



RECOMMENDED
SELECTION and
USAGE GUIDE for
HOLLOW METAL
DOORS and FRAMES



HOLLOW METAL MANUFACTURERS ASSOCIATION



A Division of

NATIONAL ASSOCIATION OF
ARCHITECTURAL METAL MANUFACTURERS



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SELECTION and USAGE GUIDE for HOLLOW METAL DOORS and FRAMES

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Details and information covered in this document are subject to change without notice.

CONTENT:

Subject	Page
Forward	2
Selection & Usage	3
IBC Occupancy Group	5
Group A - Assembly	7
Group B – Business	9
Group E – Educational	11
Group F – Factory	13
Group H – High Hazard	15
Group I – Institutional	17
Group M – Mercantile	19
Group R – Residential	21
Group S – Storage	23
Group U – Utility	25
Frames and Anchorage	27
Steel Tables	30
HMMA 803-08	

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SELECTION and USAGE GUIDE for HOLLOW METAL DOORS and FRAMES

FOREWARD:

This standard outlines the recommended selection and usage of the HMMA product constructions outlined in the following NAAMM/HMMA standard specifications. Refer to these standards for all construction and specification details. All information covered in this document is current at the time of publication. To verify this information, refer to the most recent edition of all referenced guide specifications.

HMMA 860, "Guide Specifications for Hollow Metal Doors and Frames" - used and specified for hollow metal doors and frames subject to low frequency of usage and low impact probability and less rigorous use.

- Where used: Specific opening in light commercial and light institutional occupancies
- Application: Bathrooms, closets, offices

ANSI/HMMA 861, "Guide Specifications for Commercial Hollow Metal Doors and Frames" - used and specified in commercial work is the continuously welded edge seam construction and it is this type that is the basis of the NAAMM Standard.

- Where used: All openings in commercial and institutional occupancies
- Application: Entrances, stairwells (temperature rise), corridors, meeting rooms, mechanical, etc.

ANSI/HMMA 862, "Guide Specifications for Commercial Security Hollow Metal Doors and Frames" - used and specified in applications where security against vandalism, break-in, or theft is a major concern.

- Where used: Business, high hazard, institutional, military (IBC classifications B, H, I)
- Application: Exterior entrances, pharmaceutical, security locations, etc.

ANSI/HMMA 863, "Guide Specifications for Detention Security Hollow Metal Doors and Frames" - used and specified for detention security.

- Where used: Detention and correctional facilities, institutional, military (IBC classifications B, H, I)
- Application: Exterior entrances, pharmaceutical, security locations in detention facilities, etc.

ANSI/HMMA 865, "Guide Specifications for Swinging Sound Control Hollow Metal Doors and Frames" - used and specified for applications where sound control is a factor.

- Where used: Openings where sound control is a factor (IBC classifications A, E, I, R)
- Application: Patient, operating and exam rooms, band rooms, auditoriums, etc.

ANSI/HMMA 866, "Guide Specifications for Stainless Steel Hollow Metal Doors and Frames" - used and specified when stainless steel is required for corrosion resistance or aesthetics. Where used: Openings exposed to corrosive environments, clean rooms or aesthetic requirements

- Application: Operating rooms, aquatic centers, pharmaceutical and food processing facilities.

ANSI/HMMA 867, "Guide Specifications for Commercial Laminated Core Hollow Metal Doors and Frames" - used and specified for doors incorporating the use of laminated cores.

- Where used: All openings in commercial and institutional occupancies
- Application: Entrances, stairwells (temperature rise), corridors, meeting rooms, mechanical, etc.

HMMA 850, "Fire rated Hollow Metal Doors and Frames" fire rated doors may differ in certain details of construction.

Severe Windstorm Resistant Swinging Door Components and Assemblies: This NAAMM/HMMA document does not address the selection, use and application of door opening products designed to resist the ravages of severe wind storm damages in the geographical areas which are susceptible to hurricane and tornado storms. At the time of publication, there are published standards dictating test procedures and building code requirements being adopting. NAAMM/HMMA manufacturers are conducting tests and investigations, but an industry standard specification has not been published.

Hollow Metal door and frame constructions are designed to meet the various application needs as required by the multitude of architectural requirements in commercial, industrial, institutional, government and detention constructions. The proper selection and specification of product construction, along with proper maintenance and care, are critical to the long term life cycle of the building and the security of the occupants.

Proper selection and specification is made by analyzing criteria such as frequency of use, potential abuse, physical contact, conformance to local building codes and fire code regulations. Consideration must also be given to application requirements such as sound attenuation, insulation requirements, security and architectural design and appearance.

It is the purpose of this standard to present data on current practices within the industry with emphasis on the requirements of the National Fire Protection Association (NFPA) and Model Code (IBC "International Building Code") within the United States Fire testing, listing, labeling and certification services. The building use and occupancy classifications used in this document, follows the structure of the International Building Code (IBC).

SELECTION and USAGE GUIDE for HOLLOW METAL DOORS and FRAMES

SELECTION AND USAGE:

Performance Levels: Selection of the correct hollow metal product is based on performance expectations including projected usage, impact probability, abuse and maintenance. The architect and/or specification writer must take the performance requirements into consideration when specifying the correct door, frame and hardware to meet the performance requirements.

The following are HMMA guidelines to help the architect and specification writer in the selection of Hollow Metal products:

Performance Levels	Duty Minimum thickness (see note #1)	Application & Description
1	Light Duty Frame = 18 gage 0.042" (1.06) Door = 20 gage 0.032" (0.81)	Building areas exposed to low frequency of usage and low probability of impact and abuse (i.e.: closets, offices).
2	Moderate Duty Frame = 16 gage 0.053" (1.34) Door = 18 gage 0.042" (1.06)	Building areas exposed to moderate frequency of usage and moderate probability of impact and abuse (i.e. stairwells, class rooms, meeting rooms).
3	Heavy Duty Frame = 16 gage 0.053" (1.34) Door = 16 gage 0.053" (1.34)	Building areas exposed to high frequency of usage and high probability of impact and abuse (i.e. exterior and service entrances, recreational areas, health care).
4	Maximum Duty Frame = 14 gage 0.067" (1.70) Door = 14 gage 0.067" (1.70)	Building areas exposed to high frequency of usage and very high probability of impact and abuse (i.e. exterior and service entrances, recreational areas, psychiatric clinics, pharmaceutical).
5	Detention Security Frame = 14 gage 0.067" (1.70) Door = 14 gage 0.067" (1.70)	Building areas required to assure the containment of individuals to designated areas (i.e. cells, control and day rooms in detention and correctional facilities).
6	Commercial Security Frame = 14 gage 0.067" (1.70) Door = 14 gage 0.067" (1.70)	Building areas exposed to elevated threat of intrusion, forced entry or ballistic attack (i.e. infrastructure and government facilities).

NOTES:

- Various factors may affect the material thickness of the door and frame including but not limited to the following:
 - Opening configuration: width, height, glass lights and / or louvers
 - Application: sound control, radiation shielding, fire, windstorm, thermal, blast or ballistic resistance, detention or commercial security
- Certain applications may require consideration of alternate material options including:
 - Zinc coated steel: exterior, interior masonry or interior openings subject to corrosive conditions
 - Stainless steel: severely corrosive environments, clean rooms and aesthetic considerations
- Steel Thicknesses: This document has been prepared as an aid to Architects and Specification Writers. For the purpose of maintaining consistency in terminology, the term "gage" has been used to describe the steel thicknesses of components and reinforcements.
 - Prior to 1970, sheet steel was referred to by gage. ASTM and ANSI currently do not list gage numbers in their standards. Like many generic terms, gage (or gauge) is ingrained in many vocabularies and is misunderstood as a term for thickness.
 - All dimensions shown in parenthesis are metric equivalents (millimeters) and do not include the common descriptive abbreviation of (mm).
 - Refer to NAAMM/HMMA 803 and page #30 of this document for decimal equivalent dimensions.

SELECTION and USAGE GUIDE for HOLLOW METAL DOORS and FRAMES

FREQUENCY OF USE:

Frequency of use relates to the relationship of how many times the opening is expected to be cycled (opened and closed). Cycles per **hour** will vary greatly depending on the type of building and the occupancy rate. Estimated cycles per **hour** are based on an 8 hour day, 5 days a week, 52 weeks per year. A guideline for evaluating the usage is shown below:

Frequency of Use	ANSI A250.4 Minimum cycles	Estimated cycles / hr. based on life cycle years					
		5 yrs.	10 yrs.	15 yrs.	20 yrs.	25 yrs.	30 yrs.
Low usage	250, 000 cycles (Level C)	24	12	8	6	5	4
Moderate Usage	500,000 cycles (Level B)	48	24	16	12	10	8
High Usage	1,000,000 cycles (Level A)	96	48	32	24	19	16

NORMAL USE AND OPERATIONS:

ANSI A250.4 is the industry standard performance test for evaluating commercial, industrial and institutional hollow metal doors. This test is performed under laboratory conditions and includes an operable door, frame and hardware with prescribed mechanical opening and closing of the door and periodic twisting. For the purpose of this standard, normal door, frame and hardware use is defined as operations in accordance with ANSI A250.4.

Improper installation, inadequate maintenance or improper hardware adjustment will add significantly to the abuse factors and reduce long term functionality of all openings.

ABUSE PROBABILITY:

Abuse probability relates to the projected levels of physical contact or contact by foreign objects. A guideline for evaluating abuse probability is as follows:

Abuse Probability	Abusive Contact / Situation	Opening Examples
Low	- Periodic bumping by elbows, knees or shoulder - Typical manual opening and closing of the door - Cleaning equipment - Foreign objects holding door open	- Offices - Dressing rooms - Private bathrooms - Closets (mechanical, plumbing, electrical)
Moderate	- Aggressive opening and closing - Moderate wind and weather exposure - Propping automatic doors open - Excessive slamming - Wheel chairs - Luggage - Maintenance carts	- Stairwells - Corridors - Public bathrooms - Emergency exit doors - Janitor closets
High	- Potential forced entry - Automatic door operators - Access control - High wind and weather exposure - Gurneys, material handling equipment - Opening doors with body parts other than hand - Bodily impact - Hanging on doors	- Main entrances - Classroom entrances - High volume public access - Kitchens - Mechanical rooms - Medical exam rooms - Operating rooms - Factory, production, warehouse openings - Schools - Interior and service entrances to retail, financial institutions, government facilities
Very High	- High potential forced entry - Vandalism	- Exterior and service entrances to retail, financial institutions, government facilities - Infrastructure access

SELECTION and USAGE GUIDE for HOLLOW METAL DOORS and FRAMES

IBC OCCUPANCY GROUPS:

Individual IBC Group occupancies include a wide variety of building constructions from relatively lower density occupancies (i.e. taverns and churches) to high density occupancies (i.e. arenas and concert halls). Architectural applications are varied depending on building function, aesthetic and security needs.

All openings must be in compliance with the IBC code and the Authority Having Jurisdiction.

For clarity and simplicity, HMMA has targeted typical building examples in select IBC occupancy groups. The building examples include typical door openings prevalent in that building segment construction. Openings are not limited to those outlined in this standard, since additional opening and requirements may be architecturally and functionally required.

Consult NAAMM/HMMA for guidance, selection and specification of opening applications not listed in this standard

OCCUPANCY AND APPLICATIONS:

Door, frame and hardware applications will be dependant on the building type, security requirements and community locations. Security (access control) requirements, being a growing concern, must be considered during architectural and door/hardware specifications development.

DOOR & FRAME CONSTRUCTION:

Applicable door and frame constructions may vary with architectural, aesthetic and durability requirements.

Doors:

Architectural requirements may dictate very basic and light duty construction which could be accommodated by standard sized (i.e. 3'0" X 7'0") and lighter gage (i.e. 20 gage) doors.

If requirements dictate the need for larger door opening (i.e. 3'0" X 7'6" or pairs) with higher levels of access control (electronic hardware), door construction should be upgraded to heavier gage of steel (i.e. 18 or 16 gage) door face sheets.

Aesthetic requirements may dictate the use of doors with optional finishes, textured face sheets or stainless steel doors. Building locations and finances will dictate these enhancements.

Durability and performance influence type of internal door construction and gage of steel will vary depending on the clientele occupying the building and the performance levels required.

Areas of entertainment may require the use of acoustically rated doors to help seal off and/or seal out unwanted sound transmission.

Facilities subjected to higher levels of occupancy abuse may require more durable door constructions.

Facilities with chemical or environmental exposures may require more durable construction.

Frames:

- Architectural – Like doors, the gage for the frame is dependent on the door opening size. Recommendations usually dictate that the frame should be 2 gage thicknesses heavier than the door.
- Aesthetic – Requirements may dictate special frame profiles to enhance the building image and functionality. Transom and side light elevations may also become very desirable to add architectural appeal, natural light and visibility.
- Durability and performance – Like doors, frames construction will vary depending on the clientele occupying the building and the performance levels required.

INFORMATION AIDS:

Additional information related to the selection of the proper Hollow Metal door and frame constructions can be found in the following NAAMM HMMA documents:

- | | |
|---|---|
| - HMMA 801 - Glossary | - HMMA 840 - Installation and Storage of Hollow Metal Doors and Frames |
| - HMMA 803 - Steel Tables | - HMMA 850 - Fire Rated Hollow Metal Doors and Frames |
| - HMMA 810 - Hollow Metal Doors | - HMMA 890 - Hollow Metal Technical Summary |
| - HMMA 820 - Hollow Metal Frames | - TechNotes – Published on various technical topics |

SELECTION and USAGE GUIDE for HOLLOW METAL DOORS and FRAMES

The following lists the occupancy groups as outlined in the IBC.

Group	Application	Examples
Group A – ASSEMBLY		
A-1	Intended for the production & viewing of performing arts	Theaters, symphony and concert halls
A-2	Uses intended for food and/or drink consumption	Restaurants, taverns, night clubs
A-3	Uses intended for worship, recreation, or amusement	Churches, bowling alleys, museums, libraries
A-4	Uses intended for indoor sporting events	Arenas, swimming pools, skating rinks
A-5	Uses intended for the viewing or participation of outside activities	Bleachers, grandstands, stadiums
Group B – BUSINESS		
B	Use of a building or structure for office, professional or service type transactions	Banks, clinics, laboratories, professional services, civic administration, post offices
Group E – EDUCATIONAL		
E	Use of a building or structure by 6 or more persons for educational purposes through the 12th grade	Grammar, middle and high schools as well as day care facilities
Group F – FACTORY		
F-1	Use of a structure for assembling, fabricating, manufacturing and packaging - Moderate hazard	Furniture, metals, textiles, woodworking, aircraft
F-2	Use of a structure for assembling, fabricating, manufacturing and packaging - Low hazard	Gypsum, beverages, brick, glass products
Group H – HIGH HAZARD		
H-1	Buildings that contain materials that pose a detonation hazard	Explosives, organic peroxides, unstable materials
H-2	Buildings that contain materials that pose a conflagration hazard	Flammable gases, combustible dusts
H-3	Buildings that contain materials that readily support combustion	Flammable liquids, combustible fibers
H-4	Buildings that contain materials that pose a health hazard	Corrosive or toxic materials
H-5	Semi-conductor facilities and similar research laboratories in which hazardous production materials are used	Research and development laboratories
Group I – INSTITUTIONAL		
I-1	Buildings housing more than 16 persons on a 24 hour basis because of age or mental disability who live in a supervised residential environment	Assisted living, group homes, convalescent facilities
I-2	Buildings used for medical, surgical, psychiatric or custodial care on a 24 hour basis	Hospitals, nursing homes
I-3	Occupancies that are inhabited by more than five persons who are under restraint or security	Prisons, jails, reformatories
I-4	Buildings that provide custodial care for less than 24 hours	Day care facilities
Group M – MERCANTILE		
M	Buildings for the sale and display of merchandise	Department stores, drug stores, markets
Group R – RESIDENTIAL		
R-1	Occupancies containing sleeping units where occupants are transient	Hotels, motels, boarding houses
R-2	Occupancies containing sleeping units or more than two dwelling units where the occupants are permanent in nature	Apartment houses, convents, dormitories
R-3	Residential occupancies where the occupants are permanent in nature and not classified as R-1, R-2, and R-4	Hotels, motels, boarding houses, apartment houses, convents, dormitories and assisted living facilities
R-4	Residential occupancies for residential care/assisted living including five but not more than 16 persons	Assisted living facilities
Group S – STORAGE		
S-1	Moderate hazard storage	Furniture, grains, lumber, books, sugar
S-2	Low hazard storage	Cement, food products, metals, meats
Group U – UTILITY AND MISCELLANEOUS		
U	Buildings of an accessory nature not classified as any specific occupancy	Barns, carports, sheds, stables, private garages

The following pages include charts with HMMA general recommendations for the selection and usage guidelines for typical entry locations in the most common building constructions.

IBC OCCUPANCY Group A: Assembly

Typical Building Type A-1: Theaters & Concert Halls

Assembly facilities vary greatly in frequency of use, abuse probability and function. Consideration must be given in selecting the door and frame performance levels and construction.

Ref No.	Typical Building Openings	Special Notes	Frequency Of Use	Abuse Probability	Door Performance Level						Recommended HMMA Construction Specification							Special Conditions & Options
					1	2	3	4	5	6	860	861	862	863	865	866	867	
1	Main Entrance	1, 2	High	High			○	●		+		1	4		2	3	1	2 way vision
2	Service Entrance	1, 2, 3	High	High			○	●		+		1	4		2		1	2 way vision
3	Stairwells	1, 4	Moderate	Moderate		○	●					1					1	2 way vision
4	Cross Corridor	4	Moderate	Moderate		○	●					1					1	2 way vision
5	Public Restrooms	7	High	Moderate		○	●					1					1	
6	Dressing Room		Moderate	Low	○	●					1						1	Privacy
7	Staff Offices		Low	Low	○	●					1				2		1	Privacy
8	Lounges		High	High			○	●				1	4		2	3	1	Acoustical
9	Kitchen	7	Moderate	High		○	●	+				1				3	1	2 way vision
10	Cafeteria, Restaurant	7	High	High		○	●	+				1	4				1	2 way vision
11	Theater, Symphony, Concert Hall	5	Moderate	Moderate		○	●					1			2	3	1	Acoustical
12	Closets		Low	Low	○	●					1						1	
13	Mechanical Room	1, 2, 6	Moderate	High		○	●	+				1	4		2		1	Louvers
14	Exit Only Function	1, 2	Low	Moderate		○	●	+				1	4				1	

Door Performance Level Guide:

Door performance levels vary with the buildings location and designed function. To help the architect and specification writer, the following variations can be followed:

○ = Consideration for areas of low intensity occupation and minor risk of intrusion.

● = Consideration for areas of typical to high risk of abuse, intrusion and /or vandalism.

⊕ = Consideration for areas of very high risk of abuse, intrusion and /or vandalism.

HMMA Construction Specification Guide:

The following is a guide to the proper selection and specification of Hollow Metal construction:

1 = Recommended door and frame construction options

2 = Acoustical requirements should be considered

3 = Stainless steel could be used based on function or aesthetics

4 = Commercial security construction is recommended in areas with very high risk of intrusion or severe vandalism.

Special Notes for IBC Occupancy Group A: Assembly

SPECIAL NOTES:

The following notes correlate to the information and opening matrix covered on the previous page of this standard:

1. Exterior doors and frames are recommended to be zinc coated steel with appropriate weather seals.
2. Security requirements may dictate the need of access control.
3. Service entrances (usually exposed to a higher level of abuse) are recommended to be minimum Level 3 (Heavy Duty) doors and frames.
4. Stair tower doors and cross corridor doors in the path of egress, in buildings over 4 stories high must include a minimum 450° F (250° C) temperature rise rating unless exempt by the local building code.
5. Door entering into theaters, symphony and concert halls are recommended to include gaskets to limit sound transmission. Some applications may require a specified STC rating.
6. Mechanical rooms may be required to include louvers to accommodate air flow. For exterior applications see note #1.
7. Consideration should be given to the use of zinc coated steel products due to elevated potential of exposure to cleaning agents and moisture causing corrosion.

SELECTION AND USAGE:

Occupancy group "A" includes a wide variety of building constructions which are designed to accommodate the assembly of people. When selecting and specifying Hollow Metal product for this occupancy group, consideration must be given to the targeted occupancy sub-group, the expected caliber of the facility and the targeted clientele.

Considerations should be made, but not limited to the following list of items:

Sub-Group A-1: Theaters, symphony and concert halls:

Uses intended for the production and viewing of performing arts.

1. Higher levels of product construction and performance are recommended for entertainment facilities located in areas of higher risk (intrusion, vandalism, etc.) or facilities catering to younger audiences.
2. Electronic security and access control should be considered for all entrances and exits.
3. Entrance doors into individual theater, symphony and/or concert rooms may require the addition of sound sealing gaskets and STC ratings for the operable opening.
Higher quality entertainment facilities may aesthetically require products with premium finishes (i.e. stainless steel or factory stained wood grains).

Sub-Group A-2: Restaurants, taverns, night clubs:

Uses intended for food and/or drink consumption.

1. Higher levels of product construction and performance are recommended for facilities located in areas of higher risk (intrusion, vandalism, etc.) or facilities catering to younger audiences.
2. Entrance and exit doors are recommended to include access control.
3. Doors separating kitchen and serving areas should be double acting with vision lights.
4. Higher quality facilities may aesthetically require products with premium finishes (i.e. stainless steel or factory stained wood grains).

Sub-Group A-3: Churches, bowling alleys, museums, libraries:

Uses intended for worship, recreation, or amusement

1. Some religious facilities may aesthetically require products with premium finishes (i.e. stainless steel or factory stained wood grains).
2. Higher levels of product construction and performance are recommended for bowling (sports) facilities and ~~on~~ located in areas of higher risk (intrusion, vandalism, etc.) or facilities catering to younger audiences.

Sub-Group A-4: Arenas, swimming pools, skating rinks:

Uses intended for indoor sporting events.

1. Higher levels of product construction and performance are recommended for sports facilities, facilities located in areas of higher risk (intrusion, vandalism, etc.) and facilities catering to younger audiences.
2. Entrance and exit doors are recommended to include access control.
3. Stainless steel products are recommended in areas like swimming pools and skating rinks.

Sub-Group A-5: Bleachers, grandstands, stadiums:

Uses intended for the viewing or participation of outside activities.

1. Higher levels of product construction and performance are recommended for sports facilities and located in areas of higher risk (intrusion, vandalism, etc.) or facilities catering to younger audiences.
2. Entrance and exit doors are recommended to include access control.

IBC OCCUPANCY Group B - Business

Typical Building Type B: Laboratories

Business facilities vary greatly in frequency of use, impact probability and function. Consideration must be given in selecting the door and frame performance levels and construction.

Ref No.	Typical Building Openings	Special Notes	Frequency Of Use	Abuse Probability	Door Performance Level						Recommended HMMA Construction Specification							Special Conditions & Options
					1	2	3	4	5	6	860	861	862	863	865	866	867	
1	Main Entrance	1, 2	High	High			○	●		+		1	4		2	3	1	2 way vision
2	Service Entrance	1, 2, 3	High	High			○	●		+		1	4		2		1	2 way vision
3	Stairwells	1, 4	Moderate	Moderate		○	●					1					1	2 way vision
4	Cross Corridors	4	Moderate	Moderate		○	●					1					1	2 way vision
5	Clean Rooms	8	Moderate	Moderate		○	●									3		2 way vision
6	Public Restrooms	7	High	Moderate		○	●					1					1	
7	Staff Offices	5	Low	Low	○	●					1				2		1	Privacy
8	Kitchen	7	Moderate	High		○	●	+				1				3	1	2 way vision
9	Cafeteria, Lunch Room	7	High	High		○	●	+				1	4				1	2 way vision
10	Conference Room	5	Moderate	Moderate		○	●					1			2	3	1	2 way vision
11	Closets		Low	Low	○	●					1						1	
12	Mechanical Room	1, 2, 6	Moderate	High		○	●	+				1	4		2		1	Louvers
13	Entrance between wings	8	High	High		○	●	+				1	4				1	2 way vision
14	Exit Only Function	1, 2	Low	Moderate		○	●	+				1	4				1	

Door Performance Level Guide:

Door performance levels vary with the buildings location and designed function. To help the architect and specification writer, the following variations can be followed:

- = Consideration for areas of low intensity occupation and minor risk of intrusion.
- = Consideration for areas of typical to high risk of abuse, intrusion and /or vandalism.
- +

+ = Consideration for areas of very high risk of abuse, intrusion and /or vandalism.

HMMA Construction Specification Guide:

The following is a guide to the proper selection and specification of Hollow Metal construction:

- 1 = Recommended door and frame construction options
- 2 = Acoustical requirements should be considered
- 3 = Stainless steel could be used based on function or aesthetics
- 4 = Commercial security construction is recommended in areas with very high risk of intrusion or severe vandalism.