



NATIONAL TYPE EVALUATION PROGRAM

# Certificate of Conformance

for Weighing and Measuring Devices

**For:**

Hopper Scale  
Tank Scale, Mechanical Lever System Weighing Element  
Model: FS Series  
 $n_{max}$ : 5 000  
 $e_{min}$ : (see below)  
Capacity: (see below)  
Accuracy Class: III/IIIL

**\*Submitted By: Contact Info. Updated: October 2010**

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**Standard Features and Options**


Specific models, capacities,  $e_{min}$  values, and accuracy classes of devices covered by this Certificate are listed on Page 2.

- The weighing element is a mechanical lever system with hardened and ground pivots and bearings. The connection between the levers and the load receiving element is a double-link suspension system or self-aligning bearing loops on the lighter models.
- The load receiving element is a tank/hopper, not furnished by Cardinal, mounted directly to the scale or to a fabricated steel weighbridge on which the tank/hopper is mounted.
- The indicating element can be a mechanical weighbeam; a mechanical dial; or a digital electronic indicator (for electro-mechanical device) of an approved and compatible type and covered under a separate NTEP Certificate of Conformance. The indicating element is attached to the weighing element by means of a steelyard and draft rod assembly.
- An electromechanical scale is indicated by the suffix "L." These devices use a shear beam load cell model SB-5000S (Certificate of Conformance Number 87-059A1) or a metrologically equivalent load cell with a separate NTEP Certificate of Conformance added to the end of the transverse lever. The load cell can be added to the steelyard or draft-rod assembly to provide for both a mechanical and an electronic indicating element; in this case, the model designation is still "FS." Alternatively, the mechanical indicating element can be eliminated and a load cell added to the end of the transverse lever; this changes the model designation to "FSL."
- Installations must satisfy the relationship of:  $v_{min} \leq \sqrt{d/N}$  where N= number of load cells.
- The suffix "F" indicates steel fabricated parts.

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. \*Editorial changes, not affecting the type or metrological content, corrected this certificate.

  
Tim Tyson  
Chairman, NCWM, Inc.

  
Randy Jennings  
Chairman, National Type Evaluation Program Committee  
Issued: October 29, 2010

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**Cardinal Scale Manufacturing Co.**

Hopper Scale / FS Series

**Application:** For weighing liquids or relatively free-flowing solids. Used for blending, proportioning, inventory control or weigh-in/weigh-out operations.

**Models, Capacities and Accuracy Classes:**

Model Number	Nominal Capacity (lb)	$e_{\min}$ (lb)	Accuracy Class
FS-1F	5 000	1	III
FS-2F	7 000	2	III
FS-2.5F	10 000	2	III
FS-3F	20 000	5	III
FS-4	30 000	10	III
FS-5	50 000	10	III L*
FS-6	60 000	20	III L*
FS-7	80 000	20	III L*
FS-8	100 000	20	III L*
FS-9	120 000	50	III L*
FS-9	150 000	50	III L*
FS-10	160 000	50	III L*
FS-10	200 000	50	III L*
FS-11	240 000	50	III L*
FS-11	300 000	100	III L*

\* Class III for grain hoppers.

**Test Conditions:** This Certificate supersedes Certificate of Conformance Number 88-011PN and is issued without additional testing to upgrade the Certificate from a status of provisional to full; to update the Certificate to reflect current Handbook 44 terminology for scales such as  $e_{\min}$  and  $n_{\max}$ ; to clarify the Accuracy Class designations; and to modify the original reference to device type by removing the term "floor." NTEP policy permits a pre-NTEP Certificate of Conformance to be upgraded from provisional to full provided no unfavorable comments are received during the comment period. Since no unfavorable comments were received on this device, this Certificate is issued as a full NTEP Certificate of Conformance. The test conditions for Certificate of Conformance Number 88-011PN are listed below for reference.

**Certificate of Conformance Number 88-011PN:** These scales have received type approval by individual states prior to the establishment of the National Type Evaluation Program. These scales have been in commercial use for many years. Since these devices use mechanical lever systems, they are believed to be unaffected by the influence factors specified under T.N.8. of the Scales Code of NIST Handbook 44. The NTEP Policy and Procedures permit NTEP to issue Certificates of Conformance based upon the approvals granted by PRE-NTEP jurisdictions. This Certificate was issued on this basis without formal NTEP testing.

**Pre-NTEP Type Approvals:** CA 1970, 1974; IL 1959; NY 1967; NC 1958; PA 1959

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

**Information Reviewed By:** H. Oppermann, T. Gaver (NIST) 88-011PN; T. G. Butcher, L. T. Sebring (NIST) 88-011