



# Standard Specification for Automated Vehicular Gate Construction<sup>1</sup>

This standard is issued under the fixed designation F 2200; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This specification defines performance-based and prescriptive-based methods of evaluating various classes of gates that are used for vehicular traffic and are to be automated.

1.2 Gate types addressed in this specification include horizontal slide gates, horizontal swing gates, vertical lift gates, vertical pivot gates and overhead pivot gates.

1.3 Gate types not listed in this specification will be subject to any applicable provisions contained in this specification.

1.4 Automated vehicular gates that do not comply with this specification shall be subject to independent evaluation for compliance with UL 325.

## 2. Referenced Documents

### 2.1 ASTM Standards:

F 900 Specification for Industrial and Commercial Swing Gates<sup>2</sup>

F 1184 Specification for Industrial and Commercial Horizontal Slide Gates<sup>2</sup>

F 1911 Practice for Installation of Barbed Tape<sup>2</sup>

### 2.2 UL Standard:

UL 325 Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems<sup>3</sup>

## 3. Terminology

3.1 *bottom retainer*—an angle or lip attached to the bottom horizontal member of a slide gate, usually used on a gate installed in a high security-related application, intended to protect a gate from crash-through related damage from vehicular impact.

3.2 *catcher*—see *receiver guide*.

3.3 *Class I Gate*—a gate intended for use in a home of one-to-four single family dwelling, or a garage or parking area associated therewith.

3.4 *Class II Gate*—a gate intended for use in a commercial location or building such as a multi-family housing unit (five or more single family units), hotel, garages, retail store, or other

building servicing the general public.

3.5 *Class III Gate*—a gate intended for use in an industrial location or building such as a factory or loading dock area or other locations not intended to service the general public.

3.6 *Class IV Gate*—a gate intended for use in a guarded industrial location or building such as an airport security area or other restricted access locations not servicing the general public, in which unauthorized access is prevented by means of supervision by security personnel.

3.7 *entrapment*—the condition of being caught or held in a position that increases the risk of injury.

3.8 *gate latch*—a manual mechanism that secures the gate in either the fully closed or fully open position.

3.9 *gate lock*—an electro-mechanical mechanism that locks the gate in either the fully closed or fully open position.

3.10 *positive stop*—a physical device that limits gate travel.

3.11 *protrusion*—an object less than 9 in.<sup>2</sup>(5806 mm) of cross sectional area and permanently attached to the gate with a surface that extends beyond the extreme horizontal or vertical planes created by the gate structure members.

3.12 *receiver post*—a post to which a receiver guide is attached.

3.13 *receiver guide*—a device mounted to a post or other fixed object which provides lateral stability to a closed gate.

3.14 *vehicular horizontal slide gate*—a gate that slides in a horizontal direction and is intended for use at a vehicular entrance or exit to a drive, parking lot, or the like.

3.15 *vehicular horizontal swing gate*—a gate that swings in a horizontal arc in a horizontal plane and is intended for use at a vehicular entrance or exit to a drive, parking lot, or the like.

3.16 *vehicular overhead pivot gate*—a gate made in one rigid piece designed to close an entire opening at a vehicular entrance or exit to a drive, parking lot, or the like, where opening and closing is accomplished by pivoting the gate about an axis, with or without a horizontal track to guide the top of the gate.

3.17 *vehicular vertical lift gate*—a gate that moves in the vertical direction and is intended for use at a vehicular entrance or exit to a drive, parking lot or the like.

3.18 *vehicular vertical pivot gate*—a gate that moves in an arc in a vertical plane and is intended for use at a vehicular entrance or exit to a drive, parking lot, or the like.

3.19 *weight bearing exposed roller*—an exposed roller that

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee F14 on Fences and is the direct responsibility of Subcommittee F14.10 on Specific Applications. Current edition approved July 10, 2002. Published September 2002.

<sup>2</sup> *Annual Book of ASTM Standards*, Vol 01.06.

<sup>3</sup> Available from Underwriters' Laboratories, Corporate Progress, 333 Pfingsten Rd., Northbrook, IL 60062-2096.

supports weight from the gate.

**4. General Requirements**

4.1 Gates shall be constructed in accordance with the provisions given for the appropriate gate type listed in Sections 5-10.

4.2 Gates shall be designed, constructed and installed to not fall over more than 45 degrees from the vertical plane, when a gate is detached from the supporting hardware.

4.3 Gates shall have smooth bottom edges, with vertical bottom edged protrusions not exceeding 0.50 in. (12.7 mm) when other than the *Exceptions* listed in 4.8.

4.4 The minimum height for barbed tape shall not be less than 8 ft (2.44 m) above grade.

4.5 The minimum height for barbed wire shall not be less than 6 ft (1.83 m) above grade.

4.6 An existing gate latch shall be disabled when a manually operated gate is retrofitted with a powered gate operator.

4.7 A gate latch shall not be installed on an automatically operated gate.

4.8 Protrusions shall not be permitted on any gate.

*Exceptions:*

4.8.1 For all gates, vertical bottom edge protrusions not exceed 0.50 in. (12.7 mm) which shall be smooth on all surfaces with no sharp edges.

4.8.2 For all gates, gate locks and edge sensors shall not be considered protrusions.

4.8.3 Protrusions at the leading and trailing vertical gate edges shall not exceed .50 in. (12.7 mm), and shall be smooth on all surfaces with no sharp edges.

4.8.4 For horizontal slide gates and horizontal swing gates, top pickets and top decorative designs shall not be considered protrusions, provided they are in a vertical plane with respect to the gate. Protrusions extending outside the vertical plane shall be permitted provided such protrusions are located 7 ft (2.13 m) or more above grade.

4.8.5 For horizontal slide gates, gate locks, wheels and positive stops shall not be considered protrusions.

4.8.6 For horizontal slide gates, bottom retainers shall not be considered protrusions only when used in Class IV applications.

4.8.7 For vertical lift gates, gate locks, top pickets and top decorative designs shall not be considered protrusions.

4.8.8 For vertical lift gates, positive stops shall not be considered protrusions only when used at the top of gates.

4.8.9 For vertical pivot gates, gate locks shall not be considered protrusions.

4.9 Gates shall be designed, constructed and installed such that their movement shall not be initiated by gravity when an automatic operator is disconnected.

**5. Specific Applications**

5.1 Any non-automated gate that is to be automated shall be upgraded to conform to the provisions of this specification.

5.2 This specification shall not apply to gates generally used for pedestrian access and to vehicular gates not to be automated.

5.3 Any existing automated gate, when the operator requires replacement, shall be upgraded to conform to the provisions of

this specification in effect at that time.

**6. Vehicular Horizontal Slide Gates**

6.1 The following provisions shall apply to Class I, Class II and Class III vehicular horizontal slide gates:

6.1.1 All weight bearing exposed rollers 8 ft (2.44 m), or less, above grade shall be guarded or covered.

6.1.2 All openings shall be designed, guarded or screened from the bottom of the gate to a minimum of 48 in. (1.22 m) above grade to prevent a 2 1/4 in. (57 mm) diameter sphere from passing through the openings anywhere in the gate, and in that portion of the adjacent fence that the gate covers in the open position.

6.1.3 All openings located between 48 in. (1.22 m) and 72 in. (1.83 m) above grade shall be designed, guarded or screened to prevent a 4 in. (102 mm) diameter sphere from passing through the openings anywhere in the gate, and in that portion of the adjacent fence that the gate covers in the open position.

6.1.4 A gap, measured in the horizontal plane parallel to the roadway, between a fixed stationary object nearest the roadway (such as a gate support post) and the gate frame when the gate is in either the fully open position or the fully closed position, shall not exceed 2 1/4 in. (57 mm). See Fig. 1.

*Exception:* All other fixed stationary objects greater than 16 in. (406 mm) from the gate frame shall not be required to comply with this section.

6.1.5 Positive stops shall be required to limit travel to the designed fully open and fully closed positions. These stops shall be installed at either the top of the gate, or at the bottom of the gate where such stops shall horizontally or vertically project no more than is required to perform their intended function.

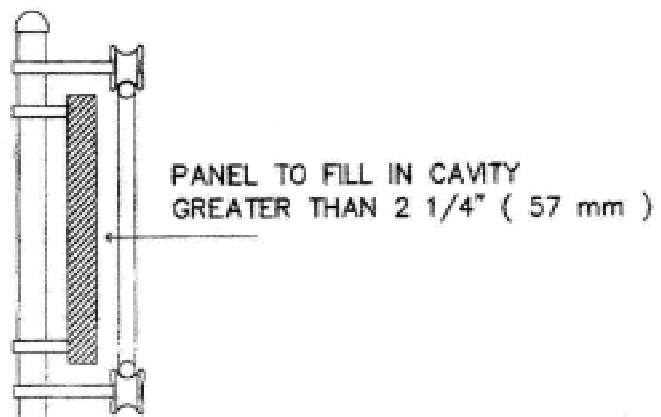
6.1.6 All gates shall be designed with sufficient lateral stability to assure that the gate will enter a receiver guide.

*6.1.6.1 Single Panel:*

Receiver guides shall be recessed behind the leading edge of the receiver post or fixed object.

*Exception:* Receiver guides mounted greater than 8 ft (2.44 m) above grade shall not be required to comply with this section.

*6.1.6.2 Dual Panels:*



**FIG. 1 Vehicular Horizontal Slide Gate- Section View**

Receiver guides, if used, may be installed on either panel, and shall include a cross-sectional area of 9 in.<sup>2</sup> (5806 mm<sup>2</sup>) or greater as measured on the leading edge of each guide.

6.2 The following provisions shall apply to Class IV vehicular horizontal slide gates:

6.2.1 All weight bearing exposed rollers 8 ft (2.44 m), or less, above grade shall be guarded or covered.

6.2.2 Positive stops shall be required to limit travel to the designed fully open and fully closed positions. These stops shall be installed at either the top of the gate, or at the bottom of the gate where such stops shall horizontally or vertically project no more than is required to perform their intended function.

## 7. Vehicular Horizontal Swing Gates

7.1 The following provisions shall apply to Class I, Class II and Class III vehicular horizontal swing gates:

7.1.1 Gates shall be designed, constructed and installed so as not to create an entrapment area between the gate and the supporting structure or other fixed object when the gate moves toward the fully open position, subject to the provisions in 7.1.1.1 and 7.1.1.2.

7.1.1.1 The width of an object (such as a wall, pillar or column) covered by a swing gate when in the open position shall not exceed 4 in. (102 mm), measured from the centerline of the pivot point of the gate.

*Exception:* For a gate that is not in compliance with this provision, the defined area shall be subject to the entrapment protection provisions of UL 325.

7.1.1.2 Except for the zone specified in Section 7.1.1.1, the distance between a fixed object such as a wall, pillar or column, and a swing gate when in the open position shall not be less than 16 in. (406 mm).

*Exception:* For a gate that is not in compliance with this provision, the defined area shall be subject to the entrapment protection provisions of UL 325.

7.2 Class IV vehicular horizontal swing gates shall be designed, constructed and installed in accordance with security related parameters specific to the application in question.

## 8. Vehicular Vertical Lift Gates

8.1 The following provisions shall apply to Class I, Class II and Class III vehicular vertical lift gates:

8.1.1 All openings shall be designed, guarded or screened to prevent a 4 in. (102 mm) diameter sphere from passing through the openings anywhere in the gate.

8.1.2 A gap, measured in the horizontal plane parallel to the roadway, between a fixed stationary object nearest the roadway (such as a gate support post) and the gate frame when the gate is in either the fully open position or the fully closed position, shall not exceed 4 in. (102 mm).

*Exception:* All other fixed stationary objects greater than 16 in. (406 mm) from the gate frame shall not be required to comply with this section.

8.1.3 Horizontal and vertical framing members of a gate shall be smooth, and shall not include horizontal protrusions other than gate hardware.

8.1.4 A positive stop shall be required to limit travel to the designed fully open position.

8.2 Class IV vehicular vertical lift gates shall be designed, constructed and installed in accordance with security related parameters specific to the application in question.

## 9. Vehicular Vertical Pivot Gates

9.1 The following provisions shall apply to Class I, Class II and Class III vehicular vertical pivot gates:

9.1.1 All openings covered by the operator when the gate is in the open position and in that portion of the operator and adjacent fence that the gate covers during the travel of the gate, shall be designed, guarded or screened to prevent a 2 ¼ in. (57 mm) diameter sphere from passing through the openings anywhere in the gate.

9.1.2 A gap, measured in the horizontal plane parallel to the roadway, between a fixed stationary object nearest the roadway (such as a gate support post) and the gate frame when the gate is in either the fully open position or the fully closed position, shall not exceed 4 in. (102 mm).

*Exception:* All other fixed stationary objects greater than 16 in. (406 mm) from the gate frame shall not be required to comply with this section.

9.1.3 Horizontal and vertical framing members of a gate shall be smooth, and shall not include protrusions other than gate hardware.

9.1.4 All gates shall be designed with sufficient lateral stability to assure that the gate will enter a receiver guide.

9.2 Class IV vehicular vertical pivot gates shall be designed, constructed and installed in accordance with security related parameters specific to the application in question.

## 10. Vehicular Overhead Pivot Gates

10.1 The following provisions shall apply to Class I, Class II and Class III vehicular overhead pivot gates:

10.1.1 All weight bearing exposed rollers 8 ft (2.44 m), or less, above grade shall be guarded or covered.

10.1.2 All openings shall be designed, guarded or screened to prevent a 4 in. (102 mm) diameter sphere from passing through the openings anywhere in the gate.

10.1.3 A gap, measured in the horizontal plane parallel to the roadway, between a fixed stationary object nearest the roadway (such as a gate support post) and the gate frame when the gate is in either the fully open position or the fully closed position, shall not exceed 4 in. (102 mm).

*Exception:* All other fixed stationary objects greater than 16 in. (406 mm) from the gate frame shall not be required to comply with this section.

10.1.4 Horizontal and vertical framing members of a gate shall be smooth, and shall not include protrusions other than gate hardware.

10.1.5 Where required, positive stops shall limit travel to the designed fully open position and/or the designed fully closed position.

10.1.6 All jamb materials, track materials and related hardware shall be designed to support the weight of the gate at any position of the gate.

10.2 Class IV vehicular overhead pivot gates shall be designed, constructed and installed in accordance with security related parameters specific to the application in question.

*ASTM International takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.*

*This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.*

*This standard is copyrighted by ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or [service@astm.org](mailto:service@astm.org) (e-mail); or through the ASTM website ([www.astm.org](http://www.astm.org)).*