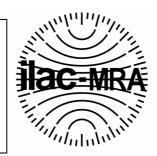
CERTIFICATE OF CALIBRATION

ISSUED BY:

SERCAL MATERIALS TESTING MACHINES SERVICES LTD UKAS ACCREDITED CALIBRATION LABORATORY

CERTIFICATE NUMBER: 59318
DATE OF ISSUE: 04 October 2022





0375

SERCAL MTMS LTD.

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Sercal Materials Testing Machines Services Ltd.
Southern Avenue, Leominster,
Herefordshire, HR6 0QH.
Tel: +44 (0) 1527 514015 Fax: +44 (0) 1527 514016

Approved Signatories L.Smith Dr N. Wrigley

E-mail: enquiries@sercalcalibrations.co.uk

Issued To: LCM Systems Ltd.

Address: Unit 15, Newport Business Park, Barry Way, Newport, Isle of Wight

Machine Description: Universal Testing Machine Serial Number: 1002

Manufacturer / Type: LCM TC3T Force Capacity: 30kN

Display System: A single range computer digital display **Software:** LCM Systems VisualLink Version 5.0

Force Transducer: 100kgf LCM Systems Load Cell Serial Number: 17789483

Associated Equipment: Mantracourt Amplifier Serial Number: 17038504

Associated Equipment: Asus Computer System Serial Number: D6PTBX005253

Date of Calibration: 22 September 2022 Ambient Temperature: 20.5°C

Sercal Quote Reference: Q220722R Location: Test & Calibration Room

Previous certificate number: 57275 Issued: 27 September 2021

Method:

The testing machine identified above has been calibrated in accordance with the requirements of BS EN ISO 7500-1:2018 over the ranges given below for increasing forces only. The calibration was performed using force proving devices and / or masses which meet the requirements of BS EN ISO 7500-1 and equipment which is calibrated in accordance with BS EN ISO 376:2011

The machine complied with the requirements of the standard for the following ranges and classifications with regard to the relative error, repeatability, resolution and zero return to which table 2 of the standard refers:

Range Mode Status Classification of range(s) to minimum force

1kN Compression As left 1kN Class 0.5 down to 0.05kN

Detailed tabulated results are shown on the following pages.

Calibrated by: Lee Smith Certified by: / Dr N S Wrigley

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to the units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with prior written approval of the issuing laboratory.

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The following traceable force proving equipment was used for the calibration:

Description	Capacity	Class	Serial Number	Certificate Number	Date Calibrated
DC Ratio meter	-	-	92-3880	2022040319-1	11 May 2022
Load Cell	1000N	0.5	9581341	0157/2111041	19 November 2021

With reference to clause 6 of BS EN ISO 7500-1 the proving equipment used has been calibrated to BS EN ISO 376 and the class of the proving device(s) was equal to or exceeded the class to which the machine has been verified.

The expiry date of the certificates of calibration for the elastic proving devices used is 26 months and for masses 5 years from the dates given above.

Where masses are used, the value for gravity (g) used to calculate the forces exerted by the masses was 9.815m/s²

When using elastic proving devices the constant indicated force method was used to effect the verification. When masses are used the constant true force method was used to effect the verification. Three verification runs were made on each range

The Interval between verifications, clause 9 of the standards refers.

The time between verifications depends upon the type of testing machine, the standard of maintenance and the amount of use. Unless otherwise specified it is recommended that the verification be carried out at intervals not exceeding 12 months. The machine shall in any case be verified if it is moved to a new location necessitating dismantling or if it is subject to major repair or adjustment.

The Sercal Calibration Laboratory is accredited by UKAS to BS EN ISO/IEC 17025 (General requirements for the competence of testing and calibration laboratories) to perform the calibration which is reported on this certificate.

Prior to verification the machine was inspected for good working order and was found to satisfy the guidelines given in section 5 of BS EN ISO 7500-1

The calculation of the accuracy and repeatability errors and the classification of the testing machines performance was made in accordance with the method specified in BS EN ISO 7500-1:2018

In the result tables which follow a negative relative error indicates that the machine indicator lags the true applied force. Where there are adjacent results at the same force increment, these are at the overlap point from the two proving devices used.

The decision rule of the classification does not take into account the uncertainty as described in section 7 of BS EN ISO 7500-1. The following settings were made in accordance with the manufacturers instructions.

Ranges	Coefficient values	Α	A1	A2	A3
1kN		-0.000179136	0.493621664	-0.000294623	0.000131826

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Results:

Range 1 1kN Compression	Shunt Cal 0.42956kN				
These results are: As left following adjustments					
Nominal Force +ve	Relative Error	Expanded Uncertainty			
kN	%	%			
0.05000	0.31	0.27			
0.10000	0.08	0.27			
0.20000	0.10	0.27			
0.30000	0.00	0.27			
0.40000	-0.01	0.27			
0.50000	0.05	0.27			
0.60000	-0.03	0.27			
0.70000	0.01	0.27			
0.80000	0.04	0.27			
0.90000	0.05	0.27			
1.00000	0.05	0.27			

End of Certificate