



SOUTHWEST RESEARCH INSTITUTE™

6220 Culebra Road, P.O. Drawer 28510
Institute Quality Systems
Institute Calibration Laboratory
Phone: 210-522-5215 Fax 210-522-3692

Certificate of Calibration

Submitted By: DIV20

Address: B57

Contact: DARRELL DUNN

Manufacturer Model: STARRETT 734M

Description: MICROMETER

Serial No: 02437171

Asset No: 010084

Procedure: MICROMETERS, 07/02

Work Order: 444052306

Date Issued: Feb 7, 2003

Calibration Date: Feb 7, 2003

****Calibration Due:** Feb 7, 2004

Calibration Location: Bldg. 64

Environment: Temp. 68.0°F Hum. 40 %RH

***As Found:** IN TOLERANCE

***As Left:** IN TOLERANCE

This certificate documents traceability to the National Institute of Standards and Technology (NIST) and the International System of Units (SI). The Laboratory quality system conforms to ISO/IEC 17025, 1999 and ANSI/NCCL Z540-1-1994 which are equivalent to relevant requirements of the ISO 9000-1994 series of standards. This certificate may not be reproduced, except in full, without the written approval of the Southwest Research Institute Calibration Laboratory. The results of this calibration relate only to the individual instrument described above. This certificate shall not be used to claim product endorsement by the American Association for Laboratory Accreditation (A2LA) or any agency of the U. S. Government.

Uncertainty evaluation includes the item under test and is calculated in accordance with the ISO "Guide to the Expression of Uncertainty in Measurement" (GUM). The uncertainty represents an expanded uncertainty using a coverage factor of $k=2$ to approximate a 95% confidence level. The calibration process provides a Test Uncertainty Ratio (TUR) of less than or equal to 25% (4:1) of the test limit unless otherwise stated in remarks or an attachment.

*The client has sole responsibility for determination of in/out of tolerance or compliance/noncompliance. An in/out of tolerance opinion is provided for your convenience based only on the Test Instrument (TI) reading(s) and limits as reported. The reported uncertainty relates only to the results at the time of calibration and does not imply any short or long term stability of the TI.

**Calibration interval is determined by the client and does not assure the instrument will remain within tolerance until this date. Any number of factors may cause the instrument to be out of tolerance before the next calibration date.

Remarks: None

Standards Used

Asset	Manufacturer	Model	Description	Cal Due
006465	STARRETT	SS81A1	GAGE BLOCK SET	Jun 29, 04
006179	STARRETT	OFPS2	OPTICAL PARALLEL SET	Mar 13, 04

Approved by: Walt Hill

Metrology Group Leader

m:\Nona21a1.rpt Rev date 15, August 02

Measurements by: Perry Carpenter

Metrology Technician

Southwest Research Institute
 Calibration Laboratory
 Calibration Data sheet.

Work Order	444052306	Mfr	STARRETT	Tech:	Perry Carpenter
Asset No.	010084	Model	734M	Procedure:	Micrometers
Serial No.	02437171	Type	Micrometer 25 mm	Cal Date:	07-Feb-03

Remarks:

Function/Range	Test Point	Parameter: Length (mm)		Test Limits+/-	Uncertainty	Found/Left
		TI Reading	Difference			
		MM	MM	MM	MM	Results
Flatness	Anvil					Pass
	Spindle					Pass
Parallelism	Anvil/Spindle					Pass
Linearity	3.048	3.050	0.002	0.003	0.001	Pass
	6.502	6.502	0.000	0.003	0.001	Pass
	13.004	13.005	0.001	0.003	0.001	Pass
	19.507	19.507	0.000	0.003	0.001	Pass
	24.130	24.130	0.000	0.003	0.001	Pass

END OF REPORT



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0972-01

Certificate of Calibration

Submitted By: DIV20
Address: B57
Contact: DARRELL DUNN
Manufacturer Model: STARRETT 734M
Description: MICROMETER
Serial No: 02437171
Asset No: 010084
Procedure: MICROMETERS, JUL/02

Work Order: 444057797
Date Issued: Mar 10, 2004
Calibration Date: Mar 10, 2004
****Calibration Due:** Mar 10, 2005
Calibration Location: Bldg. 64
Environment: Temp. 68.0°F Hum. 44 %RH
***As Found:** IN TOLERANCE
***As Left:** IN TOLERANCE

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Uncertainty evaluation includes the item under test and is calculated in accordance with the ISO "Guide to the Expression of Uncertainty in Measurement" (GUM). The uncertainty represents an expanded uncertainty using a coverage factor of k=2 to approximate a 95% confidence level. The calibration process provides a Test Uncertainty Ratio (TUR) of less than or equal to 25% (4:1) of the test limit unless otherwise stated in remarks or an attachment.

*The client has sole responsibility for determination of in/out of tolerance or compliance/noncompliance. An in/out of tolerance opinion is provided for your convenience based only on the Test Instrument (TI) reading(s) and limits as reported. The reported uncertainty relates only to the results at the time of calibration and does not imply any short or long term stability of the TI.

**Calibration interval is determined by the client and does not assure the instrument will remain within tolerance until this date. Any number of factors may cause the instrument to be out of tolerance before the next calibration date.

Remarks: None

Standards Used

Asset	Manufacturer	Model	Description	Cal Due
006465	STARRETT	SS81A1	GAGE BLOCK SET	Jun 29, 04
006178	STARRETT	OFS2 MC	OPTICAL FLAT, 2IN MASTER GRADE	May 05, 07

Approved by: Walt Hill
Metrology Group Leader

Measurements by: Perry Carpenter
Metrology Technician

Southwest Research Institute
Calibration Laboratory
Calibration Report

Work Order	444057797	Mfr	Starrett	Tech:	PWC
Asset No.	010084	Model	734M	Cal Date:	10-Mar-04
Serial No.	02437171	Type	Micrometer 25 mm		
Remarks:					

Function/Range	Test Point	TI Reading	Difference	+/-Limit	+/-Uncertainty	Found/Left
	mm	mm	mm	mm	mm	Result
Flatness	Anvil					Pass
	Spindle					Pass
Parallelism	Anvil/Spindle	Parallelism				Pass
Linearity	3.048	3.050	0.002	0.004	0.0058	Pass
	6.502	6.501	-0.001	0.004	0.0058	Pass
	13.004	13.005	0.001	0.004	0.0058	Pass
	19.507	19.507	0.000	0.004	0.0058	Pass
	24.130	24.129	-0.001	0.004	0.0058	Pass

END OF REPORT



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Certificate #
0972-01

Certificate of Calibration

Submitted By: DIV20
Address: B57
Contact: DARRELL DUNN
Manufacturer Model: STARRETT 734M
Description: MICROMETER
Serial No: 02437171
Asset No: 010084
Procedure: MICROMETERS, APR/04

Work Order: 303063397
Date Issued: Mar 24, 2005
Calibration Date: Mar 24, 2005
****Calibration Due:** Mar 24, 2006
Calibration Location: Bldg. 64
Environment: Temp. 68.0°F Hum. 44 %RH
***As Found:** IN TOLERANCE
***As Left:** IN TOLERANCE

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Uncertainty evaluation includes the item under test and is calculated in accordance with the ISO "Guide to the Expression of Uncertainty in Measurement" (GUM). The uncertainty represents an expanded uncertainty using a coverage factor of k=2 to approximate a 95% confidence level. See Remarks or attached Calibration Report with the same Work Order number for calibration data.

*The client has sole responsibility for determination of in/out of tolerance or compliance/noncompliance. An in/out of tolerance opinion is provided for your convenience based only on the Test Instrument (TI) reading(s) and limits as reported. The reported uncertainty relates only to the results at the time of calibration and does not imply any short or long term stability of the TI.

**Calibration interval is determined by the client and does not assure the instrument will remain within tolerance until this date. Any number of factors may cause the instrument to be out of tolerance before the next calibration date.

Remarks: None

Standards Used

Asset	Manufacturer	Model	Description	Cal Due
006179	STARRETT	OFPS2	OPTICAL PARALLEL SET	Mar 29, 07
006465	STARRETT	SS81A1	GAGE BLOCK SET	Aug 18, 07

Approved by: Walt Hill
Metrology Group Leader

m:\a2la1.rpt Rev date 11, May 04

Measurements by: Curtis Laurence
Metrology Technician

Southwest Research Institute
Calibration Laboratory
Measurement Report

Work Order	303063397	Mfr	Starrett	Tech:	WCL
Asset No.	010084	Model	734M	Cal Date:	24-Mar-05
Serial No.	2437171	Type	Outside Micrometer		
Remarks:					

Function/Range	Test Point	TI Reading	Difference	+/-Limit	+/-Uncertainty	Found/Left
Flatness						Result
Anvil						Pass
Spindle						Pass
Parallelism						Pass
Linearity	mm	mm	mm	mm	mm	
	3.048	3.050	0.002	0.003	0.0017	Pass
	6.502	6.505	0.003	0.003	0.0017	Pass
	13.005	13.007	0.002	0.003	0.0017	Pass
	19.507	19.510	0.003	0.003	0.0017	Pass
	24.130	24.131	0.001	0.003	0.0017	Pass

END OF REPORT