

TEXAS DEPARTMENT OF TRANSPORTATION (TxDOT)  
TRANSPORTATION PLANNING AND PROGRAMMING DIVISION

SPECIFICATION NO.  
TPP-TIWIM  
REVISED: DECEMBER 2006

SPECIFICATION FOR CLASS I PIEZOELECTRIC CABLE

PART I

GENERAL CLAUSES AND CONDITIONS

1. The equipment furnished under this specification shall be the latest improved model in current production, as offered to commercial trade, and shall be of quality workmanship and material. The bidder represents that all equipment offered under this specification shall be new. USED, SHOPWORN, DEMONSTRATOR, PROTOTYPE, OR DISCONTINUED MODELS ARE NOT ACCEPTABLE.
2. Respondent should submit with the bid or have on file with the Texas Department of Transportation (TxDOT), Austin, Texas, the latest printed literature and detailed specifications on equipment the respondent proposes to furnish. This literature is for informational purposes only.
3. The unit shall be completely assembled and adjusted, and all equipment including standard and supplemental equipment shall be installed and the unit made ready for continuous operation.
4. All parts not specifically mentioned which are necessary for the unit to be completed and ready for operation or which are normally furnished as standard equipment shall be furnished by the successful respondent. All parts shall conform in strength, quality and workmanship to the accepted standards of the industry.
5. The unit provided shall meet or exceed all Federal and State of Texas safety, health, lighting and noise regulations and standards in effect and applicable to equipment furnished at the time of manufacture.
6. It is the intent of the TxDOT to purchase goods, equipment and services having the least adverse environmental impact, within the constraints of statutory purchasing requirements, departmental need, availability, and sound economical considerations. Suggested changes and environmental enhancements for possible inclusion in future revisions of this specification are encouraged.
7. The TxDOT encourages all manufacturers to comply voluntarily with the Society of the Plastics Industry, Inc. (SPI), plastic container coding system. All plastic containers furnished to this specification should have an imprinted SPI recycling code and symbol identifying the resins composition of the container so that the item can be recycled after its useful life. Manufactures are encouraged to use recycled plastics and materials in the manufacture of their products in order to conserve natural resources, energy and landfill space. Respondents should note that future specification revisions may require mandatory compliance with the SPI plastic container coding system.

PART II

SPECIFICATIONS

1. SCOPE: This specification establishes the requirements for sensors to be used for fixed, in-road, axle weighting and designed to be connected to traffic counting equipment for the purpose of automated weigh-in-motion (WIM) data collection. The sensor shall interface with existing WIM data collection electronics without the need to modify the electronics in any way.

2. EXAMPLE: IRD, Type-190 electronics  
International Road Dynamics  
702-43<sup>rd</sup> Street East, Saskatoon, SK  
Canada S7K 3T9  
306-653-6611

NOTICE TO RESPONDENT: Any example shown is listed to show type and class of equipment desired. Respondent is cautioned to read the specification carefully, as there may be special requirements not commonly offered by the equipment manufacturer. DO NOT ASSUME STANDARD EQUIPMENT MEETS ALL OF THE DETAILED SPECIFICATION REQUIREMENTS MERELY BECAUSE IT IS LISTED AS AN EXAMPLE. Respondent is cautioned that any unit delivered to the FOB points which does not meet specifications in every aspect will not be accepted.

3. FUNCTIONAL AND DESIGN REQUIREMENTS

- 3.1. The sensor shall provide a consistent level voltage output signal when a vehicle axle passes over it, shall have a shielded transmission cable attached, and shall meet the following requirements.
- 3.1.1. The sensor constant sensitivity repeatability shall be  $\pm 10\%$ . Each sensor shall be certified in writing to have this sensitivity.
  - 3.1.2. The Output Uniformity shall be  $\pm 7\%$ .
  - 3.1.3. Typical Output Level range shall provide a minimum output signal of 250mV, from a wheel load of 400 pounds.
  - 3.1.4. Working temperature range shall be -40 degrees to 160 degrees Fahrenheit.
  - 3.1.5. The total length of the sensor shall be 12 feet or as specified in the purchase order.
  - 3.1.6. The sensor shall fit in a  $\frac{3}{4}$  inch by 1 inch saw cut in the road to minimize damage to the road.
  - 3.1.7. The sensor shall not be encapsulated in any type of metal.
  - 3.1.8. Two sizes of installation brackets shall be included with each sensor,  $\frac{3}{4}$  inch and 1 inch. One each  $\frac{3}{4}$  inch and one each 1 inch per each 6 inch of sensor length.
  - 3.1.9. The Shielded Transmission Cable shall be a coaxial cable and shall meet the following requirements.
    - 3.1.9.1. The Shielded Transmission Cable shall be RG 58C/U with a High Density Polyethylene Outer jacket that is rated for direct burial; 3/16 inch OD Plenum, 20 AWG standard tinned copper core braid.
    - 3.1.9.2. Transmission cable length shall be a minimum of 100 foot and increase with 50 foot increments to 300 foot as specified in the purchase order with no splices.
    - 3.1.9.3. Transmission cable shall have a soldered, water resistant connection to the sensor.
    - 3.1.9.4. A tag showing the unique serial number for each sensor shall be attached to the transmission cable
4. PRE-SHIPMENT SAMPLE: A pre-shipment sample shall be required within 30 days after receipt of purchase order.

5. PACKAGING AND DELIVERY

- 5.1. All sensors shall be coiled and packaged two each in a 24 inch by 20 inch 3 inch corrugated cardboard box (only one each sensor, if the cable lead-in is 300 feet or greater). Each sensor shall uncoil and flatten once the tape or banding is undone and the sensor is removed from the cardboard box, without any physical force or tools. Once uncoiled, the sensor shall not lose any integrity for a uniform signal output.
- 5.2. Each Shielded Transmission Cable shall be neatly rolled and taped or banded.
- 5.3. If packing Apopcom is used, it shall be of a biodegradable type.
- 5.4. Pre-shipment sample and final product delivery shall be made to:

Texas Department of Transportation  
Transportation Planning & Programming Division  
4305 Bull Creek Road  
Building 42  
Austin, Texas. 78731

6. WARRANTY: The equipment offered shall be warranted against defective materials, workmanship and failure for 12 months from the date of acceptance and shall cover 100% parts, labor, and shipping. The vendor shall furnish to TxDOT, prior to shipping any equipment, a warranty agreement that covers all equipment delivered under this purchase order.