

Hardened Structures Hardened Shelters, LLC

Explosion Resistant
Pre-hung
Sealed Blast Door



Drawing number: ASR-50-BD
Revision: E
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Table of Contents

Contact Information	3
Description	4, 5
Lock and Latch Operation	6
Installation	7, 8, 9, 10
Concrete Wedge Anchor - Technical Information	11

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Please see page 5 for the legend of the lettered arrows below:

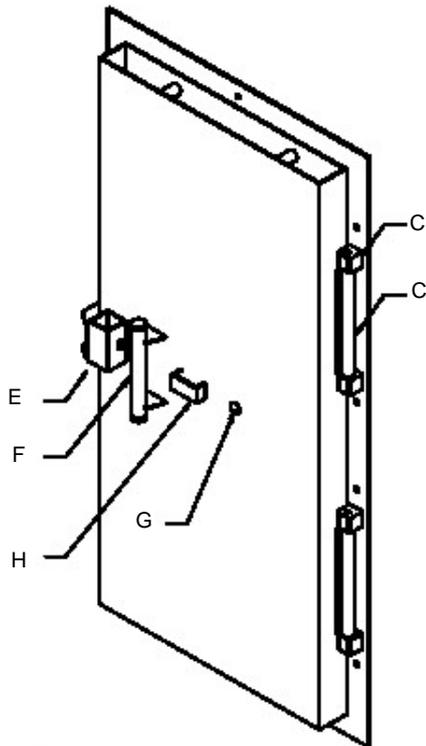


Figure 1

Description

ASR-50-BD series is a sealed, pre-hung explosion resistant blast door that offers excellent protection from extremely high pressure blast waves like those produced by a large conventional or nuclear device detonated in relatively close proximity.

This door is rated to withstand high pressure waves up to 7,200 pounds per square foot — that is 50 pounds per square inch (psi). Additionally, this door also offer an air tight compression seal between the door and the frame allowing for the use of a positive pressure NBC filtration system inside the shelter.

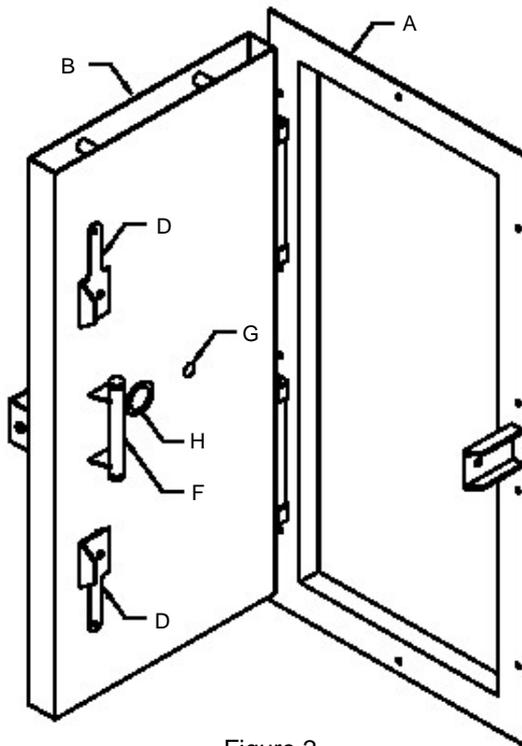


Figure 2

The pre-sized door and frame assembly are manufactured in the United States and ships via motor freight as one unit and is ready for easy installation.

Legend for parts from page 4

A. Door frame

The heavy steel frame is constructed from 5 inch by 3 inch by ¼-inch thick steel (called angle iron) with the 3 inch leg serving as the centering guide for hanging the door. The 5 inch leg is pre drilled for the concrete anchoring studs, and serves as a drilling template for locating the drill holes.

B. Door skin

The formed and welded heavy 3/16-inch thick steel skin which forms the pocket in which to pour the reinforcement concrete after hanging the door.

C. Hinges

The two vault style 1.1/2-inch diameter steel hinges are captured in externally grease able bronze knuckle bearings. This robust assembly allows for both high strength and precision closure to insure the proper alignment and compression of the gas seal.

D. Inside cam latches

The two inside cam latches draw and lock the door tight to the gas seal.

The upper and lower latch handles are provided with a built in friction safety clutch to insure that the latch handles do not unintentionally creep from the open condition to the closed or latched condition. Such a mishap would render the door unable to be opened from the outside and in order to gain access removal of the entire door frame assembly would be required.

E. Outside lock

The outside locking assembly requires a user supplied paddle lock.

For your safety the paddle lock and bolt assembly are lockable in both the unlocked and locked condition and are completely removable from the tamper proof enclosure when the shelter is occupied.

F. Heavy duty pull handles

Large two handed grip heavy duty handles constructed from steel tube and plate are located on both the inside and outside of the door.

G. Security viewer

The wide angle security is located center of the door cavity, its heavy internal steel enclosure adds structural support to the steel door envelop.

H. Optional differential pressure gauge

The optional differential pressure gauge is used to monitor the shelter overpressure when a positive pressure NBC filtration unit is installed.

This sensitive gauge measures the differential air pressure between the shelter and outside in inches of water column (inches of water column). The range is 0-0.5 inches of water column.

The gauge system includes a steel debris guard over the outside pilot sampling tube to guard against damage to the delicate gauge in the event of a nearby high energy explosion.

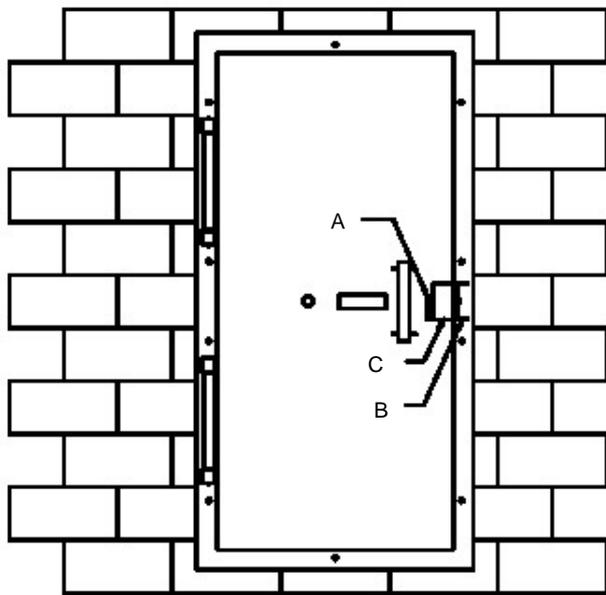


Figure 3

Lock and latch operation

Figure — 3 outside view, outside locking mechanism is a sliding bolt (A) and latch plate (B) and a user supplied paddle lock located inside the tamper proof enclosure (C). The bolt may be locked in either the locked or open condition, or for secure lock-down completely removed and brought inside the shelter for insurance against being maliciously locked in from the outside.

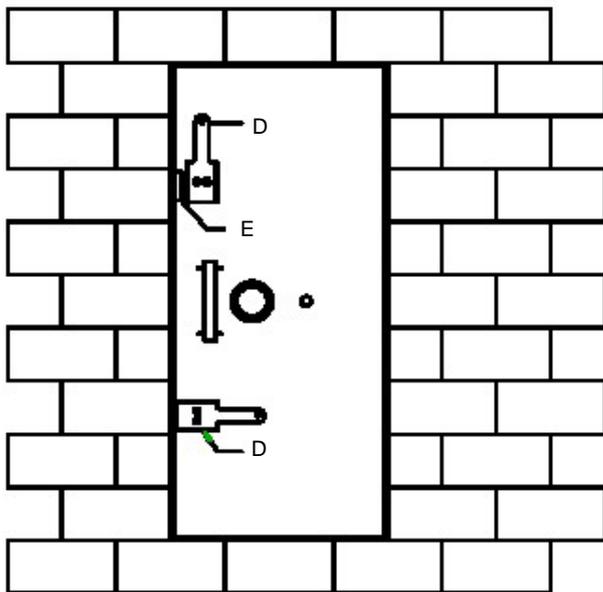


Figure 4

Figure 4 — inside view, The two cam lock levers (D) secure the door tight to the gas seal by means of tightening against the cam plate (E). In the open position the lever ends point up and down or away from each other. In the closed or locked position the lever ends are parallel pointing across the door to the hinged side. The drawing in figure 4 depicts the top lever in the open or unlocked position, and the bottom lever in the closed or locked position.

Installation

CAUTION

Read and understand these instructions thoroughly before attempting to hang this blast door. Hardened Structures strongly recommends that this door be installed by a qualified installer with the proper tools and equipment. A licenced general contractor should be able to follow these directions and complete the installation properly.

1. Determine the size
The door frame lip is made to the exact size of the door ordered.

To insure a proper fit the wall opening must be made at least $\frac{1}{2}$ inch larger than the door frame lip. The wall opening may not have less than a 6 inch high threshold (step over).

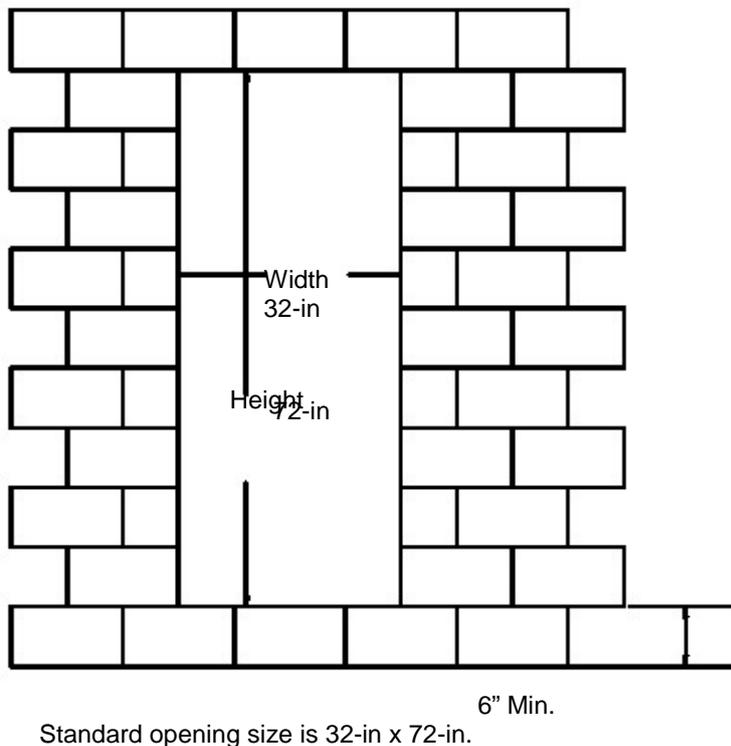


Figure 5

2. Determine right or left hand opening
All blast doors must open outward. Doors can be ordered from Hardened Structures in either right hand or left hand opening configuration.

To determine which configuration is suitable for your needs, stand inside the door frame with your back to the hinge side. If the door swings right it is a right hand door. If the door swings left it is a left hand door.

Please note: swing out is always 6" greater than the door width

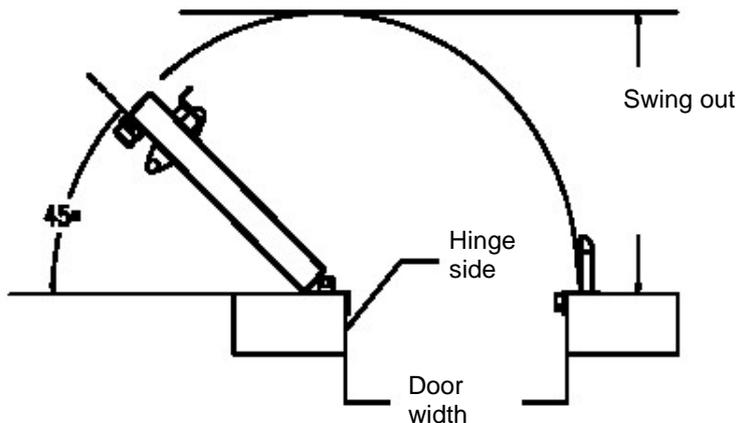


Figure 6

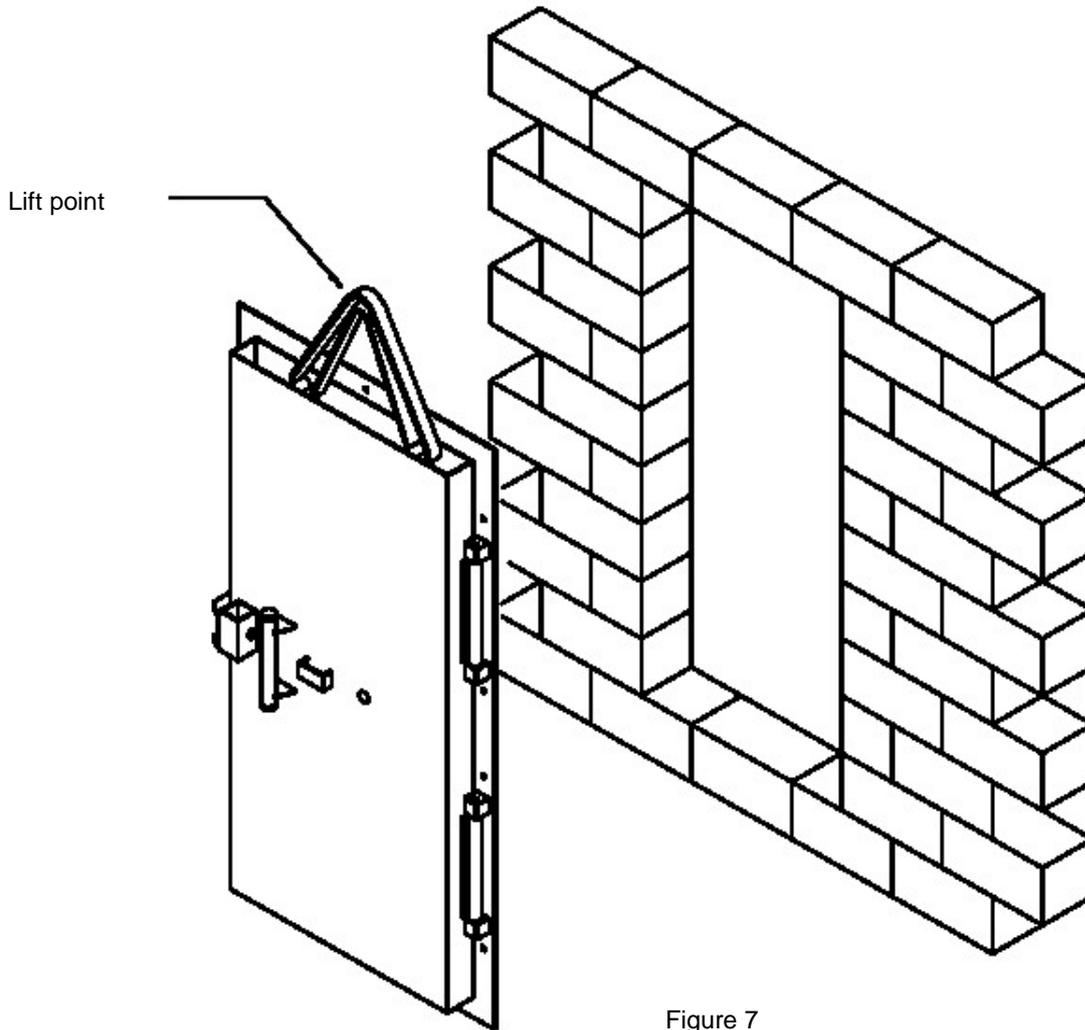


Figure 7

3. Lift the door into place

ASR blast door and frame assemblies are constructed with two lifting points inside the door envelope. Use only lifting equipment approved for overhead lifting and hardware for this task.

Leaving the door closed and locked from the outside, but not latched from the inside, lift door frame assembly into the wall opening and push the door so that the frame lip is fully captured inside the boundaries of the opening. Brace or otherwise secure the door frame assembly so that it can not fall out of the opening. If the door is installed with the inside latches secured in an unoccupied shelter, the door and frame must be removed to gain access. This door is designed to deny entry to people outside the shelter.

Use extreme caution as not to pinch body parts between the door and any obstructions as a severe pinch injury will occur. When swinging the door closed use only the provided door handles.

4. Installing the anchors

Using a ½ inch masonry bit drill the mounting anchor stud holes using the predrilled holes in frame (a) as a template.

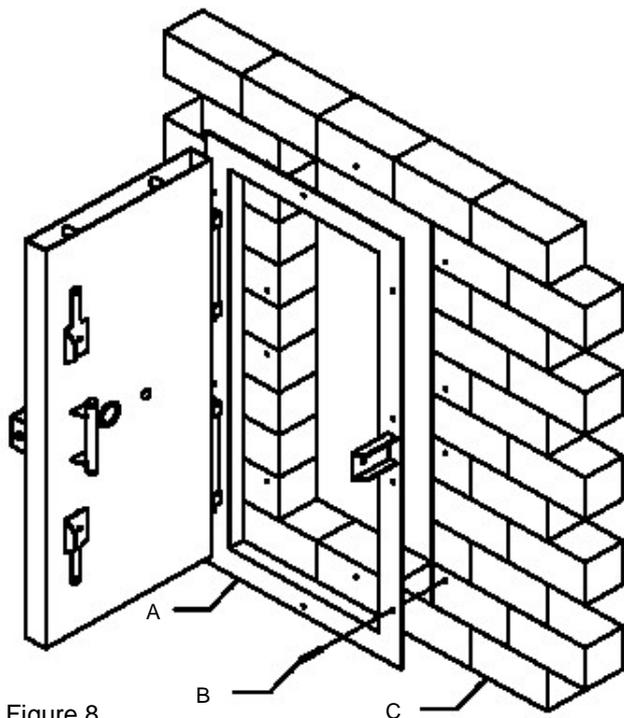
The fasteners and a carbide drill bit are included.

They are Concrete Wedge Anchor “Thunder Studs®” that are ½-inch diameter by 4.1/4-inch length (b).

See page 10 for the technical information for this fastener system.

Concrete Fasting Systems
Wedge Anchor, Thunder Stud®
1231 E. 26th Street
Cleveland, Ohio 44114

Phone 888-498-5747
Fax 216-357-7435
7:30 – 5:00 Eastern Time



5. Grouting the door frame

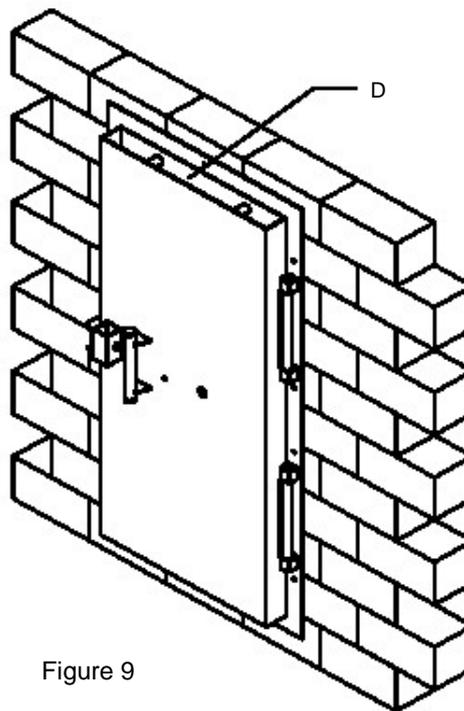
In order for the door to close, latch and seal correctly it is necessary for the outer door frame flange to nest flat against the wall surface (C).

In cases where the wall is not square or flat with the door frame it will be necessary to use cement grout to create a flat surface between the frame and well.

This is accomplished by creating a ½ inch wide void between the door frame and wall surface and filling it with wet cement grout. Using the door frame and wall surface as a vice evenly clamp a number of ½ inch thick shims or spacers between the door frame and wall surface by lightly tightening the anchor bolts.

When the cement grout is dry remove the shims and tighten the anchor bolts to full torque, this will provide the door frame with a flat mounting surface.

<http://www.confast.com/>



6. Sealing the inside door frame lip

After the cement grout is dry and the door frame anchor bolts have been tightened apply a liberal amount of silicon sealant, caulking between the inner door frame lip and the sill area.

7. Filling the door cavity with concrete

The door envelope (d, on page 8) is ready for pouring the concrete.

The amount of concrete required will depend on the door size ordered.

The formula for calculating the needed fill amount of concrete in cubic feet is the height of the door in inches times the width of the door in inches times the thickness of the door in inches divided by 1,728 (one cubic foot in inches).

Concrete Wedge Anchor -Technical Information

The ThunderStud® wedge anchor consists of two pieces, permanently pre-assembled into a single unit. The carbon steel rod is threaded for a portion of its length. The extreme end of the threaded portion is rounded to protect the threads from damage while the anchor is being driven into the hole drilled in the concrete. The other end of the rod has a necked down diameter, which runs for a short distance, at the end of which it tapers outwardly to the full diameter of the rod. A precision formed universal clip made of carbon steel is permanently assembled around the necked down diameter to complete the anchor. Each package contains the correct number of nuts and washers.

Concrete Wedge Anchor - Approvals:

Listed by Underwriters Laboratories (UL), International Conference of Building Officials (ICBO) carbon steel only, Board of Standards and Appeals (BSA), City of L.A. Meets or exceeds U.S. Government G.S.A. Specifications FF-S-325 Group 11, Type 4, Class

Concrete Wedge Anchor - Applications:

Medium to heavy duty into concrete.

Concrete Wedge Anchor - Installation:

(1) Drill hole into concrete with a carbide tipped masonry drill bit conforming to ANSI B94, 12-77, the same size as the ThunderStud® wedge anchor. If the fixture being fastened is in place and being used as a template to locate the ThunderStud® anchor, the mounting hole in the fixture should afford clearance for the universal wedge clip on the stud. (2) Clean hole, place the ThunderStud® wedge anchor through the hole in the fixture or directly into the concrete and hammer it in to the drilled hole until the threads are below the surface of the fixture/concrete. (3) Turn the nut by hand until the unit is snugged up. Tighten the nut with a wrench, approximately three or four full turns, to complete the fastening.

Concrete Wedge Anchor - Anchor Length:

Minimum embedment, plus fixture, plus nut and washer. The ThunderStud® wedge anchor requires no maximum hole depth. The depth of the hole in the concrete should be the length of the wedge anchor minus the thickness of the material being fastened. This will result in some extra depth to accommodate a minor amount of concrete cutting which may not be able to be cleaned out of hole.