Preparing Activity: USACE Superseding
UFGS-08 34 02 (April 2006)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated July 2023
****

SECTION TABLE OF CONTENTS

DIVISION 08 - OPENINGS

SECTION 08 34 02

BULLET-RESISTANT COMPONENTS

08/09

PART 1 GENERAL

1.1 REFERENCES
1.2 SYSTEM DESCRIPTION
1.2.1 Design Requirements
1.2.2 Performance Requirements
1.2.3 Submittal Requirement Details
1.3 SUBMITTALS
1.4 QUALITY ASSURANCE
1.5 DELIVERY, STORAGE, AND HANDLING
1.6 SCHEDULING
1.7 WARRANTY

PART 2 PRODUCTS

2.1 MATERIALS AND COMPONENTS
2.2 ELECTRICAL WIRING
2.3 BULLET-RESISTANT STEEL PERSONNEL DOORS
2.3.1 Fire Rated Doors
2.3.2 Sound Rated Doors
2.3.3 Door and Frame Fabrication
2.3.4 Sidelight Frames
2.3.5 Preparation for Hardware
2.3.6 Hardware
2.3.6.1 Mortise Locks and Latchsets
2.3.6.2 Hinges
2.3.6.3 Electric Strikes
2.3.6.4 Door Closers
2.3.6.5 Door Stops and Holders
2.3.7 Frame Anchors
2.3.8 Weatherstripping
2.3.9 Louvers for Doors
2.4 BULLET-RESISTANT LOUVERS
2.5 BULLET-RESISTANT STEEL BIFOLD DOORS, FRAMES, AND HARDWARE

2.5.1 Testing
2.5.2 Bifold Doors
2.5.3 Power Operators
2.5.3.1 Pneumatic Operators
2.5.3.2 Electric Operators
2.5.4 Safety Device
2.6 BULLET-RESISTANT STEEL WINDOWS
2.6.1 Glazing Materials
2.6.1.1 Laminated Glass
2.6.1.2 Acrylic Plastic Sheets
2.6.1.3 Polycarbonate Plastic Sheets
2.6.1.4 Glass/Plastic Laminate Glazing
2.6.1.5 Glass/Plastic Air-Gap Glazing
2.6.2 Adhesive Interlayer Materials
2.6.3 Sealants
2.6.4 Deal Trays
2.7 BULLET-RESISTANT SPEAKING APERTURES
2.8 BULLET-RESISTANT GUNPORTS
2.9 BULLET-RESISTANT PASS-THROUGH DRAWER
2.10 BULLET-RESISTANT PREFABRICATED MODULAR ENCLOSURE
2.11 ACCESSORIES
2.12 LABELING
2.13 SHOP/FACTORY FINISHING
2.13.1 Ferrous Metal
2.13.2 Galvanizing
2.13.3 Aluminum

PART 3 EXECUTION

3.1 EXAMINATION
3.2 FRAMED INSTRUCTIONS
3.3 INSTALLATION
3.4 FASTENERS
3.5 CORROSION PROTECTION - DISSIMILAR MATERIALS
3.6 ELECTRICAL WORK
3.7 ADJUSTING/CLEANING

-- End of Section Table of Contents --

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated July 2023
****

SECTION 08 34 02

BULLET-RESISTANT COMPONENTS
08/09

****
NOTE: This section covers requirements for bullet resistant components including doors, windows, louvers, gunports, pass drawers, deal trays, and speaking apertures.

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).
****

PART 1 GENERAL

1.1 REFERENCES

****
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.

****

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 ARCHITECTURAL MANUFACTURERS ASSOCIATION (AAMA)

AAMA 611	(2014) Voluntary Specification for Anodized Architectural Aluminum

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 E204	(1998; R 2007) Identification of Material by Infrared Absorption Spectroscopy, Using the ASTM Coded Band and Chemical Classification Index
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

NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM)

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
NAAMM HMMA 840	(2017) Guide Specifications for Receipt, Storage and Installation of Hollow Metal Doors and Frames
NAAMM HMMA 850	(20140) Fire Rated Hollow Metal Doors and Frames
NAAMM HMMA 862	(2021) Guide Specifications for Commercial Security Hollow Metal Doors and Frames

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA ICS 2	(2000; R 2020) Industrial Control and Systems Controllers, Contactors, and Overload Relays Rated 600 V
NEMA ICS 6	(1993; R 2016) Industrial Control and Systems: Enclosures
NEMA MG 1	(2021) Motors and Generators

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2023) National Electrical Code
NFPA 80	(2022) Standard for Fire Doors and Other Opening Protectives

NATIONAL INSTITUTE OF JUSTICE (NIJ)

NIJ Std 0108.01	(1985) Ballistic Resistant Protective Materials

NAVAL FACILITIES ENGINEERING AND EXPEDITIONARY WARFARE CENTER (NAVFAC EXWC)

NAVFAC EXWC CR 80.025	(1980) Testing and Evaluation of Attack Resistance and Hardening Retrofits of Marine Barrack Construction Types to Small Arms Multiple Impact Threat

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 752	(2005; Reprint Jan 2021) UL Standard for Safety Bullet-Resisting Equipment

1.2 SYSTEM DESCRIPTION

****

NOTE: In the event that the designer chooses to design and detail the component for shop fabrication, the materials and construction should be specified in Section 08 31 00 ACCESS DOORS AND PANELS.

Determine bullet-resisting ratings of metals by ballistics tests in accordance with the threat specified in paragraph COMPONENT TEST REQUIREMENTS.

****

1.2.1 Design Requirements

Provide bullet resistant components conforming to the requirements specified for the particular items and, as much as possible, complete assemblies by a single manufacturer.

1.2.2 Performance Requirements

Specify all bullet resistant items to the threat specified. Operate movableand operable components smoothly and freely. When a reference for performance is listed, conform to referenced requirements.

1.2.3 Submittal Requirement Details

Submit the followin:

a. Manufacturer's descriptive data and installation instructions. Include cleaning instructions as recommended by the plastic sheet manufacturer.

b. Spare parts data for each bifold door, after approval of the related submittals, and not later than [_____] months prior to the date of beneficial occupancy. Include a complete list of parts and supplies, with current unit prices and supply source.

c. Air flow calculations for louvers and louvers in doors.

d. Lists including schedule of all components to be incorporated in the work with manufacturer's model or catalog numbers, specification and drawing reference numbers, warranty information, threat level certified, [fire ratings,] [sound transmission coefficient ratings,] [insulation "U" value,] and number of items provided.

e. Evidence that standard products essentially duplicate items that have been satisfactorily in use for two years or more, including name of purchasers, locations of installations, dates of installations, and service organizations.

f. Manufacturer's certificates attesting that all components conform to the requirements on drawings and in specifications. Include testing reports from independent testing laboratories indicating conformance to regulatory requirements.

[Six] [_____] copies of operation and [six] [_____] copies of maintenance manuals for the bifold doors furnished. The manuals must be approved prior to beneficial occupancy.

1.3 SUBMITTALS

****

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.

****

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:

****
NOTE: Submittals SD-03 and SD-10, are to be used only when bifold doors are part of the work. Edit out those paragraphs if no bifold doors are required in the work.
****

SD-02 Shop Drawings

Installation; G[, [_____]]

SD-03 Product Data

Bullet Resistant Components

Bifold Doors

SD-07 Certificates

Bullet Resistant Components

SD-10 Operation and Maintenance Data

Bullet Resistant Components; G[, [_____]]

1.4 QUALITY ASSURANCE

****
NOTE: The threat must be identified before selection of the applicable test standard from Table I. If project criteria includes more than one threat, each component will be correlated with the appropriate regulation or standard it is required to meet. Coordinate with the drawings.

The design threat must be determined based on the importance of the assets in the facility, facility location, history, a likelihood of attacks at the location, and many other factors. The process used to determine design criteria for applicable threat and design guidance to resist the threat is provided in the manuals listed below:

UFC 4-020-01 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.

The identified threat criteria should be recorded in the Design Analysis for the project. The designer

will indicate the applicable threats, selected from Table I below, under paragraph COMPONENT TEST REQUIREMENTS or in door, window, or other component schedules as appropriate.

There is no single, uniform standard for bullet resistance. Each testing agency has its own parameters. Variables include firing distance to the test component; number of shots fired and proximity to each other; and failure criteria, such as penetration, amount of spall or further operability of the item. Most ballistic threats are based on complete penetration by projectiles or fragments of projectiles through a construction material, or on spall of the material to the degree that injury would be caused to a person standing behind the material. Some standards require only material specimen testing rather than testing of complete assemblies. This enables a designer to specify materials as bullet resistant, but does not ensure that fasteners, anchors, frames, etc., are bullet resistant. Designer should:

(1) Verify criteria requirements, define threats using standards which test complete assemblies and specify threat accordingly, or

(2) Specify that all materials and connections be certified to resist the specified threat.

Some standards also include different temperature requirements depending upon whether the component is for indoor or outdoor installation. Verify testing requirements with specification of components.

Designer will also note adverse environmental conditions which require galvanized coatings on carbon steel, stainless steel, or criteria such as temperature, weather, humidity, ventilation, and illumination required for proper installation or application. If necessary, designer will explain existing conditions through statements or by references to documents where information such as existing structures or geophysical reports can be found.

Most bullet-resistant components are custom fabricated from manufacturer's standard designs. Coordinate installation details with adjacent construction.

TABLE I - TABLE OF RELATIVE BALLISTIC STANDARDS

STANDARD THREAT LEVEL	CALIBER	WEAPON	BULLET WEIGHT & TYPE	VELOCITY (FT/SEC)/ NO. SHOTS RESISTED
NIJ-TYPE I	.22	Handgun 6-6.5 in. Barrel	40 gr. LRHV Lead	1010-1090/ 5 Shots
	and .38 Special	Handgun 6-6.5 in. Barrel	158 gr. LRN	800-900/ 5 Shots
UL-MPSA	.38 Super	Pistol Automatic 5 in. Barrel	130 gr. FMJ	1152-1344/ 3 Shots
ASTM-Submachine Gun	9 mm. Parabellum		124 gr.	1350-1450/ 3 Shots
	and 12 gauge 3 in. Magnum (adjunct)		No. 00 Buckshot	1265-1465/ Variable
(UFC 4-020-01 Low Severity Level, Ballistics Tactic):				
HPW Minimum Standards or SD Locations	9 mm.	Submachine Gun	115 gr. FMJ (Steel)	1350-1450/ 3
Submachine Gun (S)	and 12 gauge (Optional)	Shotgun	No. 4 Buckshot	1275-1375/ 3
Minimum and 1 each @ Specified Locations				
NIJ-TYPE IIA	.357 Magnum	Handgun 4-4.75 in.	158 gr.	1200-1300/ 5 Shots
	and 9 mm.	Handgun 4-4.75 in.	124 gr.	1050-1130/ 5 Shots

TABLE I - TABLE OF RELATIVE BALLISTIC STANDARDS

STANDARD THREAT LEVEL	CALIBER	WEAPON	BULLET WEIGHT & TYPE	VELOCITY (FT/SEC)/ NO. SHOTS RESISTED
		Barrel		
ASTM-Handgun (.44 Magnum)	.44 Magnum		240 gr. Soft Point	1400-1500/ 3 Shots
	and 12 gauge 3 in. Magnum (adjunct)		No. 00 Buckshot	1265-1465/ Variable
ASTM-Handgun (.38 Super)	.38 Super		130 gr. FMJ	1230-1330/ 3 Shots
	and 12 gauge 3 in. Magnum (adjunct)		No. 00 Buckshot	1265-1465/ Variable
NIJ-TYPE II	.357 Magnum	Handgun 6-6.5 in. Barrel	158 gr. JSP	1345-1445/ 5 Shots
	and 9 mm.	Handgun 4-4.75 in. Barrel	124 gr. FMJ	1135-1215/ 5 Shots
UL-HPSA	.357 Magnum	Handgun 8.35 in. Barrel	158 gr. Lead	1305-1523/ 3 Shots
NIJ-TYPE IIIA	.44 Magnum	Handgun 5.5-6.25 in. Barrel	240 gr. Lead SWC Gas Checked	1350-1450/ 5 Shots
	and 9 mm.	Submachine Gun 9.5-10.25 in. Barrel	124 gr. FMJ	1350-1450/ 5 Shots
(UFC 4-020-01 Medium Severity Level, Ballistics Tactic):				
UL-SPSA	.44 Magnum	Handgun 6.5 in. Barrel	240 gr. Lead	1323-1544/ 3 Shots

TABLE I - TABLE OF RELATIVE BALLISTIC STANDARDS

STANDARD THREAT LEVEL	CALIBER	WEAPON	BULLET WEIGHT & TYPE	VELOCITY (FT/SEC)/ NO. SHOTS RESISTED
UL-HPR	.30-'06 Springfield	Rifle Bolt Action 24 in. Barrel	220 gr. Soft Point	2169-2531/ 1 Shot
ASTM-Rifle (.44 Magnum)	7.62x51 mm. (.308 Winchester) and		M-80 Ball	2750-2850/ 3 Shots
	12 gauge 3 in. Magnum (adjunct)		No. 00 Buckshot	1265-1465/ Variable
NIJ-TYPE III	7.62x51 mm. NATO	Rifle	147 gr. M-80 Ball	2700-2800/ 5 Shots
(SEM High Severity Level, Ballistics Tactic):				
HPW Rifle Standard	5.56x45 mm. NATO	Rifle	55 gr. M-193 Ball	3135-3235/ 1 @
Specified Locations				
	and 7.62x51 mm. NATO	Rifle	147 gr. M-80 Ball	2700-2800/ 2 @
Specified Locations				
	and 12 gauge	Shotgun	No. 4 Buckshot	1275-1375/ 3-6 @
Specified Locations				
SD Military	5.56 mm. NATO	Rifle	55 gr. M-193	3135-3235/ 2
Minimum and 1 each @				

TABLE I - TABLE OF RELATIVE BALLISTIC STANDARDS

STANDARD THREAT LEVEL	CALIBER	WEAPON	BULLET WEIGHT & TYPE	VELOCITY (FT/SEC)/ NO. SHOTS RESISTED
Rifle (R) Specified Locations			Ball	
	5.56 mm. (Optional)	Rifle	63 gr. M-855 Ball	2950-3050 1 each @ Specified Locations
	and 7.62 mm. NATO	Rifle	147 gr. M-80	2700-2800/ 1 Minimum and 1 each @ Specified Locations
	12 gauge 2-3/4 in. (Optional)	Shotgun	No. 4 shot (00 Buckshot)	1275-1375/ 1 each @ Specified Locations
NFESC SAMIT	7.62x51 mm. NATO	Machine gun Light 25-1/2 in. Barrel M60E3 (US)	147 gr. M-80 Ball	2750-2850/ 25 Shots
ASTM-Rifle AP	.30-'06		M2AP	2725-2825/ 3 Shots
	and 12 gauge 3 in. Magnum (adjunct)		No. 00 Buckshot	1265-1465/ Variable

(SEM Very High Severity Level, Ballistics Tactic):

HPW Rifle AP Standard	7.62x51 mm.	Rifle	150 gr. M61 AP	2700-2800/ 3-6 @

TABLE I - TABLE OF RELATIVE BALLISTIC STANDARDS

STANDARD THREAT LEVEL	CALIBER	WEAPON	BULLET WEIGHT & TYPE	VELOCITY (FT/SEC)/ NO. SHOTS RESISTED
Specified Locations	or .30-'06	Rifle	165 gr. M2 AP	2800-2900/ 3.6 @
Specified Locations	and 12 gauge	Shotgun	No. 4 Buckshot	1275-1375/ 3.6 @
Specified Locations				
SD Rifle (AP)	.30-'06 (Optional)	Rifle	165 gr. M2 AP	2750-2850/ 1 each @
Specified Locations				
	12 gauge 2-3/4 in. (Optional)	Shotgun	No. 4 shot (00 Buckshot)	1275-1375/ 1 each @ Specified
Locations				
NFESC SAMIT (AP)	7.62x51 mm. NATO	Machine gun Light 25-1/2 in. Barrel M60E3 (US)	150 gr. M61 AP	2800/ 25 Shots
NIJ-TYPE IV	.30-'06	Rifle 22 in. Barrel	166 gr.	2750-2850/ 1 Shot

ABBREVIATIONS:

AP - Armor Piercing
LRN - Lead Round Nose Bullet
FMJ - Full Metal Jacketed
MPSA - Medium Power Small Arms

HPR - High Power Rifle
HPSA - High Power Small Arms
SPSA - Super Power Small Arms
JSP - Jacketed Soft Point
US - United States
LRHV - Long Rifle High Velocity

BALLISTIC TESTING STANDARDS:

ASTM - American Society for Testing and Materials; ASTM F1233, "Security Glazing Materials and Systems," 1989.

NFESC-SAMIT - Naval Facilities Engineering and Expeditionary Warfare Center (NAVFAC EXWC), Department of the Navy; NAVFAC EXWC CR 80.025 "Testing and Evaluation of Attack Resistance and Hardening Retrofits of Marine Barrack Construction Types to Small Arms Multiple Impact Threat (SAMIT) 1980.

NIJ - National Institute of Justice; NIJ Standard 0108.01, "Ballistic Resistant Protective Materials," 1985.

SD - Department of State; SD Std-01.01 Rev F, "Certification Standard Forced Entry and Ballistic Resistance of Structural Systems Test Procedures," 1992.

UL - American National Standards Institute/Underwriters Laboratories, Inc.; ANSI/UL 752, "Standard for Bullet-Resisting Equipment," 1995.
****

Provide Bullet-resistant components at locations shown on the drawings. Bullet-resistant components [where indicated] [_____] must be in accordance with [[NIJ Type I] [NIJ Type IIA] [NIJ Type II] [NIJ Type IIIA] of NIJ Std 0108.01.] [[UL MPSA] [UL HPSA] [UL SPSA] [UL HPR] of UL 752.] [[ASTM Submachine Gun] [ASTM Handgun (.44 Magnum)] [ASTM Handgun (.38 Super)] [ASTM Rifle (.44 Magnum)] [ASTM Rifle (AP)] of ASTM F1233.] [[HPW Minimum Standard] [HPW Rifle Standard] [HPW Rifle AP Standard].] [[SD Submachine Gun (S)] [SD Military Rifle (R)] [SD Rifle (AP)] of SD Std-01.01.] [the test requirement of [NFESC SAMIT] [NFESC SAMIT (AP)] of NAVFAC EXWC CR 80.025.]

1.5 DELIVERY, STORAGE, AND HANDLING

Deliver components to the job site with the brand, name, and model number clearly marked thereon. Deliver, store and handle all components so as not to be damaged or deformed, and in accordance with ASTM D3951. Handle doors, windows, and louvers carefully to prevent damage to the faces, edges, corners, ends, and glazing. Clean, repair, or replace abraded, scarred, or rusty areas immediately upon detection. Replace damaged components that cannot be restored to like-new condition. 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.

1.6 SCHEDULING

Glaze bullet-resistant windows, except factory-glazed units, after all concrete, masonry, ceiling, electrical, mechanical, plumbing and adjacent finish work iscomplete to avoid damage to the glazing material. Cover factory-glazed windows to protect them from damage during adjacent finish work.

1.7 WARRANTY

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

PART 2 PRODUCTS

2.1 MATERIALS AND COMPONENTS

Provide materials and components which are the standard products of a manufacturer regularly engaged in the manufacture of such products, unless otherwise indicated and detailed on the drawings, and that essentially duplicate items that have been in satisfactory use for at least two years prior to bid opening. Provide components supported by a service organization that is, in the opinion of the Contracting Officer, reasonably convenient to the site, or by the manufacturer. Where components are detailed on the drawings and do not conform to a manufacturer's standard product, provide components that are constructed of manufacturer's standard materials which conform to the specified ballistic standard or test. Provide bullet-resistant component assemblies of size and type indicated and provide at locations shown. Design all items included for exterior installation to resist water penetration or entrapment.

2.2 ELECTRICAL WIRING

Provide electrical wiring and conduit as specified in Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM.

2.3 BULLET-RESISTANT STEEL PERSONNEL DOORS

Provide factory fabricated door/frame assemblies, designed to be bullet resistant to the specified threat level, and conforming to applicable requirements of NAAMM HMMA 810, NAAMM HMMA 820, NAAMM HMMA 862, this section, and requirements indicated on drawings. Provide frames furnished by the door fabricator. Provide door silencers to cushion the impact of the door on the frame so that steel to steel contact is not made during closing. Completely weatherstrip, weatherproof, and fully insulate exterior doors. Exterior doors must close at flush top and bottom edges. Seal tops of doors against water penetration.

2.3.1 Fire Rated Doors

Provide fire rated doors at locations shown on the drawings. Furnish door assemblies bearing the identifying label of the Underwriters Laboratories, or a nationally recognized testing agency qualified to perform certificate programs, indicating that the units conform to the requirements for Special Purpose Type Fire Doors in accordance with NFPA 80. Construct fire rated doors in accordance with NAAMM HMMA 850. Certificate may be

furnished in lieu of label. For oversized fire doors, state that doors are manufactured in compliance with the requirements for doors of this type and class, and have been tested and meet the requirements for the class indicated.

2.3.2 Sound Rated Doors

Provide sound rated doors at locations shown on the drawings. Furnish door assemblies consisting of door, hardware, frame, threshold, and adjustable gaskets. The assembly must have a Sound Transmission Class (STC) rating [of] [_____] [as shown on the drawings] when tested in accordance with ASTM E90. [Submit manufacturer's descriptive data, and certificate or test report showing compliance with the specified requirements.] [Perform a field test on the door assembly to determine if the STC is within 2 points of the equivalent laboratory tested product. If the test reveals a less than acceptable STC, replace the door assembly and test the new assembly to provide an acceptable rating.]

2.3.3 Door and Frame Fabrication

Exercise special care during welding to prevent warping. Design stiffeners and attach interior armor plates such that heat-affected areas, which result from welding, do not allow a potential ballistic leak in product construction. Make subsurfaces flat, parallel, and plumb after fabrication. Construct doors and frames of [bullet-resistant steel] [or] [hollow metal with internal armoring] such that the completed assembly meets the specified regulatory requirements. Reinforce [and fully insulate] doors in accordance with manufacturer's design. Miter or cope steel door frames and weld at the corners with all welds ground smooth. Design corner assemblies to eliminate ballistic penetrable seams. Where structural channel frames are used, make stops of 38 mm 1-1/2 inch by 16 mm 5/8 inch bars welded or top screwed to the frame at not more than [150] [300] mm [6] [12] inch centers. Furnish countersunk screws. Place stops so that full contact with the frame will be assured. Make necessary reinforcements and drill and tap the frames as required for the hardware. Miter or cope frame channels and weld at corners with full penetration groove welds. Dress smooth exposed welds.

2.3.4 Sidelight Frames

Construct sidelight frames using door frame sections as shown on the drawings. Provide stop height and rabbet depth as required to accommodate the bullet-resistant glazing material specified. Weld exterior (attack side) glazing stops or make integral to the frame. Provide removable interior (protected side) glazing stops attached with high-strength alloy steel machine screws with tamper-resistant heads.

2.3.5 Preparation for Hardware

Prepare doors and frames for hardware in conformance with Section 08 71 00 DOOR HARDWARE, and NAAMM HMMA 830. Drill and tap frames for surface applied hardware in the field.

2.3.6 Hardware

****

NOTE: The hardware options listed below apply only to those bullet resistant door assemblies for which extra-heavy-duty standard commercial hardware is

suitable. This includes the following types of doors:

(1) Single and pairs of swinging personnel doors, up to 1.2 m 4 feet - 0 inches by 2.44 m 8 feet - 0 inches per leaf.

(2) Bullet-resistant threat levels up to maximum listed in paragraph COMPONENT TEST REQUIREMENTS.

(3) Bullet-resistant only or combined bullet and fire resistive, manual or powered opening.

For the following assemblies, custom or specially designed hardware should be specified (with manufacturer's guidance):

(1) Oversized single and pairs of swinging doors, such as those for vehicle entry.

(2) Sliding doors of all types.

(3) Folding doors of all types.

(4) Upward moving doors of all types.

(5) Bullet-resistant threat levels above the maximum listed in paragraph COMPONENT TEST REQUIREMENTS.

(6) Bullet-resistant doors of any type with additional forced entry blast, missile or pressure resistive requirements.

For sound rated doors rated for STC 52 or more with cypher lock requirements, designers should specify electronic cypher locks rather than mechanical locks.

Where balanced magnetic switches (BMS) are required on door/frames, specify shop drilled hardware preparation and installation of magnets.

****

Furnish hardware for bullet-resistant door assembly provided by the door assembly manufacturer to ensure a complete bullet resistant assembly. Where test standard requires hardware to be tested with the door assembly, include hardware in the labeling and/or test certification. Key as specified in Section 08 71 00 DOOR HARDWARE.

2.3.6.1 Mortise Locks and Latchsets

Furnish mortise lock and latchsets that are series 1000, operational Grade 1, Security Grade 1 or 1A, functions as indicated in the Hardware Schedule, and conforming to ANSI/BHMA A156.13. Furnish strikes for all mortise locks and latches, including deadlocks, conforming to ANSI/BHMA A156.115 except provide rectangular strikes without lip for security doors. Provide mortise-type locks and latches for doors 44 mm 1-3/4 inches thick and over that have adjustable bevel fronts or otherwise conforming to the shape of the door. Mortise locks must have armored

fronts. Mortise locks and latches must have full escutcheon, thru-bolted, extruded stainless steel trim.

2.3.6.2 Hinges

Equip all 2.1 m 7 feet - 0 inch high doors with a minimum of 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, or a single, continuous extra-heavy-duty piano-type hinge sized to carry the weight of the door without sagging. For each additional 300 mm 12 inches of door height beyond 2.1 m 7 feet - 0 inch, provide minimum of one more hinge. Equip doors greater than 2.1 m 7 feet - 0 inches with a minimum of four hinges. Provide hinges that are full mortise, half mortise, full surface or half surface design as recommended by manufacturer for frame and door design, and tamperproof or mount on the inside face of the door. Provide hinge manufacturer's certification that the hinge supplied meets all applicable test requirements of ANSI/BHMA A156.1, type, number of hinges specified, and that the hinge is suitable for the size and weight of the door assembly on which it will be utilized. If continuous piano-type hinges are provided with door, furnish independent laboratory reports covering both the door weight capacity and a 2,500,000-cycle testing to match ANSI/BHMA A156.1 Grade 1 requirements. Provide steel, prime coated interior door hinges. Provide nonferrous metal or stainless steel exterior door hinges.

2.3.6.3 Electric Strikes

Provide electric strikes conforming to ANSI/BHMA A156.5, Grade 1. Furnish strike boxes with dead bolt and latch strikes for Grade 1.

2.3.6.4 Door Closers

****

NOTE: Due to the excessive weight of bullet-resistant doors, they will present a safety hazard if allowed to close unchecked. Coordinate with manufacturers to ensure selection of proper size and types of closers.

****

Provide extra heavy duty closers of size and type recommended by manufacturer, and Grade 1 in accordance with ANSI/BHMA A156.4. Provide door closer finish that is [600] [689] [690] [691] [692] in accordance with ANSI/BHMA A156.18.

2.3.6.5 Door Stops and Holders

****

NOTE: Due to the excessive weight of bullet-resistant doors, they will present a safety hazard if allowed to have an uncontrolled opening cycle, particularly exterior out-swinging doors subject to wind pressure. Coordinate with manufacturers to ensure selection of proper size and type of stops and holders. If hold-open feature is not required or permitted (fire doors) specify equal grade stop without hold-open feature.

****

Provide extra heavy duty door stops [and holders] [Type C08511 in accordance with ANSI/BHMA A156.8] [[Type L11251] [and] [Type L11271] in accordance with ANSI/BHMA A156.16] [_____].

2.3.7 Frame Anchors

Provide jamb anchors with door/frame assembly conforming to manufacturer's recommendations to ensure complete bullet-resistant assemblies. Make provisions to stiffen the top member of all spans over 900 mm 3 feet. Extend the bottom of the frames below the finish floorline and secure to the floor slab by means of angle clips and expansion bolts. Floor clips are not required for installation in pre-built or existing openings.

2.3.8 Weatherstripping

Provide head and jambs with compression-type neoprene bulb or closed-cell neoprene adjustable-type weatherstripping. Weatherstrip door stops with a surface-mounted sponge neoprene strip in bronze housing no 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

****

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.

****

Where indicated, provide doors with full louvers or louver section. Louvers must be certified resistant to the same ballistic threat level as the rest of the door assembly. Insert sightproof louvers into the door. Do not use pierced louvers. Furnish inserted louvers that are stationary and nonremovable from the outside of exterior doors or the threat side of interior doors. [Provide removable insect screens with 18 by 16 mesh aluminum or bronze cloth.] [Where required by test standard, provide louvers with a spall-resistant screen of fine stainless steel mesh.] The free area of the total square meters 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]. Submit louver that has been tested in accordance with AMCA 500-Dairflow test, with a minimum airflow of [[_____] percent for channel style] [[_____] percent for chevron style] [[_____] percent]. Submit airflow calculations and test data showing compliance.

2.4 BULLET-RESISTANT LOUVERS

Fabricate louvers and frames from steel shapes to the opening dimensions indicated. Provide factory fabricated louver units designed to be bullet-resistant to the specified test standard in paragraph COMPONENT TEST REQUIREMENTS. Submit manufacturer's descriptive data, certificate, and test report showing compliance with the specified forced entry standard. The free area of the total square meters 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]. Submit louver that has been tested in accordance with AMCA 500-D airflow test. Provide a minimum airflow of [[_____] percent for channel

style] [[_____] percent for chevron style] [[_____] percent]. Submit airflow calculations and test data showing compliance.

2.5 BULLET-RESISTANT STEEL BIFOLD DOORS, FRAMES, AND HARDWARE

Provide bifold doors consisting of two leaves per door, four per opening, as indicated on the drawings. Hardware must allow easy manual movement of doors. Provide doors and hardware that are either entirely jamb-supported or jamb-supported with floor rollers to reduce bearing load on hinges. Provide steel hinges of ample length to prevent sagging, and are through-bolted in accordance with manufacturer's instructions. Furnish operators and all installation hardware that is the product of a manufacturer which specifically designs and produces hardware for heavy-duty industrial-type doors. Factory prime door surfaces for painting and reinforced and prepared for hardware installation. [Bifold doors must be manually securable from the protected side through actuation of surface-mounted cane bolt or similar device as recommended by manufacturer.] Maximum clearance at bottom of doors must be 25 mm 1 inch. Provide exterior doors with weather seals at jambs, head, and sill.

2.5.1 Testing

Subject bullet-resistant bifold door to testing by manufacturer to demonstrate appropriate design, strength, and application and operation of all hardware, both manual and electric. Perform door tests to replicate actual installation to the maximum extent possible. Coordinate arrangements with Contracting Officer as to time and location of tests. Tests must be witnessed and results subjected to approval by representatives of the Contracting Officer prior to delivery of the doors to the job site.

2.5.2 Bifold Doors

Furnish bullet-resistant bifold doors complete with [pneumatic operators] [electric operators] [and other] accessories specified. Design the operator so that the motor may be removed without affecting emergency auxiliary operators. [Provide a manual operator of crank-gear or chain-gear mechanism to allow manual operation in case of power failure. Provide a device for locking the chain or crank.] Submit a copy of the instructions proposed to be framed and posted.

2.5.3 Power Operators

Provide [pneumatic] [electric] type conforming to NFPA 80 and the requirements specified herein. Provide readily adjustable limit switches to automatically stop the door in its full open or closed position. [All operating devices must be suitable for the hazardous Class, Division, and Group shown, as defined in NFPA 70.]

2.5.3.1 Pneumatic Operators

****

NOTE: Designer will coordinate with the drawings to ensure compressed air is available at door locations.

****

Provide pneumatic operators, heavy-duty industrial type designed to operate the door at not less than 0.2 nor more than 0.3 m/second 8 inches nor more than one foot/second with air pressure of [_____] kPa psi.

Provide pressure regulator if operator is not compatible with previously specified air pressure. Provide dryer, filter, filter alarm, pneumatic piping up to connection with building compressed air, but not more than 6 m 20 feet from door jambs. Operators must have provision for immediate emergency manual operation of the door in case of failure. The operator must open, close, start, and stop the door smoothly. Control must be [electric, conforming to NEMA ICS 2 and NEMA ICS 6; enclosures must be Type 12 (industrial use), Type 7 or 9 in hazardous locations, or as otherwise indicated] [pneumatic] with [push button wall switches] [ceiling pull switches] [rollover floor treadle] as indicated.

2.5.3.2 Electric Operators

Provide electric operators, heavy-duty industrial type designed to operate the door at not less than 0.2 nor more than 0.3 m/second 8 inches nor more than 1 foot/second. Provide electrical controls that are [push button wall switches] [ceiling pull switches] [rollover floor treadle] as indicated. Provide electric power operators complete with electric motor, brackets, controls, limit switches, magnetic reversing starter, and all other accessories necessary. Design the operator so that the motor may be removed without disturbing the limit-switch timing and without affecting the emergency operator. Provide the power operator with a slipping clutch coupling to prevent stalling of the motor. Operators must have provisions for immediate emergency manual operation of the door in case of electrical failure. Where control voltages differ from motor voltage, provide a control voltage transformer in and as part of the starter. Provide control voltage of 120 volts or less.

a. Motors: Provide drive motors conforming to NEMA MG 1, with high-starting torque, reversible type, and of sufficient horsepower and torque output to move the door in either direction from any position at the required speed without exceeding the rated capacity. Provide motors suitable for operation on [_____] volts, [60] [_____] hertz, [single] [three] phase, and suitable for across-the-line starting. Design all motors to operate at full capacity over a supply voltage variation of plus or minus 10 percent of the motor voltage rating.

b. Controls: Provide an enclosed reversing across-the-line type magnetic starter having thermal overload protection, limit switches, remote control switches and conforming to NEMA ICS 2 for each door motor; provide enclosures that are NEMA ICS 6, Type 12 (industrial use), Type 7 or 9 in hazardous locations, or as otherwise indicated. Each wall control station must be of the three-button type, with the controls marked and color coded: OPEN - white; CLOSE - green; and STOP - red. When the door is in motion and the "STOP" control is pressed, the door must stop instantly and remain in the stop position; from the stop position, the door must be operable in either direction by the "OPEN" or "CLOSE" controls. Provide full-guarded controls to prevent accidental operation.

2.5.4 Safety Device

Provide a safety device that will immediately reverse the door movement upon contact with an obstruction and cause the door to return to its full open position. Do not substitute the safety device for a limit switch. Provide exterior doors with a combination weather seal and safety device on the leading edge.

2.6 BULLET-RESISTANT STEEL WINDOWS

****

NOTE: Bullet-resisting glazing materials may be glass, plastic, or composite of the two. Edit out all inappropriate items. Do not specify thickness of glazing. Selection of no-spall criteria generally requires use of plastic or composite glazing materials. Therefore, if these options are edited out, use low-spall criteria. Verify that glass glazing, where required, is available to meet low-spall criteria for threat specified.

****

Fabricate window assemblies from [bullet-resistant steel shapes] [or] [hollow metal with internal armoring] and bullet-resistant glazing materials specified herein; the entire assembly must meet or exceed the specified regulatory requirements. Provide welded frame units of sizes and shapes indicated on the drawings with minimum frame face dimensions of 50 mm 2 inches. Furnish glazing material with window assembly for onsite installation, or furnish factory glazed window units. Entire assembly must be furnished by same manufacturer. Weld exterior (attack side) glazing stops or integral to frame. Provide removable interior (protected side) glazing stops attached with high-strength alloy steel machine screws with tamper-resistant heads.

2.6.1 Glazing Materials

Provide factory fabricated units designed to be bullet-resistant to the specified test standard in paragraph COMPONENT TEST REQUIREMENTS. Glazing material must be [glass,] [plastic,] [or] [composite] with a [no-spall] [low-spall] protected (interior) face. [Low-spall interior face must meet or exceed requirements for spall resistance defined in UL 752.] Provide glazing material conforming to applicable requirements contained in ASTM C1036, ASTM C1048, and ASTM E1300. Test glazing materials in accordance with the applicable sections of the following testing procedures: ASTM D905, ASTM D1003, ASTM F428, ASTM F548, ASTM D4093, and ASTM F520. Apply a hardcoat to all plastic glazing exposed to the interior or exterior environment.

2.6.1.1 Laminated Glass

Provide bullet-resistant laminated glass consisting of all glass laminated construction conforming to applicable sections of ASTM C1172. The adhesive interlayer material for bonding glass to glass must be chemically compatible with the 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. Use glass plies in the lamination that are [annealed float glass conforming to Type I, quality q3 Class 1, in accordance with ASTM C1036] [or] [heat-strengthened or fully heat tempered, float glass, Condition A, Type I, q3 Class 1, in accordance with ASTM C1048].

2.6.1.2 Acrylic Plastic Sheets

Use bullet-resistant 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. Provide plastic glazing sheets that are clear and smooth on both sides.

2.6.1.3 Polycarbonate Plastic Sheets

Provide bullet-resistant laminated polycarbonate sheets, ultraviolet stabilized, [flame resistant] [high abrasion resistant] sheets 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 E204, ASTM G155, and ASTM F791. Do not use polyvinyl butyral in contact with polycarbonate because its plasticizer may craze polycarbonate.

2.6.1.4 Glass/Plastic Laminate Glazing

Furnish bullet-resistant glass/plastic laminated glazing materials consisting of glass/plastic laminated construction or glass-clad plastic "sandwich" construction conforming to applicable sections of ASTM C1172. Polycarbonate must be ultraviolet stabilized.

2.6.1.5 Glass/Plastic Air-Gap Glazing

Furnish bullet-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. Provide exterior glass plies that are [annealed float glass conforming to Type I, quality q3 Class 1, in accordance with ASTM C1036] [or] [heat-strengthened or fully heat tempered, float glass, Condition A, Type I, q3 Class 1, in accordance with ASTM C1036] [or] [heat-strengthened or fully heat tempered, float glass, Condition A, Type I, q3 class 1, in accordance with ASTM C1048]. [Provide interior (protected side) glass plies that are [annealed float glass conforming to Type I, quality q3 Class 1, in accordance with ASTM C1036] [or] [heat-strengthened or fully heat tempered, float glass, Condition A, Type I, q3 Class 1, in accordance with ASTM C1048].] [Where annealed glass is used on the protected side of the window, apply a sheet of 0.102 mm 4 mil thick clear mylar fragment retention film to the interior surface in accordance with film manufacturer's instructions. Apply film that wraps around the edges of the glass prior to glazing the window.] Furnish 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 applicable requirements of paragraph Polycarbonate Plastic Sheets.

2.6.2 Adhesive Interlayer Materials

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

2.6.3 Sealants

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

2.6.4 Deal Trays

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]. Provide deal tray welded subassembly of window assembly conforming to specified requirements for entire window assembly. Provide opening configuration of deal tray that prevents ballistic penetration or spall from the threat weapon, and resists lead spray from a shotgun blast. Provide tray opening that prevents insertion of the muzzle of a firearm.

2.7 BULLET-RESISTANT SPEAKING APERTURES

Fabricate speaking apertures to allow passage of voice at normal speaking volume without distortion, to resist the specified threat level for [outdoor] [indoor] use, and designed to prevent direct aim by the insertion of the muzzle of any firearm. Finish must match [window] [door] construction in which aperture is installed.

2.8 BULLET-RESISTANT GUNPORTS

Operate only from the protected side of the barrier, with a protected side shutter that closes automatically and is lockable from the protected side. Fabricate gunport from bullet resistant steel shapes and the entire assembly must meet or exceed the specified regulatory requirements. Size gunport for operation using submachine guns and rifles. [Provide assembly with a weather resistant opening.] Provide hinged or pivoted shutterand do not obstruct operation when in open position. Attach to wall assembly in accordance with manufacturer's recommendations. Include all aspects of gunport assembly, including hardware and method of anchorage to wall, in labeling or test certification. Provide [primed for painting] [satin stainless steel] finish. Gunport must not be operable from exposed side.

2.9 BULLET-RESISTANT PASS-THROUGH DRAWER

Fabricate pass-through drawer from bullet-resistant steel shapes; the entire assembly must meet or exceed the specified regulatory requirements. Provide pass-through drawer of size indicated on the drawings and designed to prohibit forcible entry or direct aim by the insertion of the muzzle of a firearm from exterior side when drawer is in the open position. [Provide a weather resistant opening.] Attach to wall assembly in accordance with manufacturer's recommendations. Include all aspects of the assembly, including hardware and method of anchorage to wall, in the labeling or test certification. Provide [primed for painting] [satin stainless steel] finish.

2.10 BULLET-RESISTANT PREFABRICATED MODULAR ENCLOSURE

****

NOTE: Prefabricated enclosures, as specified herein, are intended for use primarily as hardlines

on the interior of a facility, i.e., bullet-resistant partitions. Develop separate specifications if bullet resistant guards houses, control towers, etc., are required. Coordinate this specification with other disciplines where electrical work, plumbing, or HVAC are required.
****

Provide enclosure consisting of prefabricated, bullet-resistant, modular [insulated] wall [and] [ceiling] [and floor] panels with [doors,] [windows,] [louvers,] [gunports,] [and] all necessary connecting posts, hardware and accessories. Complete enclosure must be of minimum dimensions shown on the drawings. Provide [doors,] [windows,] [louvers,] [and] [gunports] in accordance with the requirements specified in those respective paragraphs. Components must be factory-welded assemblies. Factory paint all metal components with rust inhibitive primer unless indicated otherwise. Dress smooth all exposed welds. Workmanship must be rigid, neat in appearance, and free from defects. [Design enclosure to be relocatable by [crane] [forklift].]

2.11 ACCESSORIES

Provide all accessories for the installation or erection of above components into the surrounding structure. Anchorage must be as strong and bullet-resistant as the components. Install/erect in accordance with manufacturer's recommended instructions.

2.12 LABELING

****
NOTE: Model numbers and rating labels advertise the level of threat which the component is capable of resisting. Require removable labels where possible. Where this information cannot be removable, specify that it must be on the protected side or concealed from view by casual observers.
****

Plainly [and permanently] label bullet-resistant equipment in accordance with regulatory requirements. Provide label that is compatible with plastic or coating, visible only on protected side, after installation, including the following information:

a. Manufacturer's name or identifying symbol

b. [Model Number, Control Number, or equivalent]

c. Date of manufacture by week, month or quarter and year. This may be abbreviated or be in a traceable code such as the lot number.

d. Correct mounting position including threat side and secure side (by removable label on glazing material).

e. Code indicating bullet-resistant rating and test standard used (by removable label on glazing material).

2.13 SHOP/FACTORY FINISHING

Furnish all ferrous metal components, except stainless steel, primed for

painting unless indicated otherwise. Perform finish painting in accordance with Section 09 90 00 PAINTS AND COATINGS, unless otherwise indicated. When anodic coatings are specified, the coatings must conform to AAMA 611, with coating thickness not less than that specified for protective and decorative type finish in AA DAF45. Apply a polished satin finish pretreatment and a clear lacquer overcoat to anodized items. Shop finish all factory or manufactured components as indicated.

2.13.1 Ferrous Metal

Clean surfaces of ferrous metal, except galvanized and stainless steel surfaces, and shop coat with the manufacturer's standard protective coating other than a bituminous protective coating, compatible with finish coats. 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.

2.13.2 Galvanizing

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

2.13.3 Aluminum

Unless otherwise specified, aluminum items must be standard mill finish. For anodic coatings see paragraph SHOP/FACTORY FINISHING above.

PART 3 EXECUTION

3.1 EXAMINATION

Field verify dimensions of rough openings for components, and that surfaces of openings are plumb, true, and provide required clearances. Protect surrounding work prior to installation of bullet-resistant components. Restore surrounding work which is damaged as a result of the installation of bullet-resistant components to like-new condition prior to acceptance of the work described herein. Examine existing work to ensure that it is ready for installation or erection of the components. Check and correct components for racking, twisting, and other malformation prior to installation. Set frames true, plumb and aligned for proper installation. Examine all surfaces and connections for damage prior to installation.

3.2 FRAMED INSTRUCTIONS

Post framed instructions, under glass or in plastic with all edges laminated, including wiring and control diagrams showing the complete layout of each bifold door unit, where directed. Prepare condensed operating instructions explaining preventive maintenance procedures, methods of checking for normal safe operation, and procedures for safely starting and stopping in typed form, frame as specified above and post beside the diagrams. Post the framed instructions before acceptance testing.

3.3 INSTALLATION

Provide finished work that is rigid, neat in appearance and free from

defects. Install equipment plumb, level, and secured rigidly in place. Install doors and frames conforming to NAAMM HMMA 840. Install doors, frames, and hardware in strict compliance with approved printed instructions and detail drawings provided by the manufacturer. The Contractor is responsible for proper installing of the door assembly so that operating clearances and bearing surfaces conform to manufacturer's instructions. Install weatherstripping and thresholds at exterior door openings to provide a weathertight installation. Install all other components in accordance with approved manufacturer's recommended instructions. Test all operable parts of components for smooth, trouble-free operation, in the presence of the Contracting Officer. Submit Drawings containing complete wiring and schematic diagrams, where appropriate, and any other details required to demonstrate that the system has been coordinated and will properly function as a unit. Show proposed layout and anchorage of components and appurtenances, and relationship to other parts of work including clearances for operation and maintenance. Show conformance to all requirements, including fabrication details, sizes, thickness of materials, anchorage, finishes, hardware location and installation.

3.4 FASTENERS

Fasteners exposed to view must match in color and finish and must harmonize with the material to which fasteners are applied. Provide fasteners in accordance with Section 08 31 00 ACCESS DOORS AND PANELS.

3.5 CORROSION PROTECTION - DISSIMILAR MATERIALS

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

3.6 ELECTRICAL WORK

Perform all electrical work in accordance with Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM. Make flexible connections between doors and fixed supports with extra flexible type SO cable, except in hazardous locations where wiring conforms to NFPA 70. Provide cable consisting of a spring-loaded automatic take up reel, or an equivalent and approved device.

3.7 ADJUSTING/CLEANING

Make adjustments to doors and pass-thru drawers to assure smooth operation. Units must be weathertight when closed and locked. Clean all components in accordance with manufacturer's instructions.

-- End of Section --