

ITEM 599.0605XX04 M TRAFFIC BARRIER GATES

DESCRIPTION

The work shall consist of removing, furnishing, and installing new traffic barrier gates where shown on the plans. The gate installations shall include all structural mounting foundations required to securely fix the equipment for proper support and operation as designed.

MATERIALS

1. Traffic Barrier Gate:

The operating mechanism and main control components shall be contained in a weatherproof housing. The housing shall be constructed of 4.8 mm carbon steel, hot dip galvanized after fabrication. Exterior surfaces shall be painted aluminum. All fasteners shall be corrosion resistant.

Housing design shall allow for easy removal of the arm shaft assembly as a unit, including bearings and main arm crank, for ease of service. Arm assembly mounting design shall be provided with complete gaskets and shaft openings and shall incorporate O-ring seals. Front and rear access doors shall be mounted on full cross bronze straps. Hinges shall be of the slip-off type and shall have stainless steel pins. Door handles, two per door, shall use a vise action to compress a neoprene bulb-type gasket to seal the door openings. The traffic barrier gate assembly shall be manufactured by Roadway Manufacturing, B & B or approved equal.

2. Arm:

The gate arm shall be 102 mm square, 6005-T5 aluminum extruded tubing [Option: with 76 mm square end section of high-strength UV-resistant fiberglass or 76 mm square extruded aluminum]. The installer of the gates shall coordinate the arm length dimension with the owner as determined by field measurements. The gate arm length shall be referenced from the centerline of the equipment housing. Stainless steel truss cables and a damping type bumper rod shall be furnished with longer arms at the discretion of the manufacturer. Front and rear arm surfaces shall be covered with alternating red and white pre-stripped diamond grade reflective sheeting. Stripes shall be 152 mm wide, and shall slope at 45 degrees down toward the arm tip. Remaining exposed surfaces shall be painted white.

3. Arm base:

The arm base shall be designed with a shear pin mechanism to minimize damage to the gate and vehicle in the event of a collision. In the event of an impact, the shear pin shall break, allowing the arm to swing approximately 75 to 80 degrees. At the full open position, a spring-loaded latch shall engage, preventing the arm from swinging back into traffic. The arm shall be easily reset by manually releasing the latch, rotating the arm back into position and replacing the shear pin.

4. Arm Mounting Channels:

A pair of carbon steel channels, hot dip galvanized, painted aluminum, shall be rigidly affixed to the ends of the main arm shaft. The channels and a steel cross member shall provide a sturdy mount for the arm, arm base assembly and counterweights.

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5. Counterweights:

At the rear end of the side arm channels, hot dip galvanized counterweights shall be mounted to balance the arm. Counterweights shall be sectional and shall permit at least 10% adjustment.

6. Arm Shaft:

The main arm shaft shall be of 51 mm diameter, AISI 4150, with a minimum tensile strength of 965 MPa. The shaft shall be mounted in heavy duty re-lubricable ball bearings.

7. Operating mechanism:

The warning arm shall pivot in the vertical plane via a mechanical 4-bar linkage. The linkage shall utilize cranks keyed to the main arm shaft and transmission shaft and an adjustable connecting rod between a pair of self-aligning spherical rod ends. The connecting rod shall be of 25 mm diameter, AISI 4150. The linkage shall be driven by a fully enclosed, double reduction, worm gear speed reducer. Gear ratio used shall produce an operation time of 11 seconds. An auxiliary crank shall be used, paired with the transmission crank, to reduce the load on the transmission and to better balance and stabilize the load on the housing and mounting structure. The auxiliary crank shall be mounted in a permanently lubricated bronze bearing. The velocity of the arm shall follow a sinusoidal pattern to provide smooth operation. The arm shall begin and end its full motion path with zero velocity and accelerate smoothly to maximum velocity at mid-travel.

8. Motor:

The gate motors shall be rated at 208VAC, 3PH, 60Hz, ¾ horsepower. The motor shall be a C-face design and shall be mounted directly to the transmission. The motor shall be instantly reversing and overload protected.

9. Electrical Controls:

The electrical control wiring of the new gates shall be based upon the design shown on the plans. The Contractor shall wire the gate motor and warning light controls, including all limit switch connections, based upon the latest field wiring schematic diagrams available.

In addition to the latest gate control equipment options, the Contractor shall provide manual hand crank and door opening interlocks (limit switches) to prevent inadvertent operation of the gate while performing maintenance operations.

10. Braking Mechanism:

The motor shall be equipped with a solenoid-release, automatic brake. The brake shall have a manual release lever to permit manual operation of the gate during emergencies or setup.

11. Hand Crank:

A hand crank shall be provided with each gate to facilitate manual operation of the gate.

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12. Limit switch:

The gate limit switch assembly shall be a self-contained unit. The assembly shall provide 8 independent SPDT control switches. Switches shall be rated for 15 amps at 220VAC. Switches shall be controlled by individually adjustable cams. The limit switch assembly design shall permit adjustment of all cams with the gate in any position. The limit switch assembly shall have a removable cover to help prevent accidental contact with switch terminals. Shaft, cams, bushings and housing pieces shall be of non-ferrous corrosion resistant materials.

13. Safety switches, terminal blocks and wiring:

A manual disconnect switch shall be provided, pre-wired at the factory to break the main motor leads, to protect personnel during service. A hand crank safety switch shall be provided to prevent powered actuation of the gate during manual operation. Safety switches shall be installed and set at the factory to break the control circuit when either access door is opened. Door safety switches shall have a pull-to-override feature for test operation and shall automatically reset when doors are closed. Control components and terminal blocks shall be mounted inside an electrical enclosure mounted facing the roadway side access opening, except where custom components required by the customer prevent this arrangement. Pressure-type, modular terminal blocks shall be fully labeled and clearly coded to wiring diagrams. All control wiring shall be clearly coded to wiring diagrams and shall terminate at the terminal block. Connections to screw-type terminals shall have lugs. Conductors shall be #16AWG minimum stranded. Wiring shall be run in existing conduit where practical.

CONSTRUCTION DETAILS

The traffic barrier gates shall be installed at the locations shown and as detailed on the contract plans.

METHOD OF MEASUREMENT

The work of this item will be measured as a lump sum unit of work per bridge.

BASIS OF PAYMENT

The lump sum price bid shall include the cost of all labor, materials, and equipment required to complete the work of this item. All wiring and conduit connecting the panels and field equipment will be paid for under the "Electrical Work" item.

Payment will be made under:

- Item 599.06050104 M Traffic Barrier Gates – Ingersoll Street
- Item 599.06050204 M Traffic Barrier Gates – Washington Street