

Norbar Standard Calibration Detail for Returned Devices

The **Name and Address** details entered on the certificate will be completed using the company name and invoice address as detailed on the sales order acknowledgement.

Where the certificate is for a third party you may request that the third parties name and address appear on the certificate as an On Behalf of address as detailed below.

An “**On Behalf of**” name and address may be specifically requested and will appear on the certificate in addition to the name and address details taken from the sales order acknowledgement, the “On Behalf of” will be detailed on the sales order acknowledgement as “On Behalf of: A. Company”.

When an “On Behalf of” is added to a certificate the original and “On Behalf of” addresses will be shortened to allow correct fitting on the certificate, for example:

“CALIBRATION LABORATORY LTD, ON BEHALF OF: RUBBER TYRE CO, MIDDLE ROAD, CARTON, UK.”

The **Calibration Method** used will follow the current ISO/BS standard or UKAS approved method used by the laboratory for the type of device to be calibrated.

Torque measurement device calibrations to **BS 7882:2017** will follow the two-plane method giving a best achievable class of 0.2. Four plane calibrations with a best achievable class of 0.1 are available on special request.

Hand torque tool calibrations to **BS EN ISO 6789-2:2017** will for Norbar manufactured tools be calibrated using the specified accuracy as the expected measurement error unless stated otherwise by the customer (See Norbar website for OEM specifications). Tools not manufactured by Norbar and where the customer has not specified an accuracy requirement will be calibrated using the maximum permissible deviation given in clause 5.1.5 of BS EN ISO 6789-1:2017 (i.e. 4% or 6% as the expected measurement error dependent on tool type and maximum torque value).

All torque wrenches will be calibrated using the standard output drive of the tool unless otherwise specified by the customer. For tools with an interchangeable interface, they will be calibrated using an appropriate adaptor supplied by the calibration laboratory unless otherwise specified by the customer. Where a dominant type B uncertainty has been identified in accordance with clause 7.2 of ISO 6789-2:2017, the expanded uncertainty will be calculated using Monte Carlo Simulation (MCS) instead of the usual Root Sum Squared (RSS) method.

The current standards and the schedule of accreditation can be viewed on the following link

<https://www.norbar.com/en-gb/Services/UKAS-Accredited-Laboratory>

The laboratory can be contacted for specific details of particular methods and standards used.

The standard **Calibration Range** and **Units of Measurement** used for:

Torque transducers will be as detailed on the products previous calibration certificate issued by Norbar if one exists, otherwise those indicated on the equipment.

TruChecks will be as detailed against the calibration part number, using the primary units marked on the tool.

Torque wrenches/Screwdrivers will be calibrated from the lowest marked torque value to 100% of wrench capacity using the primary units marked on the tool. Where the lowest mark is below the lower limit of the measurement device, an alternative measurement point will be used; this will be no greater than 10% of the torque wrench capacity. Electronic indicating wrenches (Type 1 Class C or E) will be calibrated to the manufactures specified range as required by clause 5.1.3 of BS EN ISO 6789-1:2017. Where the lowest value is below the lower limit of the measurement device, an alternative measurement point will be used; this will be no greater than 10% of the torque wrench capacity.

Torque multipliers will be calibrated from 20-100% of full scale using the primary units marked on the tool. The expanded uncertainty will be calculated using MCS, instead of the usual RSS method.

Radius ended torque calibration beams will be measured between +/- 8 degrees from the horizontal on the radius with the deviation from the nominal size given in microns.

Free standing torque calibration beams will be measured and the dimensions of the torque radiuses given in millimetres.

N.B.: Additional readings or alternate units of measure if specifically requested will be detailed on the sales order acknowledgement.

The **Direction of Calibration** will be as detailed on the products previous calibration certificate issued by Norbar if one exists, otherwise as follows:

Clockwise for all Transducers except for the following:

Anti-Clockwise only for Annular Transducers showing a clockwise reading (Annular transducers measure reaction torque and are calibrated in the opposite direction to the torque applied).

Clockwise and Anti-Clockwise for Harsh Environment Transducers.

Clockwise for all Torque Multipliers.

Clockwise for all Torque Wrenches, except for Nortronic being Clockwise and Anti-Clockwise.

Clockwise for Display Instruments except for TTL-HE and T-Box being Clockwise and Anti-Clockwise.

Clockwise and Anti-Clockwise for Torque Calibration Beams.

Additional or alternate directions if specifically requested will be detailed on the sales order acknowledgement.

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Transducers and display instruments will be calibrated as a **System** if Norbar believe the equipment has been returned as a system, where possible reference will be made to the products previous Norbar calibration certificate (if one exists). If a system calibration is specifically requested it will be detailed on the sales order acknowledgement. If the transducer and display instrument does not appear to be a system, they will be calibrated individually using Norbar laboratory equipment.

Customer specific **References and/or Asset Numbers** detailed on the products previous calibration certificate if one exists or if specifically requested and will appear on the certificate in the observation section, the references and/or asset numbers will be detailed on the sales order acknowledgement. e.g. "Certificate note: ABC123".

Adjustments: Where possible, calibrations will be performed both before and after adjustment unless specifically requested not to attempt adjustment.

Where it is not possible to take As-Found readings, the device (where possible) will be repaired and calibrate As-Left only. Calibration results As-Found may be better or worse than previous calibrations due to general variances and usage of the equipment.

Calibration results As-Left may be better or worse than As-Found results due to repairs or adjustments, particularly on system calibrations.

We cannot guarantee to improve results on As-Left calibrations however we attempt to adjust and optimise performance wherever possible.

For hand torque tools, adjustments will only be considered if the tool does not satisfy the accuracy requirements between 20-100% of full scale.

Statements of conformity are available for every calibration, where Norbar offer the following options:

1 = Pass/Fail against customer specified Uncertainty Interval (**ONLY for BS 7882 and ISO 6789 calibrations**)

Specified by the customer, where for:

Torque Measurement Devices, customer can specify different values at <5%, ≥5% and ≥20% of full scale.

Hand Torque Tools, customer will specify a value for the entire calibration range.

2 = Pass/Fail against the manufacture's OEM specification and a Conformance Probability

Default values for OEM Spec and 95.45% Conformance Probability will be used by default, but an alternative value may be requested.

3 = Pass, Conditional Pass, Conditional Fail or Fail against OEM Specification or customer specified accuracy.

For Torque Measurement Devices, customers can specify different values at <5%, ≥5% and ≥20% of full scale.

For Hand Torque Tools and Torque Multipliers, customers can specify a single accuracy

For Beams and Display Instruments, a fixed OEM specification will be used.

For further explanation on choices, see <https://www.norbar.com/en-gb/Services/UKAS-Accredited-Laboratory>

When a conformance statement has been requested, a **Pass, Fail, N/A, Conditional Pass** or **Conditional Fail** will be quoted after the following statement reported on the front page of the certificate:

"Conformance with customer's agreed specification:"

Where a conformance statement has not been requested, our default position is for:

Torque measurement devices (BS 7882) – Achieved BS 7882 classification, but no customer conformance statement.

Hand torque tools (ISO 6789) – Option 3, using the default accuracy requirements

Torque Multipliers - Option 3, using the default accuracy requirements.

Radius End torque calibration beams – No conformance statement.

Display instruments – No conformance statement.

Confidentiality: Norbar will treat all information provided by the customer for the purpose of conducting the calibration and all information generated by Norbar in the course of conducting the calibration as confidential information belonging to the customer. Norbar will not disclose that information to any third party or use that information for any purpose other than the purpose of conducting the calibration, provided that Norbar may disclose the information to those of its employees who reasonably need to know it for the purpose of conducting the calibration and as may be required by law, court order or any governmental or regulatory authority that has jurisdiction over Norbar. This duty of confidence and non-use will survive for a period of 6 years after the date of the calibration certificate.

Receipt of the sales order acknowledgement will be deemed as acceptance of the above terms; any queries should be brought to Norbar's attention as soon as possible as calibrations may commence shortly after order entry.