



NATIONAL TYPE EVALUATION PROGRAM

Certificate of Conformance

for Weighing and Measuring Devices

For:

Weighing/Load Receiving Element
 Vehicle, Modular
 Model: Armor
 n_{max} : 10 000
 e_{min} : 20 lb (10 kg)
 Capacity: Up to 405 000 lb (183 700 kg)
 CLC: 20 ton (18 140 kg) to 50 ton (45 350 kg)
 Accuracy Class: III L

Submitted By:

Cardinal Scale Manufacturing Company
 203 East Daugherty Street
 Webb City, MO 64870
 Tel: 417-673-4631
 Fax: 417-673-2153
 Contact: Eric Golden
 Email: egolden@cardet.com
 Web site: www.cardinalscales.com

Standard Features and Options**Installations must satisfy the following relationships:**

- Nominal capacity \leq CLC x (N-0.5), where N = Number of sections in the scale
- The length of the scale is unrestricted if $v_{min} \leq e \div \sqrt{N}$, where N = Number of load cells in the scale

Dimensional requirements:

- Minimum module length: 84 inches (7 ft / 2.1 m)
- Maximum module length: 376.8 inches (31.4 ft / 9.6 m)
- Maximum module width: 201 inches (16.8 ft / 5.2 m)
- Maximum distance between sections: 360 inches (30 ft / 9.2 m)

Options:

Any combination of the following options is permitted:

- Deck Construction: Steel or Concrete
- Manhole
- Dump Through Deck
- Portability Frame

Load Cells Used:

Cardinal Scale Mfg Co. model SCBD Series (NTEP CC 16-088), DB Series (NTEP CC 97-133) dual ended shear beam load cells and the model SCD-C (NTEP CC 89-071) compression load cell or Metrologically Equivalent and compatible Load Cells with an Active NTEP Certificate of Conformance.

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

This device was evaluated under the National Type Evaluation Program and was found to comply with the applicable technical requirements of "NIST 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.

Craig VanBuren
 Chairman, NCWM, Inc.

Stephen Benjamin
 Committee Chair, NTEP Committee
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1135 M Street, Suite 110 / Lincoln, Nebraska 68508

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Cardinal Scale Manufacturing Company
Weighing/Load Receiving Element / Armor

Application: General-purpose vehicle weighing applications when connected to an NTEP-Certified and compatible indicating element.

Identification: The identification information is stamped on a metal badge that is riveted to the side of the weighbridge.

Sealing: Analog load cells and interconnection systems: Load cell adjustments are made in the load cell junction boxes and may be secured with a wire security seal. Overall calibration adjustments are sealed per the sealing method found on the approved indicating element's Certificate of Conformance.

Digital load cells and interconnection systems: There is no junction box containing potentiometers or other ways in which to change the calibration of the load cell and interconnection system. Overall calibration adjustments are sealed per the sealing method found on the approved indicating element's Certificate of Conformance.

Test Conditions: This Certificate supersedes Certificate of Conformance Number 17-047A1 and was issued to add metric units in the For: box and Standard Features and Options. Corrected a typographical error in the Information reviewed by line. Based upon information supplied by the manufacturer and review of the previous test conditions no additional testing was deemed necessary. Previous test conditions are listed below for reference.

Certificate of Conformance Number 17-047A1: This Certificate supersedes Certificate of Conformance Number 17-047 and was issued to change the minimum module length specified in the Standard Features and Options Box per NCWM Publication 14, Weighing Devices, Technical Policy. Based upon information supplied by the manufacturer and review of the previous test conditions no additional testing was deemed necessary. Previous test conditions are listed below for reference.

Certificate of Conformance Number 17-047: The emphasis was on the design, marking, and performance of the weighing element and the load receiving element. An Armor vehicle scale, consisting of one concrete module (21.2 ft x 14 ft), with dump through option, and one steel deck module (26.2 ft x 14 ft), with dump through and manhole option, was submitted for evaluation. The three section 47.3 ft x 14 ft, 50 ton CLC platform used four Cardinal model SCBD100 dual ended shear beam (NTEP CC 16-088) and two model 100K-SCD-C compression (NTEP CC 89-071) load cells. This weighing/load receiving element was interfaced with a Cardinal Model 225 Weight Indicator (NTEP CC 01-011). The scale was initially tested using 90 000 pounds of known test weights to perform increasing/decreasing load, mid-span, and shift tests. A strain load test was conducted using 90 000 pounds of known test weights to a maximum load of 241 136 pounds. The scale was subjected to the required minimum use criteria and retested. The increasing/decreasing load, shift and mid-span tests were repeated using 50 000 pounds of known test weights. A strain load test was performed to a maximum load of 241 218 pounds.

A separate concrete module (two section 21.9 ft x 14 ft, 50 ton CLC), with manhole, using four DB-75000S dual ended shear beam load cells (NTEP CC 97-133) installed on a portability frame was tested using 100 000 pounds of known test weights to perform two - increasing/decreasing, shift, and mid-span tests.

Evaluated By: D. Flocken (NTEP), R. Meadows (KS) 17-047; M. Manheim (NCWM)

Type Evaluation Criteria Used: *NIST Handbook 44 Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices*, 2018 Edition. *NCWM Publication 14 Measuring Devices*, 2018 Edition.

Conclusion: The results of the evaluation and information provided by the manufacturer indicate the device complies with applicable requirements.

Information Reviewed By: J. Truex (NCWM) 17-047, 17-047A1; D. Flocken (NCWM) 17-047A2



Cardinal Scale Manufacturing Company
Weighing/Load Receiving Element / Armor

Example(s) of Device: (shown with optional side rails)



Steel deck



Concrete deck

