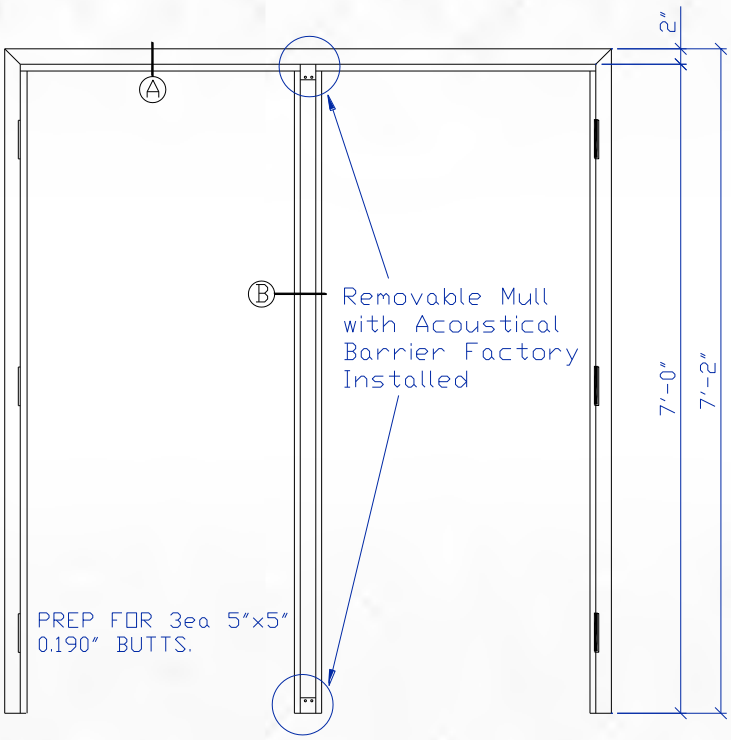
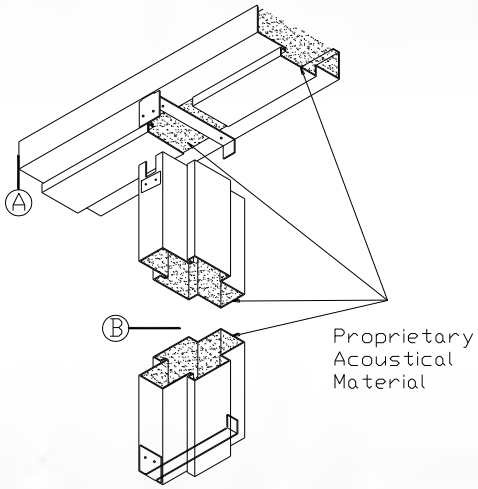
MEGAMET INDUSTRIES

MegaSonic STC Rated Hollow Metal Doors and Frames Product Information





STC 52 with 1-3/4" Model 2A Doors

Design information:

- Basics of sound control
- Approx. frequency ranges
- Approx. sound levels
- STC ratings, performance & expectations

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THE BASICS OF SOUND CONTROL

Sound is everywhere in our everyday lives. Some sounds like a babbling brook, coffee brewing in the morning, or the contented sounds of the family pet are satisfyingly welcome. Other sounds like music played too loudly, horns honking in traffic jams, or overhearing the neighbors arguing are unwanted and bothersome noise.

Simply stated, sound or noise is a series of vibrations occurring at a certain volume or loudness (sound pressure level expressed in decibels abbreviated as dB.) and frequency, which is the pitch or tone based on cycle time of vibrations expressed in "hertz", abbreviated as Hz. Reduction of unwanted noise is achieved by changing or filtering out either or both of these factors, usually by a barrier such as a sound control door assembly. Our State-of-the-Art MegaSonic Door Assemblies accomplishes this sound barrier with out-standing qualities and exceptional features.

The efficiency of this assembly can be measured by laboratory testing to standardized test method such as ASTM E-90 and calculated to a standardized performance curve using ASTM E-413 (interior noise) or ASTM E-1332 (exterior noise). Sound Transmission Losses (STL) are obtained at standardized frequencies from 125 to 4000 Hz and evaluated against the standardized curve to obtain an averaged Sound Transmission Class (STC) rating. Both STL and STC reflect the reduction in volume (loudness or sound pressure) at standardized pitch. Generally the higher the STC the more efficient the sound reduction; however since STC is averaged a better way is to use STL measurements at the frequencies actually expected to occur.

In most cases, we have also tested MegaSonic assemblies to an extended low frequency of 80 Hz to establish an Outdoor-Indoor Transmission Class (OITC). The OITC rating has a slightly different frequency range, including 80 Hz and is calculated using ASTM E-1332, which emphasizes low frequency sound. It represents the approximate STL difference between the exterior noise and interior noise.

EXAMPLES OF STC:

STC RATING	PERFORMANCE	DESCRIPTION
STC 50+	EXCELLENT	LOUD SOUNDS CANNOT BE HEARD
STC 45	VERY GOOD	LOUD SPEECH BARELY HEARD
STC 40	GOOD	LOUD SPEECH CANNOT BE UNDERSTOOD
STC 35	MARGINAL	LOUD SPEECH DIFFICULT TO UNDERSTAND
STC 30	POOR	LOUD SPEECH UNDERSTOOD CLEARLY
STC 25-	UNACCEPTABLE	NORMAL SPEECH UNDERSTOOD CLEARLY

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APPROX FREQ RANGE OF NOISE SOURCES

EXAMPLE	FREQUENCY RANGE
DRUM	80-200 Hz.
TELEPHONE RING	180-2,000 Hz.
MAN'S VOICE	110-1,900 Hz.
WOMAN'S VOICE	180-2,100 Hz.
CAR HORN	150-over 5,000 Hz.
FREIGHT TRAIN	60-over 4,000 Hz.
TRUCK	60-1900 Hz.
JET AIRPLANE	50-over 5,000 Hz.
ELECTRIC MOTOR	200-over 4,000 Hz.
PUNCH PRESS	60-over 5,000

APPROXIMATE SOUND (dB) LEVELS:

EXAMPLE dB	SOUND SOURCE
120	THUNDER
100	SUBWAY
90	BUSY STREET
90	FACTORY
80	BUSY OFFICE
70	AVERAGE STREET
60	AVERAGE OFFICE
50	AVERAGE TALKING
40	PRIVATE OFFICE
30	EMPTY AUDITORIUM
20	WHISPERING

Our customer only needs to supply the lever lock assembly, 5" heavy weight hinges, and closer compatible with the weight of the door (Figure 13.5 pounds per square foot for the 1-3/4" door). Therefore, when you purchase a MegaSonic assembly, you are assured that the frame, door, and gasket assembly is engineered to meet the STC design requirements of the project.

HANDICAP ACCESSIBILITY:

MegaSonic assemblies may be supplied with low profile aluminum thresholds that meet the requirements of ANSI A117.1 (ADA). In addition and where required, surface closers of your choice may be used to control opening and closing forces. Cam-Lift hinges, with their inherent uncontrollable opening and closing forces ARE NOT used.

WITH OR WITHOUT THRESHOLDS

MegaSonic Model 2A assemblies will usually be supplied with the door and the frame prepared for wall anchors, a gasketted ADA compliant aluminum threshold, and all gaskets required for the STC rating specified.

HINGES:

MegaMet recommends the use of 5" heavy weight (0.190") hinges furnished by the hardware supplier on all MegaSonic Model 2A assemblies. **Cam-Lift hinges ARE NOT used.**

MULTIPLE GASKET SET:

MegaSonic Model 2A assemblies may be ordered with a multiple gasket set that includes ALL supplementary gaskets needed for future upgrades of STC performance or to compensate for unforeseen installation inaccuracies.

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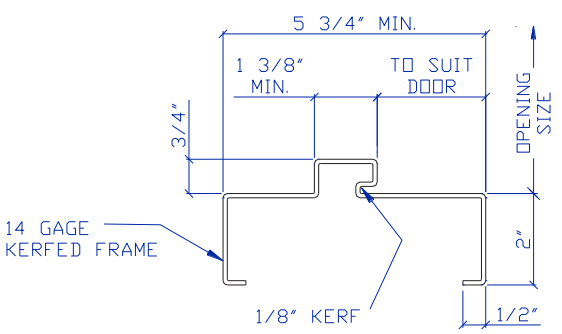
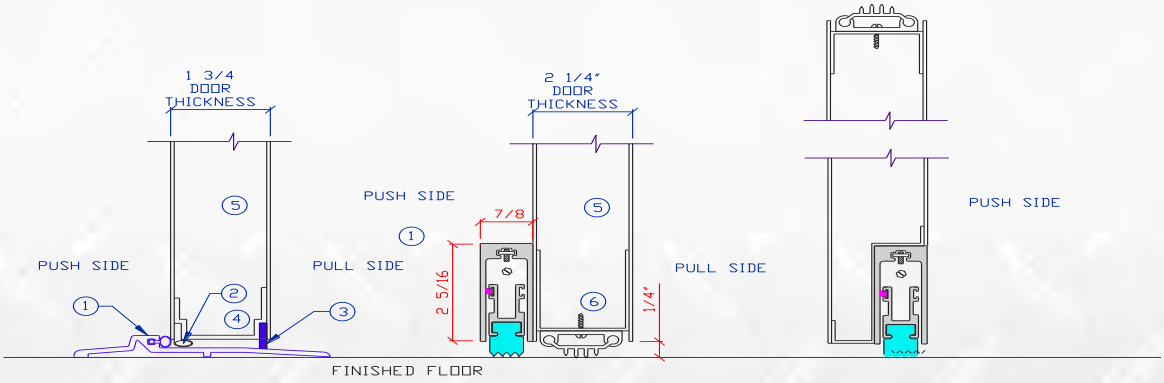
STOP-MOUNTED HARDWARE:

Most MegaSonic assemblies (singles and pairs) may be ordered with MegaMet's kerfed frame design thus assuring that the primary gaskets are not interrupted by stop-mounted hardware such as rim exit or surface vertical rod exit devices and parallel arm closers.



PATENT PENDING DESIGN AND DOOR BOTTOM OPTIONS:

MegaSonic Model 2A double doors up to STC 50 and single doors up to STC 52 (1-3/4" thick door) are constructed with an innovative double gasket design (patent pending) at the top and bottom channel, therefore eliminating the need for an automatic door bottom. If jobsite conditions require it, MegaSonic Model 2A doors are optionally available with a semi-mortise or surface mounted automatic door bottom.



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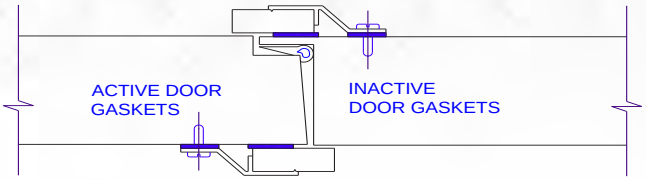
MegaSonic Double Door Assembly:

MEETING EDGE DETAIL- DOUBLE DOORS



To meet requirements allowing the use of standard ANSI flushbolts for double doors our Metal Magicians designed a unique door **without an automatic door bottom**. MegaMet developed an innovative **double gasket design** (patent pending) at the top and bottom channel (see illustration on next page) along with a low profile rabbetted meeting edge shown above. Laboratory tests for this pair with our **kerfed frame design** (see illustration on previous page) as an assembly achieved an STC of 50 (OITC 36). **The values highlighted in blue bold represent sound transmission losses in the range of human speech.** Note that STL values above 200 Hz are 38 and over, well suited for **"CAN'T HEAR ME NOW"** situations.

FREQUENCY (Hz.)	STL
80	23
100	20
125	**28**
160	**32**
200	**38**
250	**39**

FREQUENCY (Hz.)	STL
315	**44**
400	**45**
500	**47**
630	**47**
800	**49**
1000	**51**

FREQUENCY (Hz.)	STL
1250	**52**
1600	**51**
2000	**50**
2500	53
3150	57
4000	58

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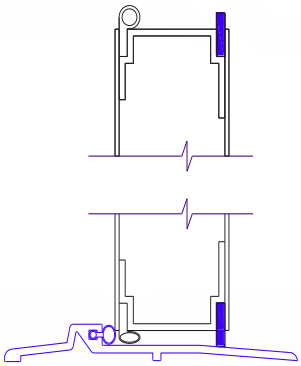
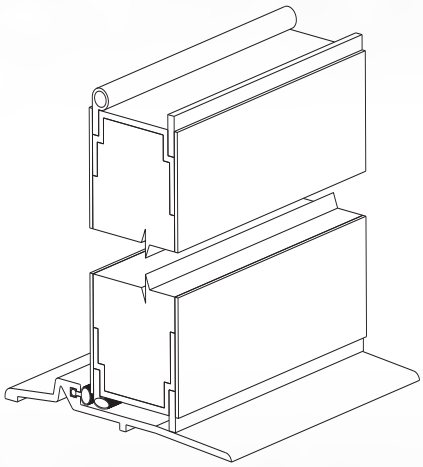
DOUBLE GASKET DESIGN AND DOUBLE DOOR LATCHING DEVICES:

MegaSonic Model 2A double doors up to STC 50 and single doors up to STC 52 (1-34" thick door) are constructed with an innovative double gasket design (patent pending) at the top and bottom channel (shown below), along with a low profile rabbetted meeting edge (see illustration on previous page). This design allows the use of standard flushbolts at both top and bottom without compromising the seals. Mortise or semi-mortise automatic door bottoms used by other manufacturers must be cut short for flushbolt clearance.



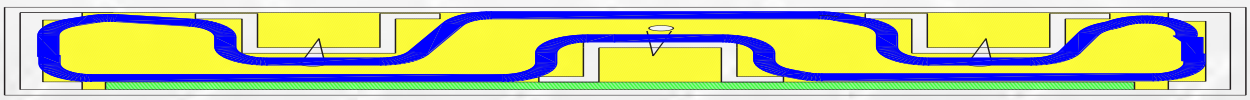
TYPICAL SECTION



EXTERIOR PROJECTION

MEGASONIC MODEL 2A CORE CONSTRUCTION:

All MegaSonic Model 2A doors (patent pending) are fabricated with the same proprietary core construction thus assuring consistency in fabrication and performance. This core utilizes a "made in USA" acoustic barrier that DOES NOT contain lead. Instead, the acoustic barrier is made from recycled materials, assuring a contribution to the GREEN Building Initiative and the maximum LEED's points credit available.



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MEGASONIC PERFORMANCE CHART:

The following chart is intended to illustrate the range of performance options available through the use of the MegaMet MegaSonic Model 2A door with kerfed or cased opening frame designs and a variety of gasket combinations. All results were obtained on laboratory tests of OPERABLE assemblies; field results may vary. The yellow shaded column indicates laboratory results for a "sealed in place" MegaSonic Model 2A PANEL for comparative purposes. This column illustrates the efficiency of this door design when all frame and gasket variables are eliminated.

The values highlighted in blue represent sound transmission losses in the range of human speech. Note that losses above 200 Hz are 40 and over, well suited for "CAN'T HEAR ME NOW" situations.

MEGASONIC PERFORMANCE						
FREQUENCY (in Hz.)	SOUND TRANSMISSION LOSS (STL) in dB					
	OPERABLE	ULTIMATE	OPERABLE	ULTIMATE	OPERABLE	ULTIMATE
	2A SINGLE	2A SINGLE	2A DOUBLE	2A DOUBLE	MegaStyro	MegaStyro
80	25	24	23	25	21	21
100	24	24	20	21	20	19
125	29	30	28	30	23	23
160	35	36	32	34	20	21
200	41	42	38	40	28	28
250	42	44	39	39	33	33
315	44	46	44	44	36	35
400	45	47	45	46	39	39
500	47	49	47	47	41	42
630	48	50	47	48	43	44
800	49	52	49	50	45	46
1000	50	54	51	52	46	47
1250	51	56	52	55	46	48
1600	53	58	51	56	47	50
2000	53	59	50	58	46	50
2500	54	60	53	61	46	50
3150	56	61	57	62	46	52
4000	57	63	58	61	48	55
STC	**50**	**52**	**49**	**50**	**41**	**42**
OITC	**38**	**38**	**35**	**36**	**31**	**31**
MMI Ref. only	07053-17	07053-7	10112-2	10112-1	09758-1G	09758-1X

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AVAILABLE WITH ACCELERATED LEAD-TIMES INCLUDING STC 52 AND ABOVE:

Do you need an STC over 52 on short notice? No time for extensive design development and testing? With MegaMet's MegaSonic Model 2A STC 52 standardized design and component system we can produce a 2", 2 1/4" or thicker door with an additional acoustic barrier layers to meet your needs.

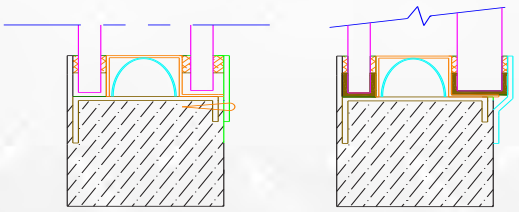
Our MegaSonic assembly, using only a 1 3/4" thick door achieved STC 52. With additional mass, insulation, and acoustic barriers (all standardized components), this would result in an STC of about 55 depending upon field condition and quality of installation. The kerfed frame for the added door thickness is no problem for our Metal Magicians. Related gaskets from the STC 52 standardized set are readily available.

The result is an economical, short lead-time assembly. Although we are confident of the capability, the actual STC performance will rely on field conditions and quality of installation.

GLAZING IN DOORS:

Doors prepared for glazing do not react the same as flush doors in acoustic tests. The light kit design, attachment, type and combinations of glass or glazing, and the glazing putty, tape, or channels interrupt the door's acoustic core and therefore the performance. The STC (or STL) of a flush door may be reduced by anywhere from 5 to 15 when glazing is incorporated. As an example, the use of a glazing system available from a major manufacturer is rated at STC 44 when tested with a non-operable panel tested at STC 55. STC ratings of glazed 1 3/4" doors from other manufacturers are STC rated in the low to mid 40s.

MegaMet light kits are manufactured with State-of-the-Art designs that minimize sound transmission, yet still have the "good looks" you would expect from MegaMet! Our 1 3/4" MegaSonic door designs will reduce the inherent negative effect of glazing. To do this we not only have created a compatible framing system but also have available glazing materials to integrate into this system.



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MEGASONIC "MegaStyro" DOOR:

To meet the STC 30/STC 40 requirements of ANSI S12.60 for classrooms, and qualify for **IEQ Credit 9 of LEED 2009 for schools,** MegaMet's Metal Magicians developed an **inexpensive** proprietary door design with an acoustic barrier interwoven with polystyrene stiffeners **"MegaStyro"** series. Laboratory tests with a standard M Series frame and conventional weather-stripping, the OPERABLE assembly achieved an STC of 41 (OITC 31). The values highlighted in blue bold represent sound transmission losses in the range of human speech. Note that STL values above 250 Hz are 33 and over, well suited for ANSI S12.60 and **"CAN'T HEAR ME NOW"** situations.

FREQUENCY (Hz.)	STL
80	21
100	20
125	**23**
160	**20**
200	**28**
250	**33**

FREQUENCY (Hz.)	STL
315	**36**
400	**39**
500	**41**
630	**43**
800	**45**
1000	**46**

FREQUENCY (Hz.)	STL
1250	**46**
1600	**47**
2000	**46**
2500	46
3150	46
4000	48

STC CAPABILITY OF STANDARD DOORS & FRAMES:

In addition to MegaSonic assemblies, we have tested standard door cores in M Series frames utilizing conventional weather-stripping to determine the STC performance that may be expected. Our results for laboratory tests of OPERABLE assemblies are as follows:

CORE TYPE	STC	OITC	HIGHEST TWO STLs
EXPANDED POLYSTYRENE	37	31	50@ 3150 dB, 53@ 4000 dB
POLYURETHANE SLAB	35	31	43@ 2000 to 3150 dB, 46@ 4000 dB
250 TEMP RISE	37	33	43@ 3150 dB, 44@ 4000 dB
HONEYCOMB	37	33	45@ 3150 dB, 50@ 4000 dB

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GREEN BUILDING (LEED) CONTRIBUTIONS:

All **MegaSonic Model 2A** doors and frames are fabricated from sufficient recycled materials to assure that they contribute to your building qualifying for **LEED** points under **MR Credit 4** (2009). The recycled material content exceeds the 10% and 20% requirements by weight.

The **"MegaStyro"** styrene stiffened STC 42 door also exceeds the 10% and 20% requirements by weight and complies with minimum STC requirements of **ANSI S12.60 for classrooms,** even those adjacent to a music room or gymnasium, thus qualifying for **IEQ Credit 9 for schools.**

A detailed **LEED** statement and additional information is published on **www.megametUSA.com.**

PROJECT DESIGNS REQUIRING WOOD VENEER AND PLASTIC LAMINATE:

If the design elements of the project require the continued look of wood veneer on doors, MegaMet can readily provide it for you. Exotic species from anegre to zebrawood can be expertly applied. The more common veneers of rotary natural birch and plain sliced red oak are always available for your project.

Standard veneer lay-ups of:

- running match
- book matched
- balanced matched

Any solid or patterned Plastic Laminate can be applied to the MegaMet line of Standard and Specialty doors.

MegaMet Industries ability to provide beautiful **wood veneer or designer plastic laminate** to Standard and Specialty doors along with Powder Coated Frames will truly create "Doorways of Distinction for the Pathways of Tomorrow"!

POWDER COAT FACTORY FINISH:

Powder coating is a type of finish that is applied to frames as a free-flowing, dry powder. The main difference between a conventional liquid paint and a powder coating is that the powder coating does not require a solvent to keep the binder and filler parts in a liquid suspension form. The coating is typically a thermoplastic or a thermoset plastic applied electrostatically and is then cured under heat to allow it to flow and form a "skin." It creates a hard finish that is tougher than conventional paint.

A Powder coat finish is a wonderful "GREEN Building initiative" finish and helps to contribute to the LEED construction requirements. The overage of powder can be collected and recycled in the process. The color choices available continue to grow with powder coating.

DISCLAIMER:
All charts represent values obtained in laboratory tests; field results may vary.

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ACOUSTIC TESTING AND RECOMMENDATIONS

ASTM E90: Standard Test Method for Laboratory Measurement of Sound Transmission Loss.
ASTM E413: Classification for Rating STC.
ASTM E1332: Determination of Outdoor-Indoor Transmission Class.
ASTM E1408: Withdrawn.
ANSI/NAAMM HMMA 865: Specifications for Sound Control Hollow Metal Doors and Frames.
ANSI S12.60: Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools.
DCID 6/9: Security Standards for Sensitive Compartmented Information Facilities (SCIF).
SDI-128: Guidelines for Acoustical Performance of Standard Steel Doors and Frames.

FIRE TESTING AND RATINGS

UL-10C: Standard for Positive Pressure Fire Tests of Door Assemblies.
UBC 7-2: Positive Pressure Fire Door Test Procedure-1997. (Replaced by UL-10C).
UL-10B: Standard for Fire Tests of Door Assemblies (Neutral Pressure).
UL9: Standard for Fire Tests of Window Assemblies.
UL Subject 63: Outlines Basic Requirements for Fire Door Frames.
UBC 7-4: Positive Pressure Fire Window Test Procedure-1997. (Replaced by UL-9).
NFPA 252: Standard Methods of Fire Tests of Door Assemblies (options for positive or neutral pressure). NFPA 257: Standard on Fire Test for Window and Glass Block Assemblies.
HMMA 850: Fire-Rated Hollow Metal Doors and Frames.
ASTM E152: Methods of Fire Tests of Door Assemblies (withdrawn in 1995).

BUILDING DESIGN (FIRE-SAFETY-ACCESSIBILITY)

NFPA 80: Basic Design, Usage, Installation and Maintenance of Fire Doors and Opening Protective's.
NFPA 101: Life Safety Code.
ANSI A117.1: Handicap and Accessibility Code (Generally referred to as "ADA").

SMOKE CONTROL (this category is generally dependant on gaskets, latches, and accuracy of installation).

UL-1784: Standard for Air Leakage Tests of Door Assemblies.
NFPA 105: Standard for the Installation of Smoke Door Assemblies.

SEVERE WINDSTORMS

ANSI/ASCE 7: Minimum Design Loads for Buildings and Other Structures (used by Structural Engineers to determine Design Pressures for each door & Frame Situation).
ASTM E330: Standard Test Method for Structural Performance by Uniform Static Air Pressure.
ASTM E1886: Standard Test Method for Structural Performance by Impact and Cyclic Pressure.
ASTM E1996: Standard Specification for Structural Performance of Systems Impacted by Windborne Debris in Hurricanes.
ANSI A250.13: Testing & Rating of Windstorm Resistant Components of Swinging Door Assemblies.
(FBC) TAS 201: Impact Test Procedures.
(FBC) TAS 202: Uniform Static Air Pressure Test Procedures for Impact & Nonimpact Components.
(FBC) TAS 203: Cyclic Wind Pressure Load Test Procedures.
PA 201, PA 202, and PA 203: (Replaced by TAS 201, TAS 202, & TAS 203 in Florida Statewide Code).
FEMA 320: Residential Safe Room or Community Safe Rooms with Less Than 16 Occupants.
FEMA 361: Commercial or Community Safe Rooms

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All products are available on our Quick Ship program!

Steel Frames choices:

- 3-sided frames, Transoms, Sidelights, Windows
- Steel Choices: 16ga., 14ga., or 12ga. in Cold Rolled or Galvanealed all prime painted, also Stainless Steel type 304 or 316 w/ 2B or #4
- Construction types: KD-drywall including Transoms, Sidelights, Windows or Factory Welded masonry assemblies
- All available with "UL" fire rating including oversized assemblies with ceramic glass
- Windstorm 2007 FBC approved with large missile impact and HVHZ including In-swing
- Kerfed Frames w/ a variety of gasket inserts
- Dutch Door frames
- Double Egress frames
- Pocket Door frames with extension
- Split Jamb frames with stronger design
- Elliptical Arch Tops or Segmented work including Mullions
- Ballistic rated through Level VI
- Lead-Lined frames for X-Ray rooms
- STC ratings up to 55
- Blast resistant

Toll free 888.322.7750
Fax 205.322.4600
P.O. Box 635 - 35201
3228 6th Ave North
Birmingham, AL 35222
www.megametUSA.com

Steel Doors choices:

- All Door edges are Welded and Seamless and are available Square or Beveled
- Steel Choices for door faces: 16ga., 14ga., or 12ga. in Cold Rolled or Galvanealed all prime painted also Stainless Steel type 304 or 316 with 2B or #4 finishes
- Construction types: 16, 14 or 12ga full perimeter internal channel with Single or Multiple Steel Stiffeners with 10ga hinge reinforcements and heavy duty lock boxes
- Core Choices: Polystyrene, Honeycomb, Polyurethane, Steel Stiffened also Mineral core for Temperature Rise conditions
- All available with "UL" fire rating including oversized assemblies with ceramic glass
- Windstorm 2007 FBC approved with large missile impact and HVHZ including In-swing
- UFC, GSA, Forced Entry, AT/FP, DCID 6-9 SKIF
- Blast resistant
- Water and Air Infiltration compliant
- ADA complaint
- LEED construction compliant
- Elliptical Arch Tops
- Sliding Doors
- Radius Sliding Doors
- Ballistic Rated to through Level VI
- Lead-Lined Doors for X-Ray rooms
- STC ratings up to 55