

CURRIES[®]

Bringing Success to Your Door



14 GA. (1.9)
CLOSER REINFORCEMENT CHANNEL
(OPTIONAL)

Engineering Specifications

22 GA. (1.75) RIBS STANDARD
20 GA. (1.4), 18 GA. (1.2), 16 GA. (1.4)
(OPTIONAL)

RIBS WELDED
TOGETHER AT ENDS

6" (152)
MAXIMUM SPACING

18 GA. (1.2) OR 16 GA. (1.4)
OR (1.9) (2) FACE SKINS
SPACED TO RIBS
AT 6" (152) MAX SPACING

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General Information

General:

The Engineering Specification Sheets have been developed to assist in describing CURRIES' products. Every effort has been made to insure the accuracy of the information. CURRIES Company reserves the right to revise these specifications without notification as new tests are conducted, tests or specifications are revised, and as new products are introduced.

Please contact the CURRIES Customer Service Department if any errors, omissions, or questions are identified.

NOTE: Information included in this data sheet is proprietary to CURRIES Company and subject to revision without notification.

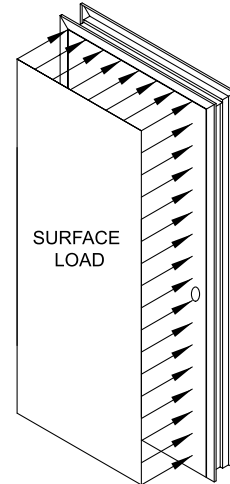
707 Door Series Physical Performance

Surface Load Test

Pressure was applied across a 707 series door installed in a test frame and deflection was recorded to determine maximum surface load achieved.

Surface Load (lb/ft ²)	Bottom Door Deflection (in)	Center Door Deflection (in)
720	0.005	0.050
1,440	0.250	1.406
1,585	0.269	1.406
1,730*	0.288	1.406
2,300	--	--

* 2300 lb/ft² was achieved but could not be sustained long enough for deflection reading.

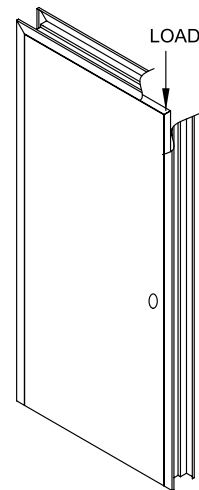


Sag Test

A downward force was applied at the lock edge top corner of a 707 series door installed in a test frame. Deflection was recorded between frame and top hinge location to determine maximum corner loading prior to hinge reinforcement failure.

Load (lb)	Deflection (in)
1,000	0.05
1,600	0.12
2,200	0.23
3,000	0.5
3,400	0.7
4,000*	1.02

* Top hinge screw threads stripped out after approximately 1 minute at load.



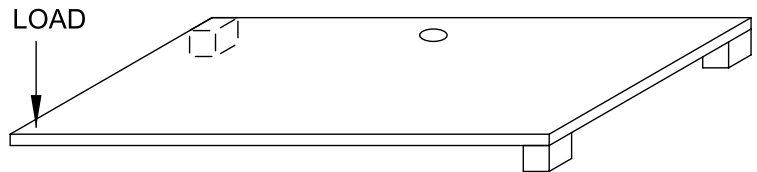
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707 Door Series Physical Performance

Racking Twist Test

Three corners of a 707 series door were supported and a load was applied to the unsupported corner. Deflection was measured to determine maximum rack load achieved.

Load (lb)	Deflection (in)
200	0.25
550	0.75
650	0.95
700	1.05
900	1.75
1050*	2.8

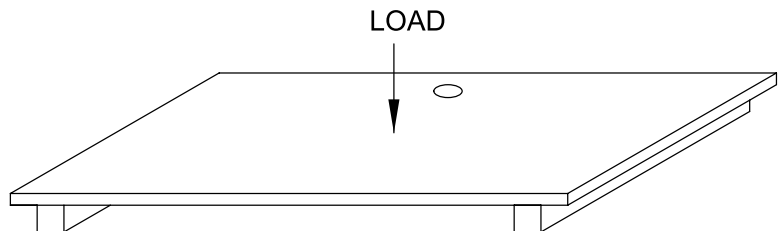


* Maximum sustainable load, 1.95" permanent deflection.

Bow Test

The ends of a 707 series door were supported across the width and a load was applied in the center. Deflection was measured to determine maximum load achieved.

Load (lb)	Deflection (in)
500	0.111
700	0.156
1,000	0.228
1,500	0.342
2,000*	0.489

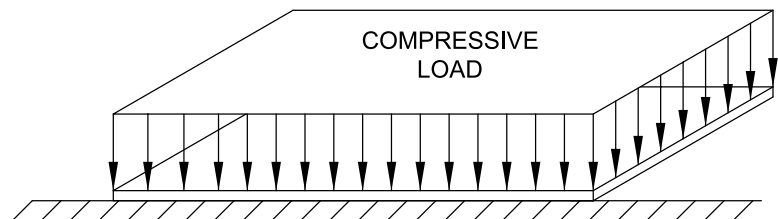


* Maximum sustainable load

Compression Load Test

A 707 series door samples was compressed to determine deflection achieved at varying compressive loads.

Compressive Load (lb)	Deflection (in)
30,000	0.16
35,000	0.51
55,000	0.91
75,000	1.3
100,000	1.46



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Channel Reinforcing Performance Characteristics

Channel vs. Plate Reinforcing Section Properties Comparison

A comparison of the section properties (tension, compression, and flexure) of channel type (3/4" x 1.625") and flat bar (1-1/4") reinforcing was performed. The u-channel reinforcing used in CURRIES' hollow metal doors exhibits superior properties to that of the flat bar reinforcing.

Channel vs. Plate	% Increase in Compression and Yielding Tension	% Increase in Fracture Tension	% Increase in Flexure (Perpendicular)	% Increase in Flexure (Parallel)
14 ga. vs. 10 ga.	32	36	2,100	395
12 ga. vs. 7 ga.	38	41	1,550	407

Hinge Channel Reinforcing #12-24 Thread Pullout Strength

Screw pullout testing has been performed on CURRIES' 12 and 14 gauge channel with extruded hole, 12 and 7 gauge flat, and 14 gauge flat double thickness to determine relative thread strength.

Sample	Results* (lb)	Observations
12 gauge channel with extruded hole	1,840	Fastener pulled apart, screw still operable in sample
12 gauge flat	1,240	Thread stripped off end of fastener
7 gauge flat	1,910	Fastener pulled apart, screw still operable in sample
14 gauge channel with extruded hole	1,250	Channel distorted before threads failed
14 gauge flat double thickness	1,320	Material distorted and thread failed

*Average of three samples tested.

The 14 gauge channel's extruded hole threads are stronger than the parent metal or the fastener. The results listed are for a single screw hole. A hinge that is mounted to a 14 gauge hinge channel has a combined strength of 5000 lbs ((1,250lbs/screw)*(4 screws/hinge)).

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Steel Specifications

ASTM Steel Specifications

CURRIES manufactures products from steel meeting applicable ASTM specifications that are listed in ANSI A250.8. Cold rolled, hot rolled, galvanized, galvanized, and stainless steel products are summarized in the table below:

CURRIES' Product Uses	Material Gauge	Steel Type	ASTM Designation
Doors	20, 18, 16, 14, 12	Cold Rolled	A1008/A1008M-00
Frames	18, 16, 14, 12		A568/A568M
E1 Coverbox w/Integral Tabs	16		A1008/A1008M-00
Reinforcing	11, 7	Hot Rolled	A568/A568M
Door Hinge/Lock Channels	14, 12, 10		A1011/A1011M
Doors	20, 18, 16, 14, 12	Galvanized G90	A653/A653M
Frames	16, 14, 12		
Doors	20, 18, 16, 14, 12	Galvanized A60	A653/A653M
Frames	18, 16, 14, 12		A924/A924M
Snap-In Top Caps	24		
Doors	20, 18, 16	Stainless Steel #304	A480/A480M
Frames	18, 16, 14		

A480/A480M	Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip.
A568/A568M	Specification for Steel, Sheet, Carbon, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled Sheet, General Requirements for
A653/A653M	Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanized) by the Hot Dip Process.
A924/A924M	Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
A1008/A1008M	Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
A1001/A1011M	Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low Alloy with Improved Formability.

Types of Zinc-Coating

Zinc-coated steel doors and frames are fabricated from steel that has been zinc-coated by the "Hotdip" process. This process consists of submerging the steel in a bath of molten zinc. As the steel emerges various means are used to level and control the thickness of the zinc-coating to achieve a specific coating weight.

The zinc-coating produced from this method consists of an iron-zinc alloy layer with spangles of free zinc sitting on the surface. This type of coating is referred to with a G designation. If the steel is subjected to an additional annealing (heat treating) step the result is a completely alloyed iron-zinc coating referred to with an A designation. Both the A and G designations are a hot-dipped galvanized coating.

Coating Designations

Coating designations are written to represent the coating type, either G or A, and the coating weight. The coating weight is the amount of zinc on the steel surface and is expressed to represent the ounces per square foot of zinc as the total weight on both surfaces of the steel sheet.

Although sometimes specified, the zinc-coating designation G90 or greater is not recommended for door and frame construction. In addition to the limited availability of this material, the heavier coating causes problems in the fabrication process during forming, welding, and painting operations.

Minimum Coating Weights

In a coating weight of 40 there is an average of 0.4 ounces of zinc per square foot of steel, in 60 there is an average of 0.6 ounces of zinc per square foot of steel, and in 90 there is an average of 0.9 ounces of zinc per square foot of steel.

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Steel Specifications

Average Coating Thickness

The average coating thickness specified in the table is based on the conversion factor of ounces of zinc coating per square foot of surface corresponding to an average coating thickness of 0.0017 in. (0.043 mm).

This coating thickness is not significant enough to make an appreciable difference in the measurable thickness of coated or uncoated steel of the same gage. Refer to the following table showing the coating designations, minimum coating weights, and average coating thickness.

The G type coatings have a free zinc spangled surface and may be processed to minimize the size of the spangle resulting in a smooth dull gray appearance. The A type coating has the zinc completely alloyed with the steel sheet and results in a dull gray surface with no spangles that is ready for painting after normal cleaning without further treatment.

Corrosion resistance is directly proportionate to coating weight. The heavier the coating weight the more zinc is present and the more corrosion protection it will provide. Therefore, under normal atmospheric conditions a 60 designation will provide 50% more corrosion protection than the 40 designation coating.

Type	Coating Designation	Min. Requirement Triple-Spot Test, (oz./ft. ²)	Min. Requirement Single-Spot Test, (oz./ft. ²)	Coating Designation	Min Requirement Triple-Spot Test, (g/m ²)	Min. Requirement Single Spot Test, (g/m ²)
Regular (Galvanized)	G90 ^A	0.90	0.80	Z275 ^A	275	235
	G60	0.60	0.50	Z180	180	150
Alloyed (Galvannealed)	A60	0.60	0.50	ZF180	180	150
	A40	0.40	0.30	ZF120	120	90

^ACURRIES' Galvanized product

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Insulation Factors

Insulation Terms

The following terms are used in describing thermal properties of building products:

BTU - The BTU (British Thermal Unit) is the amount of heat needed to raise the temperature of one pound of water one degree Fahrenheit. The BTU is used to measure the amount of heat just as the inch or foot is used to measure length.

K-Factor - The measure of thermal conductivity or amount of heat transferred (measured in BTU's) in one hour through one square foot of a single material which is one inch thick for a difference of one degree Fahrenheit between the two surfaces. THE LOWER THE "K" FACTOR, the more effective the insulation of the material.

U-Factor - The total or overall transmission of heat through a combination of materials assembly measured in BTU's per hour per square foot of area for a difference in temperature of 1 °F between the air on one side to the air on the other side. THE LOWER THE "U" VALUE, the more effective the insulation of the material.

R-Factor - The resistance or ability to retard heat flow (as opposed to ability to transmit heat) of any single material determined by the reciprocal of its conductivity. $R=1/U$ or t/K , where t is the thickness of the material involved. THE GREATER THE "R" FACTOR (or resistance), the more effective the insulation of the material.

All "K" and "U" factor values are expressed in BTU's/hr-ft²-°F (W/m²-°K). Materials possessing low "K" and "U" factor values are more efficient insulators than those with higher values.

Helpful conversion factors:

$$"R" = \frac{1}{"U"} = \frac{1}{\frac{1}{"R"}} \quad (\text{where } t \text{ is the material thickness in inches and the products are of uniform composition})$$

$$"U" = \frac{1}{R1+R2+...+etc.}$$

Thermal Performance Test Results

Curries' products are tested in accordance with ASTM C-236, SDI-113, ISDSI-107, and AAMA 1503.1 to determine the Thermal Transmission ("U" Factor) properties of the specified assemblies. A lower U factor (higher R factor) indicates better insulating properties.

CURRIES' Product Description	Thermal Transmission (U-factor), Btu/hr-ft ² -°F (W/K-m ²)	Thermal Transmission (R-factor), hr-ft ² -°F/Btu (°K-m ² /W)	Test Method
707 Door and Frame Assembly	0.24 (1.37)	4.17 (0.73)	ASTM C-236, SDI 113
747 Door and Frame Assembly	0.36 (2.06)	2.78 (0.49)	ASTM C-236, ADI 113
Thermal Brake Door/Frame Assembly	0.43 (2.45)	2.33 (0.41)	ISDSI 107, AAMA 1503.1

ASTM C236
SDI 113
ISDSI 107
AAMA 1503.1

Test Method for Steady-State Thermal Performance of Building Assemblies by Means of a Guarded Hot Box
Test Procedure and Acceptance Criteria for Apparent Thermal Performance of Steel Door and Frame Assemblies
Thermal Performance Standard for Insulated Steel Door and Weatherstrip Frame Assemblies
Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections

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Insulation Factors

Polystyrene Coreboard Material Specifications

The polystyrene foam used in the manufacturing of CURRIES' 607 and 707 series doors is a rigid cellular expanded polystyrene bead board. This material meets or exceeds the requirements of ASTM C 578, Type I.

Physical Property	Typical Value	ASTM Test Method
Density, nominal lb/ft ³ (kg/m ³)	1.0 (16)	C303 or D1622
Thermal resistance (R-factor/inch) of 1.00 in. (25.4 mm) thickness °F-ft ² -h/Btu (°K-m ² /W), typical at 25 °F (-3.9 °C) mean temperature 40 °F (4.4 °C) mean temperature 75 °F (23.9 °C) mean temperature	4.35 (0.76) 4.17 (0.72) 3.85 (0.67)	C177 or C518
Compressive resistance at yield or 10% deformation, whichever occurs first (with skins intact), lb/in ² (kPa)	10.0 (69)	C161
Flexural strength, lb/in ² (kPa)	25.0 (173)	C203
Water vapor permeance of 1.00 in. (25.4 mm) thickness, perm (ng/Pa-s-m ²)	5.0 (287)	E96
Water absorption by total immersion	4.0	C272
Dimensional stability (change in dimensions), %	2.0	D2126
Oxygen index, volume %	24.0	D2863
Flame spread index	20	E84
Smoke developed index	150-300	E84
Classification	1	C578

The R-value at 75°F and at nominal core thickness is 6.37.

Polyurethane (Polyisocyanurate) Coreboard Material Specifications

The polyurethane door core available in CURRIES' 707 series doors is a rigid cellular polyisocyanurate foam. This material meets or exceeds the requirements of ASTM C 591, Type I.

Physical Property	Typical Value	ASTM Test Method
Density, average lb/ft ³ (kg/m ³)	2.0 (32)	D1622
Thermal resistance (R-factor/inch) of 1.00 in. (25.4 mm) thickness, °F-ft ² -h/Btu (°K-m ² /W), typical initial at 75 °F (23.9 °C) mean temperature aged 10 days at mean temperature 158°F (70 °C)	6.06 (1.06)	C177 or C518
Compressive strength at yield or 10% deformation, whichever occurs first (with skins intact), lb/in ² (kPa)	17 (117)	D1621
Shear strength, lb/in ² (kPa)	16 (110)	C273
Tensile strength, lb/in ² (kPa)	47 (323)	D1623
Water absorption by total immersion, typical, volume %	3.0	C272
Dimensional stability, maximum, % volume change 158 °F, 97% relative humidity, 7 days -40 °F, ambient relative humidity, 7 days 212 °F, ambient relative humidity, 7 days	+4 -0.6 +1	D2126
Closed Cell Content, %	92.0	D2856
Flame spread index up to 6"	25	E84
Smoke developed index, up to 6"	185	E84

The R-value at 75°F and nominal core thickness is 10.04

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Insulation Factors

Fire Door Temperature Rise Coreboard Material Specifications

The coreboard used in the manufacturing of CURRIES' 727 series temperature rise rated fire doors consists of incombustible minerals felted into a highly insulative, structural panel. This material is asbestos free and provides a 30 minute temperature rise of 250 °F or less when used in the 727 series doors.

Physical Property	Result	Test Method
Density, minimum lb/ft ³ (kg/m ³)	15.0 (250)	C303
Thermal resistance (R-factor/inch) of 1.00 in. (25.4 mm) thickness, min. °F-ft ² -h/Btu (°K-m ² /W) 75 °F (23.9 °C) mean temperature	3.03 (.53)	ASTM C518
Compressive resistance at yield or 10% deformation, whichever occurs first (with skins intact), minimum, lb/in ² (kPa)	125 (865)	C165
Flexural strength, minimum, lb/in ² (kPa)	85 (588)	C203
Flame spread index, maximum	10	E84
Smoke developed index, maximum	30	E84

Thermal Resistant Glass Fiber Insulation Material Specifications

The flexible blanket glass fiber thermal insulation used in CURRIES' 747 series doors is comprised of glass fibers bonded together with a thermo-setting resin and meets or exceeds ASTM C553, Type II requirements.

Physical Property	Result	Test Method
Density, minimum lb/ft ³ (kg/m ³)	0.75 (12.5)	ASTM C167
Thermal resistance (R-factor/inch) of 1.00 in. (25.4 mm) thickness, min. °F-ft ² -h/Btu (°K-m ² /W) 75 °F mean temperature	2.8 (.49)	ASTM C177 or C518
Flame spread index, maximum	25	ASTM E84
Smoke developed index, maximum	50	ASTM E84
Classification	1	ASTM C553

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707 Door Series Physical Performance

Sound Transmission Loss Performance Test Results

CURRIES' products are tested in accordance with ASTM E90, ASTM E413, and SDI 114 to determine the Sound Transmission Coefficients (STC Value) of the specified assemblies. The higher the STC value, the better the rating.

CURRIES' Product Description	Sound Transmission Coefficient (STC Value)	Test Method
707 Door and Frame Assembly	25	ASTM E90, ASTM E413, SDI-114
747 Door and Frame Assembly	43	ASTM E90, ASTM E413, SDI-114
757 Door and Frame Assembly	46	ASTM E90, ASTM E413, SDI-114

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Paint Specifications

Surface Preparation

Commercial hollow metal doors and frames are designed to meet the requirements of ANSI A250.8 (formerly SDI 100) and are to be thoroughly cleaned, and chemically treated to insure maximum paint adhesion. All surfaces of the door and frame exposed to view shall receive a factory baked-on applied coat of rust inhibiting prime paint. CURRIES' products can be provided with prime painted finishes meeting the requirements for acceptance stated in ANSI A250.10, *Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces*.

Pre-Treatment

An automatic washing system washes, degreases, and phosphatizes CURRIES' hollow metal products. Maximum metal protection is achieved by phosphatizing prior to painting. Phosphatizing etches the metal, providing an effective surface for paint adhesion. The phosphatized metal prevents the paint from lifting and peeling. The non-metallic phosphate coating resists moisture penetration. Maximum rust protection is achieved by combining phosphatized metal with CURRIES' baked-on rust-inhibiting prime paint.

Prime Paint Tests

Requirements of ANSI A250.10 (formerly ANSI A224.1), *Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces* include:

- Salt spray testing in accordance with ASTM B117
- Condensation (humidity) testing in accordance with ASTM D4585
- Impact test in accordance with ASTM A2794
- Film adhesion test in accordance with ASTM D3359

CURRIES' product can be provided with factory applied baked-on primers complying to the following performance requirements of ANSI A250.10:

Test	Standard	Hours	Results
Salt Spray	ASTM B117	120	Passed
Condensation	ASTM D4585	240	Passed
Impact Test	ASTM D2794	N.A.	Passed
Adhesion	ASTM D3359	N.A.	Passed

CURRIStain Finish

- CURRIStain prime painted door finish meets the requirements of ANSI A250.10 Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces.
- CURRIStain finished doors meet the requirements of ANSI A250.3 Test Procedure and Acceptance Criteria for Finish Painted Steel Surfaces.

Door/Frame Prime Paint Properties

The lead and chromate free gray primer paint used on CURRIES' doors and frames may be coated over with an alkyd enamel type of paint. Contact the factory for specific information regarding top coats to be applied over this primer.

Physical Property	Door Primer	Frame Primer	Test Method
Solids by weight, (%)	62	70	ASTM D 2369
Solids by volume, (%)	40	55.1	formula constants
Resin type	Alkyd	2 Component Epoxy	not applicable
Recommended dry film thickness per coat, (mils)	1-2	1.0	ASTM D 1186
Gloss @ 60° light source, (%)	0 (Flat)	15-20	ASTM D 523
Conductivity, (megaohms)	0.5-2.0	0.5-2.0	ITW/Ransburg Paint Resistance Tester
Reducer	xylol	D-150	not applicable
Clean up	xylol	Aromatic solvent Blend	not applicable

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Windstorm Products

Windstorm Products

Windstorm and Hurricane Code Products

A system of products available to meet Dade County Protocols and other local code requirements for high wind load and missile impact. Contact factory for further details.

Hurricane Andrew in 1992 caused the United States' most expensive natural disaster - \$27 billion worth of property destroyed. During the aftermath of that hurricane, building code certification standards were established for doors and hardware - some of the strongest requirements in the country.

Testing Standards

Don't be fooled by companies that say their products meet code. There is not one standard governing impact resistant codes and standards. They vary by state and regional requirements within a state by having various wind and impact zones. Check with the authority having jurisdiction in your area for the specific requirements for each project. Always check your product approval for all requirements before using on any project.

The National Consensus Standard

The National Consensus Standard developed through the American Society of Testing Materials (ASTM) the following has standards to evaluate the performance of doors exposed to the effects of windstorms: ASTM E330 for static load; Standard ASTM 1886 for cycle testing; and standard ASTM 1996 for impact testing.

The Florida Building Code

- See Florida State Wind load map for wind-borne debris zones.
- Permitted drawings will have requirements for design pressures required by code.
- The state code will allow manufacturers to apply to the Florida Building Commission for statewide approval of products, use approved third party labeling, or apply to local Jurisdiction for local approvals.

The Saffir-Simpson Hurricane Category Scale

Category	Wind	Damage
1	74-95 mph	Mobile home damage and flooding
2	96-110 mph	Some roof, door and window damage
3	111-130 mph	Some structural damage to smaller buildings
4	131-155 mph	Some roof failures and extensive damage to doors and windows
5	155+ mph	Complete roof failures on many residential and industrial buildings

StormPro™ 361

StormPro™ 361 door/frame/hardware assembly met the debris impact criteria for storm shelters of the Federal Emergency Management Agency (FEMA) and the National Storm Shelter Association (NSSA).

Debris Impact
15 lb. 2x4 at 100 mph

Pressure
250 lb/ft² @ 5 seconds

NOTE: Information included in this data sheet is proprietary to CURRIES Company and subject to revision without notification. Please refer to curries.com website for updated windstorm product listings.

Security Product Frame Protective Coating

Commercial Security Hollow Metal Doors and Frames

CURRIES' 847 and 857 door/frame systems meet the requirements for jamb/wall stiffness, door impact, and glazing panel impact as specified in NAAMM HMMA 862 and ASTM F476. Refer to the table or Specifications listed for test requirements. Hardware preparations for 2" doors may not fit 1-3/4" doors (847). Contact factory for availability.

Security Grades and Test Load Requirements per NAAMM HMMA 862

Door Series	Grade No.	Door Face Sheet and Frame Thickness gauge (in) min.	Jamb/Wall Stiffness Test (lb)	Impact 59 (ft-lb)	Impact 89 (ft-lb)	Impact 118 (ft-lb)	Impact 148 (ft-lb)	Glazing Impacts 74 (ft-lb)	ASTM
857	40	14 (.073)	4,950	2	2	2	2	10	F476
847	40	14 (.073)	4,950	2	2	2	2	10	F476

NAAMM HMMA 862
ASTM F476

Guide Specifications for Commercial Security Hollow Metal Doors and Frames
Standard Test Methods for Security of Swinging Doors Assemblies.

Frame Protective Coating

CURRIES can apply a coal tar material to the inside frame surface for specifications requiring bituminous coating*. The coating is applied over the frame primer and provides increased corrosion resistance.

Steel samples were coated with the coal tar material and immersed in tap water for thirty days and tap water/CaCl₂ solutions for sixty days. Loss of adhesion and blistering did not occur in the water or vapor phase. Oxidation did not migrate from the coated surfaces to the uncoated surfaces.

Physical Property	Frame Primer	Test Method
Base	Coal tar	not applicable
Color	black	not applicable
Solids by volume, (%)	64 ± 2	formula constants
Volatile Organic Compounds maximum (lbs/gallon)	2.6	EPA Method 24
Recommended dry film thickness, (mils)	8-12	ASTM D 1186
30 day tap water/CaCl ₂ immersion @ ambient	good adhesion no blisters	CURRIES' Product Test Report #000020
Reducer	#2 thinner	not applicable
Clean up	#2 thinner	not applicable

* NOTE: Bituminous coating may not be used in fire rated hollow metal applications.

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Founded in 1958, CURRIES is an industry leader in the manufacture of hollow metal doors and frames.
The company supplies a full line of custom and standard products for new and retrofit construction projects in the commercial, institutional and healthcare markets.
The ASSA ABLOY Group is the world's leading manufacturer and supplier of locks and associated products,
dedicated to satisfying end-user needs for security, safety and convenience.

