



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: SNAP-ON QDRIVER2

Description: TORQUE SCREWDRIVER

Serial No: 1001200319

Asset No: 010443

Procedure: HAND TORQUE TOOLS, NOV/00

Work Order: 444055210

Date Issued: Sep 4, 2003

Calibration Date: Sep 4, 2003

****Calibration Due:** Mar 4, 2004

Calibration Location: Bldg. 64

Environment: Temp. 73.0°F Hum. 52 %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/NCSL 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.

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Remarks: None

Standards Used

Asset	Manufacturer	Model	Description	Cal Due
007010	CDI	1001-0-TTTP	TORQUE TRANSDUCER	Dec 04, 03

Approved by: Walt Hill
Metrology Group Leader

Measurements by: Perry Carpenter
Metrology Technician

Southwest Research Institute
Calibration Laboratory
Calibration Report

Work Order:	444055210	Mfr.	Snap-On	Technician	PWC
Asset No.	010443	Model	Qdriver2		
Serial No.	1001200319	Type.	Torque Screwdriver	Cal Date.	04-Sep-03
Remarks:					

Function/Range	Test Point	TI Reading	Difference	+/-Limit	+/-Uncertainty	Found/Left
Torque Clockwise	oz-in	oz-in	oz-in	oz-in	oz-in	Result
	20.0	19.5	-0.5	1.2	0.2	Pass
	20.0	19.3	-0.7	1.2	0.2	Pass
	20.0	18.9	-1.1	1.2	0.2	Pass
	20.0	18.9	-1.1	1.2	0.2	Pass
	20.0	19.9	-0.1	1.2	0.2	Pass
	20.0	19.5	-0.5	1.2	0.2	Pass
	20.0	18.9	-1.1	1.2	0.2	Pass
	20.0	19.3	-0.7	1.2	0.2	Pass
	20.0	20.0	0.0	1.2	0.2	Pass
	20.0	19.7	-0.3	1.2	0.2	Pass
	20.0	19.5	-0.5	1.2	0.2	Pass
	20.0	19.0	-1.0	1.2	0.2	Pass
	60.0	58.3	-1.7	3.6	0.6	Pass
	60.0	60.6	0.6	3.6	0.6	Pass
	60.0	58.7	-1.3	3.6	0.6	Pass
	60.0	58.2	-1.8	3.6	0.6	Pass
	60.0	58.4	-1.7	3.6	0.6	Pass
	60.0	60.0	0.0	3.6	0.6	Pass
	60.0	59.5	-0.5	3.6	0.6	Pass
	60.0	58.9	-1.2	3.6	0.6	Pass
	60.0	58.4	-1.6	3.6	0.6	Pass
	60.0	60.6	0.6	3.6	0.6	Pass
	60.0	59.6	-0.4	3.6	0.6	Pass
	60.0	58.1	-1.9	3.6	0.6	Pass
	100.0	101.6	1.6	6.0	1.0	Pass
	100.0	102.8	2.8	6.0	1.0	Pass
	100.0	103.3	3.3	6.0	1.0	Pass
	100.0	103.9	3.9	6.0	1.0	Pass
	100.0	103.8	3.8	6.0	1.0	Pass
	100.0	105.0	5.0	6.0	1.0	Pass
	100.0	104.9	4.9	6.0	1.0	Pass
	100.0	103.2	3.2	6.0	1.0	Pass
	100.0	103.7	3.7	6.0	1.0	Pass
	100.0	102.7	2.7	6.0	1.0	Pass
	100.0	102.9	2.9	6.0	1.0	Pass
	100.0	104.2	4.2	6.0	1.0	Pass

END OF REPORT



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Institute Calibration Laboratory
Phone: 210-522-5215 Fax 210-522-3692



Certificate #

0972-01

Certificate of Calibration

Submitted By: DIV20

Address: B57

Contact: DARRELL DUNN

Manufacturer Model: SNAP-ON QDRIVER2

Description: TORQUE SCREWDRIVER

Serial No: 1001200319

Asset No: 010443

Procedure: HAND TORQUE TOOLS, NOV/00

Work Order: 444057795

Date Issued: Mar 3, 2004

Calibration Date: Mar 3, 2004

**Calibration Due: Sep 3, 2004

Calibration Location: Bldg. 64

Environment: Temp. 73.0°F Hum. 54 %RH

*As Found: IN TOLERANCE

*As Left: IN TOLERANCE

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Remarks: Cal'd Clockwise Only

Standards Used

Asset	Manufacturer	Model	Description	Cal Due
007010	CDI	1001-0-TTTP	TORQUE TRANSDUCER	Mar 09, 04

Approved by: Walt Hill
Metrology Group Leader

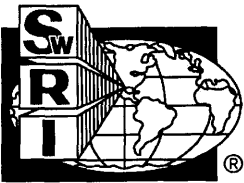
Measurements by: Perry Carpenter
Metrology Technician

Southwest Research Institute
Calibration Laboratory
Calibration Report

Work Order:	444057795	Mfr.	Snap-On	Technician	PWC
Asset No.	010443	Model	QDRIVER2		
Serial No.	1001200319	Type.	Torque Screwdriver	Cal Date.	03-Mar-04
Remarks:					

Function/Range	Test Point	TI Reading	Difference	+/-Limit	+/-Uncertainty	Found/Left
Torque Clockwise	oz-in	oz-in	oz-in	oz-in	oz-in	Result
	20.0	19.2	-0.8	1.2	0.6	Pass
	20.0	19.7	-0.3	1.2	0.6	Pass
	20.0	20.2	0.2	1.2	0.6	Pass
	20.0	20.2	0.2	1.2	0.6	Pass
	20.0	19.3	-0.7	1.2	0.6	Pass
	20.0	19.4	-0.6	1.2	0.6	Pass
	20.0	19.4	-0.6	1.2	0.6	Pass
	20.0	19.7	-0.4	1.2	0.6	Pass
	20.0	19.0	-1.0	1.2	0.6	Pass
	20.0	19.7	-0.3	1.2	0.6	Pass
	20.0	19.4	-0.6	1.2	0.6	Pass
	20.0	19.5	-0.6	1.2	0.6	Pass
	60.0	59.6	-0.4	3.6	0.8	Pass
	60.0	59.3	-0.7	3.6	0.8	Pass
	60.0	59.7	-0.3	3.6	0.8	Pass
	60.0	59.7	-0.3	3.6	0.8	Pass
	60.0	58.2	-1.8	3.6	0.8	Pass
	60.0	61.8	1.8	3.6	0.8	Pass
	60.0	59.9	-0.1	3.6	0.8	Pass
	60.0	57.7	-2.3	3.6	0.8	Pass
	60.0	59.8	-0.2	3.6	0.8	Pass
	60.0	60.2	0.2	3.6	0.8	Pass
	60.0	59.1	-0.9	3.6	0.8	Pass
	60.0	58.8	-1.2	3.6	0.8	Pass
	100.0	103.7	3.7	6.0	1.1	Pass
	100.0	103.5	3.5	6.0	1.1	Pass
	100.0	103.3	3.3	6.0	1.1	Pass
	100.0	103.7	3.7	6.0	1.1	Pass
	100.0	103.4	3.4	6.0	1.1	Pass
	100.0	100.5	0.5	6.0	1.1	Pass
	100.0	102.6	2.6	6.0	1.1	Pass
	100.0	103.6	3.6	6.0	1.1	Pass
	100.0	102.0	2.0	6.0	1.1	Pass
	100.0	104.4	4.4	6.0	1.1	Pass
	100.0	104.8	4.8	6.0	1.1	Pass
	100.0	101.1	1.1	6.0	1.1	Pass

END OF REPORT



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Institute Calibration Laboratory
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Certificate #

0972-01

Certificate of Calibration

Submitted By: DIV20

Address: B57

Contact: DARRELL DUNN

Manufacturer Model: SNAP-ON QDRIVER2

Description: TORQUE SCREWDRIVER

Serial No: 1001200319

Asset No: 010443

Procedure: TORQUE HAND TOOLS, MAR/03

Work Order: 444060614

Date Issued: Sep 3, 2004

Calibration Date: Sep 3, 2004

****Calibration Due:** Mar 3, 2005

Calibration Location: Bldg. 64

Environment: Temp. 74.0°F Hum. 56 %RH

***As Found:** IN TOLERANCE

***As Left:** IN TOLERANCE

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Remarks: Calibrated Clockwise Only.

Standards Used

Asset	Manufacturer	Model	Description	Cal Due
007010	CDI	1001-0-TTTP	TORQUE TRANSDUCER	Sep 24, 04

Approved by: Walt Hill
Metrology Group Leader

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

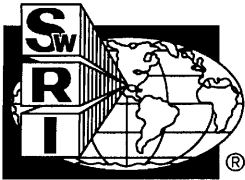
Measurements by: Perry Carpenter
Metrology Technician

Southwest Research Institute
Calibration Laboratory
Calibration Report

Work Order:	444060614	Mfr.	Snap-On	Technician	PWC
Asset No.	010443	Model	QDriver2		
Serial No.	1001200319	Type.	Torque Screwdriver	Cal Date.	03-Sep-04
Remarks: Calibrated Clockwise Only.					

Function/Range	Test Point	TI Reading	Difference	+/-Limit	+/-Uncertainty	Found/Left
Torque Clockwise	oz-in	oz-in	oz-in	oz-in	oz-in	Result
	20.0	19.0	-1.0	1.2	0.20	Pass
	20.0	19.5	-0.5	1.2	0.20	Pass
	20.0	19.2	-0.8	1.2	0.20	Pass
	20.0	19.1	-0.9	1.2	0.20	Pass
	20.0	19.4	-0.6	1.2	0.20	Pass
	20.0	19.7	-0.3	1.2	0.20	Pass
	20.0	19.0	-1.0	1.2	0.20	Pass
	20.0	19.4	-0.6	1.2	0.20	Pass
	20.0	19.4	-0.6	1.2	0.20	Pass
	20.0	19.5	-0.5	1.2	0.20	Pass
	20.0	19.4	-0.6	1.2	0.20	Pass
	20.0	19.4	-0.6	1.2	0.20	Pass
	60.0	59.1	-0.9	3.6	0.60	Pass
	60.0	60.4	0.4	3.6	0.60	Pass
	60.0	59.3	-0.7	3.6	0.60	Pass
	60.0	58.2	-1.9	3.6	0.60	Pass
	60.0	57.8	-2.2	3.6	0.60	Pass
	60.0	59.4	-0.6	3.6	0.60	Pass
	60.0	58.3	-1.7	3.6	0.60	Pass
	60.0	60.0	0.0	3.6	0.60	Pass
	60.0	59.5	-0.5	3.6	0.60	Pass
	60.0	60.0	0.0	3.6	0.60	Pass
	60.0	58.3	-1.7	3.6	0.60	Pass
	60.0	59.3	-0.7	3.6	0.60	Pass
	100.0	103.0	3.0	6.0	1.0	Pass
	100.0	103.6	3.6	6.0	1.0	Pass
	100.0	103.4	3.4	6.0	1.0	Pass
	100.0	103.2	3.2	6.0	1.0	Pass
	100.0	104.0	4.0	6.0	1.0	Pass
	100.0	104.5	4.5	6.0	1.0	Pass
	100.0	102.1	2.1	6.0	1.0	Pass
	100.0	103.1	3.1	6.0	1.0	Pass
	100.0	102.9	2.9	6.0	1.0	Pass
	100.0	103.2	3.2	6.0	1.0	Pass
	100.0	103.4	3.4	6.0	1.0	Pass
	100.0	103.6	3.6	6.0	1.0	Pass

END OF REPORT



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Institute Calibration Laboratory
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Certificate of Calibration

Submitted By: DIV20

Address: B57

Contact: DARRELL DUNN

Manufacturer Model: SARTORIUS ME215S

Description: BALANCE

Serial No: 12809099

Asset No: 008780

Procedure: CLCP-WT-001, 12/99

Work Order: 444051176

Date Issued: Nov 18, 2002

Calibration Date: Nov 15, 2002

****Calibration Due:** May 15, 2003

Calibration Location: B57 LAB III

Environment: Temp. 72.0°F Hum. 35 %RH

***As Found:** IN TOLERANCE

***As Left:** IN TOLERANCE

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Remarks: None

Standards Used

Asset	Manufacturer	Model	Description	Cal Due
005117	RICE LAKE	200G	WEIGHT, CLASS E2	Jun 14, 03
001711	RICE LAKE	50G	WEIGHT, CLASS S	Jun 14, 03

Approved by: Walt Hill
Metrology Group Leader
m:\Nona2\al.rpt Rev date 15, August 02

Measurements by: Mark Romero
Metrology Technician

Southwest Research Institute
Calibration Laboratory
Calibration Data Sheet

Work Order	444051176	Mfr.	Sartorius	Technician	Mark A. Romero
Asset No.	008780	Model	ME215S	Procedure	CLCP-WT-001, 12/99
Serial No.	12809099	Type	Balance	Cal Date	15-Nov-02

Location: Bldg. 57/ Lab III

Ambient Conditions: 72 F 35 %RH 14.23 PSIA

Operational Check: Limits +/- : 0.00041 g Uncertainty: 0.00044 g

STD Mass Load	As Found Indication	Instrument Error
200.00000 g	199.99956 g	-0.00044 g

Post Calibration Check:

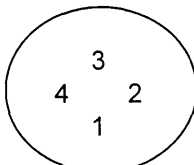
STD Mass Load	Post calibration Indication	Instrument Error	Results
200.00000 g	200.00002 g	0.00002 g	Pass

Repeatability Check: Mass Load: 200.00000 g

1	200.00002 g	6	200.00000 g
2	200.00002 g	7	200.00001 g
3	200.00005 g	8	200.00002 g
4	200.00003 g	9	200.00002 g
5	200.00002 g	10	200.00005 g

Std Deviation	Tolerance
0.00002 g	0.00003 g

Off-Centerline Check: Mass Load: 200.00000 g Uncertainty: 0.00044 g



4	3
1	2

	Indication	Instrument Error	+/- Limits	Results
1	-0.00007 g	-0.00007 g	0.00015	Pass
2	0.00003 g	0.00003 g	0.00015	Pass
3	0.00007 g	0.00007 g	0.00015	Pass
4	-0.00008 g	-0.00008 g	0.00015	Pass

Non-Linearity Check: Range: 200.00000 g Uncertainty: 0.00044 g

STD Mass Load	Indication	Instrument Error	+/- Limits	Results
0.00000 g	0.00000 g	0.00000 g	0.00010	Pass
50.00000 g	50.00008 g	0.00008 g	0.00010	Pass
100.00000 g	50.00006 g	0.00006 g	0.00010	Pass
150.00000 g	50.00007 g	0.00007 g	0.00010	Pass
200.00000 g	50.00005 g	0.00005 g	0.00010	Pass

Remarks: Readability 0.01mg. Standards used 5117 and 1711.



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Certificate of Calibration

Submitted By: DIV20

Address: B57

Contact: DARRELL DUNN

Manufacturer Model: SARTORIUS ME215S

Description: BALANCE

Serial No: 12809099

Asset No: 008780

Procedure: CLCP-WT-001, DEC/99

Work Order: 444053802

Date Issued: May 19, 2003

Calibration Date: May 15, 2003

****Calibration Due:** Nov 15, 2003

Calibration Location: B57

Environment: Temp. 68.0°F Hum. 56 %RH

***As Found:** IN TOLERANCE

***As Left:** IN TOLERANCE

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Remarks: None

Standards Used

Asset	Manufacturer	Model	Description	Cal Due
005117	RICE LAKE	200G	WEIGHT, CLASS E2	Jun 14, 03
001711	RICE LAKE	50G	WEIGHT, CLASS S	Jun 14, 03

Approved by: Walt Hill
Metrology Group Leader
m:\Nona2\la1.rpt Rev date 15, August 02

Measurements by: Vince Morales
Metrology Technician

Southwest Research Institute

Calibration Laboratory

Calibration Data Sheet

Work Order	444053802	Mfr.	Sartorius	Technician	Vmorales
Asset No.	008780	Model	ME215S	Procedure	CLCP-WT-001, 12/99
Serial No.	12809099	Type	Balance	Cal Date	15-May-03

Location: Bldg. 57/ Lab III

Ambient Conditions: 68 F 56 %RH 14.16 PSIA

Operational Check: Limits +/- : 0.00055 g Uncertainty: 0.00044 g

STD Mass Load	As Found Indication	Instrument Error
200.00000 g	199.99992 g	-0.00008 g

Post Calibration Check:

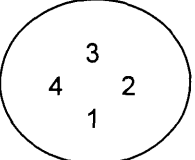
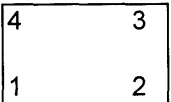
STD Mass Load	Post calibration Indication	Instrument Error	Results
200.00000 g	199.99992 g	-0.00008 g	Pass

Repeatability Check: Mass Load: 200.00000 g

1	199.99993 g	6	199.99996 g
2	199.99993 g	7	199.99994 g
3	199.99995 g	8	199.99994 g
4	199.99995 g	9	199.99991 g
5	199.99995 g	10	199.99993 g

Std Deviation	Tolerance
0.00001 g	0.00003 g

Off-Centerline Check: Mass Load: 200.00000 g Uncertainty: 0.00044 g

	Indication	Instrument Error	+/- Limits	Results
1	0.00000 g	0.00000 g	0.00015	Pass
2	0.00012 g	0.00012 g	0.00015	Pass
3	0.00012 g	0.00012 g	0.00015	Pass
4	-0.00004 g	-0.00004 g	0.00015	Pass

Non-Linearity Check: Range: 200.00000 g Uncertainty: 0.00044 g

STD Mass Load	Indication	Instrument Error	+/- Limits	Results
0.00000 g	0.00000 g	0.00000 g	0.00010	Pass
50.00000 g	50.00004 g	0.00004 g	0.00010	Pass
100.00000 g	50.00006 g	0.00006 g	0.00010	Pass
150.00000 g	50.00008 g	0.00008 g	0.00010	Pass
200.00000 g	50.00009 g	0.00009 g	0.00010	Pass

Remarks: Readability 0.01mg. Standards used 5117 and 1711.

END OF REPORT



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

0972-01

Submitted By: DIV20

Address: B57

Contact: DARRELL DUNN

Manufacturer Model: SARTORIUS ME215S

Description: BALANCE

Serial No: 12809099

Asset No: 008780

Procedure: CLCP-WT-001, DEC/99

Work Order: 444056308

Date Issued: Nov 14, 2003

Calibration Date: Nov 14, 2003

****Calibration Due:** May 14, 2004

Calibration Location: B57

Environment: Temp. 73.0°F Hum. 36 %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
005117	RICE LAKE	200G	WEIGHT, CLASS E2	Jun 20, 04
001711	RICE LAKE	50G	WEIGHT, CLASS S	Jun 23, 04

Approved by: Walt Hill
Metrology Group Leader
m:\a2la1.rpt Rev date 15, August 02

Measurements by: Tom Hannon
Metrology Technician

Southwest Research Institute

Calibration Laboratory

Calibration Data Sheet

Work Order 444056308	Mfr. Sartorius	Technician TJH
Asset No. 008780	Model ME215S	Procedure CLCP-WT-001, 12/99
Serial No. 12809099	Type Balance	Cal Date 14-Nov-03

Location: Bldg. 57/ Lab III

Ambient Conditions: 73 F 36 %RH 14.37 PSIA

Operational Check: Limits +/- : 0.00055 g Uncertainty: 0.00044 g

STD Mass Load	As Found Indication	Instrument Error
200.00000 g	200.00000 g	0.00000 g

Post Calibration Check:

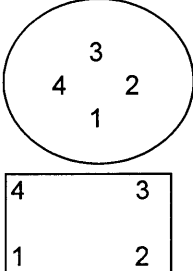
STD Mass Load	Post calibration Indication	Instrument Error	Results
200.00000 g	200.00000 g	0.00000 g	Pass

Repeatability Check: Mass Load: 200.00000 g

1	199.99998 g	6	199.99999 g
2	199.99999 g	7	200.00000 g
3	199.99999 g	8	200.00001 g
4	200.00000 g	9	200.00001 g
5	200.00000 g	10	200.00001 g

Std Deviation	Tolerance
0.00001 g	0.00003 g

Off-Centerline Check: Mass Load: 200.00000 g Uncertainty: 0.00044 g



	Indication	Instrument Error	+/- Limits	Results
1	0.00000 g	0.00000 g	0.00015	Pass
2	0.00006 g	0.00006 g	0.00015	Pass
3	0.00000 g	0.00000 g	0.00015	Pass
4	-0.00005 g	-0.00005 g	0.00015	Pass

Non-Linearity Check: Range: 200.00000 g Uncertainty: 0.00044 g

STD Mass Load	Indication	Instrument Error	+/- Limits	Results
0.00000 g	0.00000 g	0.00000 g	0.00010	Pass
50.00000 g	50.00000 g	0.00000 g	0.00010	Pass
100.00000 g	50.00004 g	0.00004 g	0.00010	Pass
150.00000 g	50.00007 g	0.00007 g	0.00010	Pass
200.00000 g	50.00006 g	0.00006 g	0.00010	Pass

Remarks: Readability 0.01mg. Standards used 5117 and 1711.

END OF REPORT



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Institute Quality Systems
Institute Calibration Laboratory
Phone: 210-522-5215 Fax 210-522-3692



Certificate #

0972-01

Certificate of Calibration

Submitted By: DIV20

Address: B57

Contact: DARRELL DUNN

Manufacturer Model: SARTORIUS ME215S

Description: BALANCE

Serial No: 12809099

Asset No: 008780

Procedure: CLCP-WT-001, DEC/99

Work Order: 444058988

Date Issued: May 14, 2004

Calibration Date: May 14, 2004

****Calibration Due:** Nov 14, 2004

Calibration Location: B57

Environment: Temp. 81.0°F Hum. 35 %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/NC SL 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. 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
005117	RICE LAKE	200G	WEIGHT, CLASS E2	Jun 20, 04
001711	RICE LAKE	50G	WEIGHT, CLASS S	Jun 23, 04

Approved by: Walt Hill
Metrology Group Leader

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

Measurements by: Tom Hannon
Metrology Technician

Southwest Research Institute

Calibration Laboratory

Calibration Data Sheet

Found / Left

Work Order	444058988	Mfr.	Sartorius	Technician	TJH
Asset No.	008780	Model	ME215S	Procedure	CLCP-WT-001, 12/99
Serial No.	12809099	Type	Balance	Cal Date	14-May-03

Location: Bldg. 57/ Lab III

Ambient Conditions: 81 F 35 %RH 14.31 PSIA

Operational Check: Limits +/- : 0.00055 g Uncertainty: 0.00044 g

STD Mass Load	As Found Indication	Instrument Error
200.00000 g	199.99945 g	-0.00055 g

Post Calibration Check:

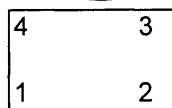
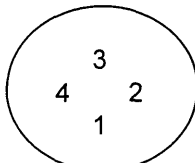
STD Mass Load	Post calibration Indication	Instrument Error	Results
200.00000 g	199.99999 g	-0.00001 g	Pass

Repeatability Check: Mass Load: 200.00000 g

1	199.99999 g	6	199.99998 g
2	199.99999 g	7	199.99999 g
3	199.99998 g	8	199.99999 g
4	200.00000 g	9	199.99998 g
5	199.99999 g	10	199.99999 g

Std Deviation	Tolerance
0.00001 g	0.00003 g

Off-Centerline Check: Mass Load: 200.00000 g Uncertainty: 0.00044 g



	Indication	Instrument Error	+/- Limits	Results
1	-0.00002 g	-0.00002 g	0.00015	Pass
2	0.00009 g	0.00009 g	0.00015	Pass
3	0.00001 g	0.00001 g	0.00015	Pass
4	0.00003 g	0.00003 g	0.00015	Pass

Non-Linearity Check: Range: 200.00000 g Uncertainty: 0.00044 g

STD Mass Load	Indication	Instrument Error	+/- Limits	Results
0.00000 g	0.00000 g	0.00000 g	0.00010	Pass
50.00000 g	49.99995 g	-0.00005 g	0.00010	Pass
100.00000 g	50.00001 g	0.00001 g	0.00010	Pass
150.00000 g	50.00001 g	0.00001 g	0.00010	Pass
200.00000 g	50.00001 g	0.00001 g	0.00010	Pass

Remarks: Readability 0.01mg.

END OF REPORT



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Institute Quality Systems
Institute Calibration Laboratory
Phone: 210-522-5215 Fax 210-522-3692



Certificate #

0972-01

Certificate of Calibration

Submitted By: DIV20

Address: B57

Contact: DARRELL DUNN

Manufacturer Model: SARTORIUS ME215S

Description: BALANCE

Serial No: 12809099

Asset No: 008780

Procedure: CLCP-WT-001, DEC/99

Work Order: 444061602

Date Issued: Nov 10, 2004

Calibration Date: Nov 10, 2004

****Calibration Due:** May 10, 2005

Calibration Location: B57

Environment: Temp. 69.0°F Hum. 45 %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. 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
001711	RICE LAKE	50G	WEIGHT, CLASS S	Jun 23, 05
001713	RICE LAKE	200G	WEIGHT, CLASS S	Jun 23, 05

Approved by: Walt Hill
Metrology Group Leader
m:\a2la1.rpt Rev date 11, May 04

Measurements by: Jerry White
Metrology Technician

Southwest Research Institute
Calibration Laboratory
Measurement Report

Work Order:	444061602	Mfr.	Sartorius	Technician	jaw
Asset No.	008780	Model	ME215S		
Serial No.	12809099	Type.	Balance	Cal Date.	10-Nov-04
Remarks:					
Ambient Conditions		69 deg F		45 % RH	
				14.30 PSIA	

Function/Range	Test Point	TI Reading	Difference	+/-Limit	+/-Uncertainty	Found/Left
Repeatability Check	grams	grams	grams	grams	grams	Result
1	200.00000	199.99995				
2	200.00000	199.99994				
3	200.00000	199.99995				
4	200.00000	199.99995				
5	200.00000	199.99994				
6	200.00000	199.99994				
7	200.00000	199.99994				
8	200.00000	199.99994				
9	200.00000	199.99994				
10	200.00000	199.99994				
		Std Deviation	0.000007	0.00003		Pass
Offcenter Check						
Front	200.00000	199.99995	-0.00005	0.00015	0.000060	Pass
Right	200.00000	200.00005	0.00005	0.00015	0.000060	Pass
Rear	200.00000	200.00004	0.00004	0.00015	0.000060	Pass
Left	200.00000	199.99995	-0.00005	0.00015	0.000060	Pass
Nonlinearity Check						
0	0.00000	0.00000	0.00000	0.00010	0.000050	Pass
50	49.99995	50.00000	0.00005	0.00010	0.000050	Pass
100	50.00001	50.00001	0.00000	0.00010	0.000056	Pass
150	50.00001	50.00002	0.00001	0.00010	0.000056	Pass
200	50.00001	50.00002	0.00001	0.00010	0.000060	Pass

End of Report