Designation: F1643 – 05 (Reapproved 2012)

Standard Test Methods for Detention Sliding Door Locking Device Assembly[1]

This standard is issued under the fixed designation F1643; 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 (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 These test methods cover the apparatus, procedures, and acceptance conditions for evaluating the normal operational performance and the performance characteristics under assault, smoke, and fire conditions of sliding device assemblies in detention and correctional institutions. These test methods give an indication of the performance characteristics of devices in actual service. Such variables as installation and maintenance conditions are not considered.

1.2 It is the intent of these test methods to help ensure that detention sliding devices perform at or above minimum acceptable levels to control passage to unauthorized or secure areas, to confine inmates and to delay and frustrate escape attempts and resist vandalism. However, these test methods do not address door construction. It is recognized that in order to meet the intent of these test methods, door assemblies shall be compatible with the level of performance required by Test Methods F1450.

1.3 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

F1450 Test Methods for Hollow Metal Swinging Door Assemblies for Detention and Correctional Facilities

F1577 Test Methods for Detention Locks for Swinging Doors

F1592 Test Methods for Detention Hollow Metal Vision Systems

F1758 Test Methods for Detention Hinges Used on Detention-Grade Swinging Doors

F1915 Test Methods for Glazing for Detention Facilities

2.2 *NFPA Standards:*[3]

NFPA 101 Life Safety Code

NFPA 105 Installation of Smoke Control Door Assemblies

NFPA 252 Methods of Fire Tests of Door Assemblies

2.3 *UL Standard:*[4]

UL-752 Bullet Resisting Equipment

UL-1034 Standard for Burglary Resistant Electric Locking Mechanisms

3. Terminology

3.1 *Definitions:*

3.1.1 *controlled passage, n*—capability to restrict the unauthorized movement of individuals.

3.1.2 *cover box, n*—enclosure that contains, secures, and protects all horizontal tracks, cables, tubing, wiring, motors, etc. that support and control the door; the enclosure is continuous across the horizontal door movement and may be continuous across several doors. Also referred to as horizontal mechanism housing.

3.1.3 *deadlocked, adj*—mechanical condition of the locking mechanism that secures against unlocking or unlatching by end pressure, lifting, prying, or other manipulations against the mechanism.

3.1.4 *door guide, n*—horizontal member attached to the wall adjacent to the bottom of the door used to control the bottom of the door.

3.1.5 *forcible egress, n*—ability to pass a 5 × 8 × 8 in. (127 × 203.2 × 203.2 mm) rigid box through an opening in the test sample created by destructive testing procedures with no more than 10 lb (44.48 N) of force.

3.1.6 *hand tools, n*—items permitted for use in disengaging a lock when it fails to disengage either remotely or manually. For example, hand screwdrivers (of various sizes and tip

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] Available from National Fire Protection Association (NFPA), 1 Batterymarch Park, Quincy, MA 02269-9101.

[4] Available from Underwriters Laboratories (UL), Corporate Progress, 333 Pfingsten Rd., Northbrook, IL 60062.

configurations including tips for coverplate security screws), claw hammer, ball peen hammer, chisel, pliers (any common size), and locking pliers. These tools are commonly carried in a correctional facility maintenance tool kit.

3.1.7 *leading edge, n*—end of the door panel that travels across the door opening.

3.1.8 *lock column, n*—vertical enclosure that contains, secures, and protects the mechanical locking mechanism.

3.1.9 *locked, adj*—door is held in place by the engagement of the locking mechanism in the door. Sliding doors must be deadlocked to be secure. A sliding door is not considered locked unless it is also deadlocked.

3.1.10 *receiver, n*—vertical channel that wraps around the leading edge of the door and provides vertical support against lateral and perpendicular movement of the door in a closed position.

4. Significance and Use

4.1 A major concern for detention and correctional administrative officials is the reliable operation of sliding devices used in their facilities. These test methods aid in assigning a level of physical security and performance to devices for sliding door assemblies.

4.2 These test methods evaluate the resistance of a sliding door assembly to attacks using battering devices, prying devices, smoke, and fire. These test methods also evaluate the performance of a sliding device under simulated operating conditions. These test methods do not provide a measure of the resistance or performance of the device subjected to attack by chemical agents, ballistics, explosives, or other extreme methods of attack. These test methods do not measure the resistance or performance of the device when subjected to environmental elements such as humidity, temperature, rain, snow, or wind-carried dust or sand. Where such elements may be a factor the manufacturer should be consulted for proper application.

4.3 The primary purpose of these test methods is to approximate the levels of abuse and operating conditions to which devices are subjected in detention and correctional institutions. The result of these test methods will provide a measure of assurance of protection to the correctional personnel, public, and inmates.

4.4 Preventative maintenance programs shall be provided in accordance with the manufacturer's recommendation to enable sliding device assemblies to function as intended throughout the expected service life.

4.5 These test methods do not measure the performance or cycle life of the local or remote mechanical emergency release mechanism, or both, due to their design variables and low user requirements.

5. Sample Selection, Construction, and Size

5.1 Sample devices shall be representative of the types and styles intended for use in the application of these test methods.

5.2 The manufacturer shall permanently mark the test samples and retain them at the manufacturing facility for future reference. In lieu of test samples, the manufacturer may provide a certified procedure for the construction of tested assemblies.

5.3 The test assembly shall be certified by an independent third party testing and certification agency; any change of components or assembly methods or processes shall be certified in writing by the testing and certification agency. The agency shall have the sole authority to decide the extent and scope of retesting required.

5.4 Test reports shall include complete details and photographs of the test specimen, the testing apparatus, and installation instructions including templates for all items of hardware.

6. Test Methods

6.1 A test sample shall consist of a minimum of one locking device complete with cover box, lock column, receiver, and door guide where these elements are part of a complete locking device. The test methods that follow consist of independent setups and procedures.

6.2 *Horizontal Impact Test*—Locking devices shall comply with the following:

6.2.1 *Scope*—This test method is designed to evaluate the capability of a detention sliding door locking device to resist repeated impact forces against the side of the door.

6.2.2 *Significance and Use:*

6.2.2.1 This test method is intended to closely simulate a sustained battering ram attack and provide an evaluation of the capability of the locking device to prevent, delay, or frustrate escape or access to unauthorized areas, or both. The test results are intended to aid in assigning a level of physical security to various configurations of detention sliding door locking devices.

6.2.2.2 An impact test of this design performed on a detention sliding device evaluates the impact strength of the device and its components, as well as quality of fabrication techniques.

6.2.3 *Apparatus:*

6.2.3.1 *Test Assembly*—This assembly consists of a test fixture (frame) and impactor apparatus as shown in Fig. 1. Refer to Appendix X1. The device under test and the test door panel are mounted on the test fixture.

6.2.3.2 *Impactor*—The impactor shall consist of a hinged or pivoted system with a mass capable of delivering impacts of 200 ft·lbf (271.2 J) to a sliding panel simulating a door and locking device mounted to a wall. The striking surface of the impactor shall be made from C1010–C1020 carbon steel and have a striking surface area of 4.0± 0.04 in.^{2} (25.8 cm^2) (see Fig. 2). The weight of the impactor shall be 80 lb (36.3 kg) ± 1 %.

6.2.4 *Procedure:*

6.2.4.1 Install the locking device on a test fixture that simulates installation of a detention sliding device on a wall. Anchoring method for the device including lock column, receiver jamb, and door guide shall be consistent with manufacturer recommended installation procedures. Using test apparatus described in 6.2.3.1 (Fig. 1), deliver the number of

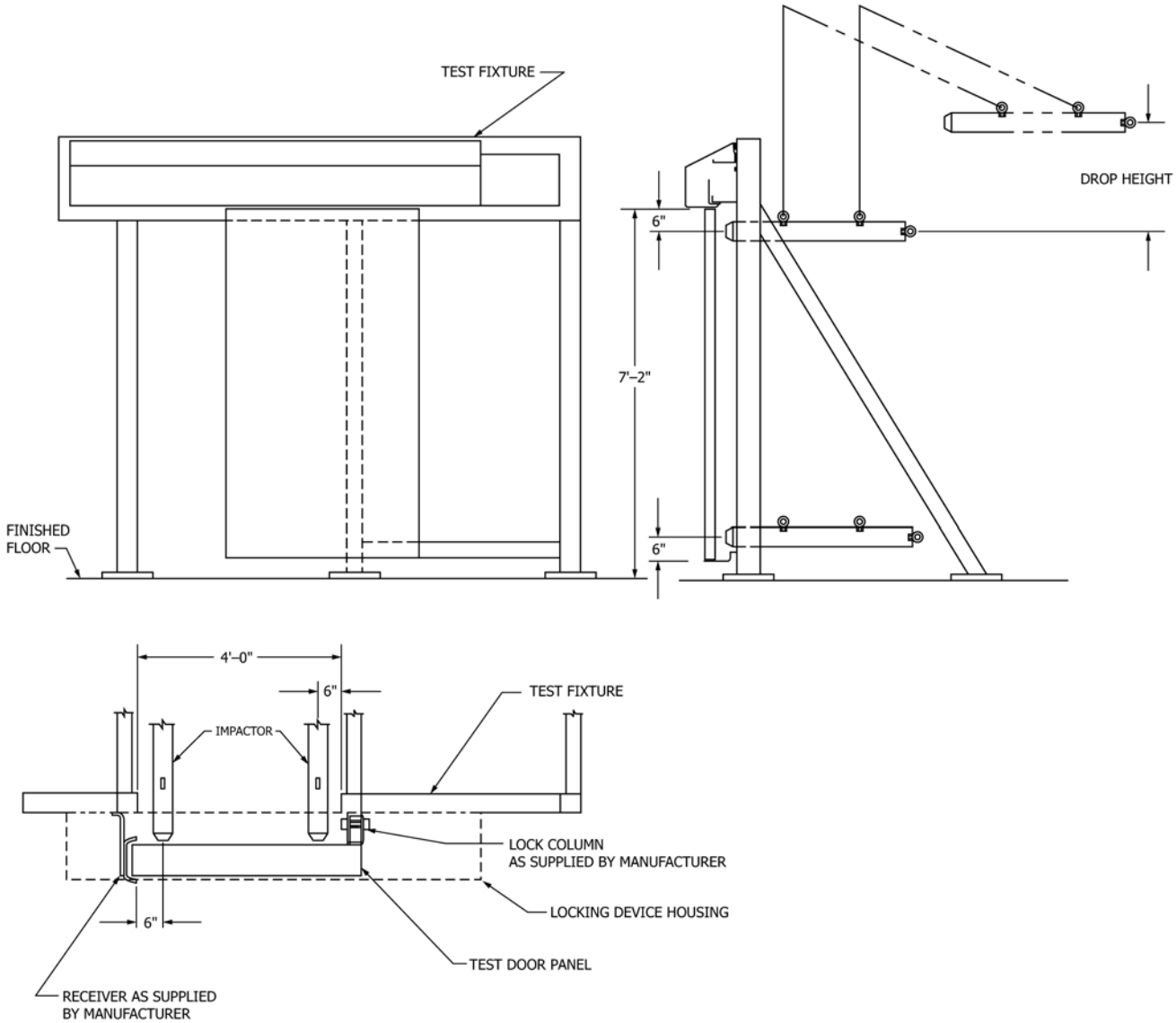


FIG. 1 Test Assembly

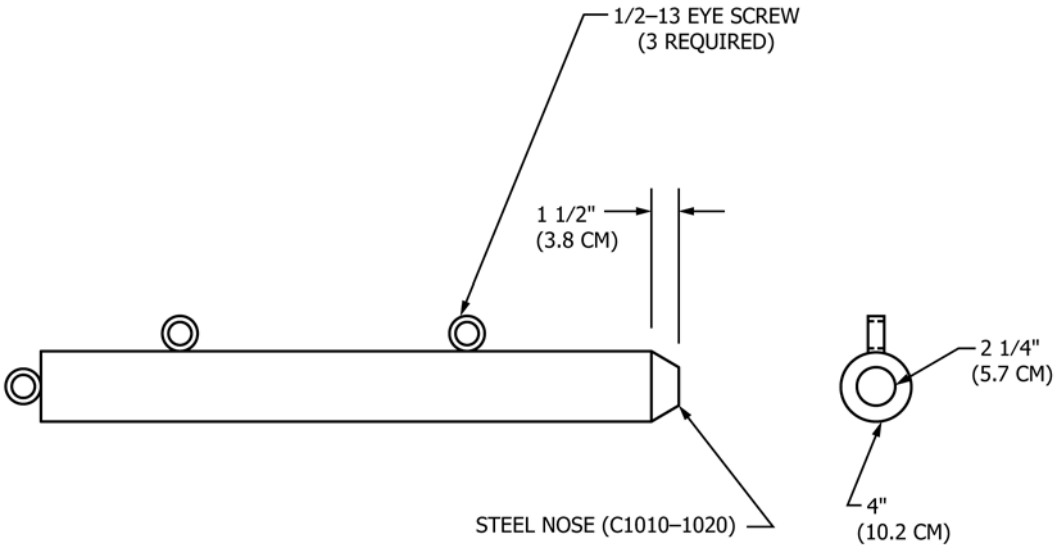


FIG. 2 Steel Impact Ram

TABLE 1 Impact Test Criteria

Security Grade	Number of Impacts	Element of Time[A]
1	600	60 min
2	400	40 min

[A] Element of time is based on the assumption that sustained manpower can deliver 400 blows of 200 ft·lbf (271.2 J) each in as few as 40 min. Since 400 blows is the number of impacts a Grade 2 device must absorb and still be operable, as described in 6.2.5; it is assumed failure of the Grade 2 device will occur after 40 min. The element of time assigned to the various grades of devices is adjusted to achieve more manageable time periods than actual calculations provide. The element of time is hypothetical.

impacts of 200 ft·lbf (271.2 J) as required for grade level being tested. See Table 1 for the number of required impacts. The number of impacts shall be one quarter of the total number of blows required by Table 1, delivered at each corner of the door as shown in Fig. 1.

6.2.4.2 *Maintenance*—Maintenance of the device is limited to initial lubrication as specified by the manufacturer.

6.2.5 *Test Termination and Conditions of Acceptance*—The device shall remain locked and controlled passage shall be maintained throughout the testing. Failure of device to remain locked or to control passage shall constitute failure. If the device will not unlock and open by remote or key operation or by use of commonly available hand tools, it shall constitute failure.

6.2.6 *Precision and Bias*—No information is presented about either precision or bias of the horizontal impact test in these test methods since the test result is nonquantitative.

6.3 *Vertical Impact Test*—Sliding device assemblies shall comply with the following:

6.3.1 *Scope*—This test method is designed to evaluate the capability of a detention sliding device assembly to resist repeated impact force.

6.3.2 *Significance and Use*—This test method is intended to simulate the impact caused by lifting the door to the maximum allowed by device clearances and then releasing the door.

6.3.3 *Apparatus*—The test equipment will consist of a mechanism capable of lifting a 300-lb (136-kg) door and applying a controlled vertical force. The device should be able to repeatedly exert a controllable vertical force on the door and then quickly release it to simulate dropping the door. A typical test arrangement is shown in Fig. 3.

6.3.4 *Procedure*—Using the test apparatus described in 6.3.3, the 300-lb (136-kg) door will be locked in the closed position and raised to the extent allowed by the mechanical clearances of the locking device. When the door is at its upper extreme, no more than 50 lbf (222 N) of vertical force will be applied. Then remove the vertical force quickly enough to allow the door to fall of its own weight. Repeat this sequence the number of cycles required by Table 2. During the test, the door will remain locked and maintain controlled passage.

6.3.4.1 *Maintenance*—Maintenance of the device is limited to initial lubrication as specified by the manufacturer.

6.3.5 *Test Termination and Conditions of Acceptance*—The door shall maintain controlled passage and remain locked throughout the test. Inability of the sliding device assembly to

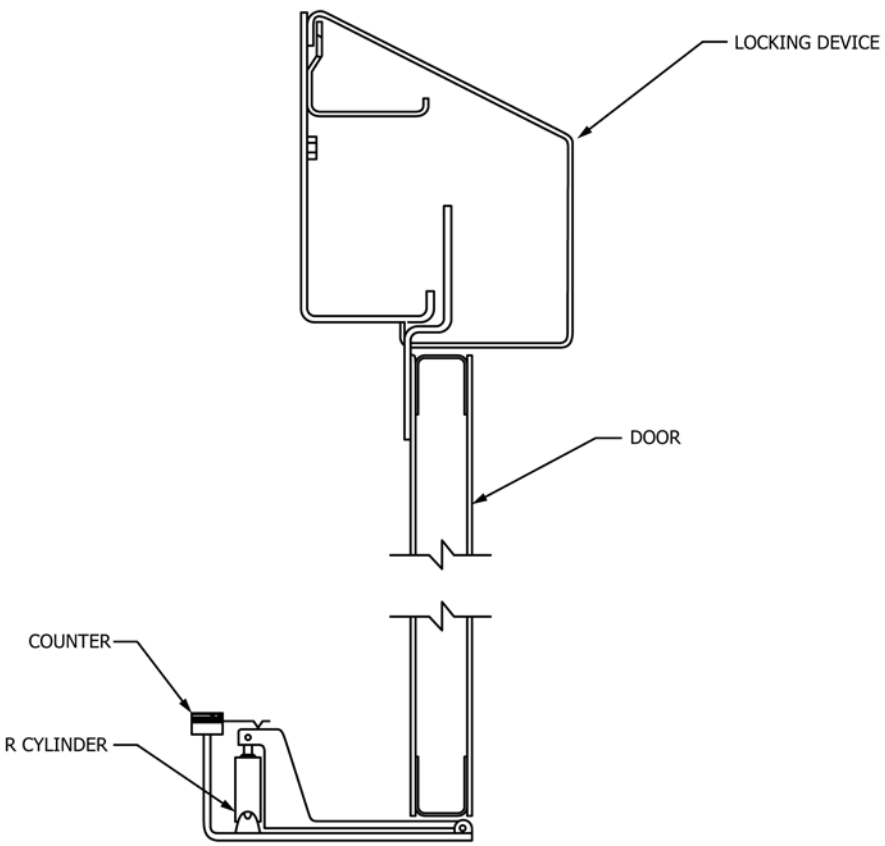


FIG. 3 Vertical Impact Apparatus

TABLE 2 Vertical Drop Test Criteria

Security Grade	Number of Cycles	Element of Time[A]
1	300	1.5 h
2	200	1.0 h

[A] Element of time is based on the assumption that sustained manpower can produce 200 drop impacts as prescribed in 6.3 in 1 h. Since 200 drop impacts is the number a Grade 2 device must absorb and still be operational, as described in 6.3.5; it is assumed failure of the Grade 2 device will not occur in less than 60 min. The element of time assigned to the various grades of devices is adjusted to achieve more manageable time periods than actual calculations provide. The element of time is hypothetical.

remain locked and maintain controlled passage throughout the test shall constitute failure. Upon completion of the test sequence, the sliding device will be cycled in its normal mode of operation, open then closed and locked. The sliding device shall achieve physical locking and shall indicate a secure condition when indicators are provided. This cycle shall be repeated a total of five times. Inability of the sliding device to complete any cycle shall constitute failure.

6.3.6 *Precision and Bias*—No information is presented about either precision or bias of the vertical impact test in these test methods since the test result is nonquantitative.

6.4 *Remote Unlocking Force Test:*

6.4.1 *Scope*—This test method covers the capabilities of remotely controlled devices to function under simulated operating conditions while lateral force is applied either perpendicular or parallel to the door face to prohibit device operation.

6.4.2 *Significance and Use*—This test method simulates the remote release (unlocking) of devices while being subjected to either a perpendicular or parallel lateral force directed to stop unlocking operation. A test of this design performed on a sliding device evaluates the operating force characteristics and strength of the device and its components as well as quality of fabrication techniques.

6.4.3 *Apparatus:*

6.4.3.1 The test fixtures shall consist of assemblies suitable for mounting the locking devices and a test door panel. Examples of these fixtures are shown in Fig. 4 and Fig. 5 and shall incorporate the device manufacturer's recommendations for mounting the device.

6.4.3.2 Test apparatus shall consist of a loading device, control panel, and means for monitoring voltage and current supplied to the device. When testing pneumatic devices, air pressure shall also be monitored. For the test load perpendicular to the door, the load shall be not less than 100 lbf (445 N) applied on the center of the door. The test load for parallel load to the door shall be not less than 40 lbf (178 N) applied to the center of the door edge.

6.4.3.3 A means shall be provided to adjust the energy to the device within the parameters specified in 6.4.4.3.

6.4.4 *Procedure:*

6.4.4.1 Mount test device on the test fixture in accordance with the manufacturer's recommended installation instructions.

6.4.4.2 *Maintenance*—Maintenance of the device is limited to initial lubrication as specified by the manufacturer.

6.4.4.3 Set the power source to the test device's operator to the minimum value allowed by the manufacturer while maintaining electrical energy in compliance with standard UL-1034 when applicable.

6.4.4.4 Verify that the door and the lock are free from binding before applying the load to the door.

6.4.4.5 With the device locked, apply the static load determined in 6.4.3.2 on the centerlines of the door.

6.4.4.6 Unlock the device remotely while maintaining the specified test load.

6.4.4.7 Perform steps 6.4.4.5 and 6.4.4.6 five consecutive times for a perpendicular loaded door and five consecutive times for a parallel loaded door. Each test shall be completed in 15 min.

6.4.5 If the device fails to unlock in 10 s or more in any of the five attempts, this shall constitute failure of the test.

6.4.5.1 If during any of the five attempts, the power consumption exceeds the manufacturer's specifications, this shall constitute failure of the test.

6.4.6 *Precision and Bias*—No information is presented about either precision or bias of the remote unlocking force test in these test methods since the test result is nonquantitative.

6.5 *Operational Force Test:*

6.5.1 *Scope*—This test method is designed to evaluate the ability of the sliding device assembly to be repeatedly stalled during operation. A sustained stall capability of the device is also tested.

6.5.2 *Significance and Use*—This test method is intended to simulate the intentional or accidental stalling of door movement during normal closing operation.

6.5.3 *Apparatus*—The test equipment shall consist of a hand-held device capable of measuring and recording a force of 40 lbf (178 N) with an accuracy of ±5 %.

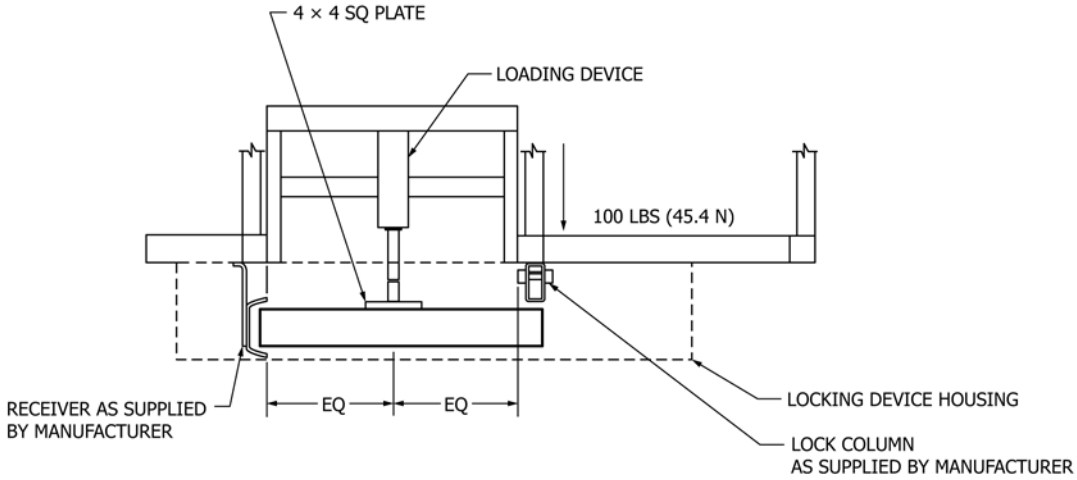
6.5.4 *Procedure*—Using the test apparatus described in 6.5.3, the following cycle shall be executed:

6.5.4.1 With the door in the open position, operate the sliding device to close the door in the normal manner. When the door is approximately half way closed, manually apply the measuring device to the mid-point of the front edge of the door.

6.5.4.2 Exert sufficient force to stall the door and maintain the condition for a minimum of 10 s. Measure and record the force required to stall the door.

6.5.4.3 Upon releasing, the door shall continue to complete the close cycle and shall lock in the normal manner. Complete the test cycle by opening the door in the normal manner. Subject the device to the number of test cycles within the specified time period appropriate to the security grade as indicated in Table 3.

6.5.4.4 After completing the cycles required in Table 3, the door shall be commanded closed in the normal manner and mechanically blocked from completing the close cycle. Maintain this stall condition for a minimum of 1 h, after which time the blocking element will be removed. After resetting, the device shall close and lock the door within the normal operational closing time. Any resetting function shall be accomplished without manual intervention. The blocking element may be any material (wood block, etc.) of sufficient strength placed at any point between the door and receiver.



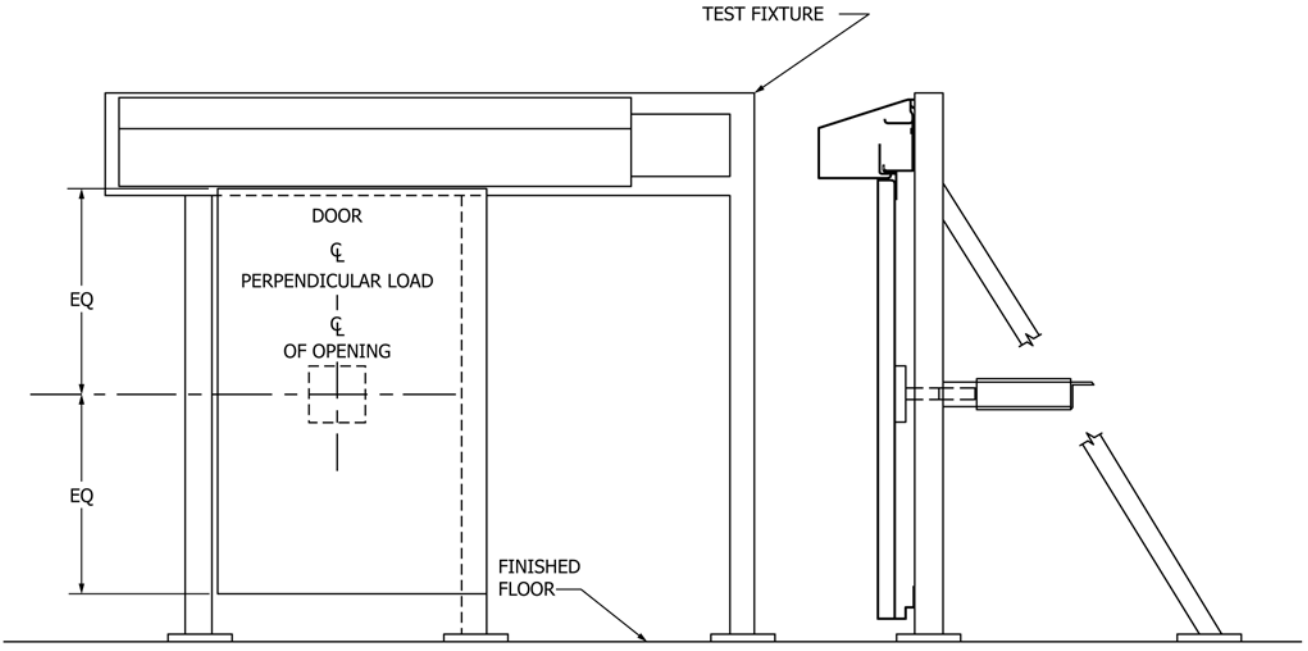


FIG. 4 Perpendicular Side Load

6.5.4.5 *Maintenance*—Maintenance of the device is limited to initial lubrication as specified by the manufacturer.

6.5.5 *Test Termination and Acceptance*— The sliding device shall exert a force not greater than 40 lbf (178 N) during each of the recorded cycles. The sliding device shall resume normal operation after the sustained stall test. Failure to successfully complete either the stall force cycle or the sustained stall test and resume normal operation shall constitute failure of the test.

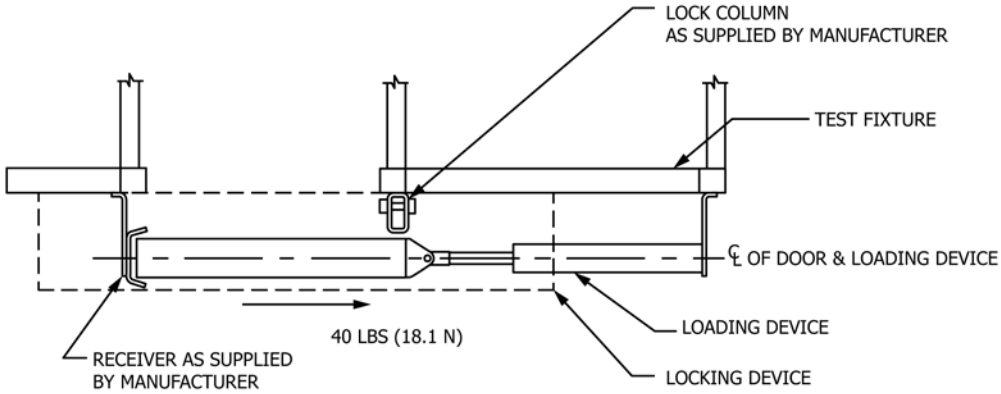
6.5.6 *Precision and Bias*—No information is presented about either precision or bias of the operational force test in these test methods since the test result is nonquantitative.

6.6 *Tool Manipulation Attack Test:*

6.6.1 *Scope*—The procedures specified in this test method evaluate the capability of a sliding door locking device to resist escape and attempts to damage or manipulate the locking mechanism.

6.6.2 *Significance and Use*—This test method is used to measure the locking device's capability to resist forced unlocking, simulating such attempts from the side of the door opposite the removable cover side.

6.6.3 *Apparatus*—A horizontal sliding locking device assembly unit shall include the recommended anchorage between the door frame and the sliding door assembly test fixture. Test assembly shall consist of the device assembly, door, receiver



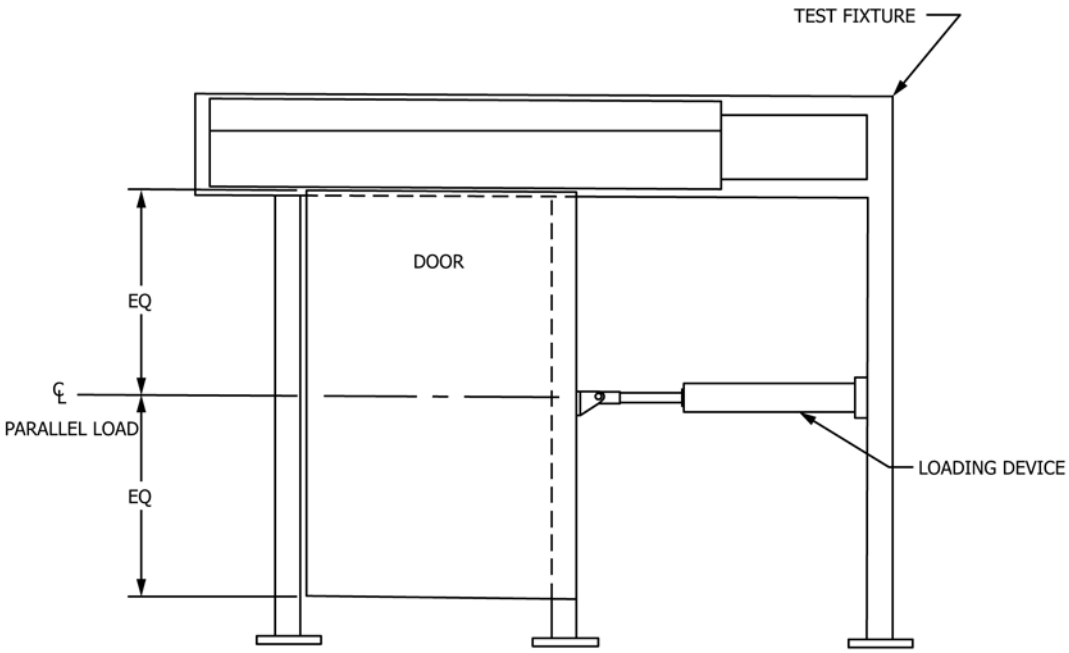


FIG. 5 Parallel Load

TABLE 3 Operational Force Test Criteria

Security Grade	Number of Cycles	Time
1	120	3 h
2	60	1.5 h

column, vertical lock column, and all related fixtures as recommended by the manufacturer.

6.6.4 *Applicable Test Tools*—Different types of tools shall be used to simulate contraband that could be in the possession of an occupant. They are as follows:

6.6.4.1 *Coat Hanger*—A piece of steel wire approximately 1⁄16 in. (1.6 mm) diameter by 48 in. (1200 mm) long.

6.6.4.2 *Knife or Spatula*—A thin blade approximately 1⁄16 in. (1.6 mm) thick by 1 in. (25 mm) wide by 6 in. (150 mm) long.

6.6.4.3 *Welding Rod*—A piece of steel rod 3⁄16 in. (4.8 mm) by 14 in. (356 mm) long.

6.6.4.4 *Steel Band Picking Tool*—A piece of steel banding 1⁄32 in. (0.8 mm) thick by 1 in. (25 mm) wide by 36 in. (915 mm) long.

6.6.4.5 A piece of plastic not to exceed ½ in. (12.7 mm) thick by 6 in. (150 mm) wide by 14 in. (365 mm) long.

6.6.4.6 Commonly found personal items such as tooth brushes, razors, combs, brushes, newspapers, magazines, toilet paper, shoe string or twine 20 in. (500 mm) long, batteries, and magnets.

6.6.5 *Procedure*—This test shall be conducted by an adult individual. The individual shall conduct the test of the locking device assembly for 60 consecutive min. The test individual shall have a 1 h time period prior to the test to examine the locking mechanism with the cover removed. After examination is complete the locking device mechanism shall be secured with all covers locked in place with the door and mechanism in the locked closed position. The individual shall attempt by

manipulation with the tools listed in 6.6.4 in any combination to unlock the sliding device within the time period prescribed.

6.6.6 *Test Termination and Conditions of Acceptance*—If the locking device unlocks or the door is opened anytime during the test, or both, it shall constitute failure of the test. Upon completion of the series of manipulation tests, an attempt shall be made to disengage the locking device (unlock). If the locking device will not unlock and be pulled open by remote or manual operation or by commonly available hand tools it shall constitute failure. The removal of access covers is acceptable to accomplish unlocking.

6.6.7 *Precision and Bias*—No information is presented about either precision or bias of the tool manipulation attack test in these test methods since the test result is nonquantitative.

6.7 *Remote Operation Cycle Test:*

6.7.1 *Scope*—This test method evaluates the capabilities of remotely operated locking devices to function under normal operating cycles.

6.7.2 *Significance and Use*—This test method is intended to closely simulate operation of the device as it undergoes cycles of remote unlocking, opening, locking open, unlocking, closing, and locking closed. This cycle test evaluates the wear characteristics and fatigue strength of the device's components as well as quality of fabrication techniques.

6.7.3 *Apparatus:*

6.7.3.1 The test apparatus shall have a means to operate a 300-lb (136-kg) door from fully closed and locked to fully open and locked open where device locks open. An example of such a test apparatus is shown in Fig. 6.

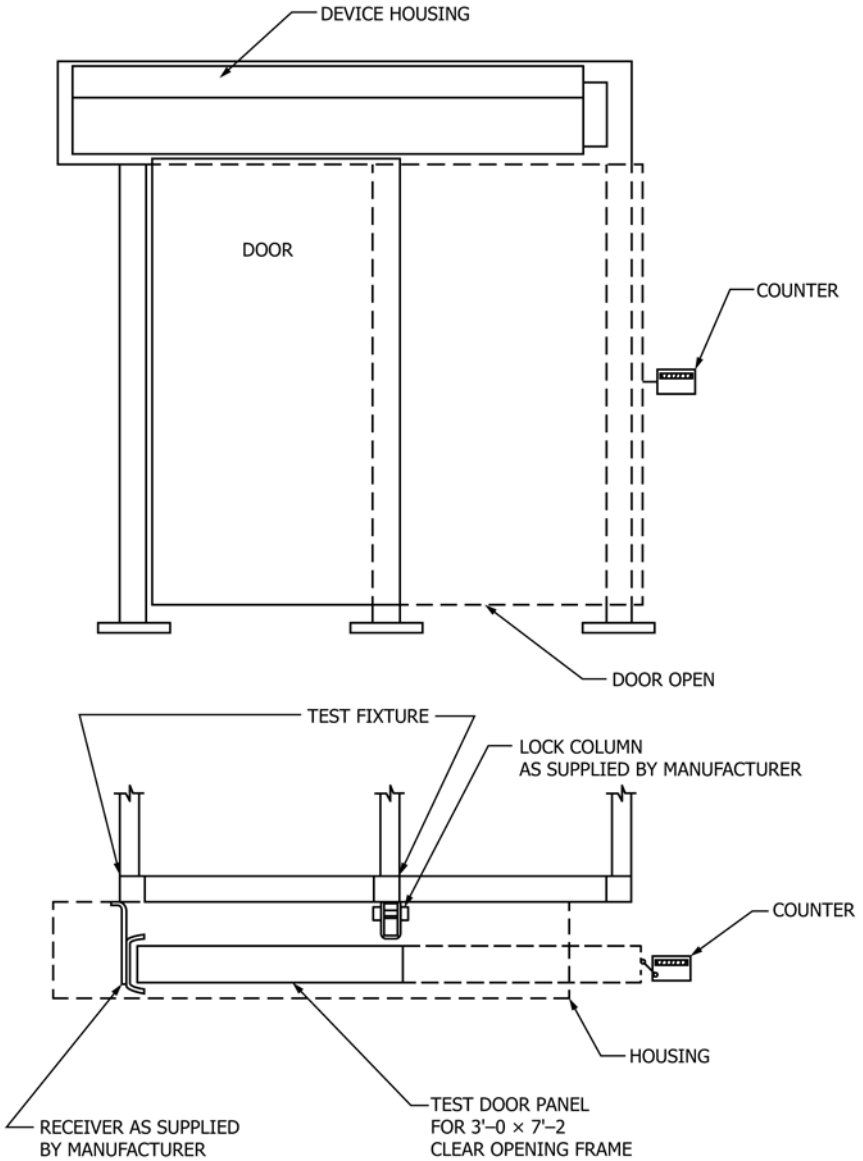


FIG. 6 Cycle Test Apparatus

6.7.3.2 A control device with a means to cycle the door shall be provided and shall require the locking device to reach its final position in both closed and open position or stop the cycling test.

6.7.3.3 A counting device actuated by the door shall be provided.

6.7.3.4 Indication of locked and unlocked status, when available in the device under test, shall be monitored.

6.7.4 *Procedure:*

6.7.4.1 Mount the sample on a test fixture incorporating the recommendations provided by the manufacturer's installation instructions.

6.7.4.2 Lubricate the device before and during the test in accordance with the manufacturer's recommendations.

6.7.4.3 Duration of the test is either 500 000 cycles for Grade 1 or 200 000 cycles for Grade 2 as measured by an automatic counter.

6.7.5 *Test Termination and Conditions of Acceptance*—Devices completing required number of cycles without failure and only periodic lubrication and adjustment in accordance with the manufacturer's recommendations shall be deemed to have passed the test. This shall include all auxiliary limit switches included as part of the test device.

6.7.6 *Precision and Bias*—No information is presented about either precision or bias of the remote operation cycle test in these test methods since the test result is nonquantitative.

6.8 *Fire Test*—When specified as fire doors, sliding device assemblies shall comply with the following:

6.8.1 The sliding device assembly shall be subjected to fire endurance and hose stream tests in accordance with NFPA 252, or equivalent.

6.8.2 *Test Termination and Conditions of Acceptance*—The acceptance criteria of fire ratings shall be in accordance with NFPA 252, or equivalent. If a manufacturer omits design options in the fire test, those options will not be permitted in production models that are required to carry a fire rating.

6.8.3 Sliding device assemblies used in a path of egress shall comply with the operational requirements of chapters 14 and 15 of NFPA 101.

6.9 *Smoke Test*—When specified as smoke control doors, sliding device assemblies shall comply with the following:

6.9.1 *Smoke Penetration*—Smoke penetration does not require a unitized test, therefore manufacturers shall provide the gasketing material in accordance with NFPA 105 when smoke penetration is required by the specifications. The manufacturer shall be responsible for providing the gasketing material.

6.9.2 *Test Termination and Conditions of Acceptance*—The acceptance criteria shall be in accordance with standard NFPA 105.

7. Keywords

7.1 correctional facility; detention facility; detention security; fire test; hardware; impact test; locks; sliding door locking device; smoke test

APPENDIXES

(Nonmandatory Information)

X1. TEST APPARATUS

X1.1 Test equipment suitable for use in evaluating the physical security and performance of detention sliding door locking devices is described in this appendix. While certain commercial instruments are identified to adequately describe the test equipment, in no case does such identification imply recommendation or endorsement, nor does it imply that the material or equipment described is necessarily the best for the purpose.

X1.2 Figs. 1-6 show the test fixtures necessary to carry out the test methods described in 6.2, 6.3, 6.4, and 6.7. Test fixtures of alternate designs may be used provided the same test parameters are evaluated.

X2. RELATED STANDARDS

X2.1 These test methods are part of a family of interrelated standards developed to work together using common testing approaches and grade classifications to address the specific needs of detention and correctional facilities, including the following: Test Methods F1450, F1577, F1592, F1643, F1758, and F1915.

X2.2 This Appendix is intended to explain some of the common approaches underlying the test methods noted above, including how to distinguish between primary and secondary materials and test objectives.

X2.3 Primary is typically an entire full-scale operating assembly of many components and materials that are tested together, whereas secondary is individual components that are only a portion of a whole assembly.

X2.4 In some instances, components that are secondary in one test become primary under a distinct and separate related standard developed specifically for that component. These separate standards typically apply more rigorous test methods to fully exploit susceptibilities unique to that component.

X2.5 Titles of related standards indicated above pertain to performance objectives for the primary component or assembly. This is explained further in examples below.

X2.6 Each related standard contains grades or levels of performance developed: to restrict passage to unauthorized areas, to delay and frustrate escape attempts, and to resist vandalism. These grades or levels were developed based on an attacker's predicted ingenuity using "riot-like" attack methods, modified depending upon strengths and weaknesses of various components. Attack sequence format(s), impact intensities, test duration(s), and tools utilized are comparable from one standard to another. Using the established security grades, a user is given reasonable assurance that components and assemblies will perform satisfactorily at their tested security grade levels. These security grades establish specific measurements of performance of the primary assembly or component material.

X2.7 *Test Methods* F1450—Attack impact test methods incorporated into Test Methods F1450 address performance characteristics of door assemblies, including constituent doors, door frames, and sub-components installed and operating as they would normally function in an actual detention or correctional facility. Components installed in test doors and frames are intended to be certified by their applicable separate component standard performance. For example, separately certify components to standards as follows: locks to Test Methods F1577, hinges to Test Methods F1758, sliding door devices to Test Methods F1643, and glazing to Test Methods F1915.

X2.8 *Test Methods* F1592:

X2.8.1 Impact test method(s) for Test Methods F1592 address not only the performance characteristics of doors and door frames, but also side light and multiple light frame assemblies, again, with all necessary components installed to form a full scale operating assembly. Once again, it is intended that individual components should be certified under their separate applicable standards.

X2.8.2 Users of detention components should review the related standards applicable to those components and their test reports for comparable attack testing grade or level of performance.

X2.8.3 Since the primary subjects of attack under Test Methods F1592 are the frame construction, glazing stops, and fasteners, a consistent steel impact "panel" may be substituted for uniformity of test results, instead of using actual security glazing. This substitution also applies to Test Methods F1450 door vision lights.

X2.9 *Complementary/Dual Certifications*:

X2.9.1 Manufacturers of components may work together to obtain multiple complementary certifications. For example, a lock manufacturer may team with a hollow metal manufacturer to conduct impact testing on an assembly under Test Methods F1450 and obtain dual certifications for impact test portions of both Test Methods F1450 and F1577, since the test methods in both are comparable.

X2.9.2 In another example, a security glazing manufacturer may team with a hollow metal manufacturer to obtain a complementary certification under Test Methods F1592. However, in this case, Test Methods F1915 requires additional testing of the security glazing that involves sharp as well as blunt attack tools, and application of heat using a torch during a blunt impact test. A security glazing product that performs well under Test Methods F1592 hollow metal frame testing may not satisfy all of the separate requirements of Test Methods F1915. Separate certification under Test Methods F1915 must also be obtained

X2.10 *Components Tested for Specific Susceptibilities*—Differences in attack testing under these two test methods (Test Methods F1915 and F1592) are related to performance degradation of some security glazing, undergoing attack testing at various thermal conditioning exposures, as well as the specific number of impacts. Test Methods F1915 contains impact tool attacks under both severe hot and cold conditioning, as well as a torch sequence combined with impact from blunt tools. Typically, heavily constructed detention hollow metal sheet is not as susceptible to these temperature changes, which is the reason why temperature conditioning is not included in impact testing for Test Methods F1592 or F1450 (except temperature conditioning for bullet resisting UL-752). Consequently, security glazing tested and certified under Test Methods F1915 provides superior assurance of performance across a range of environmental conditions not tested under most other previously existing standards.

X2.11 In conclusion, by choosing consistent grade levels from these related standards, a user can obtain greater assurance that both the security assembly and the multitude of constituent components are integrated to deliver the security performance required.