg ⁴⁾	965-217	99,-	950-117R	146,-
Electronic balances, class II, [Max] > 50 kg – 350 kg ⁴⁾	965-218	135,-	950-118R	225,-
Electronic balances, class III-IV, [Max] ≤ 5 kg ⁴⁾	965-227	65,-	950-127R	114,-
Electronic balances, class III-IV, [Max] > 5 kg – 50 kg ⁴⁾	965-228	84,-	950-128R	114,-
Electronic balances, class III-IV, [Max] > 50 kg – 350 kg ⁴⁾	965-229	110,-	950-129R	184,-
Electronic balances, class III-IV, [Max] > 350 kg – 1500 kg ⁴⁾	965-230	158,-	950-130R	270,-
Electronic balances, class III-IV, [Max] > 1500 kg – 2900 kg ⁴⁾	965-231	178,-	950-131R	375,-
Electronic balances, class III-IV, [Max] > 2900 kg – 6000 kg ⁴⁾	965-232	235,-	950-132R	580,-
Preparation for recalibration (cleaning, adjustment, function test)	-	-	969-006R	25,-

Verification⁶⁾ prices for electronic crane scales

Checking equipment	Initial verification ⁶⁾	Price € excl. of VAT ex works	Reverification ⁷⁾	Price € excl. of VAT ex works
	KERN		KERN	
Electronic crane scales, class III-IV, [Max] > 50 kg – 350 kg ⁴⁾	965-129H	119,-	950-129HR	200,-
Electronic crane scales, class III-IV, [Max] > 350 kg – 1500 kg ⁴⁾	965-130H	150,-	950-130HR	330,-
Electronic crane scales, class III-IV, [Max] > 1500 kg – 2900 kg ⁴⁾	965-131H	178,-	950-131HR	480,-
Electronic crane scales, class III-IV, [Max] > 2900 kg – 6000 kg ⁴⁾	965-132H	235,-	950-132HR	720,-
Electronic crane scales, class III-IV, [Max] > 6000 kg – 12000 kg ⁴⁾	965-133H	355,-	950-133HR	1160,-
Electronic crane scales, class III-IV, [Max] > 12000 kg – 31000 kg ⁵⁾	-	-	950-134HR	1420,-
Electronic crane scales, class III-IV, [Max] > 31000 kg – 50000 kg ⁵⁾	-	-	950-135HR	1420,-
Preparation for recalibration (cleaning, adjustment, function test)	-	-	969-006R	25,-

⁴⁾ Processing time 4 working days, ⁵⁾ processing time 15 working days,

⁶⁾ "Initial verification"/conformity assessment according to NAWID: 2014/31/EU, only when purchasing a balance from KERN, valid throughout Europe

⁷⁾ Verification ("reverification"), only for Germany

Equipment qualification

Documented quality of your balances in the log book

Consistently high product quality requires the use of measuring and test equipment that provides comprehensible, consistent and reproducible results. Hence, quality management systems require that measuring and test equipment produces a detailed traceable description and documentation of calibration results and conformity statements. True to the guiding principle of GMP/GLP: "Work not documented is work not done."

Equipment qualification is documentary evidence that a equipment is suitable for the intended purpose and is working faultlessly. A balance log book as well as our EQS (Equipment qualification software) is used to record all activities and results required for the qualification and monitoring of balances during routine operation. This includes the installation and commissioning of the balances, routine tests, maintenance as well as the recording of special events (failures, repairs, change of location).

The structure of the balance log book is based on the qualification process of the balance. The requirements for the qualification system such as DIN EN ISO 9001, DIN EN ISO/IEC 17025, GLP/GMP, VDA must be taken into account. The log book supports the user in his/her daily work with the balance and is meant to serve as necessary evidence during inspections and audits. The responsibility for maintaining the log book and its appropriate use is to be borne by the user.

Our proposal: Count on our support!

KERN offers this qualification concept throughout. Our validation services are carried out on the spot by technicians of our calibration laboratory and comprise among other things: installation, measurement test inclusive DAkkS calibration certificate as well as records in your qualification log book in the software EQS (Equipment qualification software).

We give you advice about the options of device qualification, as required and will be happy to set up an appointment for qualification at the place of installation. We offer individual calibration and maintenance agreements for the periodically required requalification.

Further information can be found at www.kern-lab.com

i If you are interested in a qualification or training for equipment qualification, please feel free to contact us:
+49 7433 9933-400
testservices-onsite@kern-sohn.com

Important elements of equipment qualification:



Design Qualification (DQ)

With the design qualification, which is carried out under consideration of a requirement specification/functional description, all the requirements on which you as a user depend on, are defined. The purchase decision is made on the basis of the design specifications and the available devices. Careful selection in the DQ can prevent later deficiencies.



Installation Qualification (IQ)

During the installation qualification based on a FMEA, we perform a documented installation, up to the qualified commissioning of your device. Points of this qualification are:

- Scope of delivery and identification
- Visual inspection of the system components
- Evaluation of the installation site
- Hardware installation and device settings
- Cleaning
- Query of work instructions during use
- Clarification of deviations
- Document review and approval

We carry out our qualifications in accordance with the GMP standard.



Function Qualification (OQ)

Instruction is given to the user/s. Items of the OQ are:

- Function test of the system
- Initial adjustment on site
- Metrological verification including USP & Ph.Eur.
- Creation of test protocols
- Check of menu function and error message
- Review and approval of documents
- Evaluation of performance and determination of further test procedure



Performance Qualification (PQ)

The PQ represents documented evidence that the balance or weighing system functions in the selected application as intended. This will be assured by a qualification test of the equipment under real conditions with respect to its surroundings and the problem definition (such as traceable data transmission).



Maintenance Qualification (MQ)

The periodical maintenance, cleaning work and complete metrological test of the balance/weighing system is documented in the MQ by a trained authorised engineer. Maintenance is carried out with the help of a maintenance schedule. We are pleased to support you with a maintenance contract for the entire organization of your measuring system.

The test weight

Calibration of test weights

In order to have calibrated measuring devices you must have calibrated checking equipment. For balances, for example, the test equipment is calibrated test weights.

Depending on frequency of use, test weights must be recalibrated at regular intervals. This is the only way to guarantee that you maintain the requirements for checking equipment so that it functions reliably.

Recalibration times depend on the frequency of use, the conditions of use and your safety requirements.

The standard does not give a defined recalibration period. We recommend that, with intensive use, you recalibrate your test weights every 6 months and with normal use (daily), every 12 months (weekly).

KERN calibrates test weights

- In all OIML error limit classes E1 – M3 and in sizes 1 mg – 2500 kg
- Test weights with free nominal value (any weight value)
- Carried out in Newton
- Independent of design (special designs)
- **Independent of the brand**



The advantages of using KERN in-house calibration (you send your test weights to us)

- Excellent price to performance ratio
- Quick handling time
 - Standard: approx. 4 working days
 - Express Service: from 48 hours (details on request)
- **Calibration service independent of the brand**
- KERN also reconditions old customer weights (e.g. cleaning or readjustment)
- KERN calibration certificates with accreditation symbol are valid internationally
- We would be pleased to monitor your recalibration times
- On request, collection and delivery service by our courier service
- The most modern calibration methods with robot operated comparators allow the most accurate calibration results and rapid process times



The advantages of using KERN on-site calibration (we visit you)

We would be pleased to visit you within Germany and calibrate your test weights to OIML error limits M1 – M3, 10 kg – 2500 kg with our mobile MACOS calibration system. Minimized downtime of your checking equipment and direct contact with our expert are the major benefits of this service. Prices on request.



Selection of the appropriate test weight

Quality of the test weight

A balance can never be more accurate than the test weight which is used to adjust it. It depends on its tolerances.

Accuracy of the test weight

Must approximately correspond to the readout [d] of the balance, or should if anything, be better.

Weight size

This is often shown in the adjust mode “CAL” in the balance display. Given a choice, the largest displayed weight is the best one to use for accurate measurement. The weight of your test weight should ideally be larger than 80 % of the maximum weighing range of the balance. If accuracy and weight size (nominal value) are fixed, the appropriate test weight is selected according to the tolerances of the individual accuracy classes (error limit classes) E1 to M3 (see page 14).

Example:

Balance with weighing range Max 2000 g (2 kg) and readout [d] 0.01 g (10 mg)

- The accuracy of the required test weight is determined by the readout [d] with approx. ± 10 mg.
- Displayed weight size in mode “CAL”: 1000 g or 2000 g. The required test weight therefore has the weight size 2 kg.
- Appropriate test weight with tolerance ± 10 mg and weight size 2 kg is found in error limit class F1.

Exception analytical balances (readout [d] ≤ 0.1 mg):

E1 test weights are recommended. Depending on the safety requirement, E2 test weights with a DAkkS calibration certificate will also be sufficient.

For more information about our test weights please go to kern-sohn.com.

OIML norm R 111 for weights

The key points from the OIML norm R 111

OIML (Organisation Internationale de Metrologie Legale) has established the exact metrological requirements for weights in verified applications in approx. 100 states all over the world. The OIML recommendation R 111 for weights relates to sizes 1 mg – 5000 kg. Statements are made on the accuracy, materials, geometric shape, marking and storage of the weights.

Error limits for weights of classes E1 to M3

The error limit classes are in fixed hierarchical levels in the proportion of 1:3, where E1 is the most accurate and M3 is the least accurate weight class. When testing weights with other weights, the correct test class is the next highest class.

Error limit classes (= tolerances)

The values given in the table below (tolerances $\pm \dots$ mg) are the respective permitted fabrication tolerances.

They are to be equal to the ► **measuring uncertainty** of the weight, if no ► **DAkkS calibration certificate** is available.

Conventional mass

The problem is the air buoyancy, which makes the weight appear lighter. In order to avoid this “distortion” in daily use, all weights are adjusted to the unit specifications as given in R 111, e.g. it is accepted that: material density of the weights is 8000 kg/m³, air density is 1.2 kg/m³ and measuring temperature is 20 °C.

KERN cylindrical test weights

Comply with OIML R 111 in all respects, without exception.

Nominal value ↓	OIML R 111:2004 Maximum permissible errors for weights = permissible tolerances “Tol ± mg”						
	E1	E2	F1	F2	M1	M2	M3
1 mg	± 0,003 mg	± 0,006 mg	± 0,020 mg	± 0,06 mg	± 0,20 mg	-	-
2 mg	± 0,003 mg	± 0,006 mg	± 0,020 mg	± 0,06 mg	± 0,20 mg	-	-
5 mg	± 0,003 mg	± 0,006 mg	± 0,020 mg	± 0,06 mg	± 0,20 mg	-	-
10 mg	± 0,003 mg	± 0,008 mg	± 0,025 mg	± 0,08 mg	± 0,25 mg	-	-
20 mg	± 0,003 mg	± 0,010 mg	± 0,03 mg	± 0,10 mg	± 0,3 mg	-	-
50 mg	± 0,004 mg	± 0,012 mg	± 0,04 mg	± 0,12 mg	± 0,4 mg	-	-
100 mg	± 0,005 mg	± 0,016 mg	± 0,05 mg	± 0,16 mg	± 0,5 mg	± 1,6 mg	-
200 mg	± 0,006 mg	± 0,020 mg	± 0,06 mg	± 0,20 mg	± 0,6 mg	± 2,0 mg	-
500 mg	± 0,008 mg	± 0,025 mg	± 0,08 mg	± 0,25 mg	± 0,8 mg	± 2,5 mg	-
1 g	± 0,010 mg	± 0,03 mg	± 0,10 mg	± 0,3 mg	± 1,0 mg	± 3,0 mg	± 10 mg
2 g	± 0,012 mg	± 0,04 mg	± 0,12 mg	± 0,4 mg	± 1,2 mg	± 4,0 mg	± 12 mg
5 g	± 0,016 mg	± 0,05 mg	± 0,16 mg	± 0,5 mg	± 1,6 mg	± 5,0 mg	± 16 mg
10 g	± 0,020 mg	± 0,06 mg	± 0,20 mg	± 0,6 mg	± 2,0 mg	± 6,0 mg	± 20 mg
20 g	± 0,025 mg	± 0,08 mg	± 0,25 mg	± 0,8 mg	± 2,5 mg	± 8,0 mg	± 25 mg
50 g	± 0,03 mg	± 0,10 mg	± 0,3 mg	± 1,0 mg	± 3,0 mg	± 10 mg	± 30 mg
100 g	± 0,05 mg	± 0,16 mg	± 0,5 mg	± 1,6 mg	± 5,0 mg	± 16 mg	± 50 mg
200 g	± 0,10 mg	± 0,3 mg	± 1,0 mg	± 3,0 mg	± 10 mg	± 30 mg	± 100 mg
500 g	± 0,25 mg	± 0,8 mg	± 2,5 mg	± 8,0 mg	± 25 mg	± 80 mg	± 250 mg
1 kg	± 0,5 mg	± 1,6 mg	± 5,0 mg	± 16 mg	± 50 mg	± 160 mg	± 500 mg
2 kg	± 1,0 mg	± 3,0 mg	± 10 mg	± 30 mg	± 100 mg	± 300 mg	± 1000 mg
5 kg	± 2,5 mg	± 8,0 mg	± 25 mg	± 80 mg	± 250 mg	± 800 mg	± 2500 mg
10 kg	± 5,0 mg	± 16 mg	± 50 mg	± 160 mg	± 500 mg	± 1600 mg	± 5000 mg
20 kg	± 10 mg	± 30 mg	± 100 mg	± 300 mg	± 1000 mg	± 3000 mg	± 10 g
50 kg	± 25 mg	± 80 mg	± 250 mg	± 800 mg	± 2500 mg	± 8000 mg	± 25 g
100 kg	-	± 160 mg	± 500 mg	± 1600 mg	± 5000 mg	± 16 g	± 50 g
200 kg	-	± 300 mg	± 1000 mg	± 3000 mg	± 10 g	± 30 g	± 100 g
500 kg	-	± 800 mg	± 2500 mg	± 8000 mg	± 25 g	± 80 g	± 250 g
1000 kg	-	± 1600 mg	± 5000 mg	± 16 g	± 50 g	± 160 g	± 500 g
2000 kg	-	-	± 10 g	± 30 g	± 100 g	± 300 g	± 1000 g
5000 kg	-	-	± 25 g	± 80 g	± 250 g	± 800 g	± 2500 g

Composition table, valid for all KERN weight sets from 1 mg

Individual weights per set	mg										g					kg				
	1	2	2	5	10	20	20	50	100	200	200	500	1	2	2	5	10			
Weight set																				
1 mg-500 mg	Σ = 1,11 g																			
1 mg-50 g	Σ = 111,11 g																			
1 mg-100 g	Σ = 211,11 g																			
1 mg-200 g	Σ = 611,11 g																			
1 mg-500 g	Σ = 1.111,11 g																			
1 mg-1 kg	Σ = 2.111,11 g																			
1 mg-2 kg	Σ = 6.111,11 g																			
1 mg-5 kg	Σ = 11.111,11 g																			
1 mg-10 kg	Σ = 21.111,11 g																			

Calibration certificate with accreditation symbol for weights

1. "Official" document

The calibration laboratory KERN (D-K-19408-01-00) is accredited by the accreditation point of the Deutsche Akkreditierungsstelle GmbH. The cal. certificate with accreditation symbol is recognised internationally and is available in several languages.

2. Item to be calibrated

The calibration item with nominal value and OIML tolerance class is applicable, as well as the serial number is documented. In this way the assignment of the issued calibration certificate to the weight or set of weights is completely guaranteed.

3. Traceability

The reference standards of the accredited laboratory are monitored in strictly defined cycles and periodically brought into line with national and thereby international standards. This is carefully documented and given on the calibration certificate. In this way the basic fundamental traceability to the national standard is ensured.

4. Applicant

On the very first page of the calibration certificate you will clearly see the applicant or owner of the calibrated checking equipment.

5. Environmental conditions

The environmental conditions during calibration are given here, such as the current temperature, the relative humidity and the air pressure at that point in time.

6. Metrological part

In this part of the calibration certificate information is given on the environmental conditions during calibration. Material, shape and density of the weight is given. The conventional weight value including the relevant measurement uncertainty is shown, as well as the OIML error limits and the OIML class.

7. ► Conventional mass

Using the substitution weighing method (comparative measurement with a test weight) you can determine the exact value of the weight to be calibrated. The conventional mass gives the deviation of the given value from the nominal value of the test item.

8. Measuring uncertainty

When obtaining any technical measurement, there is a particular uncertainty when trying to determine an exact value. This so-called measuring uncertainty should objectify measuring results, by establishing to what degree the measurement is expected to deviate from the true value. Determining and declaring the measuring uncertainty is of great significance, because the smaller this is, the more accurate the obtained weight.

KERN & SOHN GmbH
KERN CALIBRATION
Akkreditiertes Kalibrierlabor seit 1994
Accredited calibration laboratory since 1994
Ihr Partner für Kalibrierdienstleistungen, Prüfmittelmanagement und Beratung.
Your partner for calibration services, test equipment management and support.

Mitglied im / member of the
Deutschen Kalibrierdienst **DKD**

Kalibrierschein
Calibration certificate

Sample 2023-04/1

Kalibrierteilen
Calibration mark

Sample
D-K-19408-01-00
2023-04

Gegenstand
Object

Gewichtssatz, 1 mg - 1 kg
Klasse E2
Set of weights, 1 mg - 1 kg
Class E2

Hersteller
Manufacturer

KERN & Sohn GmbH
Ziegelei 1
D-72336 Balingen
Germany

Typ
Type

313 052

Fabrikat-/Serien-Nr.
Serial number

G123456789

Auftraggeber
Customer

Mustermann GmbH

Auftragsnummer
Order No.

2023-123456789

Anzahl der Seiten des Kalibrierscheines
Number of pages of the certificate

3

Kalibrierverfahren:
Calibration method

Die Kalibrierung erfolgte durch Vergleich mit den Bezugsnormen des Kalibrierlaboratoriums nach der Substitutionsmethode mit Auftriebskorrektur.
The calibration ensued through comparison with the reference standards of the calibration laboratory using the substitution method with air buoyancy correction.

Ort der Kalibrierung:
Place of calibration

Kalibrierlaboratorium KERN
Calibration - Laboratory KERN

Umgebungsbedingungen:
Ambient conditions

Die Kalibrierung wurde bei folgenden Umgebungsbedingungen ausgeführt:
The calibration was carried out under the following ambient conditions:

	von from	bis to	Unsicherheit uncertainty
Temperatur (°C) temperature	22,9	24,1	0,1
rel. Luftfeuchte (%) relative humidity	48,5	53,4	2,0
Luftdruck (hPa) air pressure	942,5	948,5	0,3

Magnetische
Eigenschaften:
Magnetic properties

Der Hersteller hat bestätigt, dass die Gewichtsstücke die magnetischen Eigenschaften gemäß R111:2004 einhalten.
The manufacturer has confirmed the compliance of the magnetic properties of the weight pieces with the OIML R111:2004.

Referenzgewichte:
Standard weights

123-D-K-19408-01-00-2022-05

Material / angenommene Dichte:
Material / assumed density

Nennwert nominal value	Dichte density	Unsicherheit uncertainty
500 mg	7850 kg/m³	140 µg

Messergebnisse:
Measurement results

Nennwert nominal value	Kennzeichnung marking	konventioneller Wägewert conventional mass	Unsicherheit A=2 uncertainty	Fehlergrenze max. perm. error	Klasse* class*
1 mg		1 mg + 0.0010 mg	0.0020 mg	± 0.0060 mg	E2 ✓
2 mg		2 mg + 0.0005 mg	0.0020 mg	± 0.0060 mg	E2 ✓
2 mg	*	2 mg + 0.0016 mg	0.0020 mg	± 0.0060 mg	E2 ✓
5 mg		5 mg + 0.0010 mg	0.0020 mg	± 0.0060 mg	E2 ✓
10 mg		10 mg + 0.0009 mg	0.0020 mg	± 0.0080 mg	E2 ✓
20 mg		20 mg + 0.001 mg	0.003 mg	± 0.010 mg	E2 ✓
20 mg	*	20 mg + 0.001 mg	0.003 mg	± 0.010 mg	E2 ✓
50 mg		50 mg + 0.001 mg	0.004 mg	± 0.012 mg	E2 ✓
100 mg		100 mg + 0.001 mg	0.005 mg	± 0.016 mg	E2 ✓
200 mg		200 mg + 0.002 mg	0.006 mg	± 0.020 mg	E2 ✓
200 mg	*	200 mg + 0.003 mg	0.006 mg	± 0.020 mg	E2 ✓
500 mg		500 mg + 0.005 mg	0.008 mg	± 0.025 mg	E2 ✓
1 g		1 g + 0.002 mg	0.010 mg	± 0.030 mg	E2 ✓
2 g		2 g + 0.002 mg	0.013 mg	± 0.040 mg	E2 ✓
2 g	*	2 g + 0.002 mg	0.013 mg	± 0.040 mg	E2 ✓
5 g		5 g + 0.010 mg	0.016 mg	± 0.050 mg	E2 ✓
10 g		10 g + 0.007 mg	0.020 mg	± 0.060 mg	E2 ✓
20 g		20 g + 0.005 mg	0.026 mg	± 0.080 mg	E2 ✓
20 g	*	20 g + 0.015 mg	0.026 mg	± 0.080 mg	E2 ✓
50 g		50 g + 0.02 mg	0.03 mg	± 0.10 mg	E2 ✓
100 g		100 g + 0.01 mg	0.05 mg	± 0.16 mg	E2 ✓
200 g		200 g + 0.05 mg	0.10 mg	± 0.30 mg	E2 ✓
200 g	*	200 g - 0.00 mg	0.10 mg	± 0.30 mg	E2 ✓
500 g		500 g + 0.10 mg	0.26 mg	± 0.80 mg	E2 ✓
1 kg		1 kg + 0.1 mg	0.5 mg	± 1.6 mg	E2 ✓

Calibration certificate with accreditation symbol for test weights (extract)


Please see www.kern-lab.com for more details on our calibration service and other useful information

Recalibration prices of test weights (accredited calibration)

Class acc. OIML R 111:2004 →	E1 with volume determination (for new weights only)		E1 without volume determination		E2		F1 / F2 * F2 only		M1 / M2 / M3	
Nominal value ↓	KERN	Price € excl. of VAT ex works	KERN	Price € excl. of VAT ex works	KERN	Price € excl. of VAT ex works	KERN	Price € excl. of VAT ex works	KERN	Price € excl. of VAT ex works
1 mg	-	-	962-251R	77,-	962-351R	34,-	962-451R	22,-	962-651R	18,-
2 mg	-	-	962-252R	77,-	962-352R	34,-	962-452R	22,-	962-652R	18,-
5 mg	-	-	962-253R	77,-	962-353R	34,-	962-453R	22,-	962-653R	18,-
10 mg	-	-	962-254R	77,-	962-354R	34,-	962-454R	22,-	962-654R	18,-
20 mg	-	-	962-255R	77,-	962-355R	34,-	962-455R	22,-	962-655R	18,-
50 mg	-	-	962-256R	77,-	962-356R	34,-	962-456R	22,-	962-656R	18,-
100 mg	-	-	962-257R	77,-	962-357R	34,-	962-457R	22,-	962-657R	18,-
200 mg	-	-	962-258R	77,-	962-358R	34,-	962-458R	22,-	962-658R	18,-
500 mg	-	-	962-259R	77,-	962-359R	34,-	962-459R	22,-	962-659R	18,-
1 g	963-231	245,-	962-231R	77,-	962-331R	34,-	962-431R	22,-	962-631R	18,-
2 g	963-232	245,-	962-232R	77,-	962-332R	34,-	962-432R	22,-	962-632R	18,-
5 g	963-233	245,-	962-233R	77,-	962-333R	34,-	962-433R	22,-	962-633R	18,-
10 g	963-234	245,-	962-234R	77,-	962-334R	34,-	962-434R	22,-	962-634R	18,-
20 g	963-235	245,-	962-235R	77,-	962-335R	34,-	962-435R	22,-	962-635R	18,-
50 g	963-236	245,-	962-236R	77,-	962-336R	34,-	962-436R	22,-	962-636R	18,-
100 g	963-237	245,-	962-237R	77,-	962-337R	43,-	962-437R	25,-	962-637R	20,-
200 g	963-238	245,-	962-238R	77,-	962-338R	43,-	962-438R	25,-	962-638R	20,-
500 g	963-239	245,-	962-239R	77,-	962-339R	43,-	962-439R	25,-	962-639R	20,-
1 kg	963-241	245,-	962-241R	77,-	962-341R	43,-	962-441R	25,-	962-641R	20,-
2 kg	963-242	550,-	962-242R	95,-	962-342R	52,-	962-442R	31,-	962-642R	21,-
5 kg	963-243	550,-	962-243R	95,-	962-343R	52,-	962-443R	31,-	962-643R	21,-
10 kg	963-244	550,-	962-244R	95,-	962-344R	52,-	962-444R	31,-	962-644R	21,-
20 kg	963-245	1280,-	962-245R	720,-	962-345R	68,-	962-445R	35,-	962-645R	27,-
50 kg	963-246	1500,-	962-246R	800,-	962-346R	79,-	962-446R	46,-	962-646R	29,-
100 kg	-	-	-	-	-	-	962-591R*	143,-	962-691R	77,-
200 kg	-	-	-	-	-	-	962-592R*	143,-	962-692R	77,-
500 kg	-	-	-	-	-	-	962-593R*	143,-	962-693R	77,-
1000 kg	-	-	-	-	-	-	-	-	962-694R	169,-
2000 kg	-	-	-	-	-	-	-	-	962-695R	310,-
1 mg – 500 mg	-	-	962-250R	500,-	962-350R	235,-	962-450R	124,-	962-650R	77,-
1 mg – 50 g	963-201	1400,-	962-201R	820,-	962-301R	385,-	962-401R	205,-	962-601R	132,-
1 mg – 100 g	963-202	1520,-	962-202R	850,-	962-302R	425,-	962-402R	220,-	962-602R	138,-
1 mg – 200 g	963-203	1750,-	962-203R	930,-	962-303R	485,-	962-403R	245,-	962-603R	155,-
1 mg – 500 g	963-204	1860,-	962-204R	970,-	962-304R	520,-	962-404R	255,-	962-604R	162,-
1 mg – 1 kg	963-205	1980,-	962-205R	1050,-	962-305R	560,-	962-405R	270,-	962-605R	170,-
1 mg – 2 kg	963-206	2580,-	962-206R	1110,-	962-306R	610,-	962-406R	310,-	962-606R	187,-
1 mg – 5 kg	963-207	2890,-	962-207R	1160,-	962-307R	650,-	962-407R	325,-	962-607R	198,-
1 mg – 10 kg	963-208	3290,-	962-208R	1200,-	962-308R	700,-	962-408R	355,-	962-608R	205,-
1 g – 50 g	963-215	1010,-	962-215R	365,-	962-315R	159,-	962-415R	83,-	962-615R	51,-
1 g – 100 g	963-216	1100,-	962-216R	395,-	962-316R	190,-	962-416R	95,-	962-616R	61,-
1 g – 200 g	963-217	1340,-	962-217R	475,-	962-317R	250,-	962-417R	121,-	962-617R	75,-
1 g – 500 g	963-218	1460,-	962-218R	520,-	962-318R	290,-	962-418R	135,-	962-618R	85,-
1 g – 1 kg	963-219	1600,-	962-219R	560,-	962-319R	320,-	962-419R	148,-	962-619R	91,-
1 g – 2 kg	963-220	2240,-	962-220R	640,-	962-320R	395,-	962-420R	186,-	962-620R	110,-
1 g – 5 kg	963-221	2620,-	962-221R	660,-	962-321R	445,-	962-421R	205,-	962-621R	119,-
1 g – 10 kg	963-222	3060,-	962-222R	720,-	962-322R	480,-	962-422R	225,-	962-622R	128,-

Additional costs for preparation, overhaul and adjustment before the calibration	KERN	Price € excl. of VAT ex works
Preparation of weights (e.g. cleaning, etc.)		
Single weight	969-001R	5,-
Weight set	969-002R	20,-
Subsequent services are carried out after confirmation		
Continued overhaul of weights (e.g. wet-cleaning, markings, repair, special packaging, adjustment E1, E2 ...)	969-005R	T & M basis
Adjustment, per weight only available for weights with adjustment chamber (F1–M3)	969-010R	15,-
Second calibration after adjustment or substitution, per weight		
Class E1	969-210R	63,-
Class E1 incl. volume determination	969-211R	230,-
Class E2	969-310R	30,-
Class F1 / F2	969-410R	20,-
Class M1–M3	969-610R	16,-
Testing of magnetic properties according to OIML R 111-2004, per weight	961-115R	15,-
Calibration of NON-OIML test weights, additional price per weight	-	8,-

KERN delivery times	
Standard service Class E2–M3	4 working days
Standard service Class E1, 1 mg – 500 mg, and recalibration 1 g – 10 kg with a known volume	10 working days
Class E1, 1 g – 2 kg, incl. volume determination (new weights)	15 working days

	Express service in 48 hours except for class E1
<ul style="list-style-type: none"> Urgent order is received at KERN by 12:00 noon at the latest Ready for shipping at KERN within two working days, at 12:00 noon Return by standard parcel service or express shipping (Costs and processing time on request) Additional cost for express Service, for each KERN test weight KERN 962-115 € 21,- For Express shipping (details on request) 	

Verification prices for test weights

Class acc. OIML R 111 →	E2 with verification certificate		F1 / F2 with verification certificate		M1 with verification certificate	
Nominal value ↓	KERN	Price € excl. of VAT ex works	KERN	Price € excl. of VAT ex works	KERN	Price € excl. of VAT ex works
1 mg	952-351R	55,-	952-451R	47,-	952-651R	32,-
2 mg	952-352R	55,-	952-452R	46,-	952-652R	32,-
5 mg	952-353R	55,-	952-453R	47,-	952-653R	32,-
10 mg	952-354R	55,-	952-454R	47,-	952-654R	32,-
20 mg	952-355R	55,-	952-455R	47,-	952-655R	32,-
50 mg	952-356R	55,-	952-456R	47,-	952-656R	32,-
100 mg	952-357R	55,-	952-457R	47,-	952-657R	32,-
200 mg	952-358R	55,-	952-458R	47,-	952-658R	32,-
500 mg	952-359R	55,-	952-459R	47,-	952-659R	32,-
1 g	952-331R	55,-	952-431R	47,-	952-631R	32,-
2 g	952-332R	55,-	952-432R	47,-	952-632R	32,-
5 g	952-333R	55,-	952-433R	47,-	952-633R	32,-
10 g	952-334R	55,-	952-434R	47,-	952-634R	32,-
20 g	952-335R	55,-	952-435R	47,-	952-635R	32,-
50 g	952-336R	55,-	952-436R	47,-	952-636R	32,-
100 g	952-337R	61,-	952-437R	47,-	952-637R	32,-
200 g	952-338R	61,-	952-438R	49,-	952-638R	32,-
500 g	952-339R	61,-	952-439R	49,-	952-639R	32,-
1 kg	952-341R	61,-	952-441R	49,-	952-641R	32,-
2 kg	952-342R	70,-	952-442R	55,-	952-642R	34,-
5 kg	952-343R	70,-	952-443R	55,-	952-643R	34,-
10 kg	952-344R	70,-	952-444R	55,-	952-644R	43,-
20 kg	952-345R	80,-	952-445R	57,-	952-645R	49,-
50 kg	952-346R	-	952-446R	68,-	952-646R	51,-
1 mg – 500 mg	952-350R	275,-	952-450R	143,-	952-650R	90,-
1 mg – 50 g	952-301R	450,-	952-401R	235,-	952-601R	150,-
1 mg – 100 g	952-302R	485,-	952-402R	255,-	952-602R	159,-
1 mg – 200 g	952-303R	550,-	952-403R	285,-	952-603R	178,-
1 mg – 500 g	952-304R	590,-	952-404R	295,-	952-604R	186,-
1 mg – 1 kg	952-305R	610,-	952-405R	310,-	952-605R	196,-
1 mg – 2 kg	952-306R	710,-	952-406R	355,-	952-606R	215,-
1 mg – 5 kg	952-307R	760,-	952-407R	380,-	952-607R	230,-
1 mg – 10 kg	952-308R	800,-	952-408R	405,-	952-608R	235,-
1 g – 50 g	952-315R	180,-	952-415R	104,-	952-615R	68,-
1 g – 100 g	952-316R	215,-	952-416R	110,-	952-616R	73,-
1 g – 200 g	952-317R	280,-	952-417R	140,-	952-617R	87,-
1 g – 500 g	952-318R	320,-	952-418R	155,-	952-618R	96,-
1 g – 1 kg	952-319R	350,-	952-419R	170,-	952-619R	106,-
1 g – 2 kg	952-320R	435,-	952-420R	215,-	952-620R	126,-
1 g – 5 kg	952-321R	480,-	952-421R	235,-	952-621R	138,-
1 g – 10 kg	952-322R	530,-	952-422R	260,-	952-622R	148,-

KERN verification delivery time	
Standard verification service Class E2 – M1	6 working days

Additional costs for preparation, overhaul and adjustment before the verification	KERN	Price € excl. of VAT ex works
Preparation of weights (e.g. cleaning, etc.)		

Single weight	969-008R	5,-
Weight set	969-009R	19,-

Subsequent services are carried out after confirmation

Continued overhaul of weights (e.g. wet-cleaning, markings, repair, special packaging, adjustment E2)	969-005R	nach Aufwand
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Adjustment, per weight only available for weights with adjustment chamber (F–M1)	969-010R	15,-
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Verification after adjustment or substitution, per weight

Class E2	969-310R	30,-
Class F1 / F2	969-410R	20,-
Class M1	969-610R	16,-

! Verification only valid in Germany



The force gauge

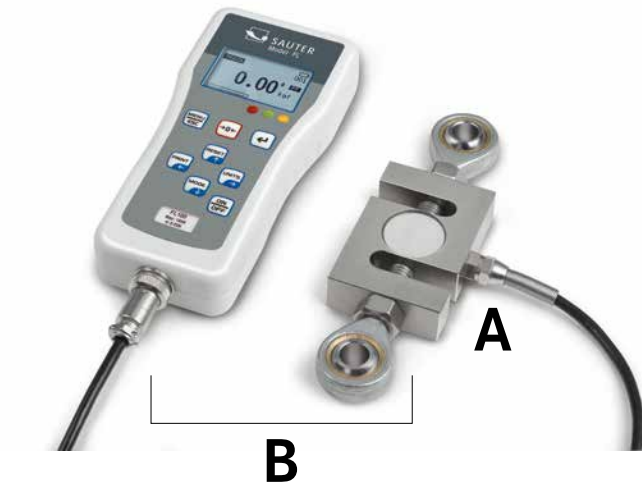
Accredited calibration with calibration certificate for force gauges

The KERN calibration laboratory is at your side when you need an accredited calibration reliably. From the transducer to the full measuring chain, we are happy to take care of traceable calibration of your test equipment for you. Our accreditation includes the calibration of tensile and pressure force up to 5 kN according to the standards DIN EN ISO 376 and DKD-R 3-3, each with the Newton (N) display unit for a complete measuring chain (situation A) or voltage ratio/transmission coefficient (mV/V, situation B).

Below you will find a comparison of which standard meets which criteria:

Comparison of DIN EN ISO 376 and DKD-R 3-3		
	ISO 376	DKD-R 3-3
Standard	ISO standard (internationally standardized)	Standard of the DKD (Germany)
Measuring equipment	Force transducers and complete measuring chains	Force transducers and complete measuring chains
Area of application	Specifically force gauges for the testing of testing equipment	General force gauges
Number of power stages	8	5
Classification/Assessment	Classification in classes 00; 0,5; 1 and 2	None in standard
Test sequences	Fixed procedure	Sequences A, B, C, D possible Standard is sequence A, B, C and D are reduced sequences, relevant previous knowledge is necessary
Summary	Higher-quality calibration, as 8 force levels are calibrated	High-quality calibration, reduced sequences with less effort possible

We can offer you a calibration solution for the following situations:



Situation A:
separate force transducer,
display unit **mV/V**

Situation B:
complete force gauge
(consisting of transducer,
amplifier and display),
display unit **N**

You can find further information on this topic at:
www.kern-lab.com



Calibration certificate with accreditation symbol for force gauges (extract)

Prices for the accredited calibration of force gauges and force transducers

Situation A: Force transducer (voltage ratio, in mV/V) ^{*1,2}					
ISO 376 (8 stages)			DKD-R 3-3 (5 stages, sequence A)		
KERN	Measuring range	€	KERN	Measuring range	€
Tensile force:					
963-161IV (R)	≤ 500 N	240,-	963-161V (R)	≤ 500 N	225,-
963-162IV (R)	≤ 2 kN	285,-	963-162V (R)	≤ 2 kN	265,-
963-163IV (R)	≤ 5 kN	370,-	963-163V (R)	≤ 5 kN	345,-
Compression force:					
963-261IV (R)	≤ 500 N	240,-	963-261V (R)	≤ 500 N	225,-
963-262IV (R)	≤ 2 kN	285,-	963-262V (R)	≤ 2 kN	265,-
963-263IV (R)	≤ 5 kN	370,-	963-263V (R)	≤ 5 kN	345,-
Tensile & Compression force:					
963-361IV (R)	≤ 500 N	400,-	963-361V (R)	≤ 500 N	370,-
963-362IV (R)	≤ 2 kN	475,-	963-362V (R)	≤ 2 kN	445,-
963-363IV (R)	≤ 5 kN	640,-	963-363V (R)	≤ 5 kN	580,-

Situation B: Complete force gauge (in N) ^{*2}					
ISO 376 (8 stages)			DKD-R 3-3 (5 stages, sequence A)		
KERN	Measuring range	€	KERN	Measuring range	€
Tensile force:					
963-161I (R)	≤ 500 N	197,-	963-161 (R)	≤ 500 N	178,-
963-162I (R)	≤ 2 kN	240,-	963-162 (R)	≤ 2 kN	215,-
963-163I (R)	≤ 5 kN	330,-	963-163 (R)	≤ 5 kN	300,-
Compression force:					
963-261I (R)	≤ 500 N	197,-	963-261 (R)	≤ 500 N	178,-
963-262I (R)	≤ 2 kN	240,-	963-262 (R)	≤ 2 kN	215,-
963-263I (R)	≤ 5 kN	330,-	963-263 (R)	≤ 5 kN	300,-
Tensile & Compression force:					
963-361I (R)	≤ 500 N	355,-	963-361 (R)	≤ 500 N	325,-
963-362I (R)	≤ 2 kN	440,-	963-362 (R)	≤ 2 kN	400,-
963-363I (R)	≤ 5 kN	590,-	963-363 (R)	≤ 5 kN	530,-

(R): Recalibration

For each force gauge without interface or from other manufacturers we charge a surcharge of **10,- €** for the additional effort.

*¹ Compatibility with our amplifiers required

*² Installation in our measuring equipment required



Factory calibration

for force

Situation A: Force transducer (voltage ratio, in mV/V)* ^{1,2}			Situation B: Complete force gauge (in N)* ²		
KERN	Measuring range	€	KERN	Measuring range	€
Tensile force:					
961-161V (R)	≤ 500 N	225,-	961-161 (R)	≤ 500 N	178,-
961-162V (R)	≤ 2 kN	265,-	961-162 (R)	≤ 2 kN	215,-
961-163V (R)	≤ 5 kN	345,-	961-163 (R)	≤ 5 kN	300,-
961-164V (R)	≤ 20 kN	440,-	961-164 (R)	≤ 20 kN	390,-
961-165V (R)	≤ 50 kN	440,-	961-165 (R)	≤ 50 kN	390,-
961-166V (R)	≤ 250 kN	470,-	961-166 (R)	≤ 250 kN	435,-
Compression force:					
961-261V (R)	≤ 500 N	225,-	961-261 (R)	≤ 500 N	178,-
961-262V (R)	≤ 2 kN	265,-	961-262 (R)	≤ 2 kN	215,-
961-263V (R)	≤ 5 kN	345,-	961-263 (R)	≤ 5 kN	300,-
961-264V (R)	≤ 20 kN	440,-	961-264 (R)	≤ 20 kN	390,-
961-265V (R)	≤ 50 kN	440,-	961-265 (R)	≤ 50 kN	390,-
961-266V (R)	≤ 250 kN	470,-	961-266 (R)	≤ 250 kN	435,-
Tensile & Compression force					
961-361V (R)	≤ 500 N	370,-	961-361 (R)	≤ 500 N	325,-
961-362V (R)	≤ 2 kN	445,-	961-362 (R)	≤ 2 kN	400,-
961-363V (R)	≤ 5 kN	580,-	961-363 (R)	≤ 5 kN	530,-
961-364V (R)	≤ 20 kN	630,-	961-364 (R)	≤ 20 kN	580,-
961-365V (R)	≤ 50 kN	630,-	961-365 (R)	≤ 50 kN	580,-
961-366V (R)	≤ 250 kN	690,-	961-366 (R)	≤ 250 kN	640,-

(R): Recalibration

For each force gauge without interface or from other manufacturers we charge a surcharge of **10,- €** for the additional effort.

*¹ Compatibility with our amplifiers required

*² Installation in our measuring equipment required

The temperature and relative humidity

Accredited calibration with calibration certificate for temperature and relative humidity

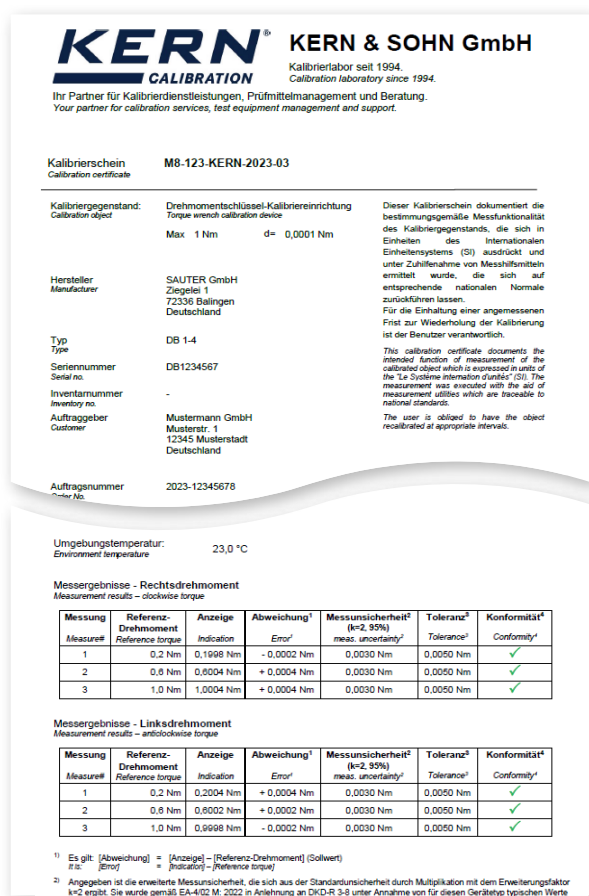
We perform accredited calibrations according to DKD-R 5-1 and DKD-R 5-8 for measuring instruments for the recording of ambient conditions. Our scope of accreditation covers a measuring range of 5°C to 50°C for temperature sensors and a measuring range from 20 % to 75 % relative humidity for humidity sensors.

Checking equipment	KERN	Price € excl. of VAT ex works
Temperature measuring device, external sensor	963-613R	130,-
Temperature measuring device, internal sensor	963-623R	130,-
Temperature and humidity, combi-sensor, external sensor, 1 temperature & 3 humidity points	963-631R	200,-
Temperature and humidity, combi-sensor, external sensor, 3 temperature & 3 humidity points	963-633R	330,-
Temperature and humidity, combi-sensor, internal sensor, 1 temperature & 3 humidity points	963-641R	200,-
Temperature and humidity, combi-sensor, internal sensor, 3 temperature & 3 humidity points	963-643R	330,-
Temperature - additional test point	963-605R	23,-
Humidity - additional test point	963-606R	23,-

For each measuring device without interface we charge a surcharge of **10,- €** for the additional effort.

Factory calibration

for other measuring instruments



Factory calibration certificate for wrench testing devices
(extract). Further details on the internet www.kern-lab.com

Factory calibration certificates

As calibration certificates with accreditation symbol cannot be offered for all measuring devices or measurement sizes, or where it is not customary, we then offer factory calibration certificates. These calibrations are carried out according to internal factory specifications and are available for many measuring devices, e.g:

- Mechanical balances (spring balances, etc.)
- Force-measuring devices up to 120 kN
- Measuring devices for layer thickness 0 µm – 2000 µm
- Hardness testing devices in accordance with Leeb tests
- Ultrasound material thickness testing devices 25 – 300 mm

This is not an accredited calibration (no proof of metrological traceability).

We carry out calibrations brand-independent. In order to avoid any unnecessary delays when processing your order, please send us the technical documents and accessories with the checking device. Calibration time 4 working days.

KERN	Measurand	Measuring range	Price € excl. of VAT ex works
Factory calibration			
961-102K	Force (for hand grip dynamometer KERN MAP)	≤ 130 kg	159,-
961-110	Coating thickness	≤ 2000 µm F or N	159,-
961-112	Coating thickness	≤ 2000 µm FN	225,-
961-113	Wall thickness (ultra sound)	≤ 300 mm (in stainless steel)	159,-
961-114	Wall thickness (test blocks)	≤ 300 mm	198,-
961-170	Hardness Shore	For sets up to 7 plates	126,-
961-131	Hardness Leeb	400 – 800 HLD	159,-
961-132	Hardness Leeb	Test block (for Leeb durometer)	159,-
961-270	Hardness (UCI)	200 – 800 HV	345,-
961-150	Length	≤ 300 mm	159,-
961-190	Light	≤ 200000 lx	308,-
961-100	Weight (Mechanical balances/ Spring balances)	≤ 5 kg	94,-
961-101	Weight (Mechanical balances/ Spring balances)	> 5 – 50 kg	117,-
961-102	Weight (Mechanical balances/ Spring balances)	> 50 – 350 kg	139,-
961-103	Weight (Mechanical balances/ Spring balances)	> 350 – 1500 kg	215,-
961-104	Weight (Mechanical balances/ Spring balances)	> 1500 – 3000 kg	290,-
961-105	Weight (Mechanical balances/ Spring balances)	> 3000 – 6000 kg	580,-
961-106	Weight (Mechanical balances/ Spring balances)	> 6000 – 12000 kg	660,-
961-120	Wrench testing devices	1 Nm – 200 Nm	225,-
964-305	Temperature calibration moisture analyser		174,-
Additional services			
962-116	Calibration express service with 48 hour delivery (only on new purchases)		52,-/ Instrument

* Calibration is limited to the following models:

DAB 100-3, DAB 200-2, DBS 60-3, DLB 160-3A, MLS 150-2A, MLS 65-3A,
MLB 50-3, MLB 50-3N, MLB 50-3C, DLT 100-3N, MLS 50-3D, MLS 50-3C

For up-to-date information on the test services for further measuring sizes please visit our website www.kern-lab.com

Digital calibration certificate (DCC)

The DAkkS calibration certificate becomes digital

The digital age is constantly revealing new opportunities for technological innovations. As a result, topics such as sustainability and resource-saving work are becoming increasingly important, especially in the industrial context. Calibration certificates, as metrological proof of a check of the respective measurand, are still printed on paper and sent to the customer by post. However, the option of a calibration certificate in PDF format is already available. Both variants no longer meet the current requirements of a laboratory. In cooperation of the PTB (Physikalisch Technische Bundesanstalt) and several expert groups from industry, the idea of a digital calibration certificate (DCC) was born. Based on the file format XML, this should be both human- and machine-readable. The basic idea is to transmit the information contained in a conventional calibration certificate to the customer electronically and securely as data. KERN DCCs comply with the requirements of VDI/VDE 2623 and PTB.

- You can download your digital calibration certificate (DCC) on www.kern-lab.com/dcc

- This service is **free of charge!**

- The Digital Calibration Certificate (DCC) is currently available for the calibration of weights. Gradually, this will also be available for other measuring devices.



For classical calibration certificates there is a scheme predefined by standards, to which the calibration laboratories shall adhere in order to be or remain accredited. This ensures standardization and simplification of the calibration procedure and its documentation. PTB is constantly working on designing such a scheme also for the DCC. Within such a scheme, of course, all previous information of a calibration certificate shall be included. This is implemented by using a so-called XML schema file in XSD format. In conclusion the generated XML file can be checked against the schema, which guarantees that the DCC is well-formed and complies with the specifications of the PTB.

Appropriate encryption algorithms and a digital signature ensure that no one can subsequently change the document and customers have the security of knowing that their tested measuring equipment has been processed and documented according to maximum quality requirements.

Within this context, KERN not only stands for precision and quality, but also for innovation in all technical matters.

YOUR ADVANTAGES OF THE DIGITAL CALIBRATION CERTIFICATE:

- ✓ Meets the requirements of DIN EN ISO/IEC 17025:2018
- ✓ Secure and error-free data transmission
- ✓ Automatic transfer of data into digital processes
- ✓ Evaluation of measurement data and optimisation of measurements
- ✓ Forgery protection through digital signature
- ✓ Internationally recognised through XML-based format
- ✓ Machine readability, supporting the quality monitoring processes

KERN GLOSSARY

CALIBRATION

Calibration is the testing and determination of the precision of a measure value without intervention in the measurement system. The calibration certificate contains the measured value with information on the relevant measuring uncertainty. If applicable, a statement can be made as to whether this is within tolerance limits. Industry requires calibration of measuring devices, in order to, for example, be able to connect parts manufactured at different locations without encountering problems. Calibrations must be repeated at appropriate time intervals, for which the user is responsible. KERN recommends that, with intensive (daily) use, you recalibrate the measuring devices every 6 months and with normal (weekly) use, every 12 months.

DAKKS CALIBRATION

DAkkS calibration is carried out for measuring devices, reference materials and material measures for particular measurement sizes and measurement ranges, which are defined individually for every laboratory as part of their accreditation. The issued DAkkS calibration certificates are proof of the metrological traceability to national and international standards, as required, for example, by the DIN EN ISO 9000 and DIN EN ISO/IEC 17025 standards. DAkkS calibration has no legally regulated period of validity. The operator is responsible for observing an appropriate time for recalibration.

INTERNATIONAL VALIDITY OF DAKKS CALIBRATION CERTIFICATES

DAkkS is represented in the EA (European co-operation for Accreditation) as well as in the ILAC (International Laboratory Accreditation Cooperation). This ensures that DAkkS calibration and DAkkS calibration certificates are recognised and valid almost anywhere in the world.

ADJUSTING

Precise setting of a measuring device by professional intervention in the measurement system. For balances: Either with an external test weight using the adjustment function (CAL or CAL key), or with the automatic internal adjustment or adjustment control. This is necessary following changes in temperature, changed environmental conditions, change of location, etc. daily routine checks are recommended. The term "calibrating" was formerly also used for adjusting, but today it means something else (see above).

MONITORING YOUR CHECKING EQUIPMENT

This is a mandatory requirement of quality management systems.

TRACEABILITY

The precondition of a perfect measurement is the complete proof that a measuring device is traceable to the SI units. This is also a requirement of the most important international standards. For example the correct display of balances and test weights is checked and – if necessary – corrected (adjusted). The test weights are traced back through a chain of calibrations to the national standard at the PTB (Physikalisch Technische Bundesanstalt) in Braunschweig, which in turn is traceable to the SI definition via various physical realizations (the "watt balance" or the "silicon sphere").

The correct traceability is what makes international measurements possible in the first place.

MEASURING UNCERTAINTY

Measurement uncertainty is determined for each balance according to a precisely given test method and documented in the Calibration certificate. It depends on various factors, both internal and external. The measuring uncertainty of a measuring device is an objective measure of its accuracy and is therefore an accurate statement for its appropriate use.

OIML

OIML (Organisation Internationale de Métrologie Légale) has representatives from almost 100 states who work on unified build and test regulations for all measuring devices. In the OIML certification system the certificates issued by the member states certify that a particular measuring device build type is in accordance with the OIML recommendations. In this way, a build type which was tested and approved in one country, can be approved in another country without having to repeat the test. (Excerpt from PTB). The OIML R111 guideline defines the construction-related characteristics for test weights, such as material, upper surface texture, markings, construction, shape etc.

FACTORY CALIBRATION CERTIFICATES

The testing of measuring devices for accuracy in accordance with a recognised but not accredited process without proof of metrological traceability – this is the difference when compared with DAkkS calibration.

CONVENTIONAL MASS

Every body experiences a relatively small loss of weight in air (buoyancy). This must be taken into account for accurate weighing procedures. In order to avoid this "distortion" in daily use, all weights are adjusted to the unit specifications as given in R111 OIML recommendation. (air pressure 1.2 kg/m³ and material density 8000 kg/m³)

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 www.kern-lab.com

**The oldest Precision Balance
 Factory in Germany**

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 since 1844
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Accredited Calibration Laboratory for 30 years

QM certification and accreditation by KERN
 as a basis for the highest level of quality.



DIN EN ISO/IEC 17025:2018



NAWI: 2014/31/EU

www.kern-lab.com –

The Central Portal for everything you need to know about the extensive KERN Calibration Services

On our website you will always find the latest news and useful information about testing and measuring devices, calibration, legal metrology and expansions to our range of services. You will also find numerous online services on the website

Database supported management of test equipment

Information on your test equipment which has been calibrated by us is stored in our database. In this way it is possible to make trend calculations. You will therefore get an overview of the long-term stability and trend behaviour of your test equipment and the necessary recalibration period can easily be determined and specified.

Paperless documentation

So that there is no administrative effort, we can handle all calibration documentation in a paperless process. From quotation, through to order confirmation, delivery note and invoice right up to calibration certificate, you will receive all documents by e-mail or you can retrieve them online.

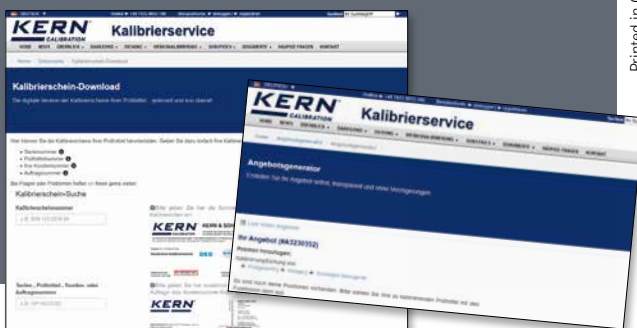
Would you prefer to receive your calibration certificate or your invoice, for example, in paper form? Of course this is not a problem either.

Price quote generator

Create your own offer – you will receive your offer directly and without delay.

RMA (Return Material Authorization)

Using the quotation generator, you can have a Return Material Authorization (RMA) number created directly for sending your test equipment. This makes it very easy to send in your test equipment and to start the calibration directly after arrival in our laboratory!



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