

Tested Doors and Components

Wind Science and Engineering Research Center

The Wind Science and Engineering Research Center performs debris impact tests on storm shelters, shelter components, and building materials to evaluate their ability to resist various types of projectiles propelled at different speeds in accordance to accepted and proposed test protocols as follows:

Protocols for Debris Impact Testing

Protocol 1	Hurricane envelope impact by a 9 lb. wood 2"x4" propelled at 34 mph. In accordance to the Florida Building Code, the International Code Council and the Texas Dept. of Insurance Windstorm Resistant Construction Guide.
Protocol 2	Hurricane Shelter Speed impact by a 9 lb. wood 2"x4" propelled at 0.40 x the design wind speed (mph) for horizontal impacts and 0.10 x the design wind speed (mph) for vertical impacts, in accordance to the proposed ICC 500 ¹ – ICC/NSSA Standard for the Design and Construction of Storm Shelters.
Protocol 3	Hurricane shelter speed impact by a 9 lb. wood 2"x4" propelled at 0.50 x the design wind speed (mph) for horizontal impacts and 0.33 x the design wind speed (mph) for vertical impacts, in accordance with FEMA 320, "Taking Shelter from the Storm," 2008 Edition and FEMA 361, "Design and Construction Guidance for Community Saferooms," 2008 Edition.
Protocol 4	Tornado shelter speed impact by a 15 lb. wood 2"x4" propelled at 100 mph for horizontal impacts and 67 mph for vertical impacts, in accordance with FEMA 320, "Taking Shelter from the Storm," 2008 Edition and FEMA 361, "Design and Construction Guidance for Community Saferooms," 2008 Edition.
Protocol 5	Department of Energy (DOE) impact standards.

¹The ICC 500 – ICC/NSSA Standard for the Design and Construction of Storm Shelters is scheduled for inclusion in the 2009 editions of the International Residential Code and the International Business Code. This is a Life Safety Standard which will use an Extreme Wind Map for Hurricanes with wind speeds starting at 225 mph and with contours along the Atlantic and Gulf Coast stepping inland in 10mph increments to 160 mph.

Listing does not imply product endorsement or warranty by TTU, FEMA or NSSA. **Unless otherwise noted, the following listings have been tested to Protocol 4, the Tornado Standard Protocol.**

Shelter Door Manufacturers Completing Debris Impact Tests

Certification Testing for Product Labeling

Master Security Doors, Inc.

Jude Plawecki
702 South Military Trail
Deerfield Beach, Florida 33442
Ph. (214) 325-1242

Tested: 10/07

Tested FEMA 320 door assembly with Master Security multi-point lever lock and Master Security frame.

Tested 10/07

Tested FEMA 361 door assembly with Master Security multi-point lock, panic bar operated and Master Security frame.

Windsor Republic Door, Inc.

Jason Lisewski
155 Republic Drive
McKenzie, TN 38201
Ph. (731) 352-3383

Test Date: 05/05

FEMA 320 Door Assembly 3070 with Securitech Series 4300 lock; 1½ pair 4 ½ "x4 ½ " Hagar heavy duty ball bearing hinges with ¼" x 20 US screws; mounted in 14-gage HM KD frame.

Listing:

Intertek ETL-SEMKO – Warnock
Hersey

REM 361 Door Pair Assembly 3070 mounted in 14-gage HM KD frame with removable mullion; approved hardware – Securitech Series 8000 & 5000; 1 ½ apir, 4 ½" x 4 ½" Hagar heavy duty ball bearing hinges with ¼" x 20 US screws on each door.

Research & Development Testing

Ambico

Jim Stockwell
1120 Cummings Ave.
Ottawa, Ontario K1JU7R8
Ph. (888) 423-2224

Tested: 11/03

FEMA 361 door assembly.

American Home Construction

Bill Stegman
12640 East N.W. Hwy #409
Dallas, TX 75228
Ph. (800) 771 - 8428

Test date: 02/00

Tested door for underground shelter

Anweld Building Products

Scot Kelly
1500 Anweld Drive
Garrettsville, Ohio 44231
Ph. (800) 248 - 6116 extn. 3040

Test date: 08/00

Tested FEMA 320 door assembly

Askew Fabricators

Test date: 08/99

James Vaughan, Vice-President
201 Arlington Drive
Yukon, OK 73099
Ph. (405) 354 - 7591

Tested door for underground shelter

Ceco Doors

Jim Darby
9159 Telecom Drive
Milam, TN 38358-3425
Ph. (731) 686 - 4274

Tested FEMA 361 door assembly
with removable mullion
Tested FEMA 320 door assembly
Tested FEMA 361 door assembly

Condor Enterprises

Ken Rick
64 Harmony Road
Northwood, New Hampshire 03261
Ph. (603) 942-5970

Tested: 06/08
Pressure only test (0.65 psi) of DeanSteel HM door
and frame with Grade #1 mortised dead bolt lock
and latch

Curries Doors

Tom Rattay
525 9th S.E.
Mason City, IA 50401-5809
Ph. (641) 423-1334

Tested FEMA 361 door
Tested FEMA 320 door assembly

Dean Steel

Claus Heide
111 Merchant
San Antonio, TX 78204
Ph. (210) 226-8271

Tested: 6/13/2006
FEMA 361 Door Assembly
Tested: 5-29-07
FEMA 320 Door

Domes International

Jimmy Skinner
P.O. Box 137
Golden, Mississippi 38847
Ph. (662) 454 - 7399

Test date: 05/01
Tested door for underground shelter

Granger Plastics

Jim Cravens
1600 M.A.D.E. Industrial Dr.
Middletown, OH 45044
Ph. (513) 424-1955

Tested: 3-8-07
Aluminum below ground shelter door

Greenville Products Group, Inc.

Clarence Otto
1301 East Commerce St.
Greenville, Alabama 36037
Ph. (334) 382-9000

Tested: 08/02
Tested fiberglass door for underground shelter

Ground Zero Shelters, Inc.

Richard Crow
4600 Independence
Perry, OK 73077
Ph. (405) 880-1351

Tested: 9-6-07
Steel below ground shelter door

Fiberglass Creations, "The Refuge"

Kelly Hall
P.O. Box 2047
Henderson, TX 75653
Ph. (903) 657 - 6616

Test date: 09/00
Tested door for underground shelter

Mr. Alan Hausner

Test date: 01/02

P.O. Box 1307
Durant, OK 74702
Ph. (888) 924 - 6988

Flat top and sloped front below ground shelter doors

Mesa Fiber Glass

Eugene Ardelt, Eric Crowe
6471 E. 49th Drive
Commerce City, CO 80022

Test date: 04/01
Tested door of underground shelter

LA Fire Door/Mesker

Dave Fielder
2993 Allesandro
Los Angeles, CA 90039
Ph. (323) 662-5335

Test Date: 02/14/05
FEMA 320 door assembly

Mesker Door Corporation

Mr. Steve Frates
3440 Stanwood Blvd.
Huntsville, AL 35811
Ph. (256) 851 - 6670

Test date: 11/19/02
FEMA 361 Door Assembly

Missouri Storm Shelters

Jeff Olson
4983 Hwy 60
Rogersville, MO 65742
Ph. (866) 511-1551

Tested: 3-8-07
Steel below ground shelter door

Oldcastle Precast, Inc.

4727 North Royal Atlanta Drive, Suite A
Tucker, GA 30084
Ph. (770) 270 - 5000

Test date 2/26/02
Steel 2'x3' above ground shelter door with and without view window

S.I. Precast

Gregg Barrett
10965 Granada Lane
Overland Park, KS 66211
Ph. (913) 345-2121

Tested: 9/04
Steel door for partially below ground shelter.

ProSteel Door Corporation

Mr. Rick Stepp
1400 South State St.
Provo, UT 84603
Ph. (801) 373 - 2385

Test date 1/7/03
FEMA 320 door assembly
Tested: 6-29-07
FEMA 320 door with Biometric Lock
Tested: 8-24-07
FEMA 320 ADA Economy Door

Quality Concrete

David Gordon
917 Bois d'Arc St.
Commerce, TX 75428
Ph. (800) 826-3055

Tested: 3-1-07
Steel below ground shelter door

Safe-T-Shelter

Applied Solar Technology
3275 Highway 55 West
Danville, AL 35619
Ph. (800) 462 - 3648

Test date: 06/01
Tested underground shelter door

Sargent Manufacturing

Test Date: 8/01

Leo Milshteyn
100 Sargent Dr.
New Haven, CT 06511
Ph. (203) 498-5641

FEMA 361 door assembly.

Southern Illinois Storm Shelters, Inc.

Scott Ingoldsby
511 W. State Street
Buckner, Illinois 62819
Ph. (877) 353-8663

Tested: 09/01
Tested fiberglass door for underground shelter

SteelCraft Door Assemblies

Al Urbaniak
9017 Blue Ash Road
Cincinnati, OH 45242
Ph. (513) 745 – 6682

Test date: 03/02
Tested door assembly for FEMA 320
Tested door assembly for FEMA 361.

Storm Defender, LLC

Greg Best
21421 E. Truman Road
Independence, MO 64056
Ph. (866) 251-5874

Tested: 1/04
Precast concrete steps/above ground shelter with steel door.

Storm Track Shelters

5000 Viewpoint
Amarillo, TX 79124
Ph. (806) 373-2640

Tested: 04/10/2006
24" x 46" Steel below ground shelter door
33" x 60" Steel below ground shelter door

Safe-T-Vault Company

Hamilton Bartlett
850 Maury Rd., Unit 29
Orlando, FL 32804-3651
Ph. (407) 927-1352

Tested: 8/05
Nominal 2'-8" X 6'-8" plate steel door for above ground precast concrete shelter

Tornado Twister Shelter

Oscar Scott, P.E.
4604 Greenwich Place
Amarillo, TX 79119
Ph. (806) 463-1033

Tested: 3-1-07
Steel above ground shelter door

Vaughn Concrete Products

10021 Amarillo Blvd. East
Amarillo, TX 79108
Ph. (806) 374-3747

Tested: 4-13-07
Steel below ground shelter door
Tested: 5-22-07 & 6-29-07
Steel above ground shelter doors

Shelter Components Manufacturers Completing Debris Impact Tests

Ambiente Housing Midwest

Mike Klumb
21800 Doral Road
Waukesha, Wisconsin 53186
Ph. (262) 798-8150

Tested: 02/08
90 mph hurricane impact resistant wall panel,
Protocol #3

American Matrix Technologies

James Wiese

Tested: 09/99
Tested ceramic/fiberglass panel

Technology Innovation Center
Iowa City, Iowa 52242
Ph. (319) 338 - 4242

APA (Formerly American Plywood Association)

Zeno Martin
P.O. Box 11700
7011 South 19th Street., West
Tacoma, WA 98411
Ph. (253) 620 - 7469

Arch Technology Corporation

Victor T. Lee, Andrea Lee-Harshbarger
11N024 Rippburger Road
Plato Center, IL 60170
Ph. (847) 464 - 5656

Domes International

Randy Avery
No. 5 Murphy Street
Tishomingo, MS 38873
Ph. (662) 438-7186

Dukane Precast, Inc.

Mr. Brian Bock
1805 High Grove Lane
Naperville, IL 60540
Ph. (630) 355 - 8118

Empresas Hopsa

August Simons
Via Transistmica & Calle 64 Oeste
Urbanizacion Industrial Los Angeles
Panama City, Republica Panama
Ph. 011-507-279-9854

FiberWeb

Imad Qashou
70 Old Hickory Blvd.
Old Hickory, TN 37138
Ph. (615) 847-7574

GCC of America

Hank Hearon
4253 Montgomery Blvd., NE
Suite 210
Albuquerque, New Mexico 87109
Ph. (800) 234-22266

GE Advanced Materials

Polymershapes Insulgard
1291 Rickett Road
Brighton, Michigan 48116

GrafTech International

Mark Segger
12900 Snow Road
Parma, OH 44130
Ph. (216) 676-2547

Tested: 11/00
Tested laminated wood panel

Tested: 04/00
Tested shelter wall component

Tested: 5/24/2006
Hurricane Protocol 1 and Protocol 2
Fiberglas Dome Panels

Tested 5-9-02
Tested precast concrete shelter wall panel

Tested: 01/21/05
EMMEDUE M-2 insulated concrete panels
Hurricane Protocol 1 – PSME80 Panels
Hurricane Protocol 2 – PSM80HP Panels
Tornado Protocol 4 – PDME100 Panels

Tested: 7-18-06, 9-26-06, 9-10-07
Hurricane Envelope Protocol house wrap

Test Date: 03/08/05
Hurricane Protocols 1 & 2 – 6” insulated concrete panels
Hurricane Protocol 3 & Tornado Protocol 4 – 8” insulated concrete panels
Tested: 3-2-07
Concrete and concrete composite panels resistant to hurricane windspeeds and impacts at : 34 mph, 60 mph, 102 mph

Test Date: 10/19/04
TorGard Bal 40 glazing in HP/600T frame.
Maximum size 8'-4" x 7'-4"

Tested: 7-19-07
FEMA impact resistant composite panel

Hardwire LLC

John Hammond
1000 Quinn Ave.
Pocomoke City, MD 21851
Ph. (410) 957-3669

Tested: 9-5-06
FEMA impact resistant composite panel

IMSI

Dr. Rudolph Strobel
7305 Thompson Road
Cincinnati, OH 45247
Ph. (513) 385 – 3317

Tested 9-16-02
Tested shelter wall panel. 3 wall, 5 cell, insulated 8”
concrete block with #4 rebar at 2’ on center

Protective Structures, Ltd.

George F. Smith
9780 Lake Forest Way
Roswell, GA 30076
Ph. (770) 518-9414

Tested: 11/03
Tornado Protocol - PL-6 & PL-8 composite panel
wall system.

RediWall

Tex-Rite Building Systems
Erwin Ritter
6103 Shadowcrest
Houston, TX 77074
Ph. (713) 776-3457

Tested: 10/03
Hurricane Test Protocol (9 lb 2x4 @ 34 mph) –
Precast concrete and steel stud wall panels.

Royal Building Systems, Limited

John Todd
1 Royal Gate Boulevard
Woodbridge, Ontario, Canada L4L8Z7
Ph. (972) 342 – 9080

Tested: 06/01
Tested wall panel system

StormBlocker Composite Panels

Mark Latham
1155 West Wall St., #102
Grapevine, TX 76051
Ph. (817) 329-6191

Tested: 7/01
Tornado Protocol - Composite wall panel installed
on exterior of FEMA 320 wall system.
Tested: 9/04
Hurricane Shelter Protocol (9 lb 2x4 @ 65 mph) –
Composite wall panel install on interior of FEMA 320
wall system.
Test Date: 02/15/05
Hurricane Protocol 3 – Stormblocker material
mounted on interior side of shelter wall.

Tri-Point Building Products, Inc.

2025 Webster
Waco, TX 76706
Ph. (214) 315-9381

Tested: 6/04
Tornado Protocol – Aerated concrete shelter panels.

Waco Composites, Inc

Wayne Hampton, Arlen Work
481-A Texas Central Parkway
Waco, TX 76702
Ph. (254) 776 – 8880

Tested: 06/99
Tested composite wall panel

Word & Boggus Contracting, Inc.

Larry Boggus
P.O. Box 278
Guntersville, AL 35976
Ph. (800) 239 - 5201

Tested: 10/99
Tested precast concrete wall panels

