

***National Type Evaluation Program  
 Certificate of Conformance  
 for Weighing and Measuring Devices***

**For:**  
 Load Cell  
 Double Ended Shear Beam  
 Models: 5103-A and 5103-B Series  
 $n_{max}$ , Multiple Cells: 5000 (Class III)  
 $n_{max}$ , Multiple Cells: 10 000 (Class III L)  
 Capacity: 5000 lb to 250 000 lb (See Page 2)

Accuracy Class: III/III L

**Submitted by:**  
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**Standard Features and Options**

The 5103 Series is identified by the model designation 5103-X<sub>1</sub>X<sub>2</sub>-YK-Z<sub>1</sub>Z<sub>2</sub>Z<sub>3</sub>Z<sub>4</sub>, where:

5103	X <sub>1</sub>	X <sub>2</sub>	YK	Z <sub>1</sub>	Z <sub>2</sub>	Z <sub>3</sub>	Z <sub>4</sub>
	A = Class III B = Class III L	$n_{max}$ in thousands	capacity in thousands of pounds	electrical cable length or connector		P = analog D = digital	wiring and private label variations

The specific load cell capacities,  $v_{min}$  values, and minimum dead loads covered by this Certificate are listed in the tables on Page 2.

Nominal output: 3 mV/V  
 4-wire design

Temperature Range: -10 °C to 40 °C (14 °F to 104 °F)

This device was evaluated under the National Type Evaluation Program (NTEP) and was found to comply with the applicable technical requirements of Handbook 44, "Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices." Evaluation results and device characteristics necessary for inspection and use in commerce are on the following pages.

Effective Date: April 9, 1999

*Louis E. Straub*

Louis E. Straub  
 Chairman, NCWM, Inc.

*G. Weston Diggs*

G. Weston Diggs  
 Chairman, National Type Evaluation Program Committee

Issue date: July 12, 1999

Note: The National Conference on Weights and Measures does not "approve", "recommend", or "endorse" any proprietary product or material, either as a single item or as a class or group. Results shall not be used in advertising or sales promotion to indicate explicit or implicit endorsement of the product or material by the NCWM.

This is a reissuance by the NCWM of a Certificate of Conformance already issued by the National Institute of Standards and Technology.

**Revere Transducers, Inc.**  
**Double Ended Shear Beam Load Cell**  
**Models: 5103-A and 5103-B Series**

**Model Designations:** \* Load cells submitted for evaluation

<b>Model</b>	<b>Capacity (lb)</b>	<b>v<sub>min</sub> (lb) Class III</b>	<b>Minimum Dead Load (lb)</b>
5103-A5-20K-ZZZZ	20 000	1.32	200
5103-A5-25K-ZZZZ	25 000	1.65	500
5103-A5-30K-ZZZZ	30 000	1.98	500
5103-A5-40K-ZZZZ	40 000	2.64	500
* 5103-A5-50K-ZZZZ	50 000	3.30	1000
5103-A5-60K-ZZZZ	60 000	3.96	1000
5103-A5-75K-ZZZZ	75 000	4.95	1500
5103-A5-100K-ZZZZ	100 000	6.60	2000
5103-A5-125K-ZZZZ	125 000	8.25	2000
5103-A5-150K-ZZZZ	150 000	9.90	3000
5103-A5-200K-ZZZZ	200 000	13.20	4000

<b>Model</b>	<b>Capacity (lb)</b>	<b>v<sub>min</sub> Class III L (lb)</b>	<b>Minimum Dead Load (lb)</b>
5103-B10-5K-ZZZZ	5000	0.16	200
* 5103-B10-10K-ZZZZ	10 000	0.33	200
5103-B10-20K-ZZZZ	20 000	0.66	200
5103-B10-25K-ZZZZ	25 000	0.83	500
5103-B10-30K-ZZZZ	30 000	1.0	500
5103-B10-40K-ZZZZ	40 000	1.3	500
5103-B10-50K-ZZZZ	50 000	1.6	1000
5103-B10-60K-ZZZZ	60 000	2.0	1000
5103-B10-75K-ZZZZ	75 000	2.5	1500
5103-B10-100K-ZZZZ	100 000	3.3	2000
5103-B10-125K-ZZZZ	125 000	4.1	2000
5103-B10-150K-ZZZZ	150 000	5.0	3000
5103-B10-200K-ZZZZ	200 000	6.6	4000
5103-B10-250K-ZZZZ	250 000	8.3	5000

**Revere Transducers, Inc.**  
**Double Ended Shear Beam Load Cell**  
**Model : 5103-A and 5103-B Series**

**Application:** The load cells may be used in Class III and III L scales for multiple cell applications consistent with the model designations, number of scale divisions, and parameters specified in this certificate. Load cells of a given accuracy class may be used in applications with lower accuracy class requirements provided the number of scale divisions, the  $v_{\min}$  values, and temperature range are suitable for the application. The manufacturer may market the load cell with fewer divisions ( $n_{\max}$ ) and with larger  $v_{\min}$  values than those listed on the certificate. However, the load cells must be marked with the appropriate  $n_{\max}$  and  $v_{\min}$  for which the load cell may be used.

**Identification:** A pressure sensitive identification badge containing the manufacturer, model designation, and serial number is located on the load cell. All other required information must be on an accompanying document including the serial number of the load cell.

**Test Conditions:** This Certificate supersedes Certificate of Conformance Number 86-039A2 and is issued to add a digital output option. This option was evaluated on a representative sample of a load cell equipped the digital output (Model SSB, Certificate of Conformance Number 86-041A3) and was tested at NIST using dead weights as the reference standard. The data were analyzed for single cell load cell applications. The load cell was tested over a temperature range of  $-10\text{ }^{\circ}\text{C}$  to  $40\text{ }^{\circ}\text{C}$ . Three tests were run at each temperature. The temperature effect on zero was measured and a time dependence test (creep) was performed. The barometric pressure test was waived due to the insensitivity of the load cell to barometric pressure. Previous test conditions are listed below for reference.

**Certificate of Conformance Number 86-039A2:** This Certificate superseded Certificate of Conformance Number 86-039A1 and was issued to include the 25 000-lb, 75 000-lb and 125 000-lb capacity load cells, and to expand the maximum number of divisions to 5000 for Class III multiple cell application load cells that range from 20 000-lb to 200 000-lb capacity for the 5103 Series.

Two 50 000-lb capacity load cells were tested at NIST using dead weights as the reference standard. The data were analyzed for multiple load cell applications. The cells were tested over a temperature range of  $-10\text{ }^{\circ}\text{C}$  to  $40\text{ }^{\circ}\text{C}$ . Three tests were run on each cell at each temperature. The temperature effect on zero was measured and a time dependence (creep) test was performed. The barometric pressure test was waived due to the insensitivity of the load cell design to changes in barometric pressure.

**Certificate of Conformance Number 86-039A1:** This Certificate was issued to upgrade the status from provisional to full for the 5000-lb, 10 000-lb and 20 000-lb capacity load cells based on NTEP policy.

Two 10 000-lb capacity load cells were tested at NIST using dead weights as the reference standard. The excitation was 10 Vdc. The data were analyzed for multiple load cell applications. The cells were tested over a temperature range of  $-10\text{ }^{\circ}\text{C}$  to  $40\text{ }^{\circ}\text{C}$ . Three tests were run on each cell at each temperature. The temperature effect on zero was measured and a time dependence (creep) test was performed. The barometric pressure test was waived due to the insensitivity of the load cell design to changes in barometric pressure.

**Certificate of Conformance Number 86-039:** This Certificate was issued in addition to Certificate of Conformance Number 86-039P Amended (dated July 25, 1988), to include the 150 000-lb, 200 000-lb and 250 000-lb capacity load cells, and to reflect new  $v_{\min}$  values for load cell capacities from 30 000 lb to 250 000 lb based on changes to NIST Handbook 44 performance requirements for the temperature effect on zero, effective January 1, 1991. This Certificate was issued to upgrade the status from provisional to full for load cell capacities from 30 000 lb to 250 000 lb based on NTEP policy. Certificate of Conformance Number 86-039PA1 remains in effect for load cells manufactured under that certificate with capacities less than 30 000 lb.

**Revere Transducers, Inc.**  
**Double Ended Shear Beam Load Cell**  
**Model: 5103-A and 5103-B Series**

**Certificate of Conformance Number 86-039PA1:** This Certificate was issued in addition to Certificate of Conformance Number 86-039P Amended (dated July 25, 1988) and Certificate of Conformance Number 86-039. This Certificate was issued to cover the 5000-lb capacity load cells not listed on Certificate of Conformance Number 86-039 and to reflect new  $v_{\min}$  values for the 5000-lb, 10 000-lb and 20 000-lb capacity load cells based on changes to NIST Handbook 44 performance requirements for the temperature effect on zero, effective January 1, 1991. Certificate of Conformance Number 86-039PA1 remains in effect for those load cells manufactured under that Certificate.

Two 50 000-lb capacity load cells were tested at NIST using dead weights as the reference standard. The excitation was 10 Vdc. The data were analyzed for multiple load cell applications. The cells were tested over a temperature range of  $-10^{\circ}\text{C}$  to  $40^{\circ}\text{C}$ . Three tests were run on each cell at each temperature. The temperature effect on zero was measured and a time dependence (creep) test was performed. The barometric pressure test was waived due to the insensitivity of the load cell design to changes in barometric pressure.

**Certificate of Conformance Number 86-039P Amended:** This Certificate was issued to define the features represented in the model designation and to include the 10 000-lb, 20 000-lb, 30 000-lb, and 40 000-lb capacity load cells to the 5103 Series; remove the 150 000-lb capacity load cell; and to reflect new  $v_{\min}$  values based on a factor of 1.0 rather than 0.7 applied to the temperature effect on the minimum dead load output.

**Certificate of Conformance Number 86-039P:** Two 50 000-lb capacity load cells were tested at the manufacturer's facility using a 20 000-lb capacity dead weight machine as the reference standard. The data were analyzed for multiple load cell applications. The cells were tested over a temperature range of  $-10^{\circ}\text{C}$  to  $40^{\circ}\text{C}$ . Three tests were run on each cell at each temperature. The temperature effect on zero was measured and a time dependence (creep) test was performed. The barometric pressure test was waived due to the insensitivity of the load cell design to changes in barometric pressure.

The results of these evaluations and information provided by the manufacturer indicate the load cells comply with the applicable requirements.

**Type Evaluation Criteria Used:** NIST Handbook 44, 1999 Edition

**Tested By:** NIST Force Group, NIST Office of Weights and Measures

**Information Reviewed By:** H. Oppermann (NIST) 86-039P; H. Oppermann (NIST) and T. Grimes (NIST) 86-039PA1; H. Oppermann (NIST) and C. Cotsoradis (MD) 86-039; H. Oppermann (NIST) and R. Whipple (NIST) 86-039A1; J. Williams (NIST) 86-039A2