

POWERCELL PDX ENGINEERING SPECIFICATIONS

1 GENERAL PROVISIONS

- | Yes | No | | |
|--------------------------|--------------------------|-----|---|
| <input type="checkbox"/> | <input type="checkbox"/> | 1.1 | The scale shall be fully electronic in design and shall not incorporate any mechanical weighing elements. |
| <input type="checkbox"/> | <input type="checkbox"/> | 1.2 | The scale's weighing-related electronics shall consist solely of load cells, load cell cables, and digital weight display. No other devices shall be permitted between the load cell and the digital weight display. Junction boxes, summing boards, gathering boards, gathering boxes, totalizers, external analog-to-digital converter boxes, and sectional controller boxes will not be accepted because of their significant and inherent maintenance issues. |
| <input type="checkbox"/> | <input type="checkbox"/> | 1.3 | The load cells shall be constructed of stainless steel. The cables shall be stainless steel sheathed. Load cells which are not stainless steel and hermetically sealed shall not be acceptable because of their inability to prevent moisture from entering the load cell and causing a premature failure. |
| <input type="checkbox"/> | <input type="checkbox"/> | 1.4 | The scale shall meet the requirements set forth by the current edition of the National Institute of Standards and Technology Handbook 44 (NIST HB-44). The scale manufacturer shall provide a Certificate of Conformance (NTEP Certification) to these standards upon request. |
| <input type="checkbox"/> | <input type="checkbox"/> | 1.5 | The system shall be capable of predictive diagnostics that include breach detection for the purpose of detecting the loss of the load cell's hermetic seal, record and store maximum overloads, record and monitor all load cell temperature (minimum, maximum, and actual), store and display all load cell serial numbers, record and store load cell voltage (minimum, maximum, and actual), and record and store load cell communication signal (high and low). |
| <input type="checkbox"/> | <input type="checkbox"/> | 1.6 | The system shall be capable of interfacing with InTouch SM Remote Services software to monitor the system status, operating parameters, and configuration. |

2 LOAD CELL SPECIFICATIONS

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|--------------------------|--------------------------|-----|---|
| <input type="checkbox"/> | <input type="checkbox"/> | 2.1 | Each load cell shall have a minimum capacity of <ul style="list-style-type: none"><input type="checkbox"/> 20 metric tons (44,000 pounds)<input type="checkbox"/> 30 metric tons (66,000 pounds)<input type="checkbox"/> 50 metric tons (110,000 pounds)<input type="checkbox"/> 90 metric tons (198,000 pounds) with 300% ultimate overload rating. |
| <input type="checkbox"/> | <input type="checkbox"/> | 2.2 | All load cells shall be certified by NTEP and meet the specifications as set forth by NIST HB-44 for Class IIIIL devices. The manufacturer shall provide a Certificate of Conformance to these standards upon request. |
| <input type="checkbox"/> | <input type="checkbox"/> | 2.3 | All load cells shall be certified to meet the specifications set forth by the International Organization of Legal Metrology (OIML) in document R60 for |

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- C3 load cells (20t, 30t, 50t, 90t)
- C4 load cells (30t, 50t, 90t)
- C6 load cells (30t, 50t)

The manufacturer shall provide a Certificate of Conformance to these standards upon request.

- 2.4 Load cells shall be digital with an integral microprocessor and analog-to-digital conversion function located within the load cell housing.
- 2.5 Load cells shall output only converted digital information without load correction for load position to the scale instrument. Analog output of signals from the load cell is not acceptable due to susceptibility of signal interference.
- 2.6 The load cell assembly shall be constructed so as to perform as a rocker pin and shall have no positive fixed mechanical connectors, such as bolts or links that are required in mounting the load cell to the weighbridge or foundation base plates.
- 2.7 The load cell shall not require flexures or chain links for stabilization, as these items are sources of ongoing maintenance requirements.
- 2.8 The load cell shall not require a junction box to communicate between the load cell and scale instrument. No other devices shall be permitted between the load cell and the digital weight display. Junction boxes, summing boards, gathering boards, gathering boxes, totalizers, external analog-to-digital converter boxes, and sectional controller boxes will not be accepted because of their significant and inherent maintenance issues.
- 2.9 The load cell shall be of stainless steel construction and hermetically sealed with a minimum NEMA 6P / IP68 (submersible) and IP69K rating.
- 2.10 The load cell shall contain integral Transient Voltage Surge Suppressors (TVSS) for all input and communication lines. Each TVSS shall contain self-resetting thermal breakers to protect the load cell components from voltage and current surges.
- 2.11 The load cell shall come equipped with a neoprene rubber boot to keep debris from contaminating the lower bearing surface.
- 2.12 The load cell shall have a positive-lock quick connector integral to its housing for connecting and disconnecting the load cell interface cable at the load cell. The connector shall be of glass-to-metal, pin-type construction to maintain a hermetic seal.
- 2.13 The system shall be designed to permit a load cell cable to be replaced without splicing the load cell cable or replacing the load cell, either of which will contribute to eventual system failure and unnecessary service costs. The system shall be designed to permit the load cell cable to be replaced without requiring the scale to be recalibrated, further reducing service and maintenance costs.
- 2.14 The load cell shall have the following specifications:

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2.14.1 OIML (based on 3,000 divisions)

Parameter	20t C3 □	30t C3 □	30t C4 □	30t C6 □	50t C3 □	50t C4 □	50t C6 □	90t C3 □	90t C4 □
Vmin in kg (lb) maximum	2.5 (5.5)	2.7 (5.9)	2.4 (5.3)	1.5 (3.3)	4.5 (9.9)	4.0 (8.8)	2.5 (5.5)	8.1 (17.8)	6.3 (13.9)
Hysteresis (% of full scale)	± 0.016	± 0.016	± 0.016	± 0.011	± 0.016	± 0.016	± 0.011	± 0.016	± 0.016
Nonlinearity (% of full scale)	± 0.01	± 0.01	± 0.01	± 0.007	± 0.01	± 0.01	± 0.007	± 0.01	± 0.01
Creep, 30 minutes (% of applied load)	± 0.015	± 0.015	± 0.012	± 0.008	± 0.015	± 0.012	± 0.008	± 0.015	± 0.012

2.14.2 NTEP (based on 10,000 divisions)

Parameter	20t C3 □	30t C3 □	30t C4 □	30t C6 □	50t C3 □	50t C4 □	50t C6 □	90t C3 □	90t C4 □
Vmin in kg (lb) maximum	0.95 (2.1)	1.0 (2.2)	0.93 (2.0)	-	1.7 (3.8)	1.55 (3.4)	-	3.2 (7.1)	2.4 (5.3)
Hysteresis (% of full scale)	± 0.016	± 0.016	± 0.016	± 0.011	± 0.016	± 0.016	± 0.011	± 0.016	± 0.016
Nonlinearity (% of full scale)	± 0.01	± 0.01	± 0.01	± 0.007	± 0.01	± 0.01	± 0.007	± 0.01	± 0.01
Creep, 30 minutes (% of applied load)	± 0.015	± 0.015	± 0.012	± 0.008	± 0.015	± 0.012	± 0.008	± 0.015	± 0.012

2.14.3 Temperature range: -10°C + 40°C

- 2.15 The load cell interface cable shall be stainless steel sheathed for environmental and rodent protection. Neoprene-covered load cell cables shall not be permitted.

2.15.1 Load cell cables which are hard wired directly to the load cell are not acceptable due to the failure rates associated with moisture wicking into the load cell from aged cables or damaged cables, and due to the unnecessary expense associated with replacing entire load cells when only a cable has been damaged.

- 2.16 Load cells shall be METTLER TOLEDO POWERCELL® PDX® load cells or equivalent.

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3 JUNCTION BOXES AND CABLES

- 3.1 Junction boxes shall not be permitted in the scale, attached to the exterior of the scale, or remotely mounted from the scale. Sectional controllers with encapsulated PCBs shall not be permitted due to the failure rates associated with PCBs that have wired connections made within enclosures which are not hermetically sealed.
- 3.2 Load cell cables and scale instrument cables shall be stainless steel sheathed for environmental and rodent protection.
- 3.3 In order to minimize maintenance issues, only a single cable shall be used to transmit data or weight signals between the weighbridge and the digital weight display.

4 LIGHTNING PROTECTION SPECIFICATIONS

- 4.1 A comprehensive lightning protection system shall be provided with the scale.
- 4.2 The system shall not require complicated wiring or devices to provide this protection.
- 4.3 Major scale components, including load cells and scale instrument (terminal), shall be included in the lightning protection system.
- 4.4 Grounding of all scale components, including load cells, scale instrument, and accessories, shall be to one common point. Systems with multiple ground points are not acceptable.
- 4.5 An AC line surge protector shall conveniently plug into a common electrical outlet and have a receptacle.
- 4.6 Each AC line surge protector required shall have one isolated, grounding, hospital-grade duplex receptacle and an internal 15-amp circuit breaker.
- 4.7 Verification of the lightning protection system's performance shall be available in writing from a third-party verification laboratory upon request. Proposals submitted without confirming the availability of third-party verification that the load cells, cables, and instrument as a system have been able to withstand the equivalent of a lightning strike with 80,000 amperes will be rejected.
- 4.8 The lightning protection system shall be a METTLER TOLEDO StrikeShield™ Lightning Protection System or equivalent.

5 WARRANTY REQUIREMENTS

- 5.1 The load cell shall have a minimum 10-year warranty against defects in materials and workmanship and failure resulting from lightning or surge voltages. The warranty shall cover all costs associated with replacement parts, travel, mileage, on-site labor, and recalibration after repair, the full cost of which shall be supported solely by the manufacturer and not in part by any other third party.