NATIONAL TYPE EVALUATION PROGRAM

Certificate of Conformance

for Weighing and Measuring Devices

For:
Register
Model: CDS1000-X
Suffix "X" is non-metrological

Submitted By:
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Standard Features and Options

- Category 3 Method of Sealing
- 240 x 128 LED Graphic Display with Back light
- 16 Button Keypad, 4 Softkey (A, B, C, D), On/Off Button
- Calibration by Flow Meter 1-5 Point Linearization
- Electronic Temperature/Pressure Compensator
- Rear Terminal Connection for:
  - Power Supply 12 Volts DC
  - RS-232 Printer
  - 1000 ohm RTD Temperature Probe
  - Signal Input (measuring element)
  - Secondary Signal Input for Pressure Probe
  - Pump Interlock
  - RS 232 Port and Bluetooth for Printer Interface

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.

Tim Tyson
Chairman, NCWM, Inc.

Randy Jennings
Chairman, National Type Evaluation Program Committee
Issued: April 6, 2011

Turbines, Inc.

Register / CDS1000-X

Application: The CDS1000 delivery system totalizer is a primary indicating element used to meter cryogenic liquids and liquid carbon dioxide. It is designed to operate with approved and compatible turbine flow meters equipped with magnetic pick-up coils.

Identification: The manufacturer's name, address, device model and serial numbers are located on the bottom panel of the enclosure. The same information is also electronically stored in the initialization option menu.

Sealing: A Category 3 event logger records changes to calibration and configuration parameters. The event logger automatically retains the identification of the parameter changed, the date and time of the change. A summary of each event showing the number of changes made is available from the audit trail. The audit trail can be accessed during initial power on by depressing and holding the "LEFT ARROW" key while momentarily depressing and releasing the On/Off push-button for at least one second. The temperature probe is sealed by threading a wire security seal through a hole in the probe coupler and around the pipe in which the probe is installed.

Operation: Product flowing through a turbine meter causes the rotor to rotate at an angular velocity proportional to the fluid velocity. The totalizer receives AC sine wave signals from a pickup coil located above the turbine's rotor. The signal of the pickup coil is amplified, divided, and displayed. A temperature compensation algorithm corrects for product densities influenced by fluid temperatures. When in CO_2 mode (CCO2), the vapor return displacement will automatically correct for vapor displacement.

Test Conditions: Model CDS1000 was submitted for a laboratory evaluation interfaced to a pulse output simulator. The emphasis of this evaluation was on design, operation, and compliance with audit trail requirements. After the laboratory evaluation, the device was installed on two vehicles dispensing liquid nitrogen and liquid carbon dioxide through a turbine meter for field evaluation. The emphasis of the field evaluation was on accuracy and repeatability. The devices were configured to indicate in cubic feet and pounds. Over 40 test runs were made at 4 different flow rates ranging from 1700 lb/min down to 23 lb/min and 180 gpm down to 23 gpm were conducted using scales and a transfer standard. The device was sealed and tests repeated after the required time and throughput were completed.

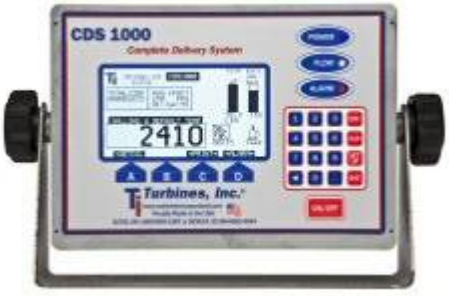
Evaluated By: C. Nelson (CA)

Type Evaluation Criteria Used: NIST, Handbook 44: Specifications, Tolerances and Other Technical Requirements for Weighing and Measuring Devices, 2011. NCWM, Publication 14: Measuring Devices, 2011.

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)

Example of Device:



Model CDS 1000