BLACK MOUNTAIN DOOR™

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INDEX – GENERAL

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Black Mountain Door reserves the right to make changes to designs or specifications or make improvements to its products without prior notice without incurring an obligation to incorporate such changes in products previously manufactured.

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SCOPE:
This bulletin is intended to inform the reader of recommendations for using Black Mountain Doors and frames fabricated under both the Amweld and Firedoor Brand names.

PURPOSE:
To act as an easily understandable set of recommendations for selecting the correct **standard** product based on specifications defined in ANSI/SDI and HMMA Standards. Due to the vast differences in Occupancy Classifications or established preferences of individual Architects, it is not intended to be all inclusive. Generally, Amweld Brand material is fabricated to hardware locations and fabrication requirements of ANSI/SDI A250.8; Firedoor Brand material is fabricated to hardware locations and fabrication requirements of HMMA Standards.

DESCRIPTION:
For identification purposes, the basic features of Black Mountain Door doors and frames are summarized as follows:

Door Edges:
- LE: Edges joined with a continuous laser welded seam (LaserEdge) for full flush edge. Filler is added and ground smooth for seamless edge,
- LS: Edges joined with a continuous interlocking seam for full flush edge. Filler is added and ground smooth for seamless edge,
- WE: Edges joined with a continuous weld, filled and ground smooth and seamless.
- CS: Same as WE but used for limited specialty items.

Amweld Brand Door Series:
- 15LE full flush polystyrene Supercore ®.
- 17LE seamless polystyrene Supercore ®.
- 25LE full flush hot-dip galvanized (galvanneal) polystyrene Supercore®.
- 27LE seamless hot-dip galvanized (galvanneal) polystyrene Supercore®.
- 35LE full flush 250 degree F temperature rise core.
- 37LE seamless 250 degree F temperature rise core.
- 35LE **(option)** full flush hot-dip galvanized (galvanneal) 250 degree F temperature rise core.
- 37LE **(option)** seamless hot-dip galvanized (galvanneal) 250 degree F temperature rise core.
- 45LE full flush honeycomb core.
- 47LE seamless honeycomb core.
- 45LE **(option)** full flush hot-dip galvanized (galvanneal) honeycomb core.
- 47LE **(option)** seamless hot-dip galvanized (galvanneal) honeycomb core.
- 61LE full flush embossed panel polystyrene core.
- 63LE seamless embossed panel polystyrene core.
- 85LE full flush urethane core.
- 87LE seamless urethane core.
- 83LE full flush hot-dip galvanized (galvanneal) urethane core.
- 89LE seamless hot-dip galvanized (galvanneal) urethane core.
- 300 tubular sections of hot-dip galvanized (galvanneal) steel.

NOTE: Standard 35LE, 37LE, 45LE and 47LE are cold rolled steel. Galv must be ordered as option.

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Firedoor Brand Door Series:

- 25LS full flush hot-dip galvanized (galvanneal) polystyrene core.
- 27LS seamless hot-dip galvanized (galvanneal) polystyrene core.
- 27WE seamless hot-dip galvanized (galvanneal) polystyrene core.
- 35LS full flush hot-dip galvanized (galvanneal) 250 degree F temperature rise core.
- 37LS seamless hot-dip galvanized (galvanneal) 250 degree F temperature rise core.
- 37WE seamless hot-dip galvanized (galvanneal) 250 degree F temperature rise core.
- 61LS full flush 6-panel hot-dip galvanized (galvanneal) polystyrene core doors.
- 63LS seamless 6-panel hot-dip galvanized (galvanneal) polystyrene core doors.
- 61CS **(see note)** full flush lockseam 6-panel hot-dip galvanized (galvanneal) steel stiffened doors.
- 63CS **(see note)** seamless 6-panel hot-dip galvanized (galvanneal) steel stiffened doors.
- 83LS full flush hot-dip galvanized (galvanneal) polyurethane core.
- 89LS seamless hot-dip galvanized (galvanneal) polyurethane core.
- 89WE seamless hot-dip galvanized (galvanneal) polyurethane core.
- 05LS full flush hot-dip galvanized (galvanneal) steel stiffened non-handed.
- 05LS **(option)** seamless hot-dip galvanized (galvanneal) steel stiffened non-handed.
- 05WE seamless hot-dip galvanized (galvanneal) steel stiffened non-handed.
- 07LS full flush hot-dip galvanized (galvanneal) steel stiffened handed.
- 07LS **(option)** seamless hot-dip galvanized (galvanneal) steel stiffened handed.
- 07WE seamless hot-dip galvanized (galvanneal) steel stiffened handed.

NOTES:
For seamless edge (**Model 2 option**) on 05LS and 07LS doors, "seamless filled edges" must be ordered.
"CS" indicates special construction; lockseam embossed face door with steel stiffeners.

Amweld Brand Frame Series, cold rolled steel or hot-dip galvanized (galvanneal) steel as ordered:

- 0400 standard Interlok(R) frames K-D or welded.
- 4400 double-egress frames frames K-D or welded.
- 0400 standard Interlok(R) cased opening frames frames K-D or welded.
- 2600 standard slip-on drywall frames K-D only.
- 4600 slip-on drywall cased opening frames K-D only.
- 0600 4-sided slip-on drywall frames K-D only
- 3000 frames with integral thermal break K-D or welded.

Firedoor Brand Frame Series hot-dip galvanized (galvanneal) steel only:

- FR equal, or single rabbet frames K-D or welded.
- FR double-egress frames K-D or welded.
- FR cased opening frames K-D or welded.
- PF pressure fit frames for doors or cased openings K-D only.
- HR “High Riser” frames for swing doors, K-D only.
- HR “High Riser” cased opening frames for sliding or bifold doors, K-D only.

Recommendations shown in the chart on page 3 are based on the "SCOPE" of ANSI/SDI A250.8-2003 (reaffirmed 2008) "SDI-100 Recommended Specifications for Standard Steel Doors and Frames". Door and Frame Series defined in this chart are suggested products based on Level Classification. “Grade” Classifications used in some prior versions based on SDI-100 are now referred to as “Level” Classifications. Gage designations are minimums and are based on material thickness shown in Tech Data #G-8.0. Other door or frame Series may be available when constructed in gauges defined.

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ANSI / SDI A250.8 – Black Mountain Door Product Reference

Level	Model	Description	Minimum Door Gauge	Recommended Door Series	Minimum Frame Gauge	Recommended Frame Series
Level 1 - Standard Duty						
1	1	Full Flush 1-3/4"	20	15LE 25LE 61LE 45LE	18(16)	400 2600 FR PF High Riser
	2	Seamless 1-3/4"	20	17LE 27LE 63LE 47LE	18(16)	400 2600 FR PF High Riser
Level 2 - Heavy Duty						
2	1	Full Flush 1-3/4"	18	15LE 05LS 35LE 45LE 61LE 85LE 25LE 07LS 35LS 61LS 83LE 25LS 83LS	16	400 2600 4400 FR PF 3000
	2	Seamless 1-3/4"	18	17LE 05WE 37LE 47LE 63LE 87LE 27LE 07WE 37WE 63LS 89LE 27WE 05LS 37LS 63WE 89LS 27LS 07LS 89WE	16	
Level 3 - Extra Heavy Duty						
3	1	Full Flush 1-3/4"	16	15LE 05LS 35LE 45LE 61LE 85LE 25LE 07LS 35LS 83LE 25LS 83LS	16	400 2600 4400 FR PF 3000
	2	Seamless 1-3/4"	16	17LE 05WE 37LE 47LE 63LE 87LE 27LE 07WE 37WE 89LE 27WE 05LS 37LS 89LS 27LS 07LS 89WE	16	
	3	Stile & Rail 1-3/4"	16/18	300	16	
Level 4 - Maximum Duty						
4	1	Full Flush 1-3/4"	14	15LE 05LS 45LE 85LE 25LE 07LS 83LE 25LS	14	400 4400 FR
	2	Seamless 1-3/4"	14	17LE 05WE 47LE 87LE 27LE 07WE 37WE 89LE 27WE 05LS 27LS 07LS 89WE	14	

Recommendations shown in the chart on page 4 are based the "SCOPE" of the following HMMA Documents:

- HMMA 860-92 "Guide Specifications for Hollow Metal Doors and Frames".
- ANSI/NAAMM HMMA 861-06 "Guide Specifications for Commercial Hollow Metal Doors and Frames".
- ANSI/NAAMM HMMA 867-06 "Guide Specifications for Commercial Laminated Core Hollow Metal Doors and Frames".

As above, Gage designations are minimums and are based on material thickness shown in Tech Data # G-8.0.

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HMI **HMMA - Amweld International Product Reference**

HMMA#	Location	Minimum Door Gauge	Recommended Door Series	Minimum Frame Gauge	Recommended Frame Series
HMMA # 860					
860	EXTERIOR	18 Galv. A60	07LS 07WE	16 Galv A60	FR 400*
	INTERIOR	20 (18)	07LS 07WE	18 HC Wood 16 Others	FR 400* PF 2600* HighRiser 4400*
HMMA # 861					
861	EXTERIOR	16 Galv. A60	07WE	16 Galv A60	FR 400*
	INTERIOR	18	07WE	16	FR 400* 4400*
HMMA # 867					
867	EXTERIOR	18 Galv. A60	05LS 05WE 07LS 07WE 25LS 25WE 27LS 27WE 61LS 61WE 63LS 63WE 83LS 89LS 89WE *Amweld Series Doors (See Note):* 25LE 27LE 45LE 47LE 61LE 63LE 87LE 89LE	16 Galv A60	FR 400* 3000*
	INTERIOR	20 (18)	05LS 05WE 07LS 07WE 25LS 25WE 27LS 27WE 61LS 61WE 63LS 63WE 83LS 89LS 89WE 35LS 37LS 35WE 37WE *Amweld Series Doors (See Note):* 25LE 27LE 45LE 47LE 61LE 63LE 87LE 89LE 15LE 17LE 35LE 37LE	18 HC Wood 16 Others	FR 400* PF 2600* HighRiser 4400*

Notes: HighRiser is 18 Gauge for Hollow Core (HC) Wood Doors Only.
* Amweld Brand Frames must be ordered with 7 Gage Hinges and Special Hardware Locations.
Amweld Series Doors must be ordered with handed beveled lock edge option, 7 Gage Hinge Reinforcements and Special Hardware Locations.

SUMMARY:

Charts included in this Tech Data are the recommendations of Black Mountain Door for standard products meeting the fabrication requirements of the Specifications noted. It must be noted that in some cases Black Mountain Door does not use certain materials (such as the frame gage indicated as minimums for Level 1). In those cases Black Mountain Door uses products heavier than actually required. Such deviations are noted in parenthesis.

CERTIFICATION:

This TD may be used as written certification of compliance to the fabrication requirements of the individual Specifications shown in charts.

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SCOPE:
This bulletin is intended to inform the reader of process and performance test acceptance criteria for Black Mountain Door's door and frame prime and factory finish paint.

PURPOSE:
To provide sufficient information to allow the reader to evaluate Architectural specifications for prime and factory finished paint coatings used by Black Mountain Door.

DESCRIPTION:
It must first be acknowledged that paint processes and ingredients are of a proprietary nature, formulated and applied to meet performance conditions of acceptance defined in nationally recognized specifications. As such, Black Mountain Door will not divulge the actual processes or ingredients used. This is not to be interpreted as a refusal to comply with regulations that require Material Safety Data Sheets MSDS) or with air quality points of LEED. Black Mountain Door doors and frames are considered "finished products". As such, there is no jobsite curing time, nor emissions generated.

Primer and factory finish paint coatings are formulated as water-borne synthetic coatings designed to be applied and fully oven cured with volatile organic compound (VOC) emissions at legal limits. This is both for the protection of the workers and local environment.

Prior to the painting process, materials are cleaned and degreased to remove oil, dust, dirt, or other such contaminants detrimental to adhesion to the surface to be painted and cohesion of the actual paint to itself. During the application and curing processes, ingredients are monitored and adjusted for conditions such as temperature and humidity.

Certain heat-sensitive products are air-dried following the same periodic monitoring and adjusting.

TESTING STANDARDS:
Many specifications will require either very specific or "hazardous" materials such as chromates, lacquer thinners, sandblasting, ketones or others. For these specifications it is necessary to establish "UP FRONT" if the specified processes are essential to the finish coat or if compliance to nationally recognized standards is more important. Specifications that reference ANSI A224.1 (1990) should be suspect since that document was replaced over 10 years ago by ANSI/SDI A250 standards.
American National Standards ANSI/SDI A250.10 "Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames" and ANSI/SDI A250.3 "Test Procedure and Acceptance Criteria for Factory Applied Finish Painted Steel Surfaces for Steel Doors and Frames" define conditions of acceptance within prescribed limits for:
240 continuous hours condensation (humidity) testing
120 continuous hours salt spray (fog) testing
Flaking after impact
Film adhesion
Resistance to abrasion
Both documents may be downloaded at www.steeldoor.org.

VENDOR LAB TESTING:
ANSI/SDI A250.10 and A250.3 Specification testing is routinely conducted at paint vendor's laboratories for validation purposes and quality control. Such paints used in testing include:
Vendor #22-F149A (Amweld Part # 94208-00 –Door Primer)
Vendor #WLA2050 (Amweld Part # 94209-00 – Frame Primer)
Vendor #WLW0166 (Amweld Part # 94336-04 – Polar White)

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An example of test results follows:

"SDI specification ANSI A250.10 was used to test WLA2050 and 22-F149A. ANSI A250.3 for the testing of WLW0166. Amweld supplied pre-coated panels of CRS and Galvanized for all products except for WLA2050 which was painted at vendor location on material supplied by Black Mountain Door. All panels were given 7 Days post cure time prior to testing. Films on all panels are including metal thickness."

ANSI A250.1	Metal	Film	Adhesion	Impact - 20 Lb	Condensation - 240 Hr	Salt Spray - 120 Hr
22-F149A	Crs	0.8-1.15	5B	Pass	Few #6-8	1/32-1/8", #9-10 Rust
WLA2050	Crs	0.8-0.95	5B	Pass	Med-Med Dense #8	0-1/32", #6-7 Rust
22-F149A	Galv	1.3-1.65	5B	Pass	Few-Med #8	0-1/8", #8-9 Rust
WLA2050	Galv	1.2-1.7	5B	Pass	No Blisters	0", #6-7 Rust
ANSI A250.3	Metal	Film	Adhesion	Impact - 20 Lb	Condensation - 480 Hr	Salt Spray - 120 Hr
WLW0166	Crs	1.2-1.8	5B	Pass	Few #8	0-1/8", #6-8 Rust
WLW0166	Galv	1.75-2.6	5B	Pass	Few #6-8	0"-#8-9 Rust

BLACK MOUNTAIN DOOR SPECIFICATION ANALYSIS:
In addition to ANSI A250 testing, each batch of primer or factory finish undergoes analysis testing to Black Mountain Door specifications before being released by the manufacturer. Such certified tests include Visual Color, Gloss, VOC Content, Wet Hiding Properties, and even PH. Due to the proprietary nature, test results are not duplicated in this TD.

CERTIFICATION:
This Tech Data may be used as a certification that paints used on Black Mountain Door doors and frames has been tested at a recognized independent testing laboratory in accordance with ANSI/SDI A250.10 and ANSI A250.3 and meet the acceptance criteria outlined in those documents (120 continuous salt spray hours, 240 continuous humidity hours, flaking after impact, film adhesion, etc.).

ENVIRONMENTAL STATEMENT:
Black Mountain Door complies with EPA and OSHA requirements regarding the use and disposal of non-hazardous primers.

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SCOPE:
This bulletin covers the recommendations and cautions for various types of paint coatings specified for application onto prime or factory finishes used on Black Mountain Door doors and frames.

PURPOSE:
To provide important information necessary to assure preservation of prime painted surfaces through storage and protection practices, provide recommendations for surface preparation prior to finish painting and to recommend steps to assure finish paint compatibility.

PRIME PAINT EXPOSURE:
Black Mountain Door's Doors, Frames and manufactured Accessories (where painted) are painted to comply with acceptance criteria specified in ANSI A250.10 (See TD# G-2.0) to insure maximum paint adhesion. Primer processes are intended to protect the steel surfaces for a limited amount of time. Factory applied primer needs to be somewhat porous in order to accept finish coatings. It is therefore susceptible to the action of moisture or ambient condensation during shipping or storage. Transportation of materials in unprotected open" trucks during inclement weather (rain or snow) or on roadways where salt or other snow melting agents are used will deteriorate the primer. Such moisture problems will show up as rusted or water stained areas. ANSI A250.8 and HMMA 840 contain an Industry consensus of jobsite storage requirements.

Should the primer become scratched, abraded, rusted or stained, the affected areas will rust unless sanded and reprimed with a suitable DTM primer containing rust inhibitors. Exercise caution when repriming with spray cans. Propellants or thinners used to make the primer sprayable may soften the factory primer in as little as a few minutes. When using spray can primers, test in an inconspicuous area or request cutoff door or frame samples. Should it become necessary to add a field coat of finished paint to a factory finished door or frame, first sand the entire surface of the door or frame for better adhesion and to assure uniform color and gloss, then repaint. Due to the many types of paint available today, it is recommended that the customer test a small area of the door with their coating before proceeding.

PREPARATION FOR FIELD PAINTING:
Black Mountain Door endorses existing National or Industry Standards for storage, protection, surface preparation, and finish painting of doors and frames. These Standards include:
ANSI/SDI A250.8 "Recommended Specifications for Standard Steel Doors and Frames" paragraph 2.1.5.
SDI 127-E Prime Painted Materials Alert
HMMA 840 "Installation and Storage of Hollow Metal Doors and Frames" Section B.
HMMA-840 TN01-07 Tech Note, "Painting Hollow Metal Products"
Before the application of finished coat of paint, surfaces must be dry and free of all dirt, oil and dust. In every case, the finish coat must be applied over a film which is intact. All scratches or bare edges should be field primed with rust inhibiting Direct-To-Metal (DTM) primer before top coating. Follow the instructions on finish coat application provided by the paint manufacturer.
Prior to application of finish coats, the substrate shall be inspected by the Painting Contractor. All Architectural Specification requirements along with all requirements of the Paint manufacturer shall be followed. These will generally include scuff sanding of the substrate with 300 grit (or smaller) sandpaper and cleaning with a mild mineral spirits type solvent and a clean white "tack-free" rag to remove foreign materials, scratches or abrasions from construction processes, along with any special or mandatory requirements for primer touch-up or additional primers required by the paint "system".

MOST IMPORTANTLY, the field-applied primer and finish paint "systems" must be designed for direct to metal applications and contain rust inhibiting properties.

IF COATING COMPATIBILITY IS AN ISSUE, either Black Mountain Door or our local Distributor can provide "sample" material for the Painting Contractor's use. Fab-A-Frame cutoffs or light/louver cutouts are ideal for this purpose.

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FINISHED COAT TESTING:
Without prejudice, Black Mountain Door conducted comparative testing on a variety of finish paints commonly seen in specifications.

Bonderite 1000 Iron Phosphated panels were sprayed with standard primer and allowed to cure at room temperature for 8 days. Dry film thickness averaged 0.85 mils. Each finish paint was then brushed on the primed panels and allowed to cure at room temperature for 7 days prior to testing.
Adhesion was tested in three ways. The first method was to apply a strip of clear scotch tape over the paint, press firmly and remove it immediately and quickly at a 90º angle. The second method was to do a crosshatch adhesion test in conformance with ANSI A250.10. The third method involved scraping the surface with a coin until the substrate was visible.

The paints involved in the testing are as follows:
A. Water Base acrylic flat black house paint - satin-sheen latex 12604.
B. Two-Package epoxy - 63-C104A 5:1 with 63-X111A.
C. Polyvinyl acetate emulsion - White base interior flat wall paint X3042-99993.
D. Nitrocellulose Lacquer - 11-W229B.
E. Water base acrylic latex paint - interior latex KM 1208 semi-gloss kitchen & bath.
F. Polyurethane - 53-C113A 2:1 53-X139A.
G. Water base acrylic latex paint - exterior performer house & trim latex gloss white, 3872.
H. 11-F245A solvent based alkyd.
The results are defined in the general terms or *poor, fair, good, very good and excellent* as follows:

Intercoat Crosshatch Adhesion Tape Tests

TOPCOAT CURE		16 Hours	24 Hours	48 Hours	72/96 Hours	7 Days
A.	Frame	Excellent	-	-	Excellent	Excellent
	Door	Poor	Poor	Poor	Poor	Poor
B.	Frame	Excellent	-	-	Very Good	Very Good
	Door	Poor	-	-	Very Good	Very Good
C.	Frame	Excellent	-	-	Excellent	Excellent
	Door	Excellent	-	-	Excellent	Excellent
D.	Frame	Excellent	-	-	Excellent	Excellent
	Door	Excellent	-	-	Very Good	Very Good
E.	Frame	Fair	-	-	Excellent	Excellent
	Door	Poor	Poor	Poor	Poor	Poor
F.	Frame	Excellent	-	-	Excellent	Excellent
	Door	Excellent	-	-	Excellent	Excellent
G.	Frame	Excellent	-	-	Excellent	Excellent
	Door	Poor	Poor	Poor	Poor	Poor
H.	Frame	Excellent	Excellent	Very Good	Very Good	Excellent
	Door	Excellent	Excellent	Excellent	Excellent	Excellent

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Poor: No adhesion, paint comes off easily.
Fair: Paint is somewhat difficult to remove, but can be readily peeled off once film is broken through.
Good: Paint is difficult to remove, but can be pulled off once film is broken through.
Very Good: Paint is very difficult to remove, but still can be separated from the primer with difficulty.
Excellent: Paint is very difficult to remove and will not separate from the primer.

RECOMMENDATIONS:
The reader may utilize the results chart on page 2 as a reference tool in selecting types of finish paints. Based on similar testing, Black Mountain Door has determined that other acceptable choices include:
☐ Sherwin Williams SWP Alkyd House & Trim or equivalent
☐ Sherwin Williams II Tile Clad Epoxy or equivalent
☐ Sherwin Williams Polane or equivalent.
We again caution the reader to make sure that finish paint chosen be suitable for Direct-To-Metal (DTM) use.

"RED FLAGS":
The following finish paints are be considered "Not Recommended" until the finish painter conducts compatibility testing prior to using them.
☐ Paints containing ketones or lacquer thinners.
☐ Water-based house paints designed for use on wood, drywall, or other such porous substrates.
☐ Paints that cannot be applied Direct-To-Metal (DTM).
☐ Paints that require sandblasting of the steel substrate or primer before application.

FINISH PAINT GLOSS:
Both the Steel Door Institute (SDI) and the Hollow Metal Manufacturers Association (HMMA) acknowledge that high gloss finish paints will permit weld marks to show through. These marks are the result of structurally necessary manufacturing processes such as welding. Black Mountain Door has taken steps to minimize these visible marks through projection welding or laser welding (see TD # G-7.0) they cannot be completely eliminated.
Appendix B "Aesthetics" of ANSI/SDI A250.8 states: "These characteristics are inherent in production and are not to be considered as manufacturing defects. The show-through characteristics increase as the paint gloss increases. This standard recommends a maximum paint gloss rating of 20% reflectance, measured using a 60° gloss meter". HMMA Tech Note HMMA-840 TN01 has similar, but not identical, verbiage including the 20% reflectance.

SUMMARY:
This TD is a summary of Black Mountain Door's recommendations. It is not intended to be complete nor is it intended to ignore any finish paint systems not tested. For the best paint coating performance, the materials must be stored, cleaned, prepared, and painted with all due attention to details. It is the adhesive and cohesive properties of multi-layer paint systems that assure the best surface protection.
For the proper performance of finish paints care should be taken to acquaint your contractor/customer with these recommendations.

CERTIFICATION:
Since the finish paints specified or used, product storage, or jobsite conditions are beyond the scope of Black Mountain Door's control, we are unable to certify the performance of finish paints.

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SCOPE:
This Tech Data is intended to inform the reader of designations, titles, and basic content for Standards and Documents commonly found in Architectural Specifications.

PURPOSE:
To act as an aid in determining how a large variety of reference documents apply (or are not applicable) to products provided by Black Mountain Door under the Amweld and Firedoor Brands.

DESCRIPTION:
Since it is so extensive, Black Mountain Door DOES NOT infer compliance with Standards and Documents listed herein. In many cases, we are asked to confirm compliance to documents that are not manufacturing documents (such as installation standards or those that define material and methods for conducting tests). In addition, when not edited, some reference documents may inadvertently be left in a specification when the product is not in the project scope.

The content is arranged for ease of use in a source and subject format. For example, ASTM Standards relating to windstorms are grouped together. We have made references specific to Black Mountain Door in addition to indicating re-designations or withdrawals.

There are other Documents or Standards that are Building Codes, product-specific, regional, military, governmental, or those of Groups not primarily involved with steel (hollow metal) doors and frames that are too numerous to summarize in this Tech Data. Many of them are covered in individual Tech Data pages such as the G-11 and G-12 Series. Based on need, they will be added in subsequent revisions to this TD.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
Steel (M indicates metric version):

ASTM A568/A568M - Standard Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for.
Standard defines formulations, dimensions, and tolerances for steel. Used primarily by steel mills but is part of steel purchasing requirements.

ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
Standard defines formulations, methods, tolerances, thicknesses, weights, and classifications for application of zinc coatings onto steel, substrates. Used primarily by steel mills in conjunction with ASTM A568 (for example) but is part of steel purchasing requirements.

ASTM A879/A879M - Standard Specification for Steel Sheet, Zinc Coated by the Electrolytic Process for Applications Requiring Designation of the Coating Mass on Each Surface.
Standard is similar to ASTM A653 but coating thicknesses are generally lower and are applied by a different process. This is not hot-dipped. Used primarily by steel mills but is part of steel purchasing requirements for components such as anchors to minimize rusting during storage.

ASTM A924/A924M - Standard Specification for General Requirements for Sheet Steel, Metallic-Coated by the Hot-Dip Process.
Standard is similar to ASTM A653 but allows alternatives to zinc as a coating.

ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.

Standard defines formulations, dimensions, and tolerances for steel used in specialized applications

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requiring (for example) high strength or ductility. Used primarily by steel mills but is part of steel purchasing requirements.

ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength. Standard is similar to ASTM A1008 but is used in very specialized applications not generally applicable to standard materials.

Fire Testing:
ASTM E152 Methods of Fire Tests of Door Assemblies
No longer applicable since this Standard was **withdrawn** in 1995.

Acoustic Testing:

ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
Standard defines the method and equipment for laboratory testing of walls and door assemblies using sound transmission loss (STL) between two acoustically specialized rooms at a series of standardized frequencies.

ASTM E413 - Classification for Rating Sound Insulation.
Standard establishes the method for calculating a single number sound transmission class (STC) based on laboratory STL measurements.

ASTM E1408- Standard Test Method for Laboratory Measurement of the Sound Transmission Loss of Door Panels and Door Systems
No longer applicable since this Standard was **withdrawn** in 2009.

ASTM E1425 - Standard Practice for Determining the Acoustical Performance of Windows, Doors, Skylight, and Glazed Wall Systems

Standard defines method and equipment for laboratory testing STL of primarily glazed assemblies of any material. It also reports operating force, latching force, and air leakage.

NOTE: Due to the very specific combination of gaskets, latches, installation and other factors that will differ between laboratory tests and actual installations, Black Mountain Door has not tested to this Standard.

Windstorm/Pressure/Impact Testing:
ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.

This Standard is an integral part of almost any windstorm tests and is also used to establish static loading performance for pressure-resistant (blast) assemblies. It defines methods and equipment for laboratory testing of door assemblies, windows, storefronts, etc for pressure loading capabilities.

ASTM E1886 - Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials.
This Standard is also an integral part of almost any windstorm tests. It defines methods and equipment for laboratory testing of door assemblies, windows, storefronts, etc for windborne debris and cyclic wind pressures common during storms.

ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes.

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This is a "companion" Standard to ASTM E1886 that details information necessary (such as locations of impacts) to conduct testing to that Standard.

Security/Detention:

ASTM F476 - Standard Test Methods for Security of Swinging Door Assemblies
This Standard provides a description of test methods to measure the ability of doors and related components to resist common "break in" attacks. It does not address attacks by skilled burglars using specialized equipment. It does not establish acceptance criteria, deferring to local authorities having jurisdiction (AHJ).

ASTM F1450 - Standard Test Methods for Hollow Metal Swinging Door Assemblies for Detention Facilities
This Standard provides methods and requirements for structural testing of doors in detention facilities to prevent or delay escape of inmates. It is a specialized Standard not used in standard products.

Painting:
ASTM Standards covering methods of testing surface preparation, painting processes, paint or other coating performance are not listed in this Tech Data. Pertinent Standards are incorporated into Standards such as ANSI/SDI A250.10 and .3.

FLORIDA DEPT. OF COMMUNITY AFFAIRS-FLORIDA BUILDING COMMISSION (FBC)
TAS 201 - Impact Test Procedures:
TAS 202 - Criteria for Testing Impact &Amp; Nonimpact Resistant Building Envelope Components Using Uniform Static Air Pressure:
TAS 203 - Criteria for Testing Products Subject to Cyclic Wind Pressure Loading:
Although the purpose of this Tech Data is not to address every "local" Building Code, these three merit attention. The basis for windstorm testing in the United States began with the South Florida Building Code (SFBC) from which these Standards were derived. In their original form, designations were **PA 201, PA 202, and PA 203**. With the statewide Code, designations were revised, but content remains the same. They are similar (not identical) to ASTM windstorm test standards noted above but contain some additional tests for water penetration and forced entry based on local needs.

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)
ANSI/ASCE 7 - American Society of Civil Engineers Minimum Design Loads for Buildings and Other Structures.
This Document forms the basis for Structural Engineers to calculate design loads on buildings. It is referenced in almost all Building Codes. In addition to floor or roof loads, it is used to determine design pressures for doors and frames based on the door's location in the wall, the height above ground, the building's location relative to the coastline, wind speeds, and numerous other factors. **Refer to the L-23 Series of Tech Data for the importance of specifying design pressure ratings.**

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI A250)
Note: The Steel Door Institute (SDI) is the Secretariat of the A250 TC-1 Technical Committee. As such, most, but not all, Document titles are indicated as ANSI/SDI. The TC-1 Committee also includes representatives from the Hollow Metal Manufacturers Association (HMMA) and the Canadian Steel Door Manufacturers Association (CSDMA).

Specifications and Instructions:
ANSI/SDI A250.4-2011 – Test Procedure and Acceptance Criteria for – Physical Endurance for Steel Doors, Frames and Frame Anchors.

ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors & Frames.
This Standard covers all necessary requirements for fabrication and use of steel doors and frames in nonresidential installations. It is the basis on which materials fabricated under the Amweld Brand are based.

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ANSI A250.11 - Recommended Erection Instructions for Steel Frames.
This Standard covers the methods and necessary precautions required to properly install the majority of steel frames in a variety of wall conditions.
ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
This Standard establishes minimum sizes and thicknesses for builder's hardware reinforcing members in steel doors and frames. It also defines how doors and frames are prepared for a variety of mortised or surface applied hardware items.

ANSI/SDI A250.7 - Nomenclature for: Standard Steel Doors and Steel Frames
This Standard provides verbal and visual definitions for the majority of specialized terminology used in the steel door and frame Industry. This Standard **REPLACED ANSI/SDI A123.1** in 1997.

Windstorm/Pressure/Impact Testing:
ANSI A250.13 - Testing and Rating of Severe Windstorm Resistant Components for Swinging Door Assemblies.
This Standard covers the required tests and methods for rating individual components of a door assembly (door, frame, locks, hinges, etc) in addition to complete assemblies. It uses valid methods and engineering practices in addition to ASTM Standards. It also clarifies how the individual component ratings contribute to an assembly rating using the least rating of components.

Painting:
ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
This Standard establishes minimum acceptable performance standards (such as adhesion, rusting, peeling, exposure, etc) for factory applied prime paints using applicable ASTM Standards.
This Standard **REPLACED ANSI A224.1** in 1990.

ANSI/SDI A250.3 - Test Procedure and Acceptance Criteria for Factory-Applied Finish Painted Steel Surfaces for Steel Doors and Frames.
This Standard establishes minimum acceptable performance standards (such as adhesion, rusting, peeling, exposure, etc) for factory applied finish paint coatings using applicable ASTM Standards.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
Building Design:
NFPA 80 - Standard for Fire Doors and Other Opening Protectives.
This Standard covers in great detail the ratings, usage, installation, repair, etc of fire doors and frames of all types, glazing, and protective fire curtains. It is probably the most commonly referenced Document in specifications and Building Codes. It is generally a building design and installation Standard, not a manufacturing Standard.

NFPA 101 - Life Safety Code.
This Standard covers numerous "life safety" issues such as smoke barriers, sprinklers, and means of egress. Similar to NFPA 80, it is generally a building design and installation Standard, not a manufacturing Standard.

Fire/Smoke Testing:
NFPA 252 - Standard Methods of Fire Tests of Door Assemblies.
This Standard is the NFPA equivalent of other fire door and frame test Standards. It incorporates many of the test methods, furnace construction, and acceptance criteria of Underwriters Laboratories (UL) Documents, but allows for neutral pressure or positive pressure testing as options. It is generally a Standard for building test apparatus and conducting the testing, not a manufacturing Standard.

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NFPA 257 - Standard on Fire Test for Window and Glass Block Assemblies.
This is a "companion" Standard to NFPA 252 covering fire and hose stream tests on fire windows and glazing. Similar to NFPA 252 it is not a manufacturing Standard.
NFPA 105 - Standard for the Installation of Smoke Door Assemblies and other Opening Protectives.
This Standard covers installation, testing, maintenance requirements and performance standards for smoke door assemblies used to limit spread of smoke penetration.

Note: Since Industry testing has established that gaskets are the primary requirement to retard passage of smoke; this Document is not entirely applicable to doors and frames.

BUILDERS HARDWARE MANUFACTURERS ASSOCIATION (BHMA)
ANSI/BHMA A156.115 Hardware Preparation in Steel Doors and Steel Frames.
This Standard visually and verbally establishes dimensions, preparations, tap locations, etc for builders hardware items that have been standardized through the efforts of Industry Groups involved with manufacturing or preparing for such items. Defined preparations include locks, strikes, flushbolts, and others. This Standard set **REPLACES ANSI/DHI A115** series of documents.
UNDERWRITERS LABORATORIES, INC. (UL)

Fire/Smoke Testing:
UL-10C - Standard for Positive Pressure Fire Tests of Door Assemblies.
This is the generally accepted Standard for methods, furnace construction, fire and hose stream testing, and acceptance criteria for "positive pressure" fire tests of door and frame assemblies. Under positive pressure, a neutral furnace pressure plane is established at 40" above the sill after 5 minutes. It is generally a Standard for building test apparatus and conducting the testing, not a manufacturing Standard, but carries very specific conditions of acceptance that serve as the basis for approvals (Listings) and manufacturing Procedures. This Standard generally **REPLACES UBC 7-2 (1997)** in major Building Codes.

UL-10B - Standard for Fire Tests of Door Assemblies.
This is the "neutral pressure" equivalent to UL-10C. Under neutral pressure, the neutral furnace pressure plane is maintained at the top of the assembly. Although positive pressure testing is now the most common, tests conducted under UL-10B are still valid for engineering analysis or evaluations.

UL-9 - Standard for Fire Tests of Window Assemblies.
This is the "companion" Standard to UL-10C and UL-10B covering fire windows and glazing. It allows for neutral pressure or positive pressure testing as options. This Standard generally **REPLACES UBC 7-4 (1997)** in major Building Codes.

UL-1784 - Standard for Air Leakage Tests of Door Assemblies.
This is the generally accepted Standard for methods, equipment, and acceptance criteria for testing gasket systems or door assemblies. Although it is a testing Standard, not a manufacturing Standard, it is used to confirm gasket systems for use in accordance with NFPA 105.

UL Subject 63 - Outline of Investigation for Fire Door Frames.
Although not generally available to the public, this Document forms the basis for fabrication of steel (sheet or structural) frames for fire doors. It is incorporated into Follow-up Services Procedures of UL Listed fire door frame manufacturers. It visually and verbally describes "generic" details and sizes for 3-sided frames, anchors, reinforcing, etc. Variations beyond these details must be fire tested or otherwise evaluated before UL will allow their use as fire door frames.

Security:
UL-752 - Standard for Bullet-Resisting Equipment.
Although a very small portion of this Standard relates to door assemblies, it is the generally accepted Standard for methods, bullet configurations, performance levels, and acceptance criteria for bullet penetration resistance. Although it is a testing Standard, not a manufacturing Standard, it is used by UL as the basis for approvals (Listings) and manufacturing Procedures for bullet resisting assemblies.

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STEEL DOOR INSTITUTE (SDI)

Manufacturing Standards:

SDI-117 - Manufacturing Tolerances Standard Steel Doors and Frames.
This Standard covers allowable manufacturing tolerances in size, profile, warp, twist, bow, hardware locations and preparations, etc for steel doors and frames that will not adversely affect fit and function of the manufactured items. Installation inaccuracies may adversely affect the operation of the assembly.

Informative Documents:

SDI-112 - Zinc-Coated (Galvanized/Galvannealed) Standard Steel Doors and Frames.
This Document describes the zinc coatings endorsed or discouraged by SDI. Coating weights, processes, and ASTM coating Classes are covered.
SDI-118 -Basic Fire Door Requirements.
This Document describes the testing methods, ratings, and usage of fire-rated steel doors and frames. It also covers the use of louvers, glazing, and hardware for both single and double doors. An important Section covers the **approved materials and methods (metal, mylar, embossing, etc) of the fire door and frame labels**.

SDI-124 - Maintenance of Hollow Metal Doors and Frames.
This Document is intended to be a reference for the Owner for use after building is occupied. This information is important when **inspections of fire doors are required by local Building Codes**. It gives recommendations for assuring continued function of the door and frame. Maintenance of hardware is addressed by the individual lock, hinge, closer; etc manufacturers separate from doors and frames.
SDI-128 - Guidelines for Acoustical Performance of Standard Steel Doors and Frames.
This Document covers terminology, rating methods and important considerations for specifying and installing mid-range standard sound control assemblies.

HOLLOW METAL MANUFACTURERS ASSOCIATION (HMMA)

Note: The Hollow Metal Manufacturers Association is a Division of the National Association of Architectural Metals Manufacturers (NAAMM),the Secretariat for the HMMA Technical Documents. As such, the document titles are prefaced as ANSI/NAAMM.

Manufacturing Standards:

ANSI/NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames.
This Standard covers steel stiffened doors in welded frames for commercial installations. It contains requirements for hardware reinforcing, hardware locations, anchors, construction, manufacturing and installation tolerances, etc. more specific to steel stiffened door assemblies than ANSI A250.8. This Standard could be used for 07WE doors and FR frames manufactured under the Firedoor Brand.

ANSI/NAAMM HMMA 867 - Guide Specifications for Commercial Laminated Core Hollow Metal Doors and Frames.
This Standard is similar in content and very specific fabrication requirements to HMMA 861 except that it covers doors with laminated (polystyrene, polyurethane, etc) cores in welded, knocked down, or slip-on drywall frames for commercial installations. This Standard could be used (as examples) for 25LS and 27WE doors and FR or PF frames manufactured under the Firedoor Brand or could be used for doors or frames (with manufacturing options) under the Amweld Brand.

ANSI/NAAMM HMMA 865 - Guide Specifications for Sound Control Hollow Metal Doors and Frames.
This Standard is similar in content and specific requirements to HMMA 861 except that it covers door assemblies used in sound control commercial installations. Unlike some of the very specific fabrication requirements of HMMA 861, it acknowledges that sound control doors and frames have proprietary variations for acoustic purposes.

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Informative Documents:
HMMA 803 - Steel Tables.
This Document equates decimal as well as metric thicknesses of uncoated steel sheet to the "gage" designations historically used.
HMMA 810-TN01 - Defining Undercuts.
This Document visually and verbally clarifies the HMMA interpretation of undercuts, finished floor, bottom clearance, etc.
HMMA 820-TN01 - Grouting Hollow Metal Frames.
This Document covers descriptions, guidelines, and precautions for grout in frames and mullions used in commercial installations.
HMMA 820-TN02 - ContinuouslyWelded Frames.
This Document visually and verbally clarifies the much misunderstood and misused term "continuously welded" in addition to other types of weld joints commonly used. It defines areas of frame corners to be welded **in addition to faces**. This IS NOT the option "WGS". Black Mountain Door prefers using the terms **full weld, fully welded, or full profile welded** since they are more descriptive.

HMMA 820-TN03 - Guidelines for Glazing of Hollow Metal Transoms, Sidelights, and Windows.
This Document visually and verbally clarifies the HMMA recommendations for positioning and sealing glazing in interior and exterior hollow metal windows or sidelight/transom frames. It is the opinion of Black Mountain Door that these recommendations are to be used by the Architect when preparing Architectural Drawings or during the shop drawing review/approval process.

HMMA 840 - Installation and Storage of Hollow Metal Doors and Frames.
This Document is somewhat of a "companion" to ANSI A250.11. From receipt at jobsite until doors are hung it covers storage, handling, and installation of frames into a variety of walls, and other recommendations or precautions.

HMMA 840-TN01 - Painting Hollow Metal Products.
This Document covers important considerations and precautions to take for cleaning, surface repair, finish painting, etc of doors and frames to assure adhesion and aesthetic properties.
ANSI/NAAMM HMMA 841 - Tolerances and Clearance for Commercial Hollow Metal Doors and Frames.
This Document is a "companion" to SDI-117, ANSI A250.11, and HMMA 840 (among others) for commercial installations. It is a subject very critical to assuring the fit and function of doors and frames, therefore it cannot be repeated enough.

DOOR AND HARDWARE INSTITUTE (DHI)
DHI Installation Guide for Doors and Hardware:
Originally **ANSI/DHI A115IG**, this Document covers the installation of doors and frames manufactured from a variety of materials including steel. It is also a general guide for installing builders hardware (hinges, locks, closers, surface mounted items, etc). Being from the 1980s, it is somewhat out of date, but most practices are still valid.

SUMMARY:
We believe this Tech Data will be beneficial to the reader and satisfy the "SCOPE" and "PURPOSE" As noted above, the documents that are listed herein is by no means intended to be a complete list. We feel that they are more complete than almost any reference list in common Specifications.
This list should reduce the time spent researching such references both for the reader and Amweld International.

CERTIFICATION:
This Tech Data is intended to be used to determine if certifications of manufactured products are applicable to the project scope (example: 15LE doors cannot comply with ASTM A 653).
Keep in mind that in cases like fire doors and frames or windstorm rated doors and frames the certification is the physical label applied to the product or a Listing by UL, FBC, Dade County or ITS/Warnock Hersey.

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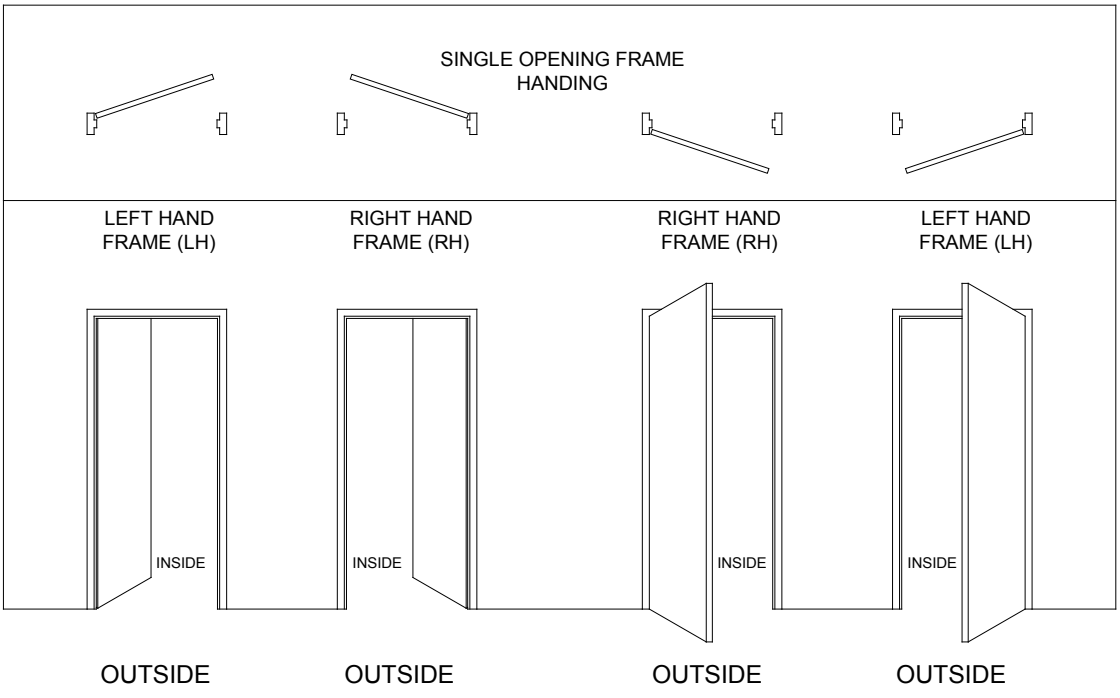
SCOPE:
This bulletin covers, in illustration detail, the rules for determining handing of doors and astragals, and the swing of the frame.

PURPOSE:
To inform the reader of Black Mountain Door standard procedures to assure that this critical concept is clearly understood and the correct entries can be made on the "Activity" column of order forms.

DESCRIPTION:
Frames (see illustration below):
Unlike doors, frames are handed as either left hand or right hand **swing** as shown. Swing in or swing out requirement is a matter of positioning the frame during installation.



Rev 11/09

Doors (see illustration on page 2):
Handing of a door designates critical operational functions such as key side, exit device mounting side, or "loose" (removable) light kit side.

Most Black Mountain Door brand standard doors have square edges, universal hinge preparation, and closer reinforcement on both sides to allow the door to be reversible (non-handed) by positioning in the frame, **not inverting**. Lock preparations such as D, Y, YBP, T, L, PB, and many others are symmetrical; therefore it is not necessary to specify a hand when ordering this type of door. When ordering doors with a non-symmetrical preparation, consider whether the preparation required on the inside face is different from that on the outside. If this is the case, handing must be specified (i.e. preparations for sectional trim (YST) or exit devices with non-symmetrical preparations). In addition, Black Mountain Door also offers a variety of Amweld brand beveled lock edge doors that will require a hand to be defined.

Almost all Firedoor brand doors (except for 05LS and 05WE) are handed and beveled on both edges, therefore handing must be noted on order.

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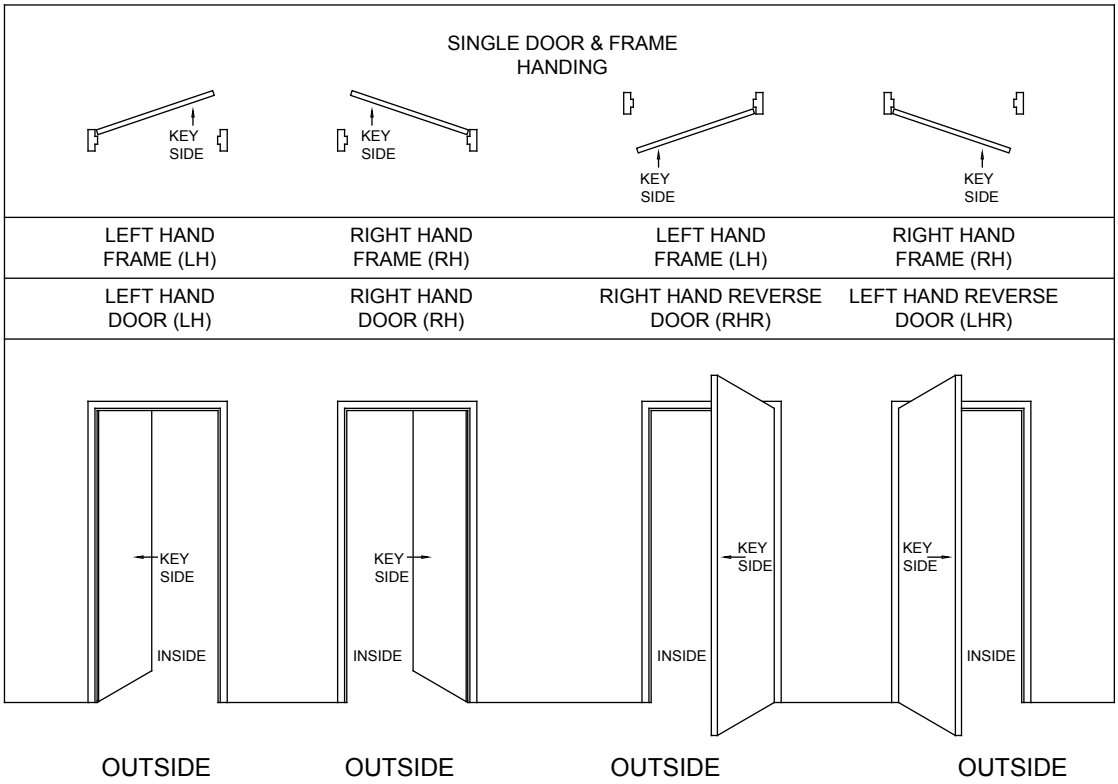

Double Doors and Frames (see illustrations on page 3):

Frames for double doors are handed when hardware preparation (such as automatic flushbolts, concealed vertical rod exit device strikes, etc.) requiring the frame header to be non-symmetrical. Handing must be specified relative to the **active** door leaf (such as Right Hand Active or Left Hand Reverse Active).

Double Doors should always be ordered as handed when any non-symmetrical hardware preparations occur or when astragals will be used. Handing for double doors is the same as for single doors.

Wrap-around or Zee astragals for labeled doors must be applied to the inactive door leaf at the factory, thus making the inactive door handed.

Astragal Parts/Accessories:

When ordering astragal kits separately, Wrap-around or Zee astragals are given the same hand as the door leaf to which it is applied. Astragal handing is shown in the illustrations on double doors.

Flat plate astragals are not handed.

Fire-Rated Double Doors:

Refer to Tech Data # L-18.0 for astragal variations permitted on double doors.

CERTIFICATION:

NOT APPLICABLE TO THIS SUBJECT.

SUMMARY:

Knowing the proper handing is essential when processing your orders. If you are unsure if handing is required, indicate it on the order. Too much information will not hurt.

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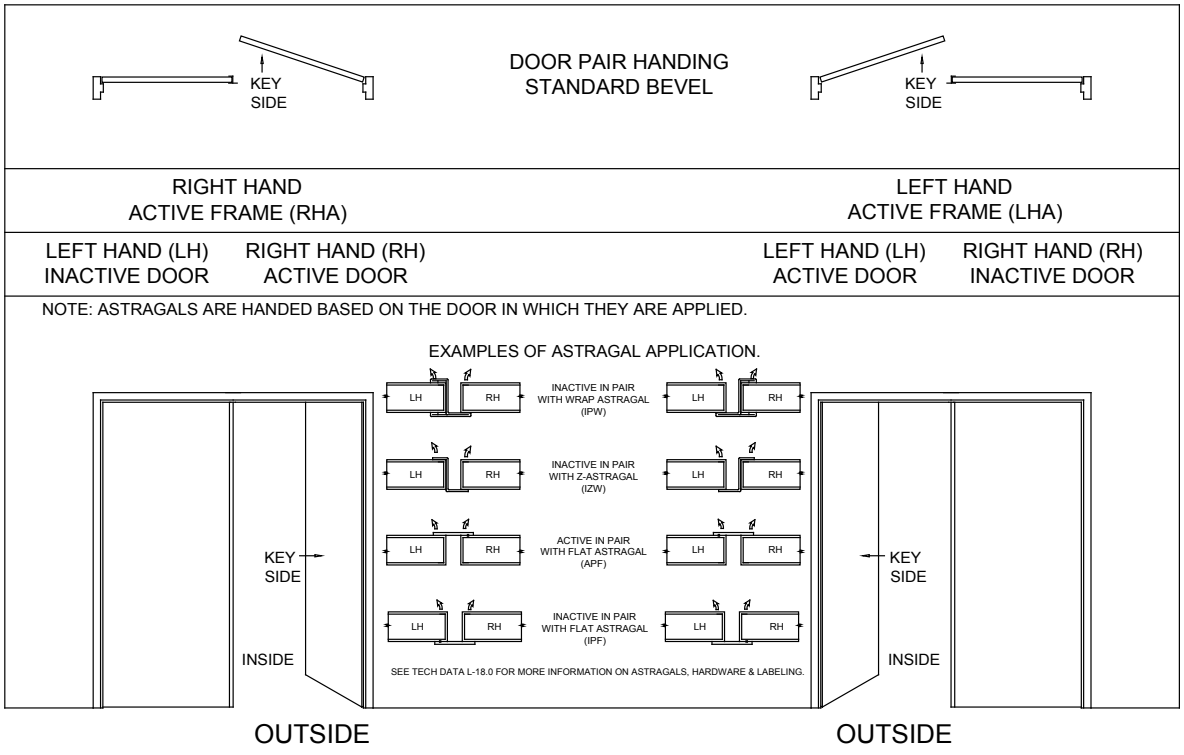

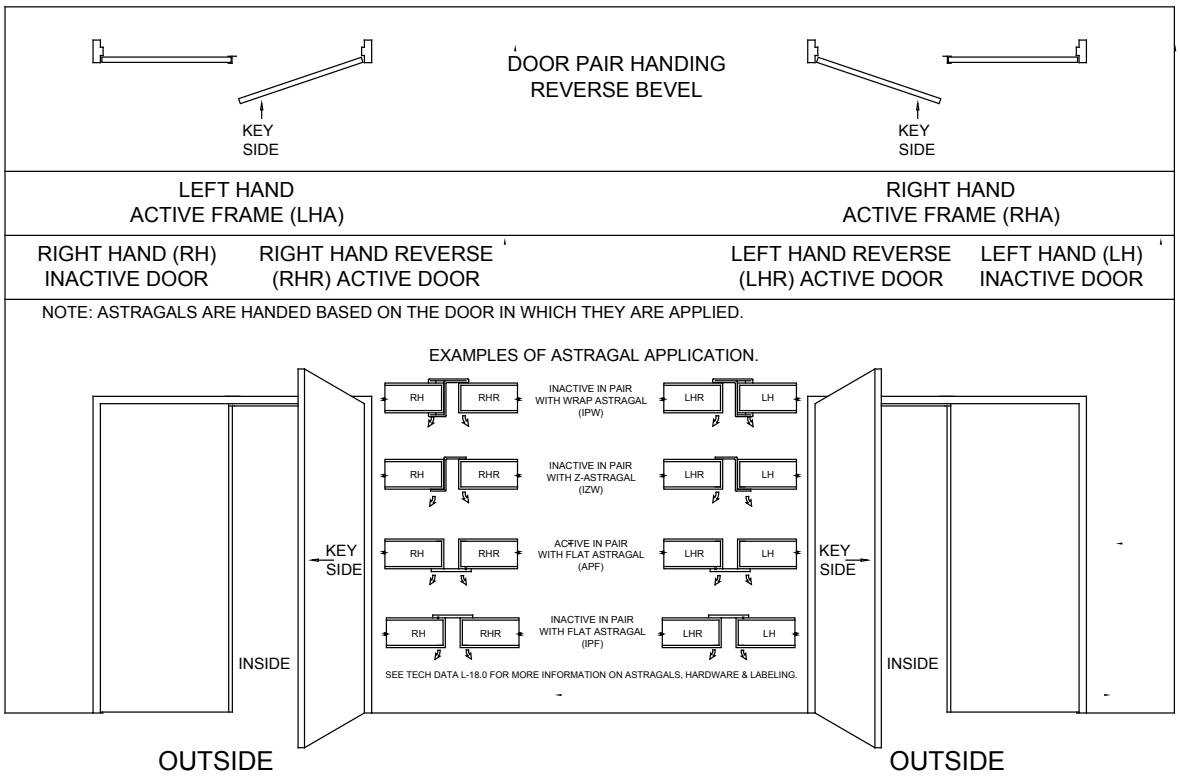

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SCOPE:

This bulletin covers the basic physical properties for Black Mountain Door's Expanded Polystyrene (EPS) door cores and thermal properties when physically tested to ASTM C-236 (Pg 1-2) C1199-09, C1363-05, E1423-06 (Pg 3).

PURPOSE:

To provide information to the reader, for comparative purposes, test results on 1 3/4" thick **operable assemblies** utilizing 1.0 pounds per cubic foot (nominal) EPS insulation. This insulation is referred to as **Super Core®** in the Black Mountain Door Brand Series 15LE, 17LE, 25LE, and 27LE doors. EPS insulation used in the Firedoor Brand has similar physical properties.

DISCLAIMER:

As stated above, this information is provided for comparative purposes only. There are many methods (ASTM and others) of physical testing, computer simulating, or simply publishing values of the core itself. The ASTM C-236 "guarded hot box" test method of operable assemblies utilized incorporates controlled measurements of heat, cold, humidity, and a wind factor similar to what occurs in reality.

Steel, along with many other materials tends to expand when heated. When the insulating core is "doing its job", the side opposite the exposed side is cooler and will experience less expansion. This phenomenon is referred to as **"thermal bow"**. This is discussed in detail in the appendix of ANSI/SDI A250.8 (download at www.steeldoor.org). It is a natural occurrence, not a product defect.

DEFINITIONS:

U-Factor is the overall coefficient of thermal transmission (air to air); the time rate of heat flow normally expressed in BTU's/hour, sq. ft., °F. The U-Factor applies to non-homogenous (composed of a variety of materials) assemblies, it is the term best suited for doors. Lower U-Factors are more thermally efficient.

R-factor or thermal resistance is the inverse of the U-factor. To calculate R-Factor, divide 1 by U-Factor (1/U=R). R-Factor is normally only used on homogeneous materials like insulations.

Apparent U Factor is applied to the results for assemblies incorporating a door and frame combination along with the wood surrounds and insulated wall used in the test.

K-factor is a measurement of thermal conductivity that applies to homogenous (a single substance) materials therefore it is not applicable to doors.

C factor or thermal conductance refers to average temperature differences between two surfaces, normally used only by air conditioning engineers.

TEST SPECIMENS and PROCEDURE:

Doors were 1 3/4" thick full size welded seam construction (not thermally broken) thus assuring metal-to-metal contact, filled with standard Super Core®. The doors were equipped with 4 1/2" standard weight butts and a cylindrical lock. Frames were 16 gage 400 Series (not thermally broken) equipped with commercial grade weatherstripping and threshold. The doors and frames were installed in a heavily insulated wall and the frames were grouted full.

Testing was conducted in accordance with ASTM C-236 by nationally recognized laboratories that are qualified and equipped to perform the tests indicated. Test data was established using calibrated controls and devices. Air temperature controls were capable of reaching and recording temperatures of -50°F. Doors were opened and closed repeatedly during the test per the test standard.

OBSERVATIONS:

Note: Observations are provided only as a reference for performance under extreme conditions.

Between -20°F and - 30°F, a small amount of delamination was observed. The test report notes "The door continued in good operating condition and served as a good thermal barrier up to the -50°F point when the test was terminated.

To determine the effectiveness of the core with respect to frost, the warm side was controlled to maintain specific dew points and relative humidity. The report indicates frost did not occur until -40°F. Frost was noted on

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the bottom edge of the unit, extending up approximately 1", on the edges up to the mid point, heavy frost on the threshold, and some evidence of frost in the knob and hinge areas.

TEST RESULTS:
The Apparent U Values (in BTU/Hour, sq. ft., °F) for the **operable assemblies** were as follows, with R-Factor (for reference only) shown in parentheses:
Apparent U Factor corrected to a winter design with 15 mph winds outside.
15LE Super Core® Series 1 3/4" 20 gage 0.28 (3.57).
15LE Super Core® Series 1 3/4" 18 gage 0.28 (3.57).
Apparent U Factor corrected to still air both sides.
15LE Super Core® Series 1 3/4" 20 gage 0.24 (4.16).
15LE Super Core® Series 1 3/4" 18 gage 0.25 (4.00).

SUMMARY:
As can be seen in the results, a very slight difference can be attributed to steel face thickness, The doors provided superior insulation values, even in sub zero temperature ranges.
Greater differences may occur when doors are cut out for glazing, hardware preparations require larger cutouts in door cores, or other such design factors. Engineers and Specifiers are reminded to recognize that doors in commercial buildings are opened (affording no thermal protection) many times more than in residences and the relatively low percentage of exterior walls "penetrated" by swinging doors. Most Energy Codes establish "default values" to cover these instances.

BASIC PHYSICAL PROPERTIES:
The chart below is included as a reference source only. It indicates relevant ASTM Specifications and includes R-values of the core at 1 1/2" thickness.

PHYSICAL PROPERTIES OF EXPANDED POLYSTYRENE			
PROPERTY	**ASTM TEST**	**UNITS**	**RESULTS**
COMMON DESIGNATION	N/A	PCF	1.0
DENSITY RANGE	C-303 OR D-1622	PCF	0.90 TO 1.14
R-FACTOR AT 1 1/2" THICKNESS	C-518	25 F 40 F 75 F	6.3 TO 6.5 6.0 TO 6.3 5.4 TO 5.8
WATER ABSORPTION	C-272	%	LESS THAN 4% BY VOLUME
CAPILLARITY	-	-	NONE
SERVICE TEMPERATURE	-	F	167 LONG TERM 180 INTERMITTENT
FLAME SPREAD	E-84	-	LESS THAN 25
SMOKE DEVELOPED	E-84	-	LESS THAN 450

CERTIFICATION:
This Tech Data may be used as a certification by Black Mountain Door of thermal test results based on ASTM C-236 and data from ASTM Standards as noted in the chart above. This certification is dependant on factors noted in SUMMARY and DISCLAIMER paragraphs.

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ADDITIONAL TESTING NOTES/FINDINGS:

Test Date: June 20, 2011 (Revised July, 19, 2011)
Excerpted from Test Report G100020717TOR-002K

From Full Unit Testing

Evaluation Property: Thermal Performance

Reporting\Testing Structure and Compliance findings for:

- ASTM C1199-09 Test Method for Measuring the Steady-State Thermal Transmittance of Fenestration Systems Using Hot Box Methods
- ASTM C1363-05 Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus
- ASTM E1423-06 Practice for Determining Steady State Thermal Transmittance of Fenestration Systems

Table 1: Products Tested

Door Number	Door Model	Interior Fill	Steel Skin Gauge	Visible Light Size (if present)
1	61LE 16C Polystyrene	Polystyrene	16	NA
2	85LE 18C Polyurethane	Polyurethane	18	NA
3	15LE 18C NCLO Polystyrene	Polystyrene	18	NA
4	15LE 18C SC-- Polystyrene	Polystyrene	18	NA
5	15LE 20C Polystyrene	Polystyrene	20	NA

Table 2: Hardware

Door Assembly	Model
Steel Frame	Generic - non-thermally broken
Hinges	Generic - 4.5” steel
Door Latch	Generic - steel knob
Sill Sweep	Generic - vinyl with co-extruded bulb and fins

Findings:

Table 3: Test Results of Steel Doors

Door Number	Door Model	U-Factor		Overall R-Value	
		Btu/hr·ft²·°F	W/m²K	hr·ft²·°F/Btu	hr·ft²·°F/Btu
1	61LE 16C Polystyrene	0.41	2.35	2.41	0.43
2	85LE 18C Polyurethane	0.38	2.14	2.65	0.47
3	15LE 18C NCLO Polystyrene	0.37	2.12	2.68	0.47
4	15LE 18C SC-- Polystyrene	0.40	2.26	2.51	0.44
5	15LE 20C Polystyrene	0.38	2.17	2.61	0.46

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SCOPE:

This bulletin covers the welding methods utilized by Black Mountain Door to structurally join parts, components, stiffeners, reinforcements and door edges.

PURPOSE:

To provide the reader with a brief, descriptive summary of welding types, processes and advantages.

DESCRIPTION:

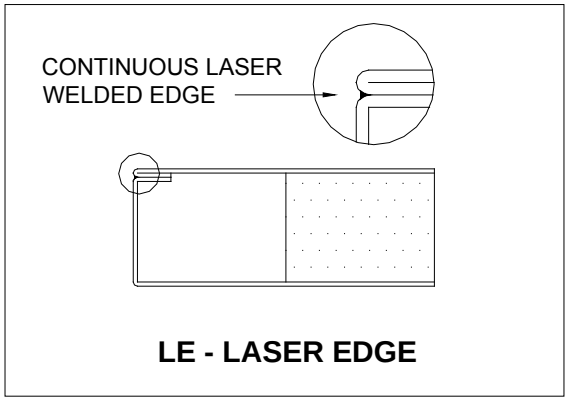
Laser Welding:

First and foremost is the patented (**Patent No. 6,351,882**) method of seam welding the vast majority of doors manufactured under the Amweld brand.

Black Mountain Door is the only steel door manufacturer with ***laser-welded*** precision doors. Our laser-welded doors represent state of the art strength, quality, and aesthetics. Our Laser- Edge welding process incorporates only the parent metals, not any wire or weld rods that degrade over time. The process utilizes the heat and concentrated beam of a laser to quickly fuse steel together. To accomplish this gaps between panels, edge radius, and alignment must be held to tolerances measured in thousandths of an inch. Amazingly, the weld is cool to the touch seconds later, thus reducing heat warp possible with other methods. The result is an aesthetically pleasing continuous weld stronger than the parent metal and recessed slightly from the bend line stress areas. This recessed weld does not require grinding.

For an invisible seamless door, the slight recess allows for the use of a minimal amount of filler.

Doors noted as Laser-Edge and/or listed with a product code of LE are considered Laser-Edge doors, eligible for our **Lifetime warranty**.



LE - LASER EDGE

Projection Welding and Spot Welding:

These two welding methods rely on the fusion of metals by controlled heat (via electricity) and, in most cases, pressure or force to hold components together. These two systems both being resistance welding, are widely used throughout industry at the present time. In these two processes, a high density current passes through a certain localized resistance path for a given length of time to produce the heat required to create a molten area and fusion between two parent metals. The current varies with material thicknesses and other factors. High forces are applied to the molten area and insure proper union.

In Projection Welding, the current flow is through a series of small outward projections on one of the components. These projections are embossments or protrusions in the parent metal and are created through forming by stamping, coining, or machining. Projections must be correctly sized for the thickness of material to be joined and are usually staggered for structural integrity after welding. With projection welding the electrode serves only to carry the required current and to apply the necessary force. The electrode, additionally, provides a means for holding the pieces during the complete welding cycle. This method is used primarily on standardized parts like hinge, lock, and strike reinforcements so that several welds are made at the same time. Projection welding minimizes distortion through controlled conditions, lower temperatures and lower pressures than spot welding.

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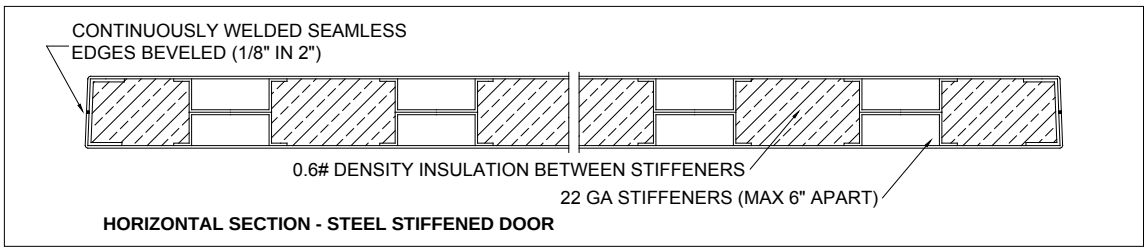
In Spot Welding, two electrodes on opposite sides of the material to create the current path or flow and furnish the pressure or force to centralizes the current flow at the single welding point. The weld's characteristics depend entirely on the size, shape and other applicable properties of the electrodes. Spot Welding is used to join overlapping materials of different thicknesses where parts are not standardized or weld configurations will vary. In many operations, such as welding stiffeners or edge channels in WE or CS Series doors, multiple electrodes are used for greater production efficiency.

The contour of the spot welding electrode changes as the usage increases and if not continually dressed to the original or wanted size, the weld itself changes physically. Black Mountain Door's Quality Manuals address the constant monitoring of equipment and electrodes.



HORIZONTAL SECTION - STEEL STIFFENED DOOR

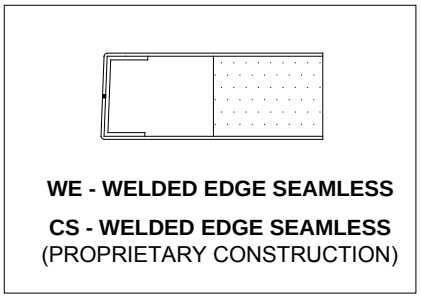
Arc Welding:

The Arc Welding method utilizes a consumable welding rod or wire to join two non-overlapping materials together. Electric current flows through the rod or wire to the substrate(s) to be welded. The rod or wire acts as "filler" material to bridge and join the materials. In most cases the rod, wire, or even the metals to be joined are coated with a "flux" to allow a better joint at lower temperatures and to shield the weld area during the process.

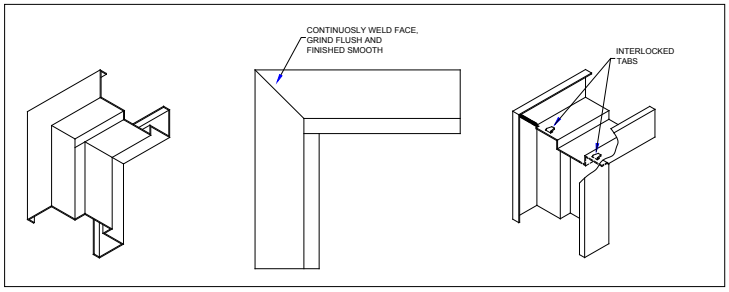
Instead of using a flux, the shielded metal arc (MIG) method is used. In this method various inert gases (like argon) are fed into the weld area to shield it. No flux is necessary, and the bare wire "filler" is mechanically fed into the weld area. This process greatly increases production since it totally eliminates the need to change weld rods.

This method is the most common "manual welding" method, ideal for assembling frames or "tack welding" anchors in place. Using continuous wire feed equipment; it is commonly used for joining butted door edge seams.

Where the weld cannot be concealed it is ground, filled, and sanded to minimize possibly objectionable welding marks.


WE - WELDED EDGE SEAMLESS

CS - WELDED EDGE SEAMLESS
(PROPRIETARY CONSTRUCTION)



AESTHETICS:

Since any method of welding relies on heat to melt and structurally join two metals, weld marks are a "necessary evil". These marks are inherent in almost any item fabricated from steel (automobiles, bicycles, swing sets, and numerous others) and are not to be considered defects. Black Mountain Door takes the necessary steps to minimize these marks without compromising structural integrity wherever possible. See Tech Data G-3.0 for further information relating to finish painting.

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SUMMARY:

We believe that the ***Laser-Welded*** edge is the most structurally durable door edge available today.

Projection welding when compared to spot welding is a more durable and efficient process, within its suitable range of use. Weld marks can be minimized by designs and equipment controls.

Spot Welding is an absolute necessity for parts that do not lend themselves to large production runs. With the proper maintenance, spot welding offers greater variety in parts to be joined.

Arc Welding is the most versatile and consistent method (other than Laser Welding) for joining butted parts or producing continuous welds.

CERTIFICATION:

Black Mountain Door is confident that the Amweld Brand ***Laser-Welded*** edge offers the most durable weld in the Industry. This edge construction meets ANSI/SDI A250.8 and, although not the entire door, HMMA 860, 861, and 867. To confirm this, an excerpt from our LE product warranty (full text available at www.blackmountaindoor.com) follows:

15LE "LASER EDGE" SERIES LIFETIME WARRANTY

Black Mountain Door warrants that the 15LE "Laser Edge" door under normal use and service, will maintain the structural integrity of door edge with no separation at any seam for the useful life of the original building where the door is originally installed, subject to the following:

1. This Warranty shall be null and void if manufacturer's products are subject to improper storage, shipping and handling, vandalism, willful damage, improper maintenance, unreasonable abuse, accident, misapplication, or installation not in accordance with the Steel Door Institute (SDI) specifications and instructions.

2. This Warranty applies only to the 15LE Series door furnished as manufacturer's product and does not extend to or cover finish painting, hardware, glass or other components furnished by other manufacturers.

3. Owner's Responsibility: Black Mountain Door will have no liability under this Warranty unless:

A. The Manufacturer's products are handled, stored, and installed in complete accordance with Steel Door Institute (SDI) specifications, instructions, the Manufacturer's recommendations, and any instructions appearing on the door label.

B. Proper maintenance, lubrication and if needed, replacement of malfunctioning hardware is performed.

C. Notice in writing to Black Mountain Door of any alleged failure or deterioration in the material shall have been given either immediately upon discovery thereof or within a reasonable period after which it should have been apparent.

Other welding methods utilized by Black Mountain Door in both Amweld and Firedoor Brands are covered by our standard warranty, an excerpt (not full text) from which follows:

Black Mountain Door hereby guarantees our steel doors and frames from material or workmanship defect, for a period of one (1) year from the date of shipment. The company's guarantee is based upon the usage of the units with the hardware for which they were prepared and the assumption that normal industry and company storage, installation, and usage recommendations were employed, that the products be properly painted and maintained and are subject to normal usage. This guarantee is limited to replacement or repair of said doors and/or frames at the option of the manufacturer, and the manufacturer makes no other implied or express guarantee.

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SCOPE:
This bulletin covers the numerical equivalents of the various gages used by Black Mountain Door in the fabrication of steel doors and frames.

PURPOSE:
To clarify the decimal equivalents to steel gage thicknesses and explain the reasoning for Black Mountain Door's continued use of the term "gages".

DESCRIPTION:
Black Mountain Door (along with most of the steel door and frame industry) uses the minimum decimal thicknesses specified by the Underwriters' Laboratories as the basic guide for purchasing steel. The UL inspector becomes a part of the QA program. These minimum thicknesses are also as published in ANSI/SDI A250.8 ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors & Frames and HMMA-803 - Steel Tables.

Base steel material used in the manufacturing of doors and frames complies with ASTM A568, ASTM A1008 and/or ASTM A1011.

Where specified, hot-dip galvanized (galvanneal) steel coating complies with ASTM A653 and ASTM A924. Coating Class A40 (ZF120) is standard; Class A60 (ZF180) is available. For zinc coated (galvanized) steel sheets, the coating thickness only slightly affects steel thickness. A40 or A60 material adds an average coating thickness of about 1 mil (0.025 mm) or 0.001" **total**. See Tech Data G-9.0 for more information on galvanized steel used by Black Mountain Door.

Decimal equivalents for steel gages as published in HMMA 803-Steel Tables is reproduced below. The full document may be downloaded at www.hollowmetal.org.

MINIMUM THICKNESS		
Uncoated Steel Sheet		
Gage	Decimal	mm
4	0.214	5.43
5	0.199	5.05
6	0.184	4.67
7	0.167	4.24
8	0.152	3.86
10	0.123	3.12
12	0.093	2.36
14	0.067	1.70
16	0.053	1.34
18	0.042	1.06
20	0.032	0.81
22	0.026	0.66
24	0.020	0.50
26	0.016	0.40
28	0.013	0.33

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CONTINUED USE OF GAGE REFERENCES:

Although no longer used in the purchase of steel or in most Industry Standards, the historical term gage (or gages) is used by Black Mountain Door. It is an integral part of the ordering, pricing, and product identification procedures that cannot be easily changed.

SUMMARY:

We believe this document will be useful in conversion of gage to decimal thickness(or vice versa) when either appears in Architectural specifications.

Steel purchased to minimum decimal thicknesses which are exceeded by the mill or supplier as normal practice. Verification is not only by Black Mountain Door internal Quality inspections but also is routinely done by UL or ITS inspectors.

CERTIFICATION:

This Tech Data serves as certification that steel thicknesses used by both the Amweld Brand and the Firedoor Brand will comply with minimum steel thicknesses of Underwriters Laboratories, ANSI/SDI A250.8, and HMMA 803.

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SCOPE:

This bulletin covers the Hot-Dip Galvanized (Galvanneal) steel coating used by Black Mountain Door in the production of steel doors and frames. It is intended to be a short summary of the subject.

PURPOSE:

To provide the reader with a brief explanation of the processes, coating classes and advantages afforded by the use of Galvanneal coatings.

DESCRIPTION:

For the purpose of this document, Black Mountain Door will refer to Hot-Dip Galvanized (zinc coated) steel sheet as "**galvanneal**".

Galvanneal is a steel treatment that combines galvanizing and annealing to create a zinc-iron alloy integral with the steel surface. Galvanneal, defined in ASTM standards as coating class A, is made by a hot-dipping process that results in its distinctive dull gray matte finish. Galvanneal is not subject to flaking when pierced or formed (coating class G is prone to flaking). The fine matte finish reacts like a primer that is easily paintable and is very rust resistant. When stored incorrectly or moisture is allowed to collect on the surface grayish white stains may appear. Since Galvanneal has excellent paintability, weldability, corrosion resistance, and formability characteristics it is extensively used in the automotive industry.

In short, **galvanneal is a hot-dip process**, it is a zinc coating (class A), it is paintable, and it does provide better corrosion protection than unpainted or primed steel without all the flaking or adhesion problems of "G" coatings.

The Process:

An excellent source of information on steel coating processes is from the International Zinc Association at www.galvinfo.com. A description of the process for galvanneal appears in GalvInfoNote 1.3. Keep in mind that this is a description of only the coating process. We have excerpted the following:

"The reactions that convert a liquid zinc coating to a solid zinc-iron coating begin at the steel interface. The moving sheet is immersed in the zinc bath where a thin inhibition alloy layer forms at the zinc-steel interface. As the strip emerges from the bath it drags excess zinc with it, which the air knives remove to obtain the desired coating weight. The still molten zinc coating is converted to zinc-iron alloy layers in the heating and holding furnaces."

This website source has many other reference materials under GalvInfoNotes in the GalvInfo Library.

Similar verbiage on the hot-dip coating process is in a document entitled "Zinc Coatings" is published by the American Galvanizers Association and is available for download at www.galvanizeit.org. Our edited summary follows:

"The continuous hot-dip coating process is a widely used method for galvanizing products such as steel sheet. The molten coating is applied onto the surface of the steel in a continuous process through a bath of molten zinc. This continuous hot-dip coating process begins by cleaning the steel. Then the steel passes into the annealing furnace to soften it and impart the desired strength and formability. The exit end of the furnace is a vacuum chamber to the molten coating bath to prevent any air from re-oxidizing the heated steel product. In the bath, the steel product reacts with the molten metal to create the bonded coating. Once removed from the bath, high-pressure air is used to remove any excess molten zinc to create a closely controlled coating thickness. The steel is cooled to allow the metal to solidify onto the steel surface."

Coatings:

Keep in mind that galvanneal is a zinc-iron alloy coating on sheet steel. Galvanneal coatings contain about 10% iron alloyed (bonded) with the zinc. Specifications for this coating are defined in ASTM A653 "Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated

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(Galvannealed) by the Hot-Dip Process" and ASTM A924 / A924M - 09 Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process".

Although a variety of coating metals are referenced in these two Standards, Black Mountain Door uses coating class A-40 or A-60 when ordered in both the Amweld and Firedoor Brands. The A 40 and A 60 designations refer to the **total** coating thickness of both sides of the sheet in ounces per square foot. A40 is 0.40 ounces per square foot; A60 is 0.60 ounces per square foot. Coating classes A0 and A25 are not used. The A40 or A60 coatings result in approximately 0.5 mils (0.0005") thickness each side, therefore not increasing steel thickness to any great degree.

The use of electro-zinc coated steel for 300 series stile/rail doors has been discontinued in favor of A40.

Advantages of Galvanneal Coatings:

- Galvanneal steel is protected in two ways. First, the zinc coating serves as a barrier between the steel and the corrosive elements in the atmosphere. Second, if the coating should be damaged, galvanic action will take over and the zinc continues to protect the steel by sacrificing itself. As a matter of fact, minor scratches may gradually close in with zinc because of this sacrificial action.
- Zinc coating is not affected by porosity. If a spot of rust occurs due to surface damage, the rust will not travel back under the adjacent coating, nor will it pit deeply into the abrasion.
- Because of its resistance to corrosion, galvanneal steel (in conjunction with primer as mandated by ANSI/SDI A250.8) are recommended for use at exterior installations, in salt or corrosive atmospheres, or where the use of acid or salt bearing additives are used in conjunction with concrete. This is not to say that the added protection of suitable finish paint systems applied in a timely manner is unnecessary.
- The annealed zinc-iron alloy coating improves paint adhesion. "G" class coatings tend to destroy the paint bond over a relatively short time, resulting in flaking or a near complete adhesion failure. Black Mountain Door considers the potential for failure of coating class G as unacceptable, especially when adhesion of door cores and primer are critical structural integrity and quality factors. This results in less warranty, delamination, or paint issues.
- A galvanneal "A" coating is harder than "G" coating, making it less prone to scratches.

Informal Testing for Galvanneal:

Through the years, we have been asked how you can tell galvanneal steel from CRS after it is painted. The key element in this is muriatic acid, a chemical available from most building supply stores (it is normally used to clean up masonry). If you scratch a regular steel painted surface and apply muriatic acid with a cotton swab, nothing happens. If you do the same thing on a galvanized steel painted surface, there is a definite bubbling action at the scratch that is easily observed.

SUMMARY:

This Tech Data to be a basic description of galvanneal steel and will answer many what-why-how questions about galvanneal. For the reasons stated herein, Black Mountain Door strongly endorses the use of Galvanneal over the G coatings. It is simply not worth the risk to use G90 (for example) instead of Galvanneal to gain only a **few ten-thousandths** of zinc that may flake off anyway.

CERTIFICATION:

This Tech Data may be used as a certification of compliance to ASTM A653 and ASTM A 924 when materials have been correctly ordered as either class A40 or A60.

It also may be used as a certification that A class coatings as used by Black Mountain Door **are hot-dipped galvanized** coatings.

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SCOPE:

This bulletin is intended to clarify the dimensional relationship that will be used by Black Mountain Door for metric and standard dimensions.

PURPOSE:

To insure the reader has proper information to convert standard dimensions into metric approximations and to establish the conversions that Black Mountain Door intends to use when metric dimensions are given.

DESCRIPTION:

The metric system is in use by most foreign countries and most construction projects of the US Government. Not all dimensions for building products, including steel doors, door frames, hardware, fasteners, components of walls, etc. are metric-based. For example, a simple # 12-24 hinge screw is based on threads per inch and cannot be directly interchanged with a metric equivalent.

In an Industry like ours where the "feet & inches" system has been the ingrained dimensional standard for hundreds of years, the task is to manufacture products that will adapt to the metric system without compromising fit and function and yet comply with tolerances defined in SDI-117 Manufacturing Tolerances Standard Steel Doors and Frames (referenced in ANSI/SDI A250.8) and ANSI/NAAMM HMMA 841 Tolerances and Clearance for Commercial Hollow Metal Doors and Frames.

In this age of CNC (computer numeric control) machines capable of operating to thousandths of an inch for piercing and forming, we can come very close to (but not exact) metrication. It is for this reason that Black Mountain Door has adopted "soft" metrication where necessary.

In the metric system for our industry, the dimensional base is the millimeter. One millimeter is a relatively small unit of measure. One millimeter equals 0.03937 inches or 0.00328 feet. For converting the opposite way, one inch equals approximately 25.4 millimeters (actually 25 25/64mm), one foot equals 304.8 millimeters.

IMPORTANT NOTE: For fit and function purposes, most dimensions will be rounded "upwards" For example a 49 mm rabbet will be 49.2 mm (1 15/16"); a 50 mm face will be 50.8 mm (2").

SUMMARY:

Charts on the following pages indicate the "soft" metric equivalents for common dimensions used by Black Mountain Door for the Amweld Brand and the Firedoor Brand. Charts also indicate the dimensions Black Mountain Door intends to use when dimensions are specified in metrics. Keep in mind that metric dimensions indicated are not "exact".

CERTIFICATION:

This Tech Data may be used as a certification that Black Mountain Door will fabricate to "soft" metric dimensional equivalents as described herein to allow for fit and function. Dimensions indicated are subject to relevant tolerances defined in SDI-117 and HMMA 841.

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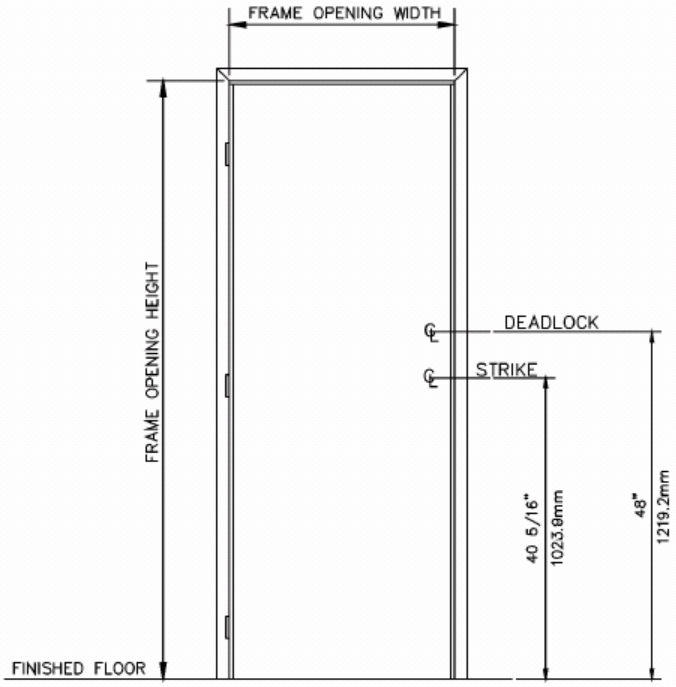

STANDARD SINGLE FRAME WIDTH	
2'–0"	609.6mm
2'–4"	711.2mm
2'–6"	762.0mm
2'–8"	812.8mm
2'–10"	863.6mm
3'–0"	914.4mm
3'–4"	1016.0mm
3'–6"	1066.8mm
3'–8"	1117.6mm
3'–10"	1168.4mm
4'–0"	1219.2mm

STANDARD DOUBLE FRAME WIDTH	
4'–0"	1219.2mm
4'–8"	1422.4mm
5'–0"	1524.0mm
5'–4"	1625.6mm
5'–6"	1676.4mm
5'–8"	1727.2mm
6'–0"	1828.8mm
6'–8"	2032.0mm
7'–0"	2133.6mm
7'–4"	2235.2mm
7'–8"	2336.8mm
7'–10"	2387.6mm
8'–0"	2438.4mm

STANDARD FRAME HEIGHT	
6'–8"	2032.0mm
7'–0"	2133.6mm
7'–2"	2184.4mm
7'–10"	2387.6mm
8'–0"	2438.4mm
10'–0"	3048.0mm

GAGE	
18=.042"	1.1mm
16=.053"	1.3mm
14=.067"	1.7mm

METRIC	STANDARD
700	**27 9/16"**
800	**31 1/2"**
900	**35 7/16**
1000	**39 3/8"**
1200	**47 1/4"**
2100	**82 11/16"**
2200	**86 5/8"**
2400	**94 1/2"**

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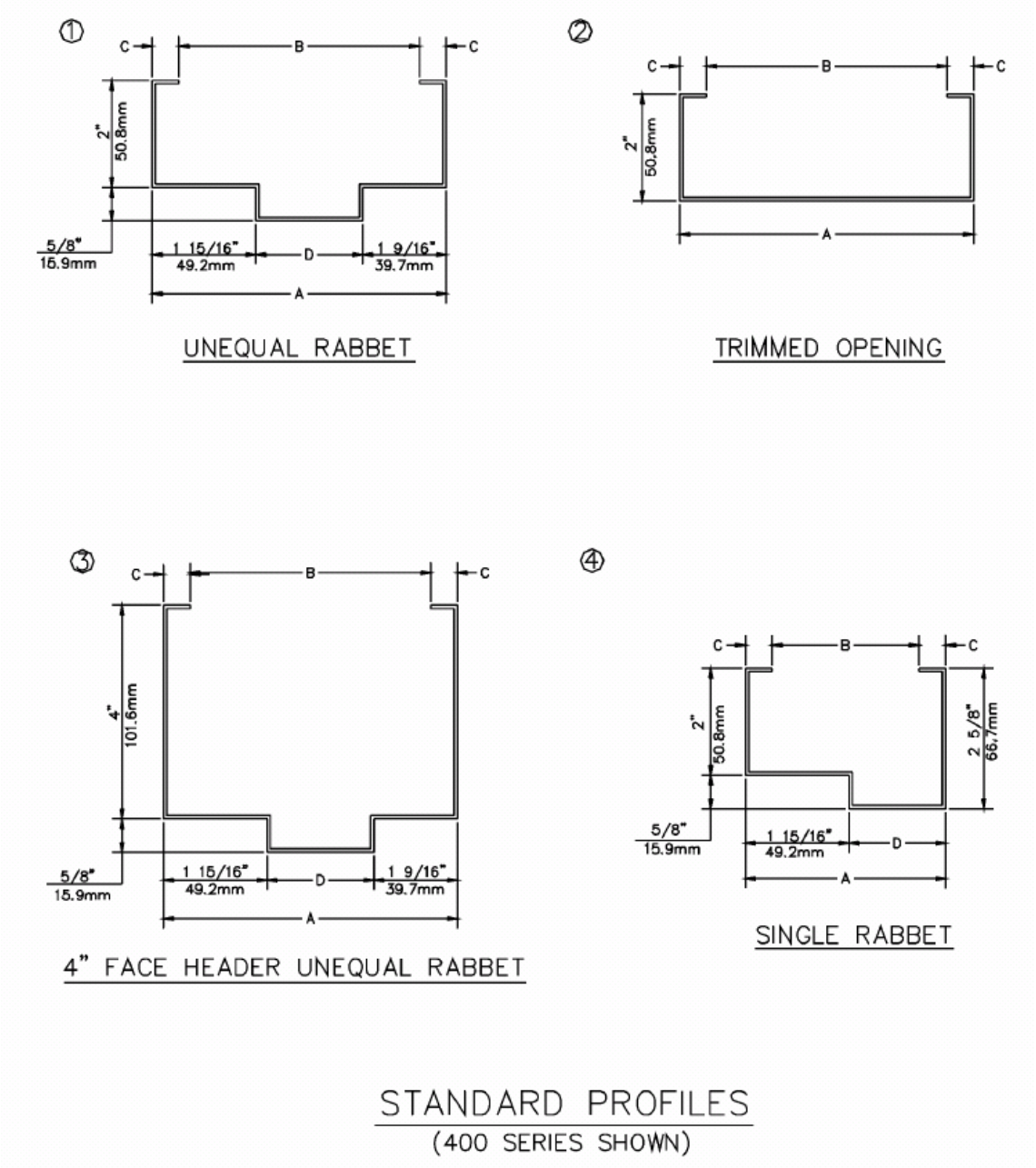

Standard 400 Series Amweld Brand frames are shown for reference. For Firedoor Brand standard frames or where equal rabbet frames are ordered, both rabbets are 1 15/16" (49.2 mm). See charts on page 4 for A-B-C-D dimensions.

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(1) UNEQUAL RABBET			
A	**B**	**C**	**D**
5 3/4"	4 7/8"	7/16"	2 1/4"
ALL OTHERS	B=A-2C	1/2"	D=A-3 1/2"
CONVERTED TO METRIC			
A	**B**	**C**	**D**
146.1mm	123.8mm	11.1mm	57.2mm
ALL OTHERS	B=A-2C	12.7mm	D=A-88.9mm

(2) EQUAL RABBET			
A	**B**	**C**	**D**
5 3/4"	4 7/8"	7/16"	1 7/8"
ALL OTHERS	B=A-2C	1/2"	D=A-3 7/8"
CONVERTED TO METRIC			
A	**B**	**C**	**D**
146.1mm	123.8mm	11.1mm	47.7mm
ALL OTHERS	B=A-2C	12.7mm	D=A-98.4mm

(3) 4" FACE UNEQUAL RABBET HDR			
A	**B**	**C**	**D**
5 3/4"	4 7/8"	7/16"	2 1/4"
ALL OTHERS	B=A-2C	1/2"	D=A-3 1/2"
CONVERTED TO METRIC			
A	**B**	**C**	**D**
146.1mm	123.8mm	11.1mm	57.2mm
ALL OTHERS	B=A-2C	12.7mm	D=A-88.9mm

(4) 4" FACE EQUAL RABBET HDR			
A	**B**	**C**	**D**
5 3/4"	4 7/8"	7/16"	1 7/8"
ALL OTHERS	B=A-2C	1/2"	D=A-3 7/8"
CONVERTED TO METRIC			
A	**B**	**C**	**D**
146.1mm	123.8mm	11.1mm	47.7mm
ALL OTHERS	B=A-2C	12.7mm	D=A-98.4mm

(5) TRIMMED OPENING			
A	**B**	**C**	**D**
3"	2 1/8"	7/16"	-
3"	1 3/4"	5/8"	-
3 3/4"	2 3/4"	1/2"	-
5 3/4"	4 7/8"	7/16"	-
ALL OTHERS	B=A-2C	1/2"	-
CONVERTED TO METRIC			
A	**B**	**C**	**D**
76.2mm	54.0mm	11.1mm	-
76.2mm	44.5mm	15.9mm	-
95.3mm	69.9mm	12.7mm	-
146.1mm	123.8mm	11.1mm	-
ALL OTHERS	B=A-2C	12.7mm	-

(6) SINGLE RABBET			
A	**B**	**C**	**D**
3"	2 1/8"	7/16"	1 1/16
3"	1 3/4"	5/8"	1 1/16
3 3/4"	2 3/4"	1/2"	1 13/16
CONVERTED TO METRIC			
A	**B**	**C**	**D**
76.2mm	54.0mm	11.1mm	27.0mm
76.2mm	44.5mm	15.9mm	27.0mm
95.3mm	69.9mm	12.7mm	46.0mm

VARIABLE DIMENSION			
A=JAMB DEPTH		**C**=RETURN SIZE	
B=THROAT OPENING		**D**=SOFFIT WIDTH	

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JAMB DEPTH (A)

STANDARD	METRIC
3	**76.2**
3 1/8	79.4
3 1/4	82.6
3 3/8	85.7
3 1/2	88.9
3 5/8	92.1
3 3/4	95.3
3 7/8	98.4
4	**101.6**
4 1/8	104.8
4 1/4	108.0
4 3/8	111.1
4 1/2	114.3
4 5/8	117.5
4 3/4	120.7
4 7/8	123.8
5	**127.0**
5 1/8	130.2
5 1/4	133.4
5 3/8	136.5
5 1/2	139.7
5 5/8	142.9
5 3/4	146.1
5 7/8	149.2
6	**152.4**
6 1/8	155.6
6 1/4	158.8
6 3/8	161.9
6 1/2	165.1
6 5/8	168.3
6 3/4	171.5
6 7/8	174.6
7	**177.8**
7 1/8	181.0
7 1/4	184.2
7 3/8	187.3
7 1/2	190.5
7 5/8	193.7
7 3/4	196.9
7 7/8	200.0

STANDARD	METRIC
8	**203.2**
8 1/8	206.4
8 1/4	209.6
8 3/8	212.7
8 1/2	215.9
8 5/8	219.1
8 3/4	222.3
8 7/8	225.4
9	**228.6**
9 1/8	231.8
9 1/4	235.0
9 3/8	238.1
9 1/2	241.3
9 5/8	244.5
9 3/4	247.7
9 7/8	250.8
10	**254.0**
10 1/8	257.2
10 1/4	260.4
10 3/8	263.5
10 1/2	266.7
10 5/8	269.9
10 3/4	273.1
10 7/8	276.2
11	**279.4**
11 1/8	282.6
11 1/4	285.8
11 3/8	288.9
11 1/2	292.1
11 5/8	295.3
11 3/4	298.5
11 7/8	301.6
12	**304.8**
12 1/8	308.0
12 1/4	311.2
12 3/8	314.3
12 1/2	317.5
12 5/8	320.7
12 3/4	323.9

(ALL STANDARD WIDTHS ARE IN INCHES, AND METRIC CONVERSIONS ARE IN MILLIMETERS)

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SCOPE:

To inform the Reader of the how the contents of "LEED 2009 for New Construction and Major Renovations" effective April 27, 2009 relates to Black Mountain Door, our Distributors, and Customers. It will also address minor differences in other 2009 LEED documents.

PURPOSE:

To allow the Reader to have a concise yet thorough knowledge of what constitutes a "Green Building", how Black Mountain Door's materials & components can affect the attainment of ratings, and what services Local Distributors can perform to assist Architects, Contractors and Owners to comply from design through construction and into occupancy.

DESCRIPTION/OVERVIEW:

A few terms, namely "Green Buildings", LEED, USGBC, or Sustainability are used for this subject. They all pertain to the "LEED 2009 for New Construction and Major Renovations" document, for public use and display, written by the U.S. Green Building Council (USGBC). This "base" document identifies performance standards for public or private commercial, institutional, or residential high rise buildings

LEED stands for "Leadership in Energy & Environmental Design" a registered trademark of USGBC. The document defines what USGBC considers as a national design guideline for a "Green Building". The public document may be downloaded from http://www.usgbc.org/DisplayPage.aspx?CMSPageID=298. The above noted document forms the basis for additional "specialized" versions based on use or occupancy. These additional documents are:

- "LEED 2009 for SCHOOLS New Construction and Major Renovations" (see TD G-11.1).
- "LEED 2009 for Commercial Interiors".
- "LEED 2009 for Core and Shell Development".
- "LEED for Existing Buildings: Operations & Maintenance" (September 2008).

Two other LEED 2009 documents covering healthcare and retail occupancies are still in development as of this date.

The Green Building Rating System is a voluntary third-party system of rating environmental design impact of the ENTIRE BUILDING leading to a LEED certification. Buildings earn "points" toward certification by meeting or exceeding specified requirements ranging from site conditions, energy & water efficiency, water quality, environmental quality, materials, heating/ventilation, furniture, appliances, alternative energy sources, and innovative design processes. Point totals vary by different classifications and uses.

Even though steel doors & frames are a relatively small percentage of the entire building's value, Black Mountain Door's products directly impact primarily the "Materials & Resources" (MR) series of credits. Distributor services can aid in other areas.

GENERAL PRODUCT INFORMATION:

STEEL:

According to the Steel Recycling Institute (www.recycle-steel.org), steel is this Country's most widely recycled material. In 2007, the latest data available, steel produced by the Basic Oxygen Furnace (BOF) method (used primarily for steel sheet) incorporated over 14 million TONS of steel scrap to produce 44 million TONS of liquid steel, a recycled content of 32%. Of this, about 25% was post-consumer and almost 7% was post-industrial.

These figures will fluctuate with scrap availability, sources, quantity exported, and the "recipe" used by the individual Steel Mill.

A Statement addressed to Architects, Engineers, Designers, and Specifiers regarding the recycled content percentages of steel is available at the above-mentioned website.

NON-RECYCLED CONTENT:

Black Mountain Door does use materials with a small recycled content in certain critical structural or performance components. These include adhesives, paint coatings, and certain core materials. Keeping in mind that the typical 15 Series door is over 90% steel by weight, the remaining materials by weight are negligible.

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FRAMES:
The typical 400, FR, or 2600 frame (or component) is over 95% steel by weight. Refer to the "STEEL" paragraph above for recycled content.

DOORS:
Typical weights for materials (other than steel) in a typical 3-0 X 7-0 door follow. The balance of material can be considered as steel.
15-17-25-27-61- 63 Series:
- Expanded Polystyrene Core = about 3 pounds per door. Note: Due to the critical structural and performance criteria, our Supplier cannot use recycled material.
- Adhesive = 1 1/2 to 2 pounds per door.
- Paint (see prime paint below) = about 1 pound.

45-47 Series:
- Honeycomb Core = about 3.75 pounds per door of which 18% is recycled material.
- Adhesive = 1 1/2 to 2 pounds per door.
- Paint (see prime paint below) = about 1 pound.

35-37 Series:
- Temperature Rise Coreboard = about 65 pounds per door of which 42% is recycled material.
- Adhesive = 1 1/2 to 2 pounds per door.
- Paint (see prime paint below) = about 1 pound.

83-85-87-89 Series:
- Polyurethane Slab Core = about 6 pounds per door. Note: Due to the performance criteria, our Supplier cannot use recycled material.
- Adhesive = 1 1/2 to 2 pounds per door.
- Paint (see prime paint below) = about 1 pound.

03 Series Full Glass:
- Paint (see prime paint below) = about 1 pound.
- Perimeter Insulation (optional) = about 4 pounds.

05-07 Series:
- Insulation = between 3 pounds for standard fiberglass up to 14 pounds for 8 pcf mineral wool.
- Paint (see prime paint below) = about 1 pound.

PRIME PAINT & FILLER:
Primer used is a "low volatile organic compound" (VOC) water reducible emulsion. In order to meet strict performance requirements, recycled materials are generally not used.
Filler is generally minimal and is sanded smooth after application. The minimal weight is therefore disregarded.

PACKAGING:
Doors as shipped by Black Mountain Door are generally packaged in cardboard corner pads and banding. Our Supplier indicates that the corner pads are made from about 50%-recycled material. A set of four weighs about one pound. The plastic banding, although a petrochemical, weighs less than 4 ounces.
Frame components are generally banded with plastic weighing about one ounce per 6-pack, a minimal amount.

HOW THIS RELATES TO "GREEN BUILDING RATING SYSTEM":

The Rating System assigns points toward the Building's compliance based on "Credit Sections" defined in the LEED document. These points are all relative to the value of the ENTIRE BUILDING. Black Mountain Door and our Distributors do not necessarily determine the final value of the steel doors & frames furnished, but the percentage by weight can be used to estimate the dollar values.

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HOW BLACK MOUNTAIN DOOR PRODUCTS CONTRIBUTE:

Using "LEED 2009 for New Construction and Major Renovations" as the base document, the most evident of the areas where Black Mountain Door products have a direct contribution toward earning these points occur in the following Credit Sections:

- MR (Materials and Resources) CREDIT 4 Recycled Content:

Points are awarded for buildings that incorporate recycled materials based on the sum of post-consumer + one-half pre-consumer (example: production process scrap) recycled content determined by weight and multiplied by cost. Recycled content of 10% earns one point; recycled content of 20% earns two points. As evidenced by the above paragraphs, the recycled content of Black Mountain Door's products is so high that they would easily meet these requirements.

- MR CREDIT 5 Regional Materials

One point is awarded for buildings that incorporate a minimum of 10% (based on cost) of total value of materials if manufactured within a radius of 500 miles. Two points are awarded for buildings that incorporate a minimum of 20% (based on cost) of total value of materials if manufactured within a radius of 500 miles.

Note: Even though the Black Mountain Door factory that produced the doors or frames may be outside of this radius, your Facility is the "manufacturer" if you modify, label, or assemble (for example) any of Black Mountain Door's products. LEED has established the definition of a manufacturing in Versions 2.0 and 2.1 as referring to the place of final assembly of components into the product.

SPECIAL NOTE REGARDING INDOOR ENVIRONMENTAL QUALITY (IEQ) CREDITS:

IEQ CREDITS specifically pertain to indoor air quality issues **during or after the construction process, not during the manufacturing process**. Points are awarded for controlling emissions of **jobsite-applied** paints, adhesives, sealants, etc. within specified limits. Other IEQ Credits relate to heating/ventilating systems, lighting, thermal comfort by allowing operable windows, increasing "daylight" or views by using glazing. Nothing in this Section directly relates to doors or frames.

OTHER CREDITS:

Sustainable Sites (SS), Water Efficiency (WE), and Energy and Atmosphere (EA) Credits directly relate to the design, location, operating systems, and performance of the building. These Sections do not directly relate to doors or frames. Innovation in Design (ID) Credits are awarded for design features or performance above requirements and/or innovative performance in categories not specifically addressed.

Regional Priority (RP) Credits are bonus points for exceeding other Credit Levels or by addressing local issues. Since these Credits are based on ZIP Code, these Credits are not addressed in this TD.

OPTIONAL DISTRIBUTOR CONTRIBUTIONS:

By providing some creative additional "services", the local Distributor can also have an indirect contribution toward earning points for the Building. At the Distributor's preference, these can be quoted as paid options or provided as free services by the Distributor. These opportunities occur in the following Credit Sections:

- EA CREDIT 1 (Optimize Energy Performance)

To verify that buildings operate as intended and that levels of energy efficiency are achieved, the Distributor can assist in defining or interpreting local Energy Codes and verifying proper installation of products. The verification of installation can be as simple as an offer to conduct a walk-through inspection of exterior doors prior to turn-over for proper function of weather-stripping to control thermal losses.

- EA CREDIT 3 (Enhanced Commissioning) and EA CREDIT 5 (Measurement & Verification)

Credits are awarded for implementing (or having a contract in place for) a review of Building operation with the Operation & Maintenance Staff. The Distributor can offer to conduct a training session for Maintenance Staff using published operation & maintenance instructions for products furnished by the Distributor.

- MR CREDIT 1.2 (Building Reuse-Maintain Interior Nonstructural Elements)

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Credits are awarded for re-using existing interior elements including doors (frames and hardware are assumed to be included) in at least 50% by area of the completed building or additions. An on-site survey may be all that is required. The Distributor then has an opportunity to provide new materials if existing door assemblies no longer meet Codes.

- MR CREDIT 2 (Construction Waste Management)

Credits are awarded for diverting construction waste from landfills. One point is awarded for diverting at least 50% of debris; two points are awarded for diverting at least 75%. As a "material supplier" the Distributor is not normally involved in the management of construction debris, but they can provide a list of known local recyclers for various materials.

- MR CREDIT 3 (Materials Reuse)

Credits awarded are very similar to Credits in MR 1.2. The Distributor can promote the use of 2600 slip-on drywall, 800 or 1800 retrofit, FR pressure fit, FR "High Riser" or similar removable frames. In the event of a major renovation, these designs are re-usable. Re-used materials earn one point if they are at least 5% of total value of materials; two points if at least 10%. It is also an opportunity for the Distributor to sell excess or obsolete material, possibly to a small new Project or renovation.

RELATED USGBC DOCUMENTS:

- "LEED 2009 for Commercial Interiors" covers tenant spaces in office, restaurant, healthcare, hotel, resort, and educational buildings both public and private. It is used for tenants that lease space but do not occupy the entire building. It is therefore possible to have a "Green" area within a non-certified building. Important differences between this and "LEED 2009 for New Construction and Major Renovations" are:

MR Credit 1.1 awards a point for tenants who commit to remain at least 10 years. MR Credit 1.2 awards one point for maintaining 40% of nonstructural components; two points for 60%.
Other MR Credits such as Recycled Content and Regional Materials are identical. IEQ Credits still relate to **jobsite-applied** materials.

- "LEED 2009 for Core and Shell Development" is essentially the remainder of the building not involving tenant spaces. Main examples are office, warehouse, or retail buildings. Important differences between this and "LEED 2009 for New Construction and Major Renovations" are:

SS (Sustainable Sites) Credit 9 awards one point for providing tenants with information on the design and construction features, requirements for coordinating their fit-out with the building system, and requirements for products and services. MR Credit 1 awards up to five points for maintaining up to 75% of the exterior building structure (excluding windows).
Other MR Credits such as Recycled Content and Regional Materials are identical. IEQ Credits still relate to **jobsite-applied** materials.

- "LEED for Existing Buildings: Operations & Maintenance" covers operating performance instead of design. MR Credits are primarily concerned with management practices for purchasing of consumable or durable goods, maintenance, cleaners, and solid waste. Doors and frames are noted in MR Credit 3 with Recycled Content and Regional Materials requirements the same as "LEED 2009 for New Construction and Major Renovations". MR Credit 9 requires diverting at least 70% by volume of facility alterations or additions waste from landfills. EQ Credit 2.1 implements an occupant survey on issues including acoustics, an area where Black Mountain Door's doors could be utilized.

CONCLUSIONS:

We trust that this Tech Data will serve to clarify the "Green Building" concept, to identify the extent to which Black Mountain Door's products contribute to attaining "points" for the Building, and to suggest opportunities that enhance the service level of the local Distributor.

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SCOPE:

To inform the Reader of the how the contents of "LEED 2009 for **SCHOOLS** New Construction and Major Renovations" effective April 27, 2009 relates to Black Mountain Door, our Distributors, and Customers. It will also address how it differs from "LEED 2009 for New Construction and Major Renovations".

PURPOSE:

With the emphasis on **SCHOOLS**, to allow the Reader to have a concise yet thorough knowledge of what constitutes a "Green Building", how Black Mountain Door's materials & components can affect the attainment of ratings, and what services Local Distributors can perform to assist Architects, Contractors and Owners to comply from design through construction and into occupancy.

DESCRIPTION/OVERVIEW:

A few terms, namely "Green Buildings", LEED, USGBC, or Sustainability are used for this subject. Within the scope of this Tech Data, they all pertain to the "LEED 2009 for **SCHOOLS** New Construction and Major Renovations" document, for public use and display, written by the U.S. Green Building Council (USGBC). This Document identifies performance standards for academic buildings on K through 12 school grounds. Non-academic buildings (offices, dormitories, maintenance buildings) on K-12 school grounds, pre-K, and post-secondary buildings have the option to use this Document or "LEED 2009 for New Construction and Major Renovations" (see TD# G-11.0 R07/09).

LEED stands for "Leadership in Energy & Environmental Design" a registered trademark of USGBC. The document defines what USGBC considers as a national design guideline for a "Green Building". The public document may be downloaded from: http://www.usgbc.org/DisplayPage.aspx?CMSPageID=298.

The Green Building Rating System is a voluntary third-party system of rating environmental design impact of the ENTIRE BUILDING leading to a LEED certification. Buildings earn "points" toward certification by meeting or exceeding specified requirements ranging from site conditions, energy & water efficiency, water quality, environmental quality, materials, heating/ventilation, furniture, appliances, alternative energy sources, and innovative design processes. Even though steel doors & frames are a relatively small percentage of the entire building's value, Black Mountain Door's products directly impact primarily the "Materials & Resources" (MR) series of credits. Distributor services can aid in other areas.

GENERAL PRODUCT INFORMATION:

STEEL:

According to the Steel Recycling Institute (www.recycle-steel.org), steel is this Country's most widely recycled material. In 2007, the latest data available, steel produced by the Basic Oxygen Furnace (BOF) method (used primarily for steel sheet) incorporated over 14 million TONS of steel scrap to produce 44 million TONS of liquid steel, a recycled content of 32%. Of this, about 25% was post-consumer and almost 7% was post-industrial.

These figures will fluctuate with scrap availability, sources, quantity exported, and the "recipe" used by the individual Steel Mill.

A Statement addressed to Architects, Engineers, Designers, and Specifiers regarding the recycled content percentages of steel is available at the above-mentioned website.

NON-RECYCLED CONTENT:

Black Mountain Door does use materials with a small recycled content in certain critical structural or performance components. These include adhesives, paint coatings, and certain core materials. Keeping in mind that the typical 15 Series door is over 90% steel by weight, the remaining materials by weight are negligible.

FRAMES:

The typical 400, FR, or 2600 frame (or component) is over 95% steel by weight. Refer to the "STEEL" paragraph above for recycled content.

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DOORS:

Typical weights for materials (other than steel) in a typical 3-0 X 7-0 door follow. The balance of material can be considered as steel.

15-17-25-27-61- 63 Series:

- Expanded Polystyrene Core = about 3 pounds per door. Note: Due to the critical structural and performance criteria, our Supplier cannot use recycled material.
- Adhesive = 1 1/2 to 2 pounds per door.
- Paint (see prime paint below) = about 1 pound.

45-47 Series:

- Honeycomb Core = about 3.75 pounds per door of which 18% is recycled material.
- Adhesive = 1 1/2 to 2 pounds per door.
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35-37 Series:

- Temperature Rise Coreboard = about 65 pounds per door of which 42% is recycled material.
- Adhesive = 1 1/2 to 2 pounds per door.
- Paint (see prime paint below) = about 1 pound.

83-85-87-89 Series:

- Polyurethane Slab Core = about 6 pounds per door. Note: Due to the performance criteria, our Supplier cannot use recycled material.
- Adhesive = 1 1/2 to 2 pounds per door.
- Paint (see prime paint below) = about 1 pound.

03 Series Full Glass:

- Paint (see prime paint below) = about 1 pound.
- Perimeter Insulation (optional) = about 4 pounds.

05-07 Series:

- Insulation = between 3 pounds for standard fiberglass up to 14 pounds for 8 pcf mineral wool.
- Paint (see prime paint below) = about 1 pound.

PRIME PAINT & FILLER:

Primer used is a "low volatile organic compound" (VOC) water reducible emulsion. In order to meet strict performance requirements, recycled materials are generally not used.

Filler is generally minimal and is sanded smooth after application. The minimal weight is therefore disregarded.

PACKAGING:

Doors as shipped by Black Mountain Door are generally packaged in cardboard corner pads and banding. Our Supplier indicates that the corner pads are made from about 50%-recycled material. A set of four weighs about one pound. The plastic banding, although a petrochemical, weighs less than 4 ounces.

Frame components are generally banded with plastic weighing about one ounce per 6-pack, a minimal amount.

HOW THIS RELATES TO "GREEN BUILDING RATING SYSTEM":

The Rating System assigns points toward the Building's compliance based on "Credit Sections" defined in the LEED for **SCHOOLS** document. These points are all relative to the value of the ENTIRE BUILDING. Black Mountain Door and our Distributors do not necessarily determine the final value of the steel doors & frames furnished, but the percentage by weight can be used to estimate the dollar values.

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HOW BLACK MOUNTAIN DOOR PRODUCTS CONTRIBUTE:

Using "LEED 2009 for **SCHOOLS** New Construction and Major Renovations" the most evident of the areas where Black Mountain Door products have a direct contribution toward earning these points occur in the following Credit Sections:

- MR (Materials and Resources) CREDIT 4 Recycled Content:

Points are awarded for buildings that incorporate recycled materials based on the sum of post-consumer + one-half pre-consumer (example: production process scrap) recycled content determined by weight and multiplied by cost. Recycled content of 10% earns one point; recycled content of 20% earns two points. As evidenced by the above paragraphs, the recycled content of Black Mountain Door's products is so high that they would easily meet these requirements.

- MR CREDIT 5 Regional Materials

One point is awarded for buildings that incorporate a minimum of 10% (based on cost) of total value of materials if manufactured within a radius of 500 miles. Two points are awarded for buildings that incorporate a minimum of 20% (based on cost) of total value of materials if manufactured within a radius of 500 miles.

Note: Even though the Black Mountain Door factory that produced the doors or frames may be outside of this radius, your Facility is the "manufacturer" if you modify, label, or assemble (for example) any of Black Mountain Door's products. LEED has established the definition of a manufacturing in Versions 2.0 and 2.1 as referring to the place of final assembly of components into the product.

- IEQ (Indoor Environmental Quality) Credit 9 (Enhanced Acoustical Performance)

One point is awarded where classrooms, walls, core learning spaces, etc meet the STC requirements of ANSI S12.60 paragraph 4.5.5. A copy is available through the Acoustical Society of America. This Document, although somewhat confusing, indicates door STC ratings of 30 between classrooms and rooms other than music rooms, mechanical equipment rooms, pool areas and gymnasium areas. These other areas require an STC of 40. Black Mountain Door's Tech Data# D-12.0 indicates test results that affirm compliance with both ratings. The STC 30 can even be achieved with standard 15 or 61 type doors with suitable sound seals. The "Specifications" Section of the Black Mountain Door website show other options that meet or exceed these STC levels.

- IEQ CREDIT 10 Mold Prevention

One point is awarded in this Section primarily for ventilation, but it should be noted that physical properties of our Expanded Polystyrene under water resistance show that this core allows only miniscule water retention, thus reducing a major source of mold.

SPECIAL NOTE REGARDING INDOOR ENVIRONMENTAL QUALITY (IEQ) CREDITS:

IEQ CREDITS not specifically noted in this TD pertain to indoor air quality issues **during or after the construction process, not during the manufacturing process**. Points are awarded for controlling emissions of **jobsite-applied** paints, adhesives, sealants, etc. within specified limits. Other IEQ Credits relate to heating/ventilating systems, lighting, thermal comfort by allowing operable windows, increasing "daylight" or views by using glazing. Nothing in this Section directly relates to doors or frames.

OTHER CREDITS:

Sustainable Sites (SS), Water Efficiency (WE), and Energy and Atmosphere (EA) Credits directly relate to the design, location, operating systems, and performance of the building. These Sections do not directly relate to doors or frames.

Innovation in Design (ID) Credits are awarded for design features or performance above requirements and/or innovative performance in categories not specifically addressed.

Regional Priority (RP) Credits are bonus points for exceeding other Credit Levels or by addressing local issues. Since these Credits are based on ZIP Code, these Credits are not addressed in this TD.

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OPTIONAL DISTRIBUTOR CONTRIBUTIONS:

By providing some creative additional "services", the local Distributor can also have an indirect contribution toward earning points for the Building. At the Distributor's preference, these can be quoted as paid options or provided as free services by the Distributor. These opportunities occur in the following Credit Sections:

- MR CREDIT 1.2 (Building Reuse-Maintain Interior Nonstructural Elements)

Credits are awarded for re-using existing interior elements including doors (frames and hardware are assumed to be included) in at least 50% by area of the completed building or additions. An on-site survey may be all that is required. The Distributor then has an opportunity to provide new materials if existing door assemblies no longer meet Codes.

- MR CREDIT 2 (Construction Waste Management)

Credits are awarded for diverting construction waste from landfills. One point is awarded for diverting at least 50% of debris; two points are awarded for diverting at least 75%. As a "material supplier" the Distributor is not normally involved in the management of construction debris, but they can provide a list of known local recyclers for various materials.

- MR CREDIT 3 (Materials Reuse)

Credits awarded are very similar to Credits in MR 1.2. The Distributor can promote the use of 2600 slip-on drywall, 800 or 1800 retrofit, FR pressure fit, FR "High Riser" or similar removable frames. In the event of a major renovation, these designs are re-usable. Re-used materials earn one point if they are at least 5% of total value of materials; two points if at least 10%. It is also an opportunity for the Distributor to sell excess or obsolete material, possibly to a small new Project or renovation.

CONCLUSIONS:

We trust that this Tech Data will serve to clarify the "Green Building" concept, to identify the extent to which Black Mountain Door's products contribute to attaining "points" for the Building, and to suggest opportunities that enhance the service level of the local Distributor.

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SCOPE:

This Tech Data is intended to summarize Black Mountain Door's interpretation of the important provisions of the October, 2003 version of the Department of Defense (DoD) Minimum Antiterrorism Standards for Buildings. It does not include the provisions of the January, 2007 version (see TD# G-12.2).

PURPOSE:

To inform the Reader of what this Standard involves and how it relates to exterior doors and windows on Department of Defense (DoD) Facilities. It is for use where Specifications may reference this version of the DoD Document.

DISCLAIMER:

This Tech Data represents Black Mountain Door's interpretation of this Standard. It **does not** infer that this interpretation is endorsed by the U.S Government, the Department of Defense, or any other such entity beyond Black Mountain Door. The Reader is cautioned to utilize this TD in conjunction with the Document noted in the SUBJECT. The Reader may seek relevant documents from the Whole Building Design Guide website at "dod.wbdg.org" or "www.wbdg.org".

OVERVIEW:

This document is intended to apply to ALL buildings for the ALL "Components" of the Department of Defense (DoD). It was created under the Unified Facilities Criteria (UFC) document control system for construction by the May 29, 2002 Under Secretary of Defense memorandum. It is intended to minimize casualties from terrorist attacks against DoD Facilities.
It assigns responsibility for application of this standard to every DoD employee, **contractor**, or **vendor**.

The list of reference documents includes other UFC documents in "draft" stages or "FOUO" (for official use only-not available to the public). Mandatory minimum requirements are specified in appendices to the actual document.

Generally, all DoD new, existing, leased, or temporary facilities regardless of funding source are included. Definitions relating to building types, use, or occupancy are covered in Chapter 1 Section 6.

Much of the document is devoted to "standoff distances", types of threats, and methods of attack.

Tables 2-1 and 2-2 in Chapter 2 define levels of protection based on structural damage, door and window hazards, and injuries, however Tables DO NOT define any performance criteria.

DESCRIPTION:

GLAZING:

Non-impact rated glazing is noted as one of the major threats to inhabitants. Minimizing the quantity and sizes of windows is suggested. Window and door designs must treat all components and attachments as an integrated system. Replacement of glazing is MANDATORY for all existing inhabited buildings within any planned door or window replacement project.

Appendix A defines "glazing" as the part of a window or door assembly that is transparent and transmits light, not air. It defines "structural glazed window systems" as window systems that use an adhesive to bond both sides of the glazing to the window frame. The Dow-Corning sealant used in Black Mountain Door's windstorm-rated doors qualifies.

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This standard limits “visual glazing openings” (assume exposed lite sizes) to no more than 32 square feet. For larger openings, the “DoD Security Engineering Design Manual is to be consulted. As of January, 2007 this is still in “DRAFT” stage and is almost impossible for the general public to access.

All exterior glazing is to be a minimum of 1/4” nominal laminated glass consisting of two 1/8” glass panes laminated to both sides of a 0.030” PVB interlayer. (The glazing used in Black Mountain Door’s windstorm-rated doors exceeds this.) This glazing must also be used as the inner pane of insulating glass units.

GLAZED DOOR AND WINDOW ASSEMBLIES:

All exterior doors for inhabited areas must open outward. Doors in Mailrooms must have weather-stripping at all four edges. External hallway configurations containing large numbers of doors should be avoided for inhabited buildings. The size and number of windows should be minimized.

Designs must treat all components and attachments as an integrated system. Un-reinforced masonry walls are prohibited for exterior walls of new buildings. This would suggest that masonry anchors have holes to allow rebar to pass.

Glazed window frames and glazed door stiles & rails may use “ultimate yield stresses” (not defined). Equivalent static design loads are 1 pound per square inch (144 psf) applied to the surface of glazing, with allowable deformation not exceeding 1/160 of unsupported lengths. It does not say if this load is based on exposed glazing area or total assembly area.

Minimum “bite” (overlap of glazing and framing member) is 3/8” for structural glazing and 1” for all others. This would be 5/8” stop height for structural glazing and 1 1/4” stop height for others.

Static design loads applied to the surface of glazing and the frame for the window or door frame to the walls, hardware, or other connections shall be 10.8 pounds per square inch (1,555 psf) with exposed lite area of 10.8 square feet or smaller and 4.4 pounds per square inch (634 psf) for exposed lites over 10.8 square feet up to 32 square feet. As a comparison, our 70psf 16 gage 15LE windstorm assembly passed a static load of 105 psf, the Black Mountain Door/Firedoor FEMA 320 “tornado” unit passed a static load of 1.41 pounds per square inch (203 psf).

Where minimum “stand off” distances are not possible, frames and glazing must resist explosives based on Table B-1 which denotes weight of TNT for specific exposure categories. The TNT weight is based on a document designated “FOUO”, making the chart inaccessible to the public reader.

CONCLUSIONS:

The treatment of door or window openings as “integrated systems” infers that they are “assemblies” rather than components. Under typical Architectural specification systems, the door and/or frame manufacturer does not have the ability to control the hardware, glazing components, or the actual installation since they are in other specification sections.

The static load design criteria specified herein are well beyond the capabilities of our current door designs tested for hurricane or tornado situations. Designs needed to comply with this version of UFC 4-010-01 are specially designed “blast” door assemblies.

Black Mountain Door can generally comply with the specific manufacturing details for doors and windows (sizes, glazing bite, structural glazing adhesive), but the static loading requirements necessitate extensive design and testing of radically “non-standard” assemblies.

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SCOPE:
This Tech Data is intended to summarize Black Mountain Door's interpretation of the important provisions of the January, 2007 version of the Department of Defense (DoD) Minimum Antiterrorism Standards for Buildings. This version contains significant revisions of the October, 2003 version (see TD# G-12.1).

PURPOSE:
To inform the Reader of what this Standard involves and how it relates to exterior doors and windows on Department of Defense (DoD) Facilities. It is for use where Specifications may reference this version of the DoD Document.

DISCLAIMER:
This Tech Data represents Black Mountain Door's interpretation of this Standard. It **does not** infer that this interpretation is endorsed by the U.S Government, the Department of Defense, or any other such entity beyond Black Mountain Door. The Reader is cautioned to utilize this TD in conjunction with the Document noted in the SUBJECT. The Reader may seek relevant documents from the Whole Building Design Guide website at "dod.wbdg.org" or "www.wbdg.org".

OVERVIEW:
This document is the revised version of UFC 4-010-01 (October 2003). It incorporates ASTM test standards for glazing that were not available for the 2003 version. Thus, it adds performance standards to prescriptive requirements.
It is still intended to apply to ALL buildings for the ALL "Components" of the Department of Defense (DoD) to minimize casualties from terrorist attacks against DoD Facilities. It retains responsibility for application of this standard to every DoD employee, **contractor**, or **vendor**.
The list of reference documents still includes other UFC documents in "draft" stages, documents noted as "FOUO" (for official use only-not available to the public) or Working Group websites that are incorrect or not accessible. Mandatory minimum requirements are specified in appendices to the actual document. The additional ASTM documents pertain to determining load resistance, testing, and specifying **glazing**.
Generally, all DoD new, existing, leased, or temporary facilities regardless of funding source are included. Definitions of building types, use, or occupancy are covered in Chapter 1 Section 6.
Much of this version remains devoted to "standoff distances", types of threats, and methods of attack.
Tables 2-1 and 2-2 in Chapter 2 define levels of protection based on structural damage, door & window hazards, and injuries. They still DO NOT define any performance criteria. Performance descriptions are in a document not available to the public.

DESCRIPTION:
GLAZING AND WINDOW ASSEMBLIES:
Glazing is noted as one of the major threats to inhabitants. Minimizing the quantity and sizes of windows is suggested. Window and door designs must treat all components and attachments as an integrated system. Appendix A defines "glazing" as the part of a window or door assembly that is transparent and transmits light, not air. It defines "structural glazed window systems" as window systems that use an adhesive to bond both sides of the glazing to the window frame. The Dow-Corning sealant used in Black Mountain Door's windstorm-rated doors qualifies.
Replacement of glazing is MANDATORY for all existing inhabited buildings during any door or window replacement project.

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Table B-1 denotes weight of TNT for specific categories of exposure. The TNT weight is based on a document designated “FOUO” therefore the chart is USELESS to the public reader.

Tables B-2 and B-3 have been added to aid in the selection of laminated and insulated glazing and interlayer thicknesses based on standoff distances (distance between the building or portion thereof and the location of potential explosive device). Many of the entries rely on ASTM F-2248 for determination of design loads, explosive weight, and standoff distances. Restrictions on size of windows in the 2003 version have been removed.

All exterior glazing is to be a minimum of 1/4” nominal laminated glass consisting of two 1/8” glass panes laminated to both sides of a 0.030” PVB interlayer. (The glazing used in Black Mountain Door’s windstorm-rated doors exceeds this.) This glazing must also be used as the inner pane of insulating glass units.

Un-reinforced masonry walls are still prohibited for exterior walls of new buildings. This would suggest that masonry anchors have holes to allow rebar to pass.

Framing members of window frames must resist deflection at the edges of glazing to 1/160 of length at design loads based on ASTM F 2248. Minimum “bite” (overlap of glazing and framing member) is now dependent on ASTM F 2248 instead of being prescriptive like the 2003 version.

Connections to surrounding walls are based on loads determined in accordance with ASTM F 2248, with alternate methods of analysis or testing now allowed.

EXTERIOR DOOR ASSEMBLIES:

This version separates exterior doors from windows. All exterior doors for inhabited areas must open outward. Doors in Mailrooms must have weather-stripping at all four edges. **Glazing in doors must meet requirements for glazing and windows.** Designs must treat all components and attachments as an integrated system. External hallway configurations containing large numbers of doors should be avoided for inhabited buildings.

Un-reinforced masonry walls are prohibited for exterior walls of new buildings again suggesting that masonry anchors have holes to allow rebar to pass.

Prescriptive design loads specified in the 2003 version have been removed. In their place, this version relies on ASTM F-2248 for determination of design loads, explosive weight, and standoff distances. Table B-1 denotes weight of TNT for specific categories of exposure. The TNT weight is based on a document designated “FOUO” making the chart is inaccessible to the public reader.

CONCLUSIONS:

The treatment of door or window openings as “integrated systems” infers that they are “assemblies” rather than components. Under typical Architectural specification systems, the door and/or frame manufacturer does not have the ability to control the hardware, glazing components, or the actual installation since they are in other specification sections.

Although the prescriptive static load requirements (see TD# G-12.1) have been deleted, the need to use ASTM standards in conjunction with this standard infers that extensive design and testing of radically “non-standard” assemblies will still apply.

We are initiating an Engineering Evaluation from Intertek Testing Services to determine to what extent our windstorm-rated doors may comply based on explosive weight and standoff distance. Results will be addressed in a future G-12 series Tech Data.

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