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Preparing Activity: USACE **Superseding**
UFGS-08 34 01 (April 2006)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated July 2023

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SECTION 08 34 01

FORCED ENTRY RESISTANT COMPONENTS
08/09

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NOTE: This guide specification covers requirements for forced entry resistant door assemblies, window assemblies, louvers, pass-through drawers, and prefabricated guardhouses.

Adhere to UFC 1-300-02 Unified Facilities Guide Specifications (UFGS) Format Standard when editing this guide specification or preparing new project specification sections. Edit this guide specification for project specific requirements by adding, deleting, or revising text. For bracketed items, choose applicable item(s) or insert appropriate information.

Remove information and requirements not required in respective project, whether or not brackets are present.

Comments, suggestions and recommended changes for this guide specification are welcome and should be submitted as a Criteria Change Request (CCR).
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PART 1 GENERAL

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NOTE: The manuals listed below contain information on the forced entry tactic.

UFC 4-020-1 Security Engineering - Project Development

UFC 4-020-2FA Security Engineering - Concept Design

UFC 4-020-3FA Security Engineering - Final Design

These manuals are marked "For Official Use Only", and they may be ordered by Department of the Army agencies from the U.S. Army Publications

Distribution Center, 2800 Eastern Blvd., Baltimore, MD 21220-2896.

UFC 4-020-1 defines threats to military assets including the forced entry tactic in terms of weapons, tools, and explosives. The threat to an asset may be developed using the threat analysis procedure described in UFC 4-020-1. UFC 4-020-2FA and UFC 4-020-3FA contain guidance on design and protective measures to resist forced entry and other tactics. To be effective, a forced entry resistant component must be part of a forced entry resistant construction envelope that protects and asset. Refer to appendix C of UFC 4-020-2FA for a table of components and construction elements that are rated against various threat severity levels of the forced entry tactic. If a designer chooses to design components for shop fabrication, the materials should be specified in appropriate sections including Section 08 31 00 ACCESS DOORS AND PANELS.

At the time of preparation of this specification, manufacturers had not tested vehicle doors to the forced entry test standards covered herein. The designer may specify oversized swinging doors or specify a door for vehicle entry to meet a forced entry test standard as an alternate bid item, or under a separate bid request doors to be tested in accordance with the required test standard. If the latter is chosen, allow long lead time for the manufacturer to design, test, and receive approval of the door.

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1.1 REFERENCES

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NOTE: This paragraph is used to list the publications cited in the text of the guide specification. The publications are referred to in the text by basic designation only and listed in this paragraph by organization, designation, date, and title.

Use the Reference Wizard's Check Reference feature when you add a Reference Identifier (RID) outside of the Section's Reference Article to automatically place the reference in the Reference Article. Also use the Reference Wizard's Check Reference feature to update the issue dates.

References not used in the text will automatically be deleted from this section of the project specification when you choose to reconcile references in the publish print process.

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The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by

the basic designation only.

AIR MOVEMENT AND CONTROL ASSOCIATION INTERNATIONAL, INC. (AMCA)

AMCA 500-D	(2018) Laboratory Methods of Testing Dampers for Rating

ALUMINUM ASSOCIATION (AA)

AA DAF45	(2003; Reaffirmed 2009) Designation System for Aluminum Finishes

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M	(2020; Errata 1 2021) Structural Welding Code - Steel

ASM INTERNATIONAL (ASM)

ASM STFA	(2001; 6th Ed) The Surface Treatment and Finishing of Aluminum and Its Alloys (2 Vol.)

ASTM INTERNATIONAL (ASTM)

ASTM A123/A123M	(2017) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A653/A653M	(2023) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM C1036	(2021) Standard Specification for Flat Glass
ASTM C1048	(2018) Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass
ASTM C1172	(2019) Standard Specification for Laminated Architectural Flat Glass
ASTM D256	(2010; R 2018) Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics
ASTM D542	(2014) Index of Refraction of Transparent Organic Plastics
ASTM D570	(1998; E 2010; R 2010) Standard Test Method for Water Absorption of Plastics
ASTM D635	(2018) Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position
ASTM D638	(2014) Standard Test Method for Tensile

	Properties of Plastics
ASTM D696	(2016) Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between -30 degrees C and 30 degrees C With a Vitreous Silica Dilatometer
ASTM D792	(2013) Density and Specific Gravity (Relative Density) of Plastics by Displacement
ASTM D882	(2012) Tensile Properties of Thin Plastic Sheeting
ASTM D905	(2008; E 2009) Strength Properties of Adhesive Bonds in Shear by Compression Loading
ASTM D1003	(2013) Haze and Luminous Transmittance of Transparent Plastics
ASTM D1044	(2019) Standard Test Method for Resistance of Transparent Plastics to Surface Abrasion by the Taber Abraser
ASTM D1922	(2015; R 2020) Propagation Tear Resistance of Plastic Film and Thin Sheeting by Pendulum Method
ASTM D3595	(2014) Polychlorotrifluoroethylene (PCTFE) Extruded Plastic Sheet and Film
ASTM D3951	(2018) Commercial Packaging
ASTM D4093	(1995; R 2014) Photoelastic Measurements of Birefringence and Residual Strains in Transparent or Translucent Plastic Materials
ASTM D4802	(2016) Standard Specification for Poly(Methyl Methacrylate) Acrylic Plastic Sheet
ASTM D5420	(2016) Standard Test Method for Impact Resistance of Flat, Rigid Plastic Specimen by Means of a Strike Impacted by a Falling Weight (Gardner Impact)
ASTM E90	(2009; R2016) Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
ASTM E169	(2016; R 2022) Standard Practices for General Techniques of Ultraviolet-Visible Quantitative Analysis
ASTM E831	(2014) Linear Thermal Expansion of Solid

	Materials by Thermomechanical Analysis
ASTM E1300	(2016) Standard Practice for Determining Load Resistance of Glass in Buildings
ASTM F428	(2019) Intensity of Scratches on Aerospace Glass Enclosures
ASTM F520	(2021) Standard Test Method for Environmental Resistance of Aerospace Transparencies to Artificially Induced Exposures
ASTM F521	(2022) Standard Test Methods for Bond Integrity of Transparent Laminates
ASTM F548	(2019) Standard Test Method for Intensity of Scratches on Aerospace Transparent Plastics
ASTM F735	(2022) Standard Test Method for Abrasion Resistance of Transparent Plastics and Coatings Using the Oscillating Sand Method
ASTM F791	(1996; R 2013) Stress Crazing of Transparent Plastics
ASTM F1233	(2021) Standard Test Method for Security Glazing Materials and Systems
ASTM G155	(2021) Standard Practice for Operating Xenon Arc Lamp Apparatus for Exposure of Materials

BUILDERS HARDWARE MANUFACTURERS ASSOCIATION (BHMA)

ANSI/BHMA A156.1	(2021) Butts and Hinges
ANSI/BHMA A156.4	(2013) Door Controls - Closers
ANSI/BHMA A156.5	(2020) Cylinder and Input Devices for Locks
ANSI/BHMA A156.8	(2021) Door Controls - Overhead Stops and Holders
ANSI/BHMA A156.13	(2022) Mortise Locks & Latches Series 1000
ANSI/BHMA A156.16	(2018) Auxiliary Hardware
ANSI/BHMA A156.18	(2020) Materials and Finishes
ANSI/BHMA A156.115	(2016) Hardware Preparation in Steel Doors and Steel Frames

GLASS ASSOCIATION OF NORTH AMERICA (GANA)

GANA Glazing Manual	(2008) Glazing Manual

H.P. WHITE LABORATORY (HPW)

HPW TP-0500.03	(2003) Transparent Materials for use in Forced Entry or Containment Barriers

NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM)

NAAMM HMMA 801	(2012; R 2018) Glossary of Terms for Hollow Metal Doors and Frames
NAAMM HMMA 802	(2007) Manufacturing of Hollow Metal Doors and Frames
NAAMM HMMA 810	(2009) Hollow Metal Doors
NAAMM HMMA 820	(2008) Hollow Metal Frames
NAAMM HMMA 830	(2002) Hardware Selection for Hollow Metal Doors and Frames

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 80	(2022) Standard for Fire Doors and Other Opening Protectives
NFPA 80A	(2022) Recommended Practice for Protection of Buildings from Exterior Fire Exposures

U.S. DEPARTMENT OF STATE (SD)

SD Std-01.01	(1993 Rev G Amended; Inx Certified Prod/Mfg) Certification Standard Forced Entry and Ballistic Resistance of Structural Systems

UNDERWRITERS LABORATORIES (UL)

UL 10B	(2008; Reprint May 2020) Fire Tests of Door Assemblies

1.2 SUBMITTALS

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NOTE: Review submittal description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list, and corresponding submittal items in the text, to reflect only the submittals required for the project. The Guide Specification technical editors have classified those items that require Government approval, due to their complexity or criticality, with a "G." Generally, other submittal items can be reviewed by the Contractor's Quality Control System. Only add a “G” to an item, if the submittal is sufficiently important or complex in context of the project.

For Army projects, fill in the empty brackets following the "G" classification, with a code of up to three characters to indicate the approving

authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.

The "S" classification indicates submittals required as proof of compliance for sustainability Guiding Principles Validation or Third Party Certification and as described in Section 01 33 00 SUBMITTAL PROCEDURES.

Choose the first bracketed item for Navy, Air Force and NASA projects, or choose the second bracketed item for Army projects.

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Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are [for Contractor Quality Control approval.][for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government.] Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Installation; G[, [_____]]

SD-03 Product Data

Forced Entry Resistant Components

Installation

Components

SD-07 Certificates

Forced Entry Resistant Components; G[, [_____]]

1.3 QUALITY ASSURANCE

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NOTE: The project forced entry threat must be identified before selection of test standard. The designer will then select the forced entry testing standard that most represents the threat, using Table I. The designer will then indicate the applicable test standard in paragraph COMPONENT TEST REQUIREMENTS or on the drawings in door, window, or other component schedule.

If project criteria includes more than one forced entry threat, each component will be correlated with the appropriate test standard it is required to meet.

Test standards should be selected based on the forced entry threat as defined in UFC 4-020-1 for a given asset. The forced entry tactic has associated with it five threat severity levels consisting of very low, low, medium, high, and very high.

There is no single uniform standard for forced entry resistance. Each testing agency has its own parameters. Variables include the tools used, the attack time, the attack team size, and the failure criteria. Some standards apply only to specific components. Verify that the test standard is applicable to components being specified.

Bullet and forced entry resistant window design. Refer to Section 08 34 02, BULLET-RESISTANT COMPONENTS, when specifying ballistic threats only. Where both forced entry and ballistic resistance are required, the designer must substantially alter and combine the pertinent parts of this UFGS and UFGS Section 08 34 02. Combined forced entry and ballistic testing procedures are included in SD Std-01.01 and ASTM F1233.

TABLE I - EQUIVALENT FORCED ENTRY STANDARDS						
Forced Entry Standard						
Threat Severity Levels	Number of Attackers (where applicable)	Attack Times (minutes) (where applicable)	Very Low	Low	Medium	High
ASTM F1233						
Class IV	---	Variable	X			
Class V	---	Variable		X		
HPW TP-0500.03						
Level II	---	Variable	X			
Level III	---	Variable	X			
Level IV	---	Variable		X		
Level V	---	Variable		X		
SD Std-01.01						
5 Minute Protection Level	2	5		X		

TABLE I - EQUIVALENT FORCED ENTRY STANDARDS						
Forced Entry Standard						
Threat Severity Levels	Number of Attackers (where applicable)	Attack Times (minutes) (where applicable)	Very Low	Low	Medium	High
15 Minute Protection Level	2	15		X		
60 Minute Protection Level	2	60		X		

ABBREVIATIONS:

ASTM - American Society for Testing and Materials
HPW - H. P. White Laboratories
UL - Underwriters Laboratories, Inc.
SD - U. S. Department of State

The forced entry test standards described below include both those developed and used by independent testing laboratories and those developed for specific application by other Government agencies. These standards differ in attack tools employed, the number of persons (if any) used in the attack force, the attack duration, and the failure criteria. Before specifying construction components to meet a standard, obtain the standard and become familiar with it. A brief description follows each standard and, when possible, the standard is equated to forced entry severity levels from UFC 4-020-1.

1. American Society for Testing and Materials (ASTM).

a. "Standard Test Method for Security Glazing Materials and Systems," ASTM F1233. Acceptance of component is determined by one of the following: ballistics attack only; physical attack only to include blunt tool impacts, sharp tool impacts, thermal stress, and chemical deterioration; or ballistics attack followed by and in combination with physical attack. The physical attack tools used in the Class V testing sequence are similar to the "low forced entry severity level." The physical attack tools used in the Class IV testing sequence are similar to the "very low forced entry severity level." The use of power tools or devices requiring more than two persons to transport or operate is specifically exempted from testing. This test method defines two factors (the tools employed and the techniques and methods used by the attackers) and allows a third factor (duration) to vary in order to establish severity levels of forced entry.

b. "Test Methods for Resistance of Window Assemblies to Forced Entry, Excluding Glazing", ASTM F588. This specification applies to window assemblies of various materials and types of construction. Five window types are classified. The tests are intended to establish a measure of resistance to attack by unskilled or opportunistic burglars. Tests include hand manipulation, tool manipulation, static load, and locking device strength resistance. This testing is at a level comparatively below the "very low forced entry severity level."

2. H. P. White Laboratories: "Transparent Materials and Assemblies for Use in Forced Entry or Containment Barriers," HPW TP-0500.03. This standard was developed by H. P. White Laboratories for commercial, governmental, or military application and generally is used in testing prison (forced exit resistant) components. This test method defines two of three factors (tools and techniques) and varies the third factor (time) to establish five levels of forced entry resistance. Levels I, II, III, IV, and V specify attack tools and sequences of attacks with the specified tools. Attack weapons and tools include hand tools, propane and acetylene torch, chemical solvents, and five levels of ballistic assault. The ballistic threats are considered integral to the forced entry rating in this standard and differ from those in other H. P. White standards. Tests are conducted on either a 915 x 1220 mm 3 x 4 foot specimen of transparent material or on a complete assembly.

3. International Code Council, "Tests for Window Assemblies," UBC 41.2. Describes the following tests which are related to security windows: hand manipulation, tool manipulation, static load, and locking device tests. This testing is at a level comparatively below the "very low forced entry severity level."

4. National Institute of Justice (NIJ). "Physical Security of Window Units," NIJ 0316.00-80. Use of the NIJ standard for Army application is limited because it describes construction types which have been demonstrated to have minimal penetration times against the more sophisticated threats. This specification describes four classes of physical security by describing the window types indicated below. This testing is at a level comparatively below the "very low forced entry severity level."

a. Class I (Grade 10)--minimum level: Regular glazing in commercial sash; double locks; wood frame acceptable.

b. Class II (Grade 20)--moderate level: Heavy-duty

sash with laminated or polycarbonate glazing; wood sash must be reinforced or heavy.

c. Class III (Grade 30)--medium level: Heavy-duty sash with laminated glass over 6 mm 1/4 inch thick or polycarbonate glazingr 6 mm 1/4 inch thick; locks should include two heavy-duty deadlocking bolts.

d. Class IV (Grade 40)--high level: Very heavy fixed frames with laminated glass overr 6 mm 1/4 inch thick or security screen, bars, or shutters with special locking devices.

e. Window performance requirements include lock tests for stability (cycles of unlocking motion) and strength (loads ranging from 218 N 49 lb. force to 3350 N 753 lb. force; sash strength (218 N(49 lb. force) primary and secondary loads to 445 N 100 lb. force primary load, 3350 N 753 lb. force secondary load) and impact resistance (not applicable to Class I, Grade 10; other classes range from one impact at 50 J 37 ft-lb force to 10 at 100 J 74 ft-lb force); and glazing impact test (same as for sash impact).

5. Underwriters Laboratories Inc. (UL), "Standard for Burglary Resisting Glazing Material," UL 972, evaluates a glazing material's ability to withstand multiple impacts over a wide temperature range. Impact testing is standardized rather than subjecting the specimen to actual physical attack simulations by persons who can analyze and exploit the weaknesses of specimens. A steel ball is dropped a number of times from different heights. The intent of this standard is to replicate hit-and-run burglary attacks on commercial establishments. This testing is at a level below the "very low forced entry severity level."

6. U. S. Department of State (SD).

"SD Std-01.01. This standard was developed for determining the forced entry resistance of building components to be used in State Department facilities. The protection level is 5, 15, or 60 minutes. The tools are similar to the low forced entry severity level. This standard is for the testing of louvers, fixed windows and panels, and doors. Testing is performed by a two-member team for the 5-minute protection level and by a six-member team for the 15- and 60-minute protection levels. Penetration time is considered to be when an opening has been created which allows passage of either a solid, incompressible object 300 x 300 x 200 mm 12 x 12 x 8 inches or a solid, incompressible right cylinder 300 x 300 mm 12 x 12 inches. Both a forced entry and a ballistic rating can be obtained on the same component if the component passes the ballistic and forced entry tests contained in the test standard.

Add more rows of information when necessary.
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Qualify welding procedures, welders, and welding operators in accordance with AWS D1.1/D1.1M. Forced entry resistant components must be certified as resistant to the forced entry test standards indicated herein. Test forced entry resistant components as specified below. The test results and certification thereof must be approved by the Contracting Officer before delivery of the component to the job site.

Component	Test Standard	Level Within Test Standard (If Any)	Minimum Attack Time (Minutes)
[_____]	ASTM F1233	Class IV	Variable
[_____]	ASTM F1233	Class V	Variable
[_____]	HPW TP-0500.03	Prolonged	180
[_____]	HPW TP-0500.03	Level II	Variable
[_____]	HPW TP-0500.03	Level III	Variable
[_____]	HPW TP-0500.03	Level IV	Variable
[_____]	HPW TP-0500.03	Level V	Variable
[_____]	SD Std-01.01	5 Minute	5
[_____]	SD Std-01.01	15 Minute	15
[_____]	SD Std-01.01	60 Minute	60

1.4 DELIVERY, STORAGE, AND HANDLING

Deliver Components to the job site with the manufacturer's name, and model number clearly marked thereon. Deliver, store, and handle components so as not to be damaged or deformed and in accordance with ASTM D3951. Carefully handle components to prevent damage to the faces, edges, corners, ends, and glazing where applicable. Clean, repair, or replace immediately abraded, scarred, or rusty areas upon detection of the damage. Replace damaged components that cannot be restored. Store components and equipment in a dry location on platforms or pallets that are ventilated adequately, free of dust, water, and other contaminants, and stored in a manner which permits easy access for inspection and handling. Submit lists including schedule of components to be incorporated in the work with manufacturer's model or catalog numbers, specification and drawing reference numbers, warranty information, threat level designated, [fire ratings,] [sound transmission coefficient ratings,] [insulation "U" value,] and number of items provided. Listing of similar products that have been satisfactorily in use for two years or more, including name of purchasers, locations of installations, dates of installations, and service organizations.

1.5 SEQUENCING AND SCHEDULING

When testing of a previously untested component is specified, allow

sufficient lead time so that testing will not delay construction. The test results and component must be approved by the Contracting Officer before delivery of the component to the job site.

1.6 WARRANTY

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NOTE: A warranty for all glazings should be specified. The designer will determine availability of warranty.

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Furnish manufacturer's warranty for [_____] [5] years for glazing materials. Warranty must provide for replacement and installation of glazing if delamination, discoloration, or cracking or crazing occurs.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

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NOTE: This specification is to be used for components identified as forced entry resistant. The designer will clearly distinguish on the drawings, such as on door, window, and louver schedules, which components are to be forced entry resistant.

****

2.1.1 General Requirements

Components covered in this specification are designed to resist forced entry attacks with increasing severity levels of hand, power, and thermal tools and weapons and explosives. The components include forced entry resistant [personnel door/frame assemblies] [louvers] [windows] [glazing for doors] [pass-through drawers] [prefabricated guardhouses]. Each type of forced entry resistant component must be a complete assembly produced by a single manufacturer. Provide movable and operable components that operate smoothly and freely. Design items for exterior installation to resist water and vapor penetration or entrapment. Submit manufacturer's descriptive data, installation instructions, and certificate and test report showing compliance with the specified forced entry test standard as specified in paragraph COMPONENT TEST REQUIREMENTS for all components. [Following approval of manufacturer's descriptive data, submit a schedule listing the items and components to be furnished.] Submit manufacturer's certificate indicating that compliance with the installation instructions [and drawings] will provide the specified degree of forced entry resistance.

2.1.2 Other Submittal Requirements

Submit the following:

a. Manufacturer's descriptive data and finish samples.

b. The forced entry resistant door lock functions, for selection by the Contracting Officer.

c. Airflow calculations for louvers.

d. Manufacturer's certificates attesting that components conform to the requirements on drawings and in specifications.

e. Testing reports from independent testing laboratories indicating conformance to regulatory requirements.

f. Certificate, in lieu of a label, for fire rated doors.

g. Certificate indicating compliance with the requirements for doors of the type and fire rating class.

h. Manufacturer certification that compliance with the installation instructions and/or drawings will provide the specified degree of forced entry resistance.

2.2 COMPONENTS

For each type of forced entry resistant component, provide the standard product of a manufacturer regularly engaged in the manufacture of such products and duplicate items that have been tested and approved in accordance with the forced entry test standard specified in paragraph COMPONENT TEST REQUIREMENTS.

2.3 FORCED ENTRY RESISTANT PERSONNEL DOOR AND FRAME ASSEMBLIES

Provide doors and frames that are factory fabricated assemblies of indicated sizes. Provide doors consisting of steel, hardened steel, or reinforced internally with steel shapes and clad with aluminum. Provide interior composition and reinforcement determined by the manufacturer. Install rubber silencers on door frames. Close top edges of exterior doors flush and seal against water penetration, insulate, and provide with weatherstripping and thresholds. Provide locks and hinges that are the same or equal in performance and number as the hardware used on the tested door. Provide manufacturer's lock and hardware as a complete assembly. Furnish frames from the door fabricator, with anchorage to wall construction completely specified as to number of anchors, anchor size, material, and length.

2.3.1 Fire Rated Doors

Provide fire rated doors at locations indicated. Provide door assemblies complying with the forced entry test standard specified and bearing the listing identification label of the Underwriters' Laboratories, Inc. or a nationally recognized testing laboratory that is qualified to perform tests of fire door assemblies in accordance with UL 10B, and that has a listing service for the tested assemblies. Door assemblies include door, hardware, frame, closers, and glazing. A certificate indicating that the units were inspected in accordance with NFPA 80 and NFPA 80Amay be furnished in lieu of label. For oversized doors, a certificate from Underwriters' Laboratories, Inc. or a nationally recognized testing laboratory may be furnished in lieu of label. State that oversized doors are manufactured in compliance with the requirements for doors of the type and fire rating class. Submit manufacturer's descriptive data.

2.3.2 Sound Rated Doors

Provide sound rated doors at locations indicated. Provide door assemblies complying with the forced entry test standard specified and consisting of

door, hardware, frame, threshold, and adjustable gaskets. The assembly must have a laboratory Sound Transmission Class (STC) rating [of [_____]] [as indicated] when tested in accordance with ASTM E90. Submit manufacturer's descriptive data, test report, and certification of the test report showing compliance with the specified requirements.

2.3.3 Door and Frame Fabrication

The subsurfaces must be flat, parallel, and plumb after fabrication. Provide doors that are reinforced [and fully insulated] in accordance with manufacturer's design. Anchor door frames as specified by the door manufacturer. Coordinate the door manufacturer's requirements for welding to wall reinforcement or casting frame embedments into wall before wall is placed. Miter or cope steel door frames and weld at the corners with welds ground smooth. Where structural channel frames are used, specify the size, weight, stops, welding, and anchorage into surrounding construction and test along with the door as an assembly. Make any necessary reinforcements in the door and the frame in the factory. Drill and tap door and frame as required for the specified hardware. Miter or cope frame channels and weld at corners with full penetration groove welds. Dress smoth exposed welds. Manufacture hollow metal doors and frames in accordance with NAAMM HMMA 801, NAAMM HMMA 802, NAAMM HMMA 810, and NAAMM HMMA 820 as a standard of quality, and meet the specified forced entry testing standard.

2.3.4 Sidelight Frames and Door Glazing

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NOTE: Designers should avoid sidelights because they make the door assembly more susceptible to prying and jamb spreading. When they are used, reinforce side jambs with heavy structural steel anchored at the top and bottom.

****

Construct sidelight frames using forced entry resistant door frame sections. For glazing in door or sidelight, provide stop height and rabbet depth as required to accommodate the glazing material that is resistant to the forced entry test standard specified. Test the assembly with the specified glazing and stops installed. Exterior (attack side) glazing stops must be welded or integral to the frame. Provide removable interior (protected side) glazing stops attached with high-strength alloy steel machine screws with tamper-resistant heads or as required by the manufacturer. Glazing is specified in paragraph Forced Entry Resistant Glazing Materials.

2.3.5 Preparation for Hardware

Prepare doors and frames for hardware in accordance with [NAAMM HMMA 830] [manufacturer's instructions]. Drill and tap surface applied hardware in the field.

2.3.6 Hardware

****

NOTE: Panic hardware on a forced entry rated door renders the door more susceptible to compromise. If panic hardware is required, use a push pad type which has a flush-mounted bar. Locks and hinges are

an integral part of the forced entry resistance of a door assembly.

The following hardware guidance refers to single and pairs of swinging personnel doors, up to 1.22 x 2.44 m 4 x 8 feet per leaf. The locks and hinges listed below provide minimum levels of protection only. The locks and hinges for forced entry resistant door assemblies should be a tested part of a door manufacturer's assembly. For other door hardware, extra-heavy-duty standard commercial hardware is suitable.

****

Provide hardware for forced entry resistant door assemblies by the door assembly manufacturer to ensure a complete forced entry resistant assembly. Where test standard requires hardware to be tested with the door assembly, include locks and hinges in the labeling and/or test certification. Provide locks and hinges that are the same or equal in performance, quality, grade, and quantity as used on the successfully tested door assembly in accordance with the specified forced entry testing standard. Provide certification that the locks, latches, and hinges provide the same degree of forced entry resistance as required by the specified forced entry testing standard. Provide keying as specified in Section 08 71 00 DOOR HARDWARE.

2.3.6.1 Locks and Latchsets

****

NOTE: Most forced entry resistant door assemblies require two or more specialty locks severely limiting lock functions. Coordinate with codes for fire exiting and safety. Hardware for doors located in a means of egress must comply to the requirements of NFPA 101, Life Safety Code. Add specialized requirements for locking, keying, and opening to this paragraph.

****

Submit available lock functions for selection of function by the Contracting Officer. Provide mortise lock and latchsets, as a minimum, series 1000, operational Grade 1, Security Grade 1 or 1A, and conforming to ANSI/BHMA A156.13. Provide strikes for mortise locks and latches (including deadbolt locks), as a minimum, conforming to ANSI/BHMA A156.115 except strikes must be rectangular (without curved lip). Provide mortise-type locks and latches for doors 45 mm 1-3/4 inches thick and over that have adjustable bevel fronts or otherwise conform to the shape of the door. Mortise locks must have armored fronts. Mortise locks and latches must have full escutcheon, through-bolted, extruded stainless steel trim. Provide lock finish [630] [639] [652] in accordance with ANSI/BHMA A156.18.

2.3.6.2 Hinges

Provide steel doors and frames required to resist the "very low" or "low" threat severity level that are up to and including 2.13 m 7 feet 0 inches high must, as a minimum, equipped with three Grade 1 hinges in accordance with ANSI/BHMA A156.1, minimum size 125 mm 5 inches high, heavy, double, or triple weight as required for weight of door. For each additional 300 mm 12 inches of door height beyond 2.13 m 7 feet 0 inches, provide a

minimum of one more hinge. Provide hinges that are full mortise, half mortise, full surface, or half surface design as recommended by the manufacturer for frame and door design and tamperproof unless mounted on the protected side of the door. Hinges must have [pins as recommended by the manufacturer] [nonremovable pins] [security pins] [and be equipped with a safety stud]. Spot welding of hinge pin will not be acceptable. Provide hinge manufacturer's certification that the hinge supplied meets applicable test requirements for ANSI/BHMA A156.1 type number of hinge specified and that the hinge is suitable for the size and weight of the door assembly on which it will be utilized. Continuous extra heavy-duty piano-type hinge sized to carry the weight of the door without sagging is permitted. If continuous piano-type hinges are provided with the door, furnish independent laboratory reports covering both the door weight capacity and a 2,500,000 cycle testing to match the ANSI/BHMA A156.1 Grade 1 requirements. Furnish prime coated steel interior door hinges . Furnish nonferrous metal or stainless steel exterior door hinges.

2.3.6.3 Electric Strikes

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NOTE: Use of an electric strike makes the door assembly more susceptible to compromise, especially on doors swinging into a protected area.
****

Where required, provide electric strikes conforming to ANSI/BHMA A156.5 Grade 1. Furnish strike boxes with deadbolt and latch strikes for Grade 1. Provide [fail secure] [fail safe] strikes.

2.3.6.4 Door Closers

****
NOTE: Excessively heavy doors require coordination with manufacturers to ensure selection of proper sizes and types of closers.
****

Provide manufacturer's recommended Grade 1, extra heavy duty closers conforming to ANSI/BHMA A156.4. Provide [600] [689] [690] [691] [692] door closer finish in accordance with ANSI/BHMA A156.18.

2.3.6.5 Door Stops and Holders

****
NOTE: Excessively heavy doors require coordination with manufacturers to ensure selection of proper sizes and types of stops and holders.
****

Provide extra heavy duty door stops [and holders] conforming to [ANSI/BHMA A156.8, Type C08511 overhead surface mounted type] [ANSI/BHMA A156.16, Type L11251 for floor mounted installation] [ANSI/BHMA A156.16, Type L11271 for wall mounted installation] [_____].

2.3.7 Frame Anchors

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NOTE: Some manufacturers require frame anchors to be built or cast into the surrounding construction.

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Provide jamb and head anchors with door/frame assembly as specified by the manufacturer and forced entry resistant to the same degree as the component. Coordinate concrete work with component manufacturers when the manufacturer specifies frame anchors to be embedded into a concrete or concrete masonry unit surface during construction.

2.3.8 Weatherstripping

Provide head and jambs of exterior doors with compression-type neoprene bulb or closed-cell neoprene adjustable type weatherstripping. Door stops must be weatherstripped with a surface-mounted sponge neoprene strip in bronze housing not less than 1.78 mm 0.070 inch thick installed to make contact with the door. Install weatherstripping in conformance with the manufacturer's directions after completion of finish painting.

2.3.9 Louvers for Doors

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NOTE: Due to louver thickness and heavy weight, designers should avoid louvers in doors. If used, place louvers in inactive leaf of door pair where possible.

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Where indicated, provide doors with full louvers or louver section. Insert sightproof louvers into the door. Do not use pierced louvers. Inserted louvers must be stationary and nonremovable from the attack side of forced entry resistant doors. [Insect screens must be removable type with 18 by 16 mesh aluminum or bronze cloth.] The free area of the total square meters square feet of the louver must be [17 percent for channel style louvers] [39 percent for chevron style louvers (inverted angles at 25 mm 1 inch on center)] [[_____] percent]. Provide louvers in accordance with AMCA 500-D airflow test; minimum airflow must be [[_____] percent for channel style] [[_____] percent for chevron style] [[_____] percent]. Submit airflow calculations and test data showing compliance.

2.4 FORCED ENTRY RESISTANT LOUVERS

Fabricate louvers and frames from steel shapes to the opening dimensions indicated. The free area of the total square meters square feet of the louver must be [17 percent for channel style louvers] [39 percent for chevron style louvers (inverted angles at 25 mm 1 inch on center)] [[_____] percent]. Test louver in accordance with AMCA 500-D airflow test; minimum airflow must be [[_____] percent for channel style] [[_____] percent for chevron style] [[_____] percent]. Submit airflow calculations and test data showing compliance.

2.5 FORCED ENTRY RESISTANT WINDOW ASSEMBLIES

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NOTE: Forced entry resistant glazing materials may be glass, plastic, or composites. Specify glazing only at the "very low" or "low" threat severity levels. Do not specify glazing thickness.

****

Construct forced entry resistant window assemblies using forced entry

resistant frame sections. Provide welded frame unitssized and shaped with minimum frame face dimensions of 50 mm 2 inches. Provide frame anchorage as specified by the manufacturer and forced entry resistant to the same degree as the component. Provide top height and rabbet depth as required to accommodate the glazing material resistant to the forced entry test standard specified. Exterior (attack side) glazing stops must be welded to or integral to the frame. Interior (protected side) glazing stops must be removable stops attached with high-strength alloy steel machine screws with tamper-resistant heads, or as required by the manufacturer.

2.5.1 Deal Trays

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NOTE: Install in windows only; do not use in doors.
****

Provide nominal 325 mm 12-3/4 inch wide by 40 mm 1-5/8 inch high opening in sill of window frame[and include a 165 mm 6-1/2 inch steel writing ledge on exterior side of window][and provide with a weatherproof closure]. Provide deal tray of the same materials and finish, that is a welded subassembly of the window assembly, and conforming to specified forced entry requirements for the entire window assembly.

2.5.2 Speaking Apertures

Fabricate speaking apertures to allow passage of voice at normal speaking volume without distortion, and to resist the referenced forced entry resistant standard for [outdoor] [indoor] use. Speaking aperture must be a welded subassembly of the window assembly conforming to the specified requirements for the entire window assembly.

2.5.3 Forced Entry Resistant Glazing Material

Provide [glass,] [plastic,][or][composite] glazing material conforming to applicable requirements ASTM C1036, ASTM E1300, and ASTM C1048. Test glazing materials in accordance with the applicable sections of the following test procedures: ASTM D905, ASTM D1003, ASTM F428, ASTM F548, ASTM D4093, and ASTM F520. Plastic glazing must be acrylic plastic sheets, polycarbonate plastic sheets, or approved equal. Plastic glazing must be smooth and clear on both sides. [Provide factory installed glazing material.] Cover factory-glazed components to protect them from damage during adjacent finish work.

2.5.3.1 Laminated Glass

Provide laminated glass conforming to applicable sections of ASTM C1172. Provide adhesive interlayer material for bonding glass to glass that is chemically compatible with surfaces which are to be bonded. Test materials selected for lamination purposes in accordance with the following testing procedures: ASTM D905, ASTM D1044, ASTM F735, ASTM D4093, ASTM F521, ASTM F520, and ASTM D1003. Glass plies used in the lamination must be [annealed float glass conforming to Type I, quality q3, Class 1, ASTM C1036] [or] [heat-strengthened or fully heat-tempered float glass, Condition A, Type I, quality q3, Class 1, ASTM C1048].

2.5.3.2 Acrylic Plastic Sheets

Use acrylic plastic glazing sheets "as cast" and in stretching operations with improved moisture absorption resistance conforming to ASTM D4802.

Test acrylic materials in accordance with the applicable sections of the following testing procedures: ASTM D256, ASTM D5420, ASTM D542, ASTM D570, ASTM D635, ASTM D638, ASTM D696, ASTM D792, ASTM D1003, ASTM E831, ASTM F791, and ASTM G155.

2.5.3.3 Polycarbonate Plastic Sheets

Provide laminated or solid, ultraviolet stabilized [flame resistant] [high abrasion resistant] polycarbonate plasticsheets conforming to ASTM D3595. Test polycarbonate materials in accordance with the applicable sections of the following testing procedures: ASTM D256, ASTM D5420, ASTM D792, ASTM F735, ASTM D1003, ASTM D635, ASTM D638, ASTM D1044, ASTM D882, ASTM D1922, ASTM D570, ASTM F520, ASTM E169, ASTM G155, and ASTM F791. Do not use polyvinyl butyral in contact with polycarbonate because its placticizer may craze polycarbonate.

2.5.3.4 Glass/Plastic Laminate Glazing

Provide glass/plastic laminated glazing materials consisting of glass/plastic laminated construction or glass-clad plastic "sandwich" construction conforming to applicable sections of ASTM C1172.

2.5.3.5 Glass/Plastic Air-Gap Glazing

Provide forced entry resistant glass/plastic air-gap glazing consisting of an assembly in which glass forms the exterior [and interior (protected side)] layer, separated by an air space from the laminated plastic plies. Glass plies must be [annealed float glass conforming to Type I, quality q3, Class 1, ASTM C1036] [or] [heat-strengthened or fully heat-tempered float glass, Condition A, Type I, quality q3, Class 1, ASTM C1048]. Provide plastic plies consisting of laminated ultraviolet stabilized polycarbonate sheets, conforming to paragraph Polycarbonate Plastic Sheets and/or acrylic sheets for use "as cast" and in stretching operations with improved moisture absorption resistance conforming to paragraph Acrylic Plastic Sheets.

2.5.4 Adhesive Interlayer Materials

Provide adhesive interlayer material for bonding laminates (glass-glass, glass-plastic, or plastic-plastic bonds) that is chemically compatible with the surfaces bonded. Interlayer materials may be polyvinyl butyral, cast-in-place urethane, proprietary materials, sheet from urethane and other materials. Do not use polyvinyl butyral to bond polycarbonate. Provide adhesives conforming to ASTM D905 and the manufacturer's recommendations.

2.5.5 Sealants

Provide sealants for glazings that are chemically compatible with the glazing materials they are in contact with and have no deleterious effects to the glazing materials or to the adhesives used in glazing laminates. Sealants must conform to the glazing manufacturer's recommendations and the requirements of GANA Glazing Manual.

2.6 FORCED ENTRY RESISTANT PASS-THROUGH DRAWER

Fabricate pass-through drawer of steel and of the size indicated. Assembly must provide a weather resistant opening. Attachment to wall assembly must be in accordance with the manufacturer's recommendations.

Finish must be [primed for painting] [satin stainless steel] [_____].

2.7 FORCED ENTRY RESISTANT PREFABRICATED GUARDHOUSES

Provide guardhouse consisting of prefabricated, forced entry resistant, modular wall [and] [ceiling] [and floor] panels insulated to R-value of [_____] with [doors] [windows] [louvers] [gunports] and necessary connecting posts, hardware, and accessories. Submit complete enclosure. Components must be factory painted with rust inhibitive primer unless indicated otherwise. Dress smooth exposed welds. Workmanship must be rigid, neat in appearance, and free from defects. Guardhouse must be [of rain and weatherproof design.] [designed to be relocatable by [crane] [forklift].] Perform electrical work in accordance with local codes.

2.8 ACCESSORIES

Provide accessories for the installation of components into the surrounding structure. Anchorage must be forced entry resistant to the same degree as the component. Install in accordance with the manufacturer's recommended instructions. Materials, parts, bolts, anchors, supports, braces, fasteners, and connections necessary for completion of the work.

2.9 LABELING

Plainly and permanently label forced entry resistant components as to the applicable forced entry test standard and level within the test standard under which the component was tested and approved. Label must be visible only from the protected side after component installation and include the following information: (1) manufacturer's name or identifying symbol; (2) model number, control number, or equivalent; (3) date of manufacture with the week, month or quarter, and year (this may be abbreviated or be in a traceable code such as the lot number); (4) correct mounting position (by removable label); and (5) forced entry resistant rating by indicating the test standard, level within the test standard (if any), and minutes of attack time withstood (if variable in the standard).

2.10 SHOP/FACTORY FINISHING

Unless otherwise specified, shop finish all factory or manufactured components as indicated below.

2.10.1 Ferrous Metal

Clean surfaces of ferrous metal, except galvanized and stainless steel surfaces, and factory prime for painting. Provide finish painting in accordance with Section 09 90 00 PAINTS AND COATINGS. Prior to shop painting, clean surfaces with solvents to remove grease and oil and with power wire-brushing or sandblasting to remove loose rust, loose mill scale, and other foreign substances. Do not shop paint surfaces of items to be embedded in concrete.

2.10.2 Galvanizing

Items specified to be galvanized must be hot-dip processed after fabrication. Galvanize in accordance with ASTM A123/A123M or ASTM A653/A653M.

2.10.3 Aluminum

Unless otherwise specified, aluminum items must be standard mill finish. When anodic coatings are specified, coatings must conform to ASM STFA, with treatment to a coating thickness not less than that specified for protective and decorative type finish in AA DAF45. Items to be anodized must receive a polished satin finish pretreatment and a clear lacquer overcoat conforming to the above-referenced standard.

PART 3 EXECUTION

3.1 EXAMINATION

Field verify dimensions of rough openings for components and that surfaces of openings are level, plumb, and provide required clearances. Examine components for racking, twisting, and other malformation and corrected prior to installation. Replace damaged components that cannot be corrected. Protect surrounding work prior to installation of forced entry resistant components. Repair surrounding work, which is damaged as a result of the installation of forced entry resistant components, in an approved manner prior to acceptance. Protect glazed units from damage during adjacent work.

3.2 FABRICATION

Construct, assemble, weld, and equip components with all hardware and accessories required to complete the assembly in the shop of a competent fabricator.

3.3 FASTENERS

Fasteners exposed to view must match in color and finish and harmonize with the material to which fasteners are applied. Drill or neatly punch holes for bolts and screws. Reject work with poor matching holes . Conceal fasteners where practicable. Unless otherwise specified, provide fasteners conforming to Section 08 31 00 ACCESS DOORS AND PANELS.

3.4 CORROSION PROTECTION - DISSIMILAR MATERIALS

Give a protective coating to contact surfaces between dissimilar metals and aluminum surfaces in contact with concrete, masonry, pressure-treated wood, or absorptive materials subject to wetting in accordance with Section 09 90 00 PAINTS AND COATINGS.

3.5 INSTALLATION

The finished work must be free from defects. Install components plumb and level and secure rigidly in place. Install components in accordance with approved manufacturer's recommended instructions. Test operable parts of components for smooth operation in the presence of the Contracting Officer. Coordinate frame embedments into the construction where required by the component manufacturer. Replace or repair materials which incur damage as a result of adjacent finish work as specified above. Install glazing for window assemblies, which are not specified as factory glazed, in accordance with GANA Glazing Manual and the manufacturer's recommended instructions. Field glazing must occur only after concrete, masonry, ceiling, electrical, mechanical, plumbing and adjacent finish work has been completed. Properly install forced entry resistant door assemblies so that operating clearances and bearing surfaces conform to the

manufacturer's instructions. Secure the bottom of door frames to the floor slab in accordance with the manufacturer's recommendations. Install weatherstripping and thresholds at exterior door openings to provide a weathertight installation. Submit Drawings showing (1) anchorage of components and appurtenances into the actual surrounding construction, (2) clearances for operation, and (3) hardware location and installation details. Submit complete drawings for forced entry resistant prefabricated guardhouses. Submit a copy of installation instructions and recommended cleaning and maintenance instructions.

3.6 MANUFACTURER'S FIELD SERVICES

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NOTE: Designer will only use this paragraph when justified.

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Provide the services of a manufacturer's representative who is experienced in the installation, adjustment, and operation of the component specified. At the request of the Contracting Officer, the representative must supervise the installation, adjustment, and operation (if operable) of the component. The representative must be onsite [1] [2] [_____] working days.

3.7 ADJUSTING/CLEANING

Make adjustments to assure smooth operation. Provide units that are weathertight when closed and locked. Clean components in accordance with manufacturer's instructions. Use only cleanser recommended by the manufacturer to clean polycarbonate, plastic, and applied hardcoats.

-- End of Section --