

ENGINEERING SPECIFICATIONS
7360 Railroad Scale

1 GENERAL PROVISIONS

- | Yes | No | |
|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | 1.1 All equipment and material furnished shall be new. |
| <input type="checkbox"/> | <input type="checkbox"/> | 1.2 Buyer shall provide (as necessary) on-site quality-assurance personnel to ensure compliance to the specifications listed in this document, manufacturer's specifications, and any other applicable regulatory requirements. |
| <input type="checkbox"/> | <input type="checkbox"/> | 1.3 Buyer shall at its own expense apply for and obtain any permits and inspections required for the installation and/or use of the equipment furnished by bidder. |
| <input type="checkbox"/> | <input type="checkbox"/> | 1.4 All necessary installation and start-up services to render a functional rail car weighing system are to be provided during normal weekday hours, 8 AM to 4 PM. |
| <input type="checkbox"/> | <input type="checkbox"/> | 1.5 Furnish and install one combination railroad/truck scale system. |
| <input type="checkbox"/> | <input type="checkbox"/> | 1.6 The scale shall have a clear and unobstructed weighing surface of not less than 75 feet long and 10 feet wide. |
| <input type="checkbox"/> | <input type="checkbox"/> | 1.7 The scale shall be fully electronic in design and shall not incorporate any mechanical weighing elements, check rods, or check stays. |
| <input type="checkbox"/> | <input type="checkbox"/> | 1.8 The scale shall be designed to perform as a summed weighing platform and shall be of a pit, self-contained, and live-rail/live-deck design. |
| <input type="checkbox"/> | <input type="checkbox"/> | 1.9 The scale shall have a gross weighing capacity of 170 tons (340,000 pounds) and shall have a sectional capacity of 85 tons (170,000 pounds). |
| <input type="checkbox"/> | <input type="checkbox"/> | 1.10 The scale shall be designed to meet the requirements established by AAR/AREMA for Cooper E-80 loading and the current edition of the National Institute of Standards and Technology Handbook 44 (NIST H-44). |
| <input type="checkbox"/> | <input type="checkbox"/> | 1.11 The scale shall be calibrated to 340,000 pounds by 50-pound increments. |
| <input type="checkbox"/> | <input type="checkbox"/> | 1.12 The load cells shall be constructed of stainless steel. The cables shall be stainless steel sheathed. |
| <input type="checkbox"/> | <input type="checkbox"/> | 1.13 The scale shall meet the requirements as set forth by NIST H-44 for Class IIIIL devices. The scale manufacturer shall provide a Certificate of Conformance (NTEP Certification) to these standards upon request. |
| <input type="checkbox"/> | <input type="checkbox"/> | 1.14 The design and manufacture of the scale weighbridge, load cells, digital instrument, printer, and associated accessories shall be of one manufacturer to maximize compatibility and availability of components. Also, the manufacturer shall have a quality system that has been registered to the standards of ISO 9001. |

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- 1.15 The manufacturer shall provide with the bid proposal a listing of major spare parts and their prices, including (but not limited to) replacement load cells, digital instrument, and associated parts.
- 1.16 Documentation, to include technical data, equipment manuals and operator manuals, shall be provided digitally.
- 1.17 The scale shall be a METTLER TOLEDO Model 7360 or equivalent.

2 SCALE FOUNDATION REQUIREMENTS

- 2.1 The foundation shall meet all local requirements and the minimum specifications as stated in this section.
- 2.2 The minimum soil bearing required shall be 4,000 pounds per square foot. The buyer shall be responsible for determining whether or not the soil conditions are adequate.
- 2.3 The foundation shall consist of a single pit. The foundation shall meet all minimum requirements as set forth by the manufacturer, AAR/AREMA for Cooper E-80 loading, and NIST H-44.
- 2.4 The foundation shall be constructed to provide positive drainage to a sump pump reservoir.
- 2.5 The foundation shall be designed to include an approach on each end of the scale in accordance with local regulations, AAR/AREMA requirements, servicing railroad requirements, and the guidelines of NIST H-44.
- 2.6 Grout shall be 5-STAR non-shrink epoxy grout or equivalent.
- 2.7 New 115# rail will be supplied and installed by the contractor. Rail will be "Industrial Grade" or better and will be of American manufacture. A sufficient amount of rail will be provided to extend across the new plates, center section, and approaches. A qualified rail contractor, using approved compromise joints, will complete reconnecting new rail to the existing rail. All costs will be the responsibility of the bidder.

3 WEIGHBRIDGE SPECIFICATIONS

- 3.1 The scale weighbridge shall meet all AAR/AREMA for Cooper E-80 loading and NIST H-44 requirements. The scale weighbridge shall be capable of weighing trucks that have dual-tandem axle weights (4 feet minimum between dual axles and at least 10 feet from next axle) of up to 55,000 pounds.
- 3.2 The weighbridge shall be designed to allow access to the load cell cables and foundation steel via removable access covers.
- 3.3 The weighbridge shall consist of prefabricated modules and shall not require special wide-load permits for shipping.

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- 3.4 All welding shall be completed in accordance with the American Welding Society (AWS) D1.5 Bridge Welding Code.
- 3.5 All welding shall be performed by welding operators that have been certified to the AWS D1.5 Bridge Welding Code.
- 3.6 All welding shall be performed in position 1F, to ensure maximum weld integrity.
- 3.7 The weighbridge and load cell mounting assemblies shall be designed to allow installation or replacement of a load cell without any special tools other than jacking equipment.
- 3.8 There shall be no bolted connections between the load cell and weighbridge assemblies.

4 SURFACE PREPARATION AND FINISH

- 4.1 The weighbridge shall be shot blasted to a minimum SSPC-SP6 specification prior to painting.
- 4.2 All exterior surfaces of the scale shall have a two-component, high-build epoxy finish, flake filled for increased corrosion resistance and UV protection, providing a total Dry Film Thickness of 8-10 mils (Sherwin William MACROPOXY 646 or equivalent).
- 4.3 The finish shall be force cured in order to reduce risk of contamination and ensure durability of the surface.

5 LOAD CELL SPECIFICATIONS

- 5.1 Each load cell shall have a minimum capacity of 50 metric tons (110,000 pounds) with 300% ultimate overloading rate.
- 5.2 All load cells shall be certified by NTEP and meet the specifications as set forth by NIST HB-44 for Class III L devices. The manufacturer shall provide a Certificate of Conformance to these standards upon request.
- 5.3 All load cells shall be certified to meet the specifications set forth by the International Organization of Legal Metrology (OIML) in document R60 for C3 load cells, which requires 60% tighter accuracy tolerances than NIST HB-44 for Class III L devices. The manufacturer shall provide a Certificate of Conformance to these standards upon request.
- 5.4 Load cells shall be digital with an integral microprocessor and analog-to-digital conversion function located within the load cell housing.
- 5.5 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.

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- 5.6 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.
- 5.7 The load cell shall not require check rods, flexures or chain links for stabilization, as each of these items are sources of ongoing maintenance requirements.
- 5.8 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.
- 5.9 The load cell shall be of stainless steel construction and hermetically sealed with a minimum NEMA 6P / IP68 (submersible) and IP69k rating.
- 5.10 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.
- 5.11 The load cell shall come equipped with a neoprene rubber boot to keep debris from contaminating the lower bearing surface.
- 5.12 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.
- 5.13 The system shall be so designed as to permit a load cell cable to be replaced without either 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 so designed as to permit replacing the load cell cable without requiring the scale to be recalibrated, further reducing service/maintenance costs.
- 5.14 The load cell shall have the following specifications:
 - 5.14.1 Vmin: 5.0 pounds maximum
 - 5.14.2 Hysteresis: $\pm 0.025\%$ of full scale
 - 5.14.3 Non-Linearity: $\pm 0.015\%$ of full scale
 - 5.14.4 Creep (30 minutes): $\pm 0.017\%$ of applied load
 - 5.14.5 Temperature range: $-10^{\circ}\text{C} + 40^{\circ}\text{C}$
- 5.15 The load cell interface cable shall be stainless steel sheathed for environmental and rodent protection. Neoprene-covered load cell cables shall not be permitted.

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- 5.16 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.
- 5.17 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.
- 5.18 Load cells shall be METTLER TOLEDO POWERCELL® PDX® load cell or equivalent.

6 SCALE INSTRUMENT

- 6.1 The scale instrument shall have the following service characteristics.
 - 6.1.1 Set-up and navigation through all phases of set-up, calibration, and testing shall be intuitive through a decision-tree format.
 - 6.1.2 Capable of performing calibration, span, zero, and shift adjustment through software calculations that require no in-scale adjustment.
 - 6.1.3 Entry of information shall be accomplished through the instrument's keyboard only.
 - 6.1.4 Capable of assigning each load cell with its own unique identification number and displaying the weight reading of each individual load cell through the instrument without disconnecting any of the load cells from the system.
 - 6.1.5 Ability to display digital raw counts for the attached digital load cells with their values being updated on a real-time basis. The scale instrument shall also be capable of displaying the raw count values of multiple digital load cells on the graphical display.
 - 6.1.6 Ability to identify and to immediately display an error condition associated with an individual load cell in the event of a failure or out-of-tolerance condition. The displayed message shall identify the failed load cell and the cause of the failure to avoid an invalid weighment on the scale.
 - 6.1.7 Ability to monitor and display health of load cell network and to compare the current network status to the values captured during calibration. This is a requirement to reduce downtime and provide information to the user so that the user can proactively use the information to determine the most convenient time to address maintenance issues, while avoiding downtime at the most inopportune time.

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- 6.1.8 Load cell health information shall include individual load cell temperature, supply voltage at load cell, signal voltages, maximum loading. These data are vital in reducing downtime and troubleshooting time and cost.
- 6.1.9 Ability to monitor the gas concentration sensors in each load cell and identify which load cell may be breached or physically damaged so that unscheduled downtime can be eliminated.
- 6.1.10 Ability to access system status data through an Ethernet connection using a web server residing on the instrument for remote diagnostics.
- 6.1.11 Ability to access system memory through an Ethernet connection using a shared data server. This allows tighter integration with customer operations.
- 6.2 The scale instrument shall be NTEP certified and meet or exceed the specifications set forth by NIST HB-44 for Class II, III, and III-L Devices. The manufacturer upon request shall provide a Certificate of Conformance to these standards.
- 6.3 The scale instrument shall be housed in a metal enclosure that is suitable for desk or wall mounting.
- 6.4 The scale instrument shall have flexible storage capability with a minimum of 256 Mbytes of flexible memory in which to store pertinent vehicle, transactional, and commodity information. The scale instrument shall be capable of storing the weight information automatically or enabling the operator to assign a memory location to the weight manually. The scale instrument will run SQL or equivalent database application to enable possible integration into higher-level databases.
- 6.5 The scale instrument shall have subtotal and total weight accumulators.
- 6.6 The operator shall be able to enter up to 12 digits of alphanumeric ID through the instrument keyboard.
- 6.7 The scale instrument shall have gross/net weight switching.
- 6.8 The scale instrument shall be capable of being programmed and calibrated in pounds or kilograms.
- 6.9 The scale instrument shall have the following data communications capabilities:
 - 6.9.1 One com port RS232
 - 6.9.2 One com port RS232, RS422, or RS485
 - 6.9.3 One TCP/IP 10 Base-T Ethernet
 - 6.9.4 One Web server
 - 6.9.5 One Shared Data server

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- 6.10 The scale instrument shall output the following information:
 - 6.10.1 Gross, Tare, and Net Weight
 - 6.10.2 ID
 - 6.10.3 Transaction Counter
 - 6.10.4 Time and Date
 - 6.10.5 Variable Application-Specific Information
 - 6.10.6 Standard Reports Generated by the Scale Instrument
- 6.11 The scale instrument shall be UL/cUL listed.
- 6.12 Scale instrument shall have the ability to connect with external PC software to allow configuration, data backup and restore, security unlock capabilities, FTP access to log files so as to significantly reduce service cost and downtime during any repair and maintenance of the scale.
- 6.13 Scale instrument shall have the ability to display traffic light, gate or loop status in color and ability to control traffic light and gate from the scale instrument with Task Expert or equivalent programmability.
- 6.14 The scale instrument shall be a METTLER TOLEDO Model IND780 or equivalent.

7 LIGHTNING PROTECTION SPECIFICATIONS

- 7.1 A comprehensive lightning protection system shall be provided with the scale.
- 7.2 The system shall not require complicated wiring or devices to provide this protection.
- 7.3 Major scale components including load cells, scale instrument, and printer shall be included in the lightning protection system.
- 7.4 Grounding of all scale components including load cells, scale instrument, printer, and accessories shall be to one common point. Multiple ground point systems are not acceptable.
- 7.5 An AC line surge protector shall conveniently plug into a common electrical outlet and have receptacles for the scale instrument, ticket printer, and other scale accessories.
- 7.6 Each AC line surge protector required shall have one isolated grounding, hospital-grade duplex receptacles, and an internal 15-amp circuit breaker.

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- 7.7 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.
- 7.8 The lightning protection system shall be a METTLER TOLEDO StrikeShield™ Lightning Protection System or equivalent.

8 WARRANTY REQUIREMENTS

- 8.1 The scale manufacturer shall warrant the scale assembly including weighbridge structure, scale instrument, and associated cables from failures due to a defect in manufacturing, workmanship, lightning, or surge voltages.
- 8.2 The guarantee will warrant the product for a period of 5 years from date of installation or 62 months from date of shipment to the Buyer, whichever occurs first. Bidder shall promptly correct any such defect appearing within the warranty period.
- 8.3 The warranty shall support 100% coverage of repair parts, labor, travel time, and mileage from the closest service location, or at the manufacturer's sole discretion, replacement of the product under warranty. The full cost of warranty as specified herein shall be supported solely by the manufacturer and not in part by any other third party or service provider.