Standard Test Methods for Glazing for Detention Facilities[1]

This standard is issued under the fixed designation F1915; 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, including a fire test response method, cover the apparatus, procedures, and acceptance conditions for evaluating the normal operational performance and the performance characteristics under assault conditions of detention glazing used in window and door assemblies in detention and correctional facilities; thus, these test methods only give an indication of the performance characteristics of detention glazing in actual service. Such variables as installation and maintenance conditions are not considered except as otherwise included in this test method.

1.2 It is the intent of these test methods to help ensure that detention glazing performs at or above minimum acceptable levels to restrict inmate passage to unauthorized areas, to confine inmates, to delay and frustrate escape attempts and to resist vandalism.

1.3 Tools defined in these test methods are representative of similar tools or materials, which may become available to inmates within the secure perimeter of detention and correctional facilities, and which could be used to inflict similar product damage.

1.4 These test methods should not be used to establish or confirm the absolute prevention of forced entries or exits. These test methods define five factors (tool, temperature, techniques, time, and number of impacts) used to determine resistance to defined attacks.

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

1.6 In these test methods, the specimens are subjected to one or more specific sets of laboratory test conditions. If different test conditions are substituted or the end-use conditions are changed, it is not always possible by or from these test methods to predict changes in the physical attack, or fire-test-response characteristics measured, or both; therefore, the results are valid only for the physical attack, or fire-test-exposure conditions, or both, described in these test methods.

1.7 *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]

F1233 Test Method for Security Glazing Materials And Systems

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

F1643 Test Methods for Detention Sliding Door Locking Device Assembly

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

2.2 *UL Standard:*[3]

UL 752 Bullet Resisting Equipment

2.3 *NIJ Standard:*[4]

NIJ 0108.1 Ballistic Resistant Protective Materials

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *benchmark, n*—endpoint or intermediate point in the test sequence as determined by the certification agency.

3.1.2 *detention security, n*—assurance of the restriction of mobility of inmates to designated areas within a correctional or detention facility.

[1] These test methods are under the jurisdiction of ASTM Committee F33 on Detention and Correctional Facilitiesand are the direct responsibility of Subcommittee F33.02 on Physical Barriers.

Current edition approved June 1, 2012. Published August 2012. Originally approved in 1998. Last previous edition approved in 2005 as F1915 – 05. DOI: 10.1520/F1915-05R12.

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

[4] Available from National Institute of Justice (NIJ), 810 7th St., NW, Washington, DC 20531.

3.1.3 *forcible egress, n*—ability to pass a 5 by 8 by 8-in. (127 by 203.2 by 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.

3.1.4 *frame, n*—assembly of members surrounding and supporting a window or windows.

3.1.5 *glazing, n*—any infill material, usually transparent or translucent glass, polycarbonate, or combination thereof, used in a security detention frame.

3.1.6 *glazing stop, n*—formed metal section used to secure glazing or panel in a frame.

3.1.7 *head or header, n*—horizontal member that forms the top of a frame.

3.1.8 *hollow metal, n*—term used in reference to such items as doors, frames, partitions, enclosures, and other items that are fabricated from metal sheet, usually carbon steel.

3.1.9 *jamb, n*—vertical member forming the side of a frame.

3.1.10 *manufacturer, n*—party responsible for the fabrication of the test samples.

3.1.11 *performance characteristic, n*—response of the glazing sample in any one of the tests described herein.

3.1.12 *tamper-resistant security screw, n*—screw that is designed to be removed only by special tools kept by facility maintenance personnel.

3.1.13 *test completion, n*—conduct of one test sequence for each of the glazing samples resulting in either successful completion of the test sequence or the attainment of forcible egress.

3.1.14 *testing laboratory, n*—independent materials testing laboratory not associated with any manufacturer.

3.1.15 *vision system frame, n*—an assembly of members surrounding and supporting glazing panels, steel panels, or combinations thereof, that are located in an interior partition or exterior wall.

4. Significance and Use

4.1 The predictable and reliable performance of detention glazing used in detention and correctional facilities is a major concern. These test methods aid in assigning a level of physical security to glazing used in window and door assemblies based upon objective tests which can be consistently duplicated.

4.2 These test methods identify four security grades, corresponding to the four security grades established in Test Methods F1450. The intent is to establish a comparable level of performance for opening assemblies which incorporate detention glazing in conjunction with window and door assemblies. Test methods for detention glazing differ in sequencing a variety of attack tools and temperatures.

4.3 These test methods evaluate the resistance of detention glazing to attacks using blunt and sharp impact devices and fire. These test methods evaluate the performance of glazing in hot and cold environments. These test methods do not provide a measure of the resistance or performance of glazing subjected to attack by ballistics, chemical agents, explosives or other extreme methods of attack. Where such elements are a factor, consult the manufacturer.

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

4.5 Detention and correctional facility administrative staff are encouraged to provide adequate training, supervision, and preventative maintenance programs to enable detention glazing assemblies to function as intended.

5. Sample Selection, Size, and Specimen Preparation

5.1 Samples manufactured for testing purposes shall be representative of the types and styles intended for use in the application of these test methods. The manufacturer shall provide three test samples of each product, one for each test. The test size shall be a nominal 3 ft, 0 in. (914.4 mm) wide by 4 ft, 0 in. (1219.2 mm) high.

5.2 Test reports shall include complete details as identified in Section 8.

5.3 Fig. 1 shows an acceptable test fixture and the location of the strike points described in Tables 1 and 2.

5.4 *For Nonsymmetrical Materials*—The "threat side" of the product shall be identified by the manufacturer and attacked during the test procedure.

6. Test Methods

6.1 *Cold Temperature Impact Test:*

6.1.1 *Scope*—These test methods are designed to evaluate the capability of detention glazing to resist repeated impact forces from both a blunt and sharp impactor under cold temperature conditions.

6.1.2 *Significance and Use*—These test methods are intended to closely simulate a sustained battering ram style or pounding type attack and provide an evaluation of the capability of the glazing to prevent, delay, or frustrate escape or access to unauthorized areas under cold temperature conditions. These test results are intended to aid in assigning a level of physical security to various configurations of detention glazing. An impact test of this design performed on detention glazing evaluates the impact strength of the glazing and its components as well as the quality of fabrication techniques.

6.1.3 *Apparatus:*

6.1.3.1 *Large Blunt Impactor*—The blunt impactor shall consist of a hinged or pivoted system with a mass of 80 lbs (36.32 kg) capable of delivering impacts of 200 ft-lbf (271.2 J) to a glazing specimen mounted in a frame assembly. The striking surface of the impactor shall be made from C1010–C1020 carbon steel and have a striking surface of 4 ± .04 in.^{2} (101.6 ± 1.016 mm^2) with rounded edges similar to a 10-lb (4.54-kg) sledge hammer head. See Fig. 2a.

6.1.3.2 *Sharp Impactor*—The sharp impactor shall consist of a hinged or pivoted system with a mass of 80 lbs (36.32 kg) capable of delivering impacts of 100 ft-lbf (135.6 J) to a glazing specimen mounted in a frame assembly. The striking

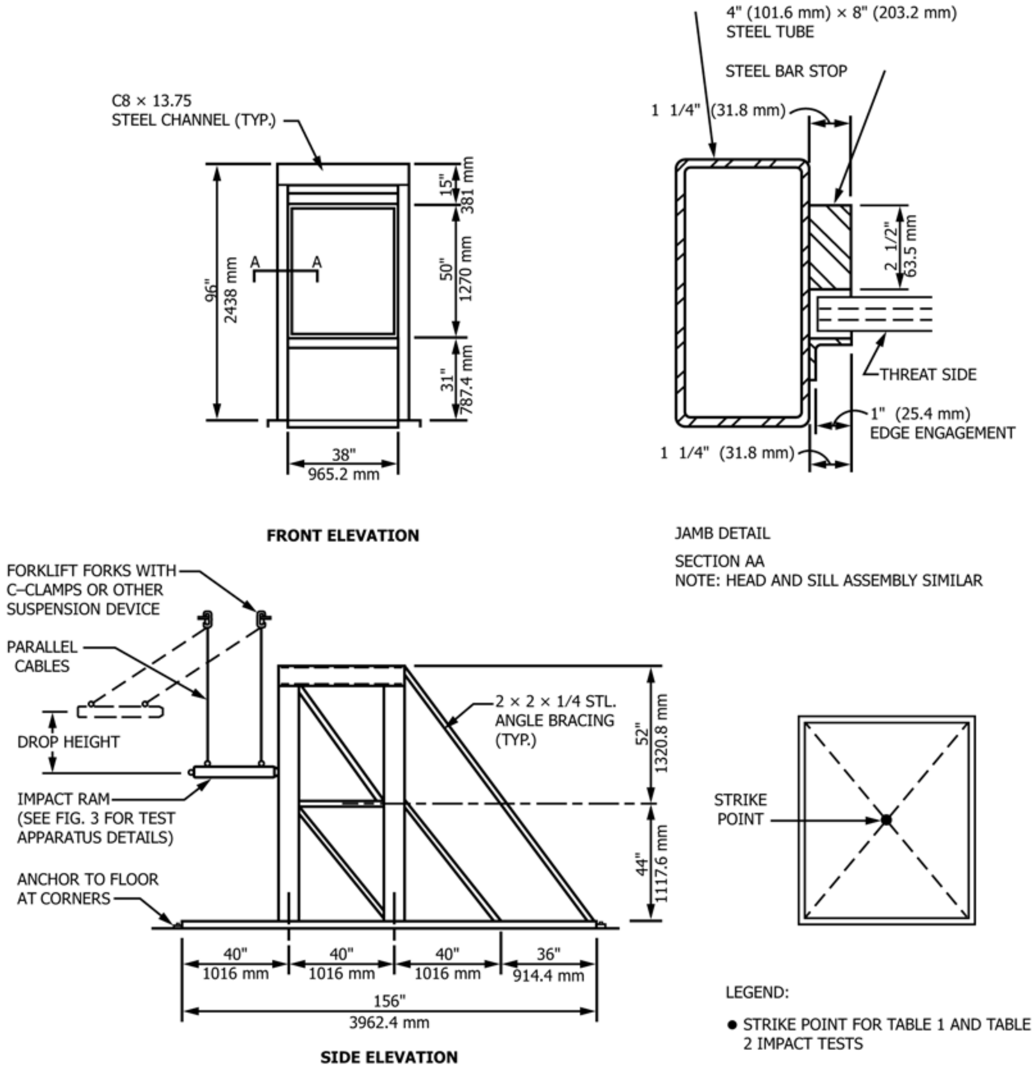

FIG. 1 Test Assembly for Detention Glazing Systems and Elevation Location of Impact Strike Point

TABLE 1 Impact Test Criteria: Large Blunt and Sharp Impactors

Security Grade	Total Time^B	Sequence and Impacts^A 1 Blunt Impactor	2 Sharp Impactor	3 Blunt Impactor	Total Number of Impacts
1	60 min	150	300	150	600
2	40 min	100	200	100	400
3	20 min	50	100	50	200
4	10 min	25	50	25	100

^{A} To be performed on both hot and cold conditioned samples.
^{B} See Appendix X5, Element of Time.

TABLE 2 Impact Test Criteria: Torch and Small Blunt Impactor

Security Grade	Blunt Impacts^A
1	150
2	100
3	75
4	50

^{A} To be performed on a room temperature sample only.

surface of the impactor shall be made from C1010–C1020 carbon steel and sharpness of the impacting point similar to the end of a new fireman's axe at the beginning of a test sequence. See Fig. 2b.

6.1.4 *Procedure:*

6.1.4.1 *Conditioning*—The panel shall be subjected to a cold soak of –20°F (–28.89°C) for a period not less than 4 h, gradually reducing the surface temperature to –20 ± 5°F (–28.89 ± 2.78°C). The nonthreat surface temperature shall be maintained at –20 ± 5°F (–28.89 ± 2.78°C), 2 in. (50.8 mm) from edge, during the test until an opening is created. Periodic measurements shall be taken by the test laboratory to maintain surface temperature.

6.1.4.2 *Installation*—The panel shall be installed into the test fixture with a minimum 1-in. (25.4-mm) edge engagement. Appropriate gasketing material shall be used to keep glazing material from contacting frame. Refer to manufacturers recommendations.

6.1.4.3 *Procedure*—Using the test apparatus in accordance with 6.1.3, begin a series of strikes against the center of the panel for the number of required impacts, first with the blunt impactor followed by the sharp impactor on the pendulum. The

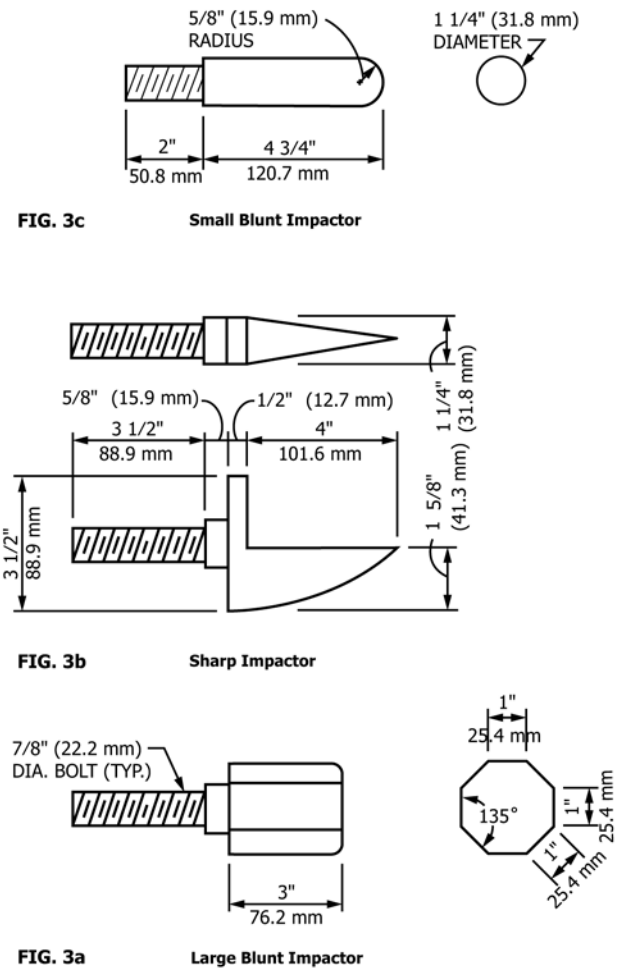

FIG. 2 Test Apparatus Details

strikes shall be uniformly made with 9-s intervals. Changing of blunt and sharp impactors during the test shall not exceed 90 s. During the test, reposition the pendulum as necessary to produce the maximum possible duress on the panel, leading to panel failure. Record the number of strikes required to produce the first penetration of the panel, and the number of strikes required to produce an opening large enough to pass a 5 by 8 by 8-in. (127 by 203.2 by 203.2-mm) rigid rectangular box with no more than 10 lbf (44.48 N).

6.1.5 *Test Termination*—Terminate the test after the required impacts, or when an opening in the test panel large enough to pass a 5 by 8 by 8-in. (127 by 203.2 by 203.2-mm) rigid rectangular box with no more than 10 lbf (44.48 N) is produced, whichever occurs first. Record the size of opening to the nearest ¼-in. (6.35-mm), at test termination.

6.1.6 *Precision and Bias*—The precision and bias of these test methods for evaluating the impact fatigue strength of detention glazing are being determined.

6.1.7 See Table 1 for Impact Test Criteria: Large Blunt and Sharp Impactor.

6.2 *Warm Temperature Impact Test:*

6.2.1 *Scope*—These test methods are designed to evaluate the capability of detention glazing to resist repeated impact forces from both a blunt and sharp impactor under warm temperature conditions.

6.2.2 *Significance and Use*—These test methods are intended to closely simulate a sustained battering ram style or pounding type attack and provide an evaluation of the capability of the glazing to prevent, delay, or frustrate escape or access to unauthorized areas, or combination thereof, under warm temperature conditions. The test results are intended to aid in assigning a level of physical security to various configurations of detention glazing. An impact test of this design performed on detention glazing evaluates the impact strength of the glazing and its components as well as the quality of fabrication techniques.

6.2.3 *Apparatus:*

6.2.3.1 *Large Blunt Impactor*—The blunt impactor shall consist of a hinged or pivoted system with a mass of 80 lbs (36.32 kg) capable of delivering impacts of 200 ft-lbf (271.2 J) to a glazing specimen mounted in a frame assembly. The striking surface of the impactor shall be made from C1010–C1020 carbon steel and have a circular striking surface of 4 ± 0.04 in.^{2} (101.6 ± 1.016 mm^2) with rounded edges similar to a 10-lb (4.54-kg) sledge hammer head. See Fig. 2a.

6.2.3.2 *Sharp Impactor*—The sharp impactor shall consist of a hinged or pivoted system with a mass of 80 lbs (36.32 kg) capable of delivering impacts of 100 ft-lbf (135.6 J) to a glazing specimen mounted in a frame assembly. The striking surface of the impactor shall be made from C1010–C1020 carbon steel and sharpness of the impacting point similar to the end of a new fireman's axe at the beginning of a test sequence. See Fig. 2b.

6.2.4 *Procedure:*

6.2.4.1 *Conditioning*—The panel shall be subjected to a heat soak of 120°F (48.9°C) for a period not less than 4 h, gradually increasing the surface temperature to 120 ± 5°F (48.9 ± 2.78°C). The nonthreat surface temperature shall be maintained at 120 ± 5°F (48.9 ± 2.78°C), 2 in. (50.8 mm) from edge, during the test until an opening is created. Periodic measurements shall be taken by the test laboratory to maintain surface temperature.

6.2.4.2 *Installation*—The panel shall be installed into the test fixture with a minimum 1-in. (25.4-mm) edge engagement. Appropriate gasketing material shall be used to keep glazing material from contacting frame. Refer to manufacturer's recommendations.

6.2.4.3 *Procedure*—Using the test apparatus in accordance with 6.2.3, begin a series of strikes against the center of the panel, for the number of required impacts first with the blunt impactor followed by the sharp impactor on the pendulum. The strikes shall be uniformly made with 9-s intervals. Changing of blunt and sharp impactors during the test shall not exceed 90 s. During the test, reposition the pendulum as necessary to produce the maximum possible duress on the panel, enlarging the opening and leading to panel failure. Record the number of strikes required to produce the first penetration of the panel, and the number of strikes required to produce an opening large enough to pass a 5 by 8 by 8-in. (127 by 203.2 by 203.2-mm) rigid rectangular box with no more than 10 lbf (44.48 N).

6.2.5 *Test Termination*—Terminate the test after the required impacts, or when an opening in the test panel large enough to pass a 5 by 8 by 8-in. (127 by 203.2 by 203.2-mm) rigid rectangular box with no more than 10 lbf (44.48 N) is produced, whichever occurs first. Record the size of penetration, to the nearest ¼-in. (6.35-mm), at test termination.

6.2.6 *Precision and Bias*—The precision and bias of this test method for evaluating the impact fatigue strength of detention glazing is being determined.

6.2.7 See Table 1 for impact test criteria for large blunt impactor and sharp impactors.

6.3 *Torch and Small Blunt Impactor Test:*

6.3.1 *Scope*—These test methods are designed to evaluate the capability of detention glazing to withstand a sustained flame attack in conjunction with repeated impact forces from blunt impactor.

6.3.2 *Significance and Use*—These test methods are intended to simulate a sustained flame attack used in conjunction with an impact object that is similar in nature to a ball peen hammer that will either break away glass so the flame will contact the plastic core, or continue to damage the plastic as it burns, or both. A flame/impact test of this design performed on detention glazing evaluates the flame resistance and impact strength of the glazing and its components, as well as the quality of fabrication techniques.

6.3.3 *Apparatus:*

6.3.3.1 *Small Blunt Impactor*—The small blunt impactor shall consist of a hinged or pivoted system with a mass of 22 lbs (9.99 kg) capable of delivering impacts of 62 ft-lbf (84.07 J) to a glazing specimen mounted in a frame assembly. The striking surface of the impactor shall be made from C1010–C1020 carbon steel and have a round impact surface with a ⅝-in. (15.87-mm) radius. See Fig. 2c.

6.3.3.2 *Torch*—A propane torch producing a blue flame of 1800 to 2000°F (982.22 to 1093.33°C) shall be used. It should be set so as to strike the panel at the proposed impact location at an angle of 60° from the panel face, using a 2-in. (50.8-mm) stand-off distance.

6.3.4 *Procedure:*

6.3.4.1 *Conditioning*—The panel shall be conditioned at room temperature, 72 ± 3°F (22.22± 1.66°C).

6.3.4.2 *Installation*—The panel shall be installed into the test fixture with a minimum 1 inch (25.4mm) edge engagement. Gasketing material shall be used to keep glazing material from contacting frame based on manufacturers recommendations.

6.3.4.3 *Procedure*—Using the test apparatus in accordance with 6.3.3, start the propane torch and begin measuring the elapsed time. Start the series of strikes at the center of the panel after 9-s. Continue impacting at 9-s intervals until the required number of impacts is reached. During the test, reposition the pendulum and torch as necessary to produce the maximum possible duress on the panel, leading to failure. Record the number of strikes required to produce the first penetration of the panel, and the number of strikes along with the duration of the flame exposure required to produce an opening large enough to pass a 5 by 8 by 8-in. (127 by 203.2 by 203.2-mm) rigid rectangular box with no more than 10 lbf (44.48 N). If the impactor becomes stuck in the panel, it must be removed within 60 seconds.

NOTE 1—If it cannot be removed in this time, the test will be considered invalid. After removal of the impactor from the panel, any impacts missed shall be made up at an accelerated rate not to exceed 1 every 4.5 s.

6.3.5 *Test Termination*—Terminate the test after the required impacts, or when an opening in the test panel large enough to pass a 5 by 8 by 8-in. (127 by 203.2 by 203.2-mm) rigid rectangular box with no more than 10 lb of force (44.48 N) is produced, whichever occurs first. After extinguishing the flame, the softened material should be prevented from sagging into the opening. Record the size of the opening to the nearest ½ in. (12.70 mm) at test termination.

6.3.6 *Precision and Bias*—The precision and bias of this test method for evaluating the impact fatigue strength of detention glazing is being determined.

6.3.7 See Table 2 for impact test criteria for torch and small blunt impactor.

7. Testing Requirements and Certification

7.1 The product tested shall be rated based upon its ability to meet or exceed all testing requirements for each test, as defined in 6.2 and 6.3 for a particular security grade.

7.2 When testing for a specific level, if a product fails to reach that level, but meets or exceeds a lower level, it shall be rated at that lower level.

7.3 Provide certification, if required, in accordance with Appendix X2.

8. Report

8.1 Report the following information:

8.1.1 Name and address of laboratory.

8.1.2 Date laboratory completed tests.

8.1.3 Name and address of glazing manufacturer.

8.1.4 Description of identifying markings on all components of test assembly.

8.1.5 Location of testing equipment.

8.1.6 Diagrams, details, and photographs of testing equipment.

8.1.7 Specifications and make-ups of glazing assemblies including thickness, weight, composition and product model number(s) and test orientation of nonsymmetrical test samples.

8.1.8 All related test data.

8.2 Provide the following:

8.2.1 Videotape cassette recording of the entire test(s) from inception of the physical test to product failure or termination of the test.

8.2.2 Still color photographs of the salient stages of the test, such as:

8.2.2.1 Initial penetration.

8.2.2.2 Product failure.

8.2.2.3 Conclusion of test.

9. Keywords

9.1 attack weapons; battering ram; correctional facility; detention facility; fire; flame exposure; glazing; impact test;

impactor (blunt and sharp); physical attack; polycarbonate; security glass; security glazing; security grades; temperature (cold and warm); test assembly; test criteria; time (element of); torch

APPENDIXES

(Nonmandatory Information)

X1. TEST APPARATUS

X1.1 Test equipment suitable for use in evaluating the physical security and performance of detention glazing 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 and 2 show the test fixtures necessary to carry out the test methods described in 6.2 and 6.3. Test fixtures of alternate designs may be used provided the same test parameters are evaluated.

X2. CERTIFICATION

X2.1 When specified, a manufacturer's certification that the assembly was tested in accordance with these test methods, together with a complete test report, shall be furnished by the manufacturer.

X2.2 The manufacturer may elect to contract with the testing laboratory to provide the manufacturer with a certified procedure for the construction of tested assemblies with factory follow-up inspection service as an option.

X2.3 Recertification shall become necessary if the product composition, test criteria or manufacturing process have undergone modifications.

X3. MULTILAYER PLASTICS

X3.1 Based on many years of testing experience, monolithic plastic materials and glass-clad plastic with monolithic cores have shown a high variability in testing performance and may not be appropriate for medium and higher levels of security requirements.

X3.2 Multilayer plastic materials, with or without glass-cladding, have proven more effective and consistent in performance testing for medium and higher security levels. This is due to the nature of plastic materials acting independently when laminated together, and providing a more consistent attack resistant barrier.

X4. ATTACK WEAPONS

X4.1 These test methods address only those threats to glazed openings, which would be anticipated based on the limited weapons, tools, and resources available to inmates within detention and correctional facilities. Where a glazed opening is also accessible to external assault with weapons, tools, and resources (including chemicals) available in the free world outside the facility, consider applying additional standards, such as: Test Method F1233, UL 752, or NIJ 0108.1.

X5. ELEMENT OF TIME

X5.1 Element of time is based upon historical testing observation that indicates that sustained manpower can deliver 400 blows of 200 lbf (271.2 J) each in 40 min. The element of time assigned to the various grades of detention glazing is adjusted to achieve more manageable time periods than actual calculations provide. The amount of time is estimated and is offered solely as supplementary design information to assist the user in matching security grades with the attack resistance times and staff response times required for each barrier in the facility.

X6. TEST PROCEDURE TIME INTERVAL

X6.1 A nine second (9 s) time interval has been incorporated in all test procedures. Maintaining this time interval is important to help assure more consistent product evaluation. Otherwise, test results may imply unrealistic performance expectations.

NOTE X6.1—In the Torch and Small Blunt Impactor Test, shortening the time interval may increase the ability of a product to absorb blows when subjected to heat. Conversely, lengthening the time interval may decrease the ability of a product to absorb blows when subjected to heat.

X6.2 In consideration of possible variations in product performance, the time elements for each security grade shown in Table 1 have been reduced to provide a factor of safety. Thus, a product that passes the 600 blow, 90 min test regimen for Security Grade 1 may be considered suitable for 60 min facility installation applications.

X7. RELATED STANDARDS

X7.1 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.

X7.2 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.

X7.3 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.

X7.4 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.

X7.5 Titles of related standards indicated above pertain to performance objectives for the primary component or assembly. This is explained further in examples below.

X7.6 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.

X7.7 *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.

X7.8 *Test Methods F1592* :

X7.8.1 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.

X7.8.2 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.

X7.8.3 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.

X7.9 *Complementary/Dual Certifications*:

X7.9.1 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.

X7.9.2 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

X7.10 *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.

X7.11 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.