

American Safe Room
Installation and Operation Manual
for the
ASR-101-BV
7-Bar Double Acting Automatic Blast Valve

— blast protection for hardened shelters —



Drawing: ASR-101-BV
Revision: H
February 5, 2013

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How it Works

Large explosions produce both positive and negative pressure waves. The first wave is a positive pressure wave traveling outward from the location of the blast. As this wave expands outward, it takes the atmosphere with it and a low or negative pressure is created at the core. As the outgoing wave loses its energy, it collapses back in toward the explosion being pushed by the high-pressure air outside the core.

Occupants in a shelter without a proper explosion protection or a “blast valve” protection are susceptible to injury or death in the event of a nearby conventional or nuclear detonation.

As the pressure wave passes over the ventilation vents of an unprotected shelter it will force super heated or toxic air inside. When the outside air pressure turns negative it will draw air out of the shelter, only to be forced back in again when the return wave strikes.

The air being forced in by the return pressure wave will contain all the fallout, toxins and gases that are currently present outside the shelter.

The ASR-101-BV Automatic Double Acting Blast Valve protects the occupants by automatically closing when the initial positive pressure wave from an explosion hits (figure 2) and automatically closing a second time when the outside air pressure goes negative (figure 3).

When the outside air pressure returns to normal, the blast valve automatically returns to its normal open state (figure 1).

Valve closes at 0.5-psi/3.5-kilopascal overpressure
Valve maximum pressure 102-psi/703-kilopascal

Construction:

- All steel body
- Welded and bolted construction
- Double stainless steel hemispherical valve heads
- Double Buna rubber 5-inch diameter valve seats
- Machined bronze guide bushing
- Stainless steel metering rod.
- Round steel mounting flange with eight 5/8-inch holes on 10.2-inch diameter bolt circle

Principles of Operation

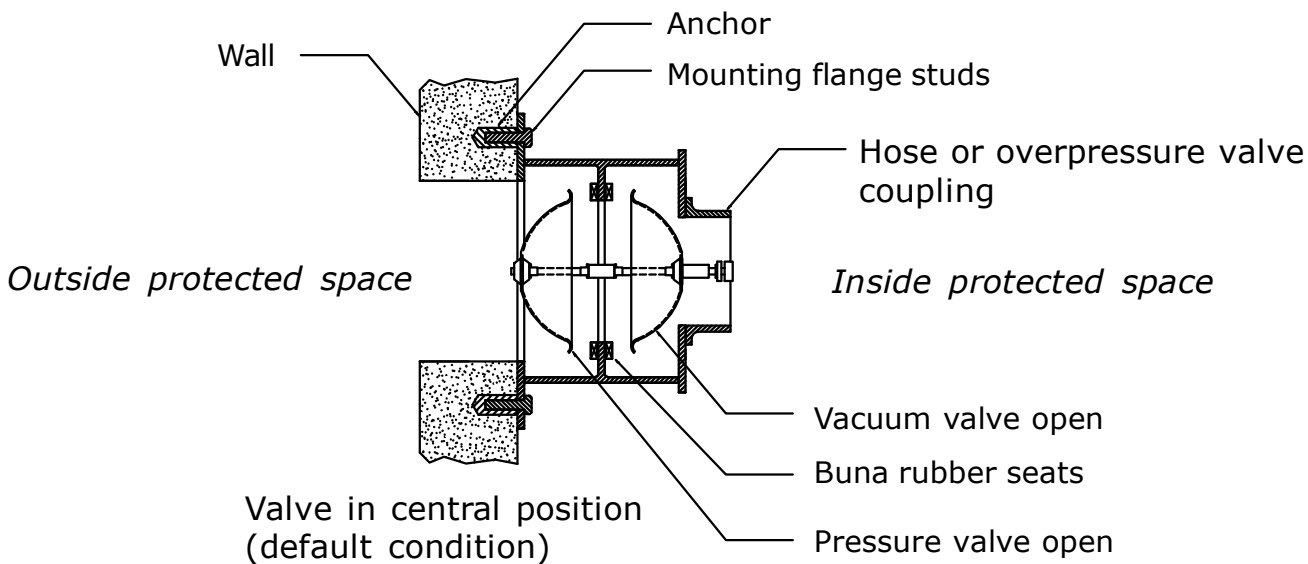
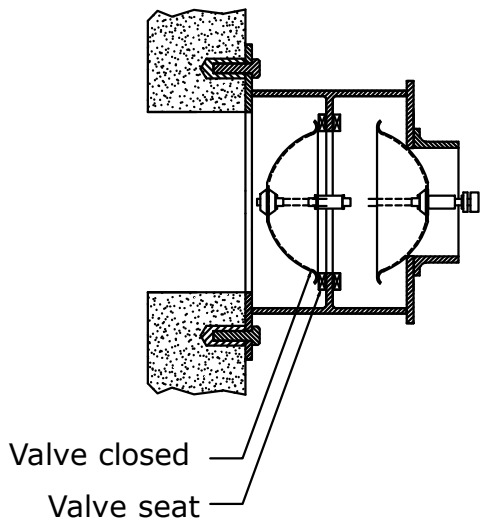
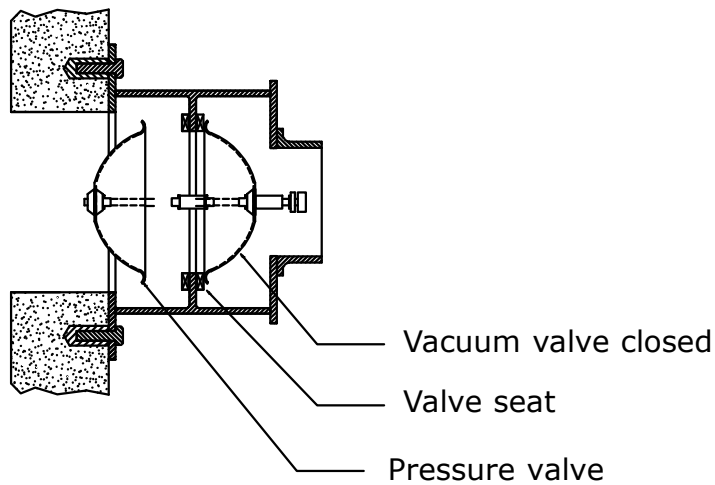


Figure 1



Valve in closed condition
 outside air pressure is positive
 (blast condition)

Figure 2



Valve in closed condition
 outside air pressure is negative
 (vacuum condition)

Figure 3

Choosing a location

Please note the following 4 constraints:

- A. The valve body is normally installed inside the protected space. Contact American Safe Room if you need to mount it outside the protected space.
- B. The valve body **must** be installed over **all** ventilation ports to the outside (both intake and exhaust).
- C. All intake and exhaust air **must** pass through the blast valve.
- D. In order to create and maintain overpressure in a sealed protected space, the ASR-50-OP overpressure valve is recommended to meter the outflow. This valve installs on the blast valve that is over the outflow ventilation pipe. Please specify at time of ordering whether you plan to mount your outflow port on the ceiling or the wall of the protected space because the diaphragm valve in the overpressure valve needs to be orientated horizontally.

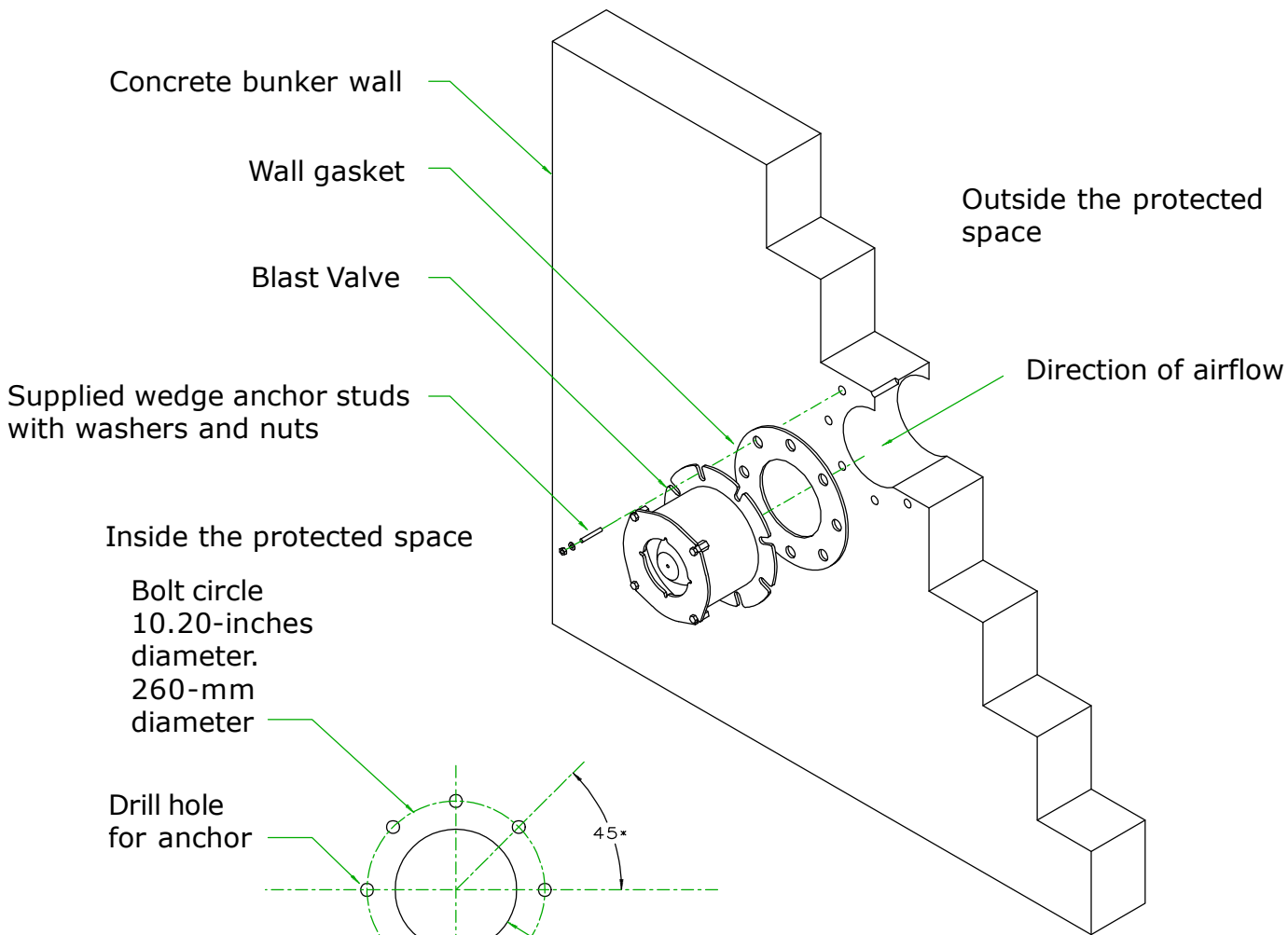
Installation

1. The blast valve is installed inside the shelter room as shown in figure 4.
2. Locate and cut the intake vent hole through the shelter wall — minimum diameter of 4.5-inches (114-mm), maximum diameter 6.5-inches (165-mm).
3. Layout and drill holes for lug bolt studs as shown in figure 5, taking care to insure that the Blast Valve hole pattern is centered over the exhaust vent hole cutout.

The anchor studs are Concrete Wedge Anchor "Thunder Studs®" that are ½-inch diameter by 4.1/4-inch length. The fasteners and a carbide drill bit are included. See page 10 for the technical information for this fastener system.

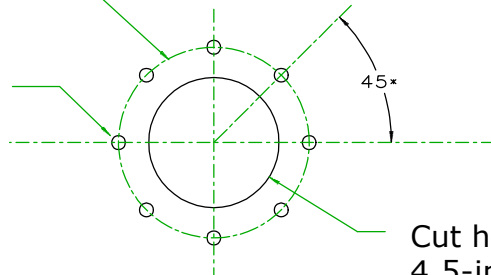
4. Drive the studs into their respective holes.
5. Use the included gasket between the wall and the blast valve mounting flange.
6. Secure the blast valve and tighten the anchor nuts to their rated torque using an opposed tightening pattern.
7. When applicable connect the filtration unit's intake hose to the hose collar as described in the Safe Cell manual.

Installation



Bolt circle
10.20-inches
diameter.
260-mm
diameter

Drill hole
for anchor



Cut hole through wall
4.5-inch/114-mm
minimum diameter
6.5-inch/165-mm
maximum diameter

Figure 4

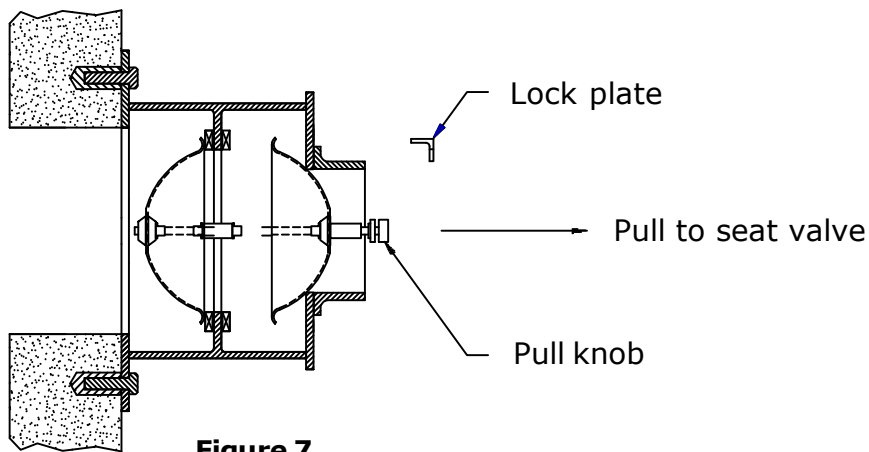
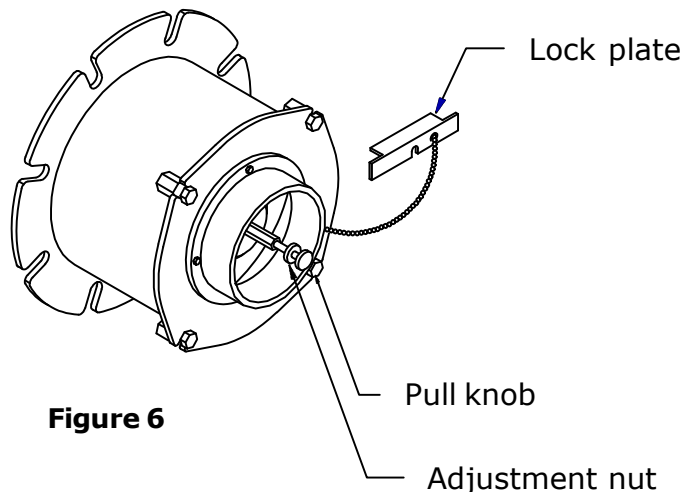
Figure 5

Operation

By default, the valves will remain in their central, neutral position allowing low pressure air to flow through the valve.

To lock valve in the closed position:

1. Pull red shut off knob until valve seats
2. Insert lock plate between adjustment knob and hose port as shown
3. Release pull knob and tighten adjustment knob until it seats firmly - do not overtighten.



*Outside
protected
space*

Figure 7

Inside protected space

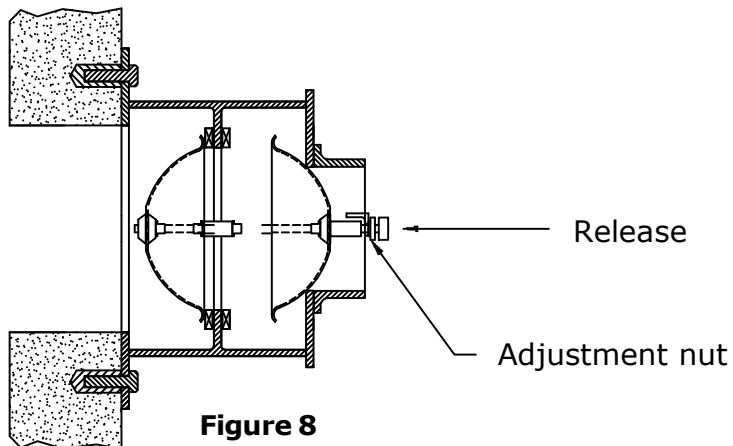
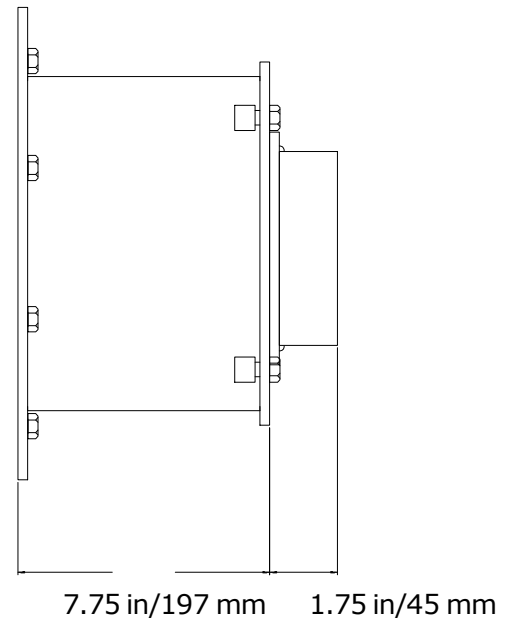
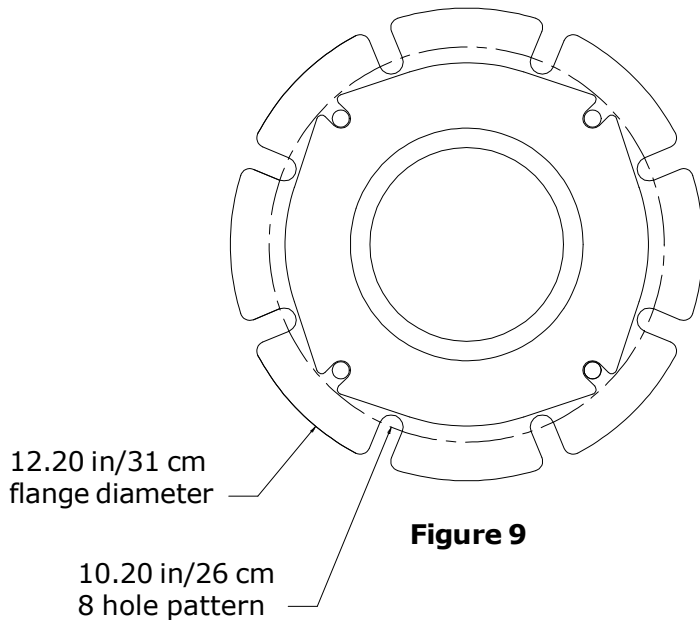


Figure 8

Specifications

American Safe Room certifies that the ASR-101-BV explosion resistant blast valves are tested to meet or exceed the following specifications:

Type	Automatic double acting blast valve
Minimum closing pressure	0.5 PSI/3.5 kilopascals
Maximum operating pressure	102 PSI/703 kilopascals
Minimum operating temperature	-15 degrees Fahrenheit/-26 degrees Celsius
Maximum operating temperature	212 degrees Fahrenheit/100 degrees Celsius
Weight	25.0 pounds/11.3 kilograms
Static airflow resistance (pressure drop)	0.15 inch of water column at 100 CFM
	0.25 inch of water column at 122 CFM
	0.50 inch of water column at 148 CFM
	0.75 inch of water column at 187 CFM
	1.00 inch of water column at 218 CFM
Construction, body	A-36/1018 steel
Construction, valve heads	304 stainless steel
Construction, seals	Buna synthetic rubber
Construction, guide bushing	60-60 Bronze
Mounting	8 each 5/8"/16mm holes on 10.2"/260mm bolt circle



Maintenance - annual test

With one finger reach through the opening located on the end of the valve body and insure that the valve heads are free by pushing on the spring loaded assembly. The valve tests good if the assembly slides back and forth freely and returns to it neutral center position when finger pressure is released.

Certification

These valves were subjected to a static pressure test witnessed by a licenced professional engineer:

Wood Engineering, Inc.

Edward N. Wood, P.E.
Civil – Mechanical – Structural
311 Smethwick Drive
Umpqua, OR 97486
541-459-2994

Certification Blast Valve Test
October 29, 2008

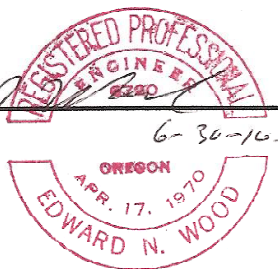
In Accordance with TM 5-1300/NAVFAC P-397/AFR 88-22
Section 6.1.2

The ASR 101-BV, 7-bar blast valve was subjected to a pneumatic pressure test of 120 pounds per square inch - gauge (8.2 bar) for a sustained period of time of two hours.

At the conclusion of the test the valve was inspected for functionality and defects.

The valve continued to operate as designed with no defects observed or found.


Edward N. Wood, P.E.



Parts Drawing

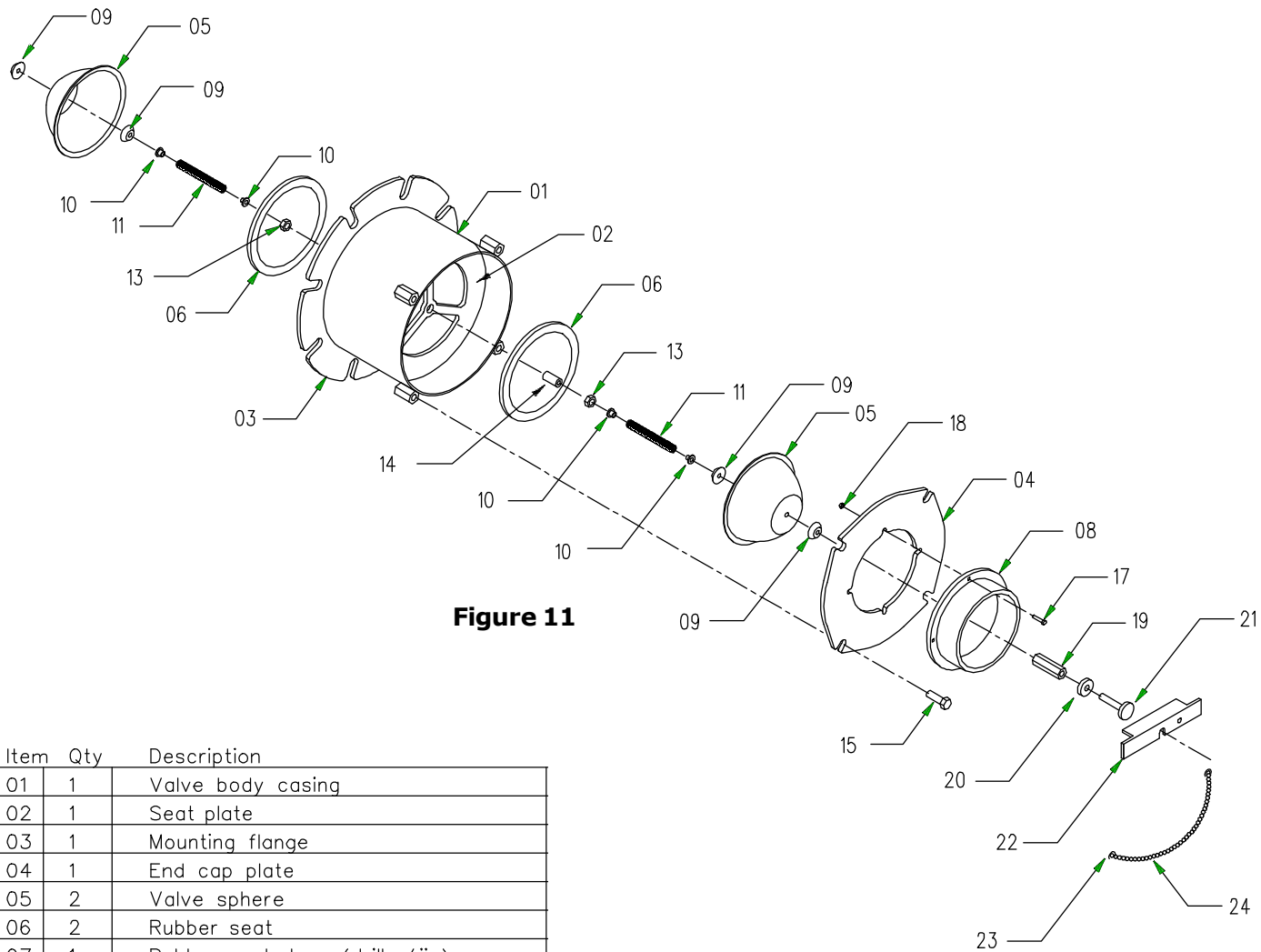


Figure 11

Item	Qty	Description
01	1	Valve body casing
02	1	Seat plate
03	1	Mounting flange
04	1	End cap plate
05	2	Valve sphere
06	2	Rubber seat
07	1	Rubber gasket (drill w/ jig)
08	1	Hose coupling
09	4	Spanner nuts 1/4-20
10	4	Spring retainer
11	2	Spring
12	1	Threaded stud 1/4-20
13	2	Hex nut 1/2-13
14	1	Bronze guide bushing
15	4	Cap screw 3/8-16X1.00"
16	4	Weld nut 3/8-16
17	4	Cap screw 10-24X1.00
18	4	Hex nut 10-24
19	1	Conector nut
20	1	Round nut
21	1	Red threaded knob
22	1	Lock-out angle
23	1	Ball chain
24	2	Ball chain, anchor

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.