



## **ARMOR Digital Truck Scale Specifications**

### **Concrete Deck – 135 Ton – 11 x 70 Platform**

#### **GENERAL PROVISIONS:**

Furnish and install one concrete platform motor truck scale and associated electronic controls.

The scale shall have a clear and unobstructed weighing surface of not less than 70 feet in length by 11 feet in width.

The scale shall have a profile not to exceed 15-1/2 inches, which is measured from the top of the scale to the top of the foundation slab or pier at the load cell bearing points.

The scale shall be of a fully digital load cell design and shall not incorporate any mechanical weighing elements, check rods, or check stays.

The scale shall be designed to perform as a single weighing platform and shall be of flat top design. Side rail support beams are not acceptable.

The scale shall have a gross weighing capacity of 135 tons and shall have a concentrated load capacity of 50 tons.

The scale shall be designed to accept vehicles that generate up to 100,000 pounds per tandem axle.

The scale shall be designed to accept an average daily traffic volume of up to 250 vehicles per day, 365 days per year, for 20 years, assuming that 100% of the vehicles are fully loaded with the equivalent of 80,000 pounds on their dual tandem axle.

The scale shall be calibrated 200,000 pounds by 20 pound increments.

Load cells shall be constructed of stainless steel and the internal load cell electronics shall be completely encapsulated and filled with a potting compound in all voids to prevent moisture from entering the load cell causing premature failure.

There shall be no moving parts below the scale deck.

The cables shall be metal braided and run in continuous galvanized steel conduit.

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.

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.

The scale shall be a Cardinal Model ARMOR®.

#### **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 buyer shall be responsible for determining whether or not the soil condition is adequate.

The foundation shall extend to the frost line at the load cell piers. The areas between the load cell piers are not for 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 at a 28-day cure.

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 100,000 pounds.

The weighbridge shall consist of three prefabricated steel modules.

The prefabricated scale modules shall be so designed to enable field pouring of the concrete without additional field forming. No rebar shall be required for the concrete deck. The requirement of field added reinforcing steel or other methods shall not be permissible.

Concrete for scale deck shall be a minimum strength of 4,500 PSI at a 28-day cure

The weighbridge shall be designed to allow access to load cell cables, base plates, and all foundation anchor bolts from the top of the scale platform.

The weighbridge and load cell mounting assemblies shall be designed to allow installation or replacement of a load cell with only one additional inch of clearance required between the top of the foundation and the bottom of the weighbridge on pitless installations.

The load cell assembly shall be designed so that when you are at the scale weighbridge with a lifting jack, the load cell can be replaced in less than 5 minutes.

There shall be no field welding required for the installation of the scale.

All required load cells and load cell cables shall be furnished and factory pre-installed

The weighbridge shall be constructed of 8-inch side I-beams and a ¼-inch bottom plate. One-quarter-inch stringers and round cross members shall be welded to the bottom pan and be of such design to easily allow concrete to flow around them and fully encapsulate them.

The weighbridges shall connect to each other via connection blocks that span the width of the load cell mounting. Bolted or pin and saddle designs shall not be permissible.

The depth of the concrete shall be 8 inches and less concrete depth shall not be permitted.

#### **SURFACE PREPARATION AND FINISH:**

The structural steel is shot blasted to an SSPC-SP10 condition to remove rust and mill scale, then protected with a baked-on, heavy-duty 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.

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 III L, multiple cells, 10,000 divisions. The manufacturer shall provide a NTEP Certificate of Conformance attesting to compliance with these requirements.

Load cells shall be digital with an integral microprocessor and analog-to-digital conversion function located within the load cell housing.

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.

The load cell assembly shall be constructed to self-center.

The load cell shall not require check rods, check bolt, flexures, or chain links for stabilization, as these items are sources of ongoing maintenance requirements.

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.

The distance between the top of the concrete pier to the bottom of the resting load cell in its stand shall not be less than 8 inches to avoid debris accumulation and water build-up.

No part of the load cell may extend below the scale deck.

The load cell shall be constructed from stainless steel and shall be environmentally sealed to an IP69K rating.

The load cell shall not need boots or shrouds of any kind to prevent the contamination of the bearing surface but shall be of a self-cleaning design. Designs using boots or shrouds shall not be allowable.

The load cell shall have a connector integral to its housing for connecting and disconnecting the load cell interface cable at the load cell.

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 load cell interface cable shall be metal braided for environmental and rodent protection. Neoprene covered load cell cable shall not be permitted.

The load cell shall be manufactured by the scale manufacturer and shall be a Cardinal Scale model SCBD75 SmartCell® with axis® frictionless centering system.

#### **LOAD CELL JUNCTION BOX:**

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.

Load cell interface cable shall be metal braided for environmental and rodent protection.

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.

#### **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.

#### **WEIGHT INDICATOR:**

The scale shall be provided with a weight indicator that is compatible with Cardinal SmartCell® digital load cells.

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 desktop stainless steel enclosure and shall include a LCD display visible in all levels of light including total darkness.

The weight indicator shall be manufactured by the scale manufacturer and shall be a Cardinal Scale 225 series Navigator weight indicator 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.