

# **BarrierGate<sup>®</sup>**

General Specifications

Manual Operations General Specifications

**BarrierGate®**  
**GENERAL SPECIFICATIONS**

**I. GENERAL**

- A. The BarrierGate system (the gate) shall be designed and manufactured by Energy Absorption Systems, Inc. of Chicago, Illinois.
- B. The gate shall be a crashworthy longitudinal barrier which opens to provide a 12.8m (42 ft.) wide opening for controlled access.
- C. The gate profile shall not exceed 762mm (30 in.) wide by 1.1m (43 in.) tall and the gate weight shall be approximately 17,300 kg (38,000 lbs.).
- D. The gate is designed for sites with less than 8% longitudinal grade and less than 4% lateral cross slope.

**II. DESCRIPTION OF SYSTEM**

- A. The gate shall be constructed of two movable steel gate assemblies that join at the center of an opening in concrete median barrier to form a continuous longitudinal barrier. The two gate half assemblies shall lock together at the center of the installation with a pin and hook type connection.
- B. The sides of the gate assemblies shall be constructed of three-beam panel and lower skirt sections and have sufficient tensile strength to resist design speed vehicle impacts.
- C. Exterior and most interior surfaces shall be corrosion resistant per ASTM A-123.
- D. The outermost ends of the gate assemblies shall be equipped with transition sections that attach to custom concrete median barrier (CMB) wall assemblies. The gate half assemblies shall be secured by the wall assemblies in tension, yet be allowed to slide freely when the gate is opened. The wall assemblies shall have the New Jersey safety shape profile from the 1989 AASHTO Roadside Design Guide, Figure 6.7. The top of the CMB shall be 200mm (8 in.) wide.
- E. Each wall assembly shall further consist of a 1.2m (4 ft.) steel enclosure assembly, a 7.9m (26 ft.) concrete CMB section (long CMB), and a 1.5m (5 ft.) concrete CMB section (short CMB). The steel enclosure assembly and the long CMB section shall be rigidly attached to one another and

anchored to a 254mm (10 in.) minimum thickness 27.6 MPa (4000 psi) concrete pad with (48) ¾ in. dia. X 10 in. polyester grouted ASTM A193 B7 galvanized threaded steel rods. The short CMB section shall be attached to the long CMB section but shall not be attached to the concrete foundation. The short CMB section shall provide a gradual change in rigidity between the rigid long CMB section and the more flexible gate assembly, thereby allowing smooth vehicle redirection regardless of the point of impact. Installer shall modify the existing median barriers to transition to the enclosure assembly as necessary to prevent vehicle pocketing and snagging.

- F. To ensure smooth operation and proper alignment during opening and closing, the gate halves shall ride on track assemblies anchored to the concrete foundation and guide rail assemblies attached to the top of the wall.
- G. The gate shall be available in both manually operated and electrically powered models.
  - 1. The manually operated model shall be equipped with a manual jack that operates the lock securing the two gate halves together. The manual open and close movements shall be accomplished via a capstan drive system located in one of the steel enclosure assemblies. Movement of the manual gate is accomplished by manual hand crank through a two-speed chain and sprocket reduction.
  - 2. The electrically powered model shall be equipped with a NEMA 4 rated electrical control system which provides electrically powered locking/unlocking and opening / closing gate movements. The incoming power supply shall be 240 VAC single phase 50A (480VAC 25A optional). Activation and operation of the electrically powered gate shall be through a pair of security clearance numerical keypads (4 digit combination) operating on low voltage DC power. The unlock and lock operation shall be powered by a 6.7 kN [1500 lbs.] 120VAC electromechanical actuator positioned in one gate half. The open and close operations shall be powered by a 2.2 kW [3hp] 240 VAC electric winch and cable system positioned in one of the steel enclosures. The control system shall allow semiautomatic opening of closing of the gate from either end of the installation. The control system shall sense gate stall conditions and shut down safely. The manually operated drive system shall be included with the electrically powered model as a means of operating the gate in the event of loss of electrical power.

### **III. PERFORMANCE CRITERIA**

- A. The gate shall be fully tested to and meet the recommended structural adequacy, occupant risk, and vehicle trajectory criteria set forth in the National Cooperative Highway Research Program Report 350 for the Test Level 3 length of need and transition (TL-3 LON/T), impact conditions of 820 to 2000 kg (1808 to 4409 lb.) vehicles at speeds to 100 km/h (62.2 mph) and angels up to 25 degrees when properly installed according to the manufacture's recommendations.
- B. The gate shall be capable of preventing vehicle penetration, vaulting, and underriding during TL-3 LON/T impacts and shall smoothly redirect the vehicle.
- C. For TL-3 LON/T impacts, detached debris shall not show potential for penetrating the vehicle occupant compartment or present a hazard to other traffic, pedestrians or workers in a work zone. The vehicle shall remain upright during and after the collision. Moderate rolling, pitching, and yawing may occur.
- D. The impact velocity of a hypothetical front seat passenger against the vehicle interior, as calculated from the longitudinal vehicle acceleration and 600mm (23 5/8 in.) forward displacement, and the lateral vehicle acceleration and 300mm (1ft.) lateral displacement shall be less than 12 m/s (39.3 ft./s) and the highest 10 ms average vehicle acceleration in the longitudinal and lateral directions subsequent to the instant of passenger impact shall be less than 20 g's.
- E. The gate shall be fully operational after minor impacts and must remain a positive physical and visual barrier before and after design speed impacts.
- F. The gate shall be resistant to jamming from -30 to 50°C (-22 to 122°F) in the absence of snow and ice and/or severe debris buildups.
- G. The time to completely power open or close the electrically powered BarrierGate shall be approximately one minute. Manual opening times will vary with strength and skill of the operator(s) and typically will be less than ten minutes.

#### **IV. DESIGN AND SELECTION CRITERIA**

- A. Design, selection, and placement of the gate shall conform to applicable guidelines in:
  - 1. U.S. Department of Transportation. Federal Highway Administration. "Manual on Uniform Traffic Control Devices" Washington, D.C. U.S. Government Printing Office, 1988.
  - 2. American Association of State Highway and Transportation Officials. "Roadside Design Guide" Washington, D.C.: AASHTO, 1989.
- B. Installation of the gate shall be accomplished in accordance with the recommendations of Energy Absorption Systems, Inc. in the BarrierGate Product Manual.

#### **V. OPTIONAL ACCESSORIES**

- A. Various control options shall be available for use in the conjunction with the electrically powered model:
  - 1. A 5KVA 480 VAC to 240 VAC transformer for sites with 480 VAC single-phase power.
  - 2. For remote sites having no power, a generator power input is available to operate the gate from a customer-supplied generator.
  - 3. A flashing strobe and warning horn for use where audible and/or visual feedback of gate operation is necessary.
  - 4. An infrared safety sensor to reverse gate closure when blocking is detected.
  - 5. An automatic timed closure function for installations where automatic closure of gate is desired. This option comes with an infrared safety sensor.
  - 6. A one-button radio remote with automatic timed closure (range approximately 800m [1/2 mile]) at locations where portable remote control of gate is necessary.
  - 7. A hard-wired remote control with automatic timed closure where stationary remote gate operation is necessary.

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