



## ENGINEERING SPECIFICATIONS

Multi-Platform Steel Deck Low-Profile  
Cardinal Electronic Truck Scale  
135 Ton Capacity - 122040-EPR-MP45



### GENERAL PROVISIONS:

Furnish and install one steel multi-platform motor truck scale and associated electronic controls.

The scale shall have a clear and unobstructed weighing surface of not less than 72 feet in length by 11 feet in width and shall consist of three independent platforms. The first platform shall be 12 feet in length, the second or middle platform shall be 20 feet in length and the third platform shall be 40 feet in length.

Each scale platform shall be of a fully electronic load cell design and shall incorporate a restraint system that limits the motion of the deck.

The scale shall be designed to perform as a three independent weighing platforms and shall be of flat top design.

The first platform (12 feet long) shall have a nominal capacity of 100,000 pounds. The second platform (20 feet long) shall have a capacity of 100,000 pounds. The third platform (40 feet long) shall have a capacity of 150,000 pounds.

Each scale platform shall have a concentrated load capacity of 45 tons.

Each scale platform shall be designed to accept vehicles that generate up to 90,000 pounds per tandem axle.

Each scale platform weight shall be displayed in increments of no more than 20 pounds.

The scale shall include a total display that indicates the sum of the three platform weights in 20 pound increments up to 200,000 pounds then automatically switch to 50 pound increments for weights greater than 200,000 pounds but less than 270,000 pounds.

Load cells shall be constructed of stainless steel.

The scale shall be NTEP certified and shall meet the requirements as set forth by the National Institute of Standards and Technology Handbook 44 current edition for class IIIIL devices. The scale manufacturer shall provide a NTEP Certificate of Conformance attesting to conformance with these standards. Provisional certification will not be accepted.

The design and manufacture of the scale weighbridge, load cells, digital instrumentation and associated accessories shall be of one manufacturer to maximize compatibility and availability of components.

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, weight indicator, circuit boards and associated accessory parts.



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### SCALE FOUNDATION REQUIREMENTS:

The foundation shall meet all local requirements and the minimum specifications as stated herein.

The minimum soil bearing capacity shall be 3,000 psf.

The foundation shall extend to the frost line at the load cell piers. The areas between the load cell piers are not load bearing purposes and are for cover.

The foundation shall provide a minimum of 3 inches of clearance to the weighbridge. If local regulations call for more than 3 inches of clearance, then they shall prevail.

The approach slab shall be a maximum of 15 ½ inches above the pier.

The foundation shall be constructed of concrete with a minimum strength of 3,000 psi.

The foundation shall be reinforced in all load-bearing areas. The reinforcing steel shall be 60 KSI yield strength and conform with ASTM A615 grade 60 minimum.

The entire foundation shall be tied together by a minimum of 6 inch x 6 inch, 10 gauge woven wire mesh, which shall cover the entire length and width of the foundation.

The foundation shall be constructed such that positive drainage away from the foundation is maintained.

The foundation shall be designed to include two approaches, one at each end of the scale in accordance with local regulations and guidelines of the National Institute of Standards and Technology Handbook 44, current edition.

### WEIGHBRIDGE SPECIFICATIONS:

The scale weighbridge shall be capable of weighing trucks having a tandem axle weight of up to 90,000 pounds.

The first and second scale platform weighbridges shall consist of one prefabricated steel deck module while the third scale platform weighbridge shall consist of two prefabricated steel deck modules. The scale deck shall be checkered plate steel a minimum of 3/8-inch thick.

The weighbridge shall allow top access to the load cells. The deck modules are to be designed with a "no-bolt" connection.

All required load cells, load cell interconnection cable, junction boxes and weight indicator shall be furnished and installed at the site.

There shall be no bolted connections between the load cell and the weighbridge assemblies.

Load cell stands shall have an overall height of 11 inches for a clearance of 4.5 inches.

### SURFACE PREPARATION AND FINISH:

The structural steel is shot blasted to an SSPC-SP6 condition to remove rust and mill scale, then protected with a baked-on epoxyde cross-linked polyester anticorrosion tan powder paint for the highest quality and durable finish.

**LOAD CELL SPECIFICATIONS:**

All load cells shall be of double-ended shear beam strain gauge design and shall have a minimum capacity of 75,000 pounds with a 150% of capacity overload rating. A total of fourteen (14) cells shall be used in the scale assembly.

Load cells shall be certified by NTEP and shall meet the specifications as set forth by the National Institute of Standards and Technology Handbook 44 for Class IIIIL, multiple cells, 10,000 divisions. The manufacturer shall provide a NTEP Certificate of Conformance attesting to compliance with these requirements.

Load cells shall output a analog voltage proportional to the applied load. Digital or hydraulic load cell outputs are not acceptable. The outputs from the load cells shall be electrically summed with provisions for adjustment of individual load cells provided.

The load cell shall be constructed from stainless steel.

The load cell shall include an integral shielded cable. Load cells with connectors are not acceptable.

The load cell shall be environmentally sealed to IP68.

The load cell shall be manufactured by the scale manufacturer.

The load cell shall be a Cardinal Model DB75000S load cell or equivalent.

**Specifications:**

<b>Overload, Safe</b>	150%
<b>Overload, Ultimate</b>	200%
<b>Output, Nominal</b>	2 mV/V
<b>Temperature Range</b>	
<b>Compensated</b>	-10 to +40 degrees C
<b>Operating</b>	-20 to +70 degrees C
<b>Accuracy Class</b>	IIIIL
<b>Capacity</b>	75,000 pounds
<b>V-min</b>	2.1 pound



**LOAD CELL JUNCTION BOX:**

All load cell cables from each shall be terminated at a single junction box.

The load cell junction box shall be constructed from stainless steel and have an environmental rating of IP 65 or better.

The load cell junction box shall not contain any adjustments. All adjustments shall take place adjacent to the weight indicator and not at the scale itself.

The junction box shall contain a two-stage transient protection consisting of a 15kA ps gas discharge arrestor / TVS diode for each load cell circuit and output circuit.

**SCALE CELL AND SECTION TRIM BOX:**

All individual load cell and section adjustments shall take place in a single junction box located adjacent to the weight indicator.

The junction box shall be constructed from stainless steel and have an environmental rating of IP65 or better.

Adjustments for individual load cell and sections shall be comprised of a minimum of a 25-turn potentiometer.

Cable termination shall employ spring-loaded clamps. Screw terminals are not acceptable.

The junction box shall include two-stage transient suppression consisting of a 15kA ps gas discharge arrestor / TVS diode for each circuit.

Cable runs shall be a minimum of 22 awg for runs up to 300 feet. Cable runs of 300 feet or more shall use 18 awg cable.

All cable shall be shielded.

**GROUNDING SYSTEM:**

The grounding system shall employ a single-point ground in accordance with local regulations.

The grounding system shall conform to the manufacturer's recommendations.





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### WEIGHT INDICATOR:

The scale shall be provided with a weight indicator that is compatible with analog strain gauge load cells.

The scale shall have a minimum sensitivity of 0.7 micro-volts per division confirmed by laboratory evaluation.

The weight indicator shall comply with the appropriate specifications for a Class III L 10,000 division weight indicator as specified by the National Institute of Standards and Technology Handbook 44 and shall have a NTEP Certificate of Conformance attesting to that compliance.

The weight indicator shall be housed in a desk-top stainless steel enclosure and shall include a LCD display visible in all levels of light including total darkness.

The weight indicator shall be capable of displaying all three scale platform weights along with the total weight simultaneously. Each scale platform weight shall be identified with the platform number (1, 2 and 3).

The weight indicator shall be manufactured by the scale manufacturer.

The weight indicator shall be a Cardinal 200 series weight indicator and the scale shall be a Cardinal Model 122040-EPR-MP45 or equivalent.

### WARRANTY REQUIREMENTS:

The scale manufacturer shall warrant the scale assembly including the deck and components below the deck for a period of five years; the digital weight indicator, printer and peripheral devices shall be covered for a period of one year.

The manufacturer or its local representative shall present a program of regular maintenance and calibration service. Inspection in said maintenance program shall occur a minimum of once every six months and shall comply with the guidelines set forth by the scale manufacturer, local regulations, and the current edition of the National Institute of Standards and Technology Handbook 44.