FORTRESS
PROTECTIVE BUILDINGS

SAFE™
SHOCK AND FRAGMENT ENCLOSURE

Product overview and catalog

fortressprotectivebuildings.com

What is SAFE™?



SAFE: SHOCK AND FRAGMENT ENCLOSURE

Turnkey solutions for hazard containment enclosures

STREAMLINED DESIGN-BUILD OPERATION

Single point of contact for design, construction, and installation of enclosure and equipment

INDUSTRIES AND APPLICATIONS FOR SAFE™.

PRESSURE TESTING:

Oilfield services, Hydrogen, Space

BATTERIES:

Automotive, Battery abuse testing, Battery energy storage systems (BESS)

ROTATING EQUIPMENT:

Manufacturing

EXPLOSIVE STORAGE:

Military, Explosive manufacturing, Mining

Standard SAFE Products

1. BATTERY ABUSE TESTING



2. HORIZONTAL BUNKER



3. HIGH BAY



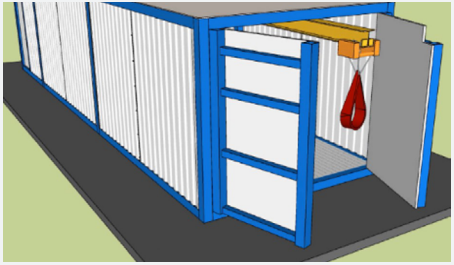
4. BALLISTIC BLANKET



5. CART



6. WALK-IN ROOM





1 Booth

PRESSURE TESTING

- Example is 7’ x 7’ x 7’ tall but can be any size
- Prefabricated structural steel
- Bulkheads for utility line pass-throughs
- Optional flanges for duct exhaust







Case Study

PRESSURE TESTING BOOTH

REFER TO PAGE 4

The operator needed to conduct pressure testing of vessels and equipment for aerospace applications using gas at high pressures and volumes. The 7-ft cube enclosure was designed to contain various sizes of potential projectiles that could be thrown in the event of an accidental failure or release, the most noteworthy being a flange weighing over 100 lbs.

The enclosure was also designed to contain blast loads from the sudden release of high-pressure gas in case of an accidental failure during pressure testing. The roof includes several flanges that the operator hooked up to their air flow and ventilation needed for their test protocol. All construction was done off-site with installation taking only one day to minimize the intrusion to ongoing operations at the facility.





Booth

BATTERY ABUSE TESTING

- Prefabricated, delivered, and installed, as shown
- Optional vent panels, dampers, HVAC scrubber, and utility bulkheads





Case Study

BATTERY ABUSE TESTING BOOTH

REFER TO PAGE 6

BakerRisk's client needed to perform battery abuse testing for their products used in the electric vehicle industry. The enclosure was designed to contain blast loads from a potential battery explosion that may occur during abuse testing. The enclosure included several ventilation features, including a large intake damper along a side wall, four vent panels occupying the majority of the back wall, and an HVAC scrubber on the roof to detoxify any off-gassing that may occur during testing.

All construction was done off-site with installation taking only one day to minimize the intrusion to ongoing operations at the facility.



2 Horizontal Bunker

- Example is 3’ wide x 3’ tall (interior dimensions) but can be any size
- Can be adapted to any length
- Ideal for long horizontal vessels
- Hydraulics can be used to open and close the lid
- Locking and unlocking the latches can be automated for faster operation

END VIEW WITH CONTROLS



FRONT SIDE VIEW WITH LATCHES



BACK SIDE VIEW WITH HYDRAULICS



Horizontal Bunker

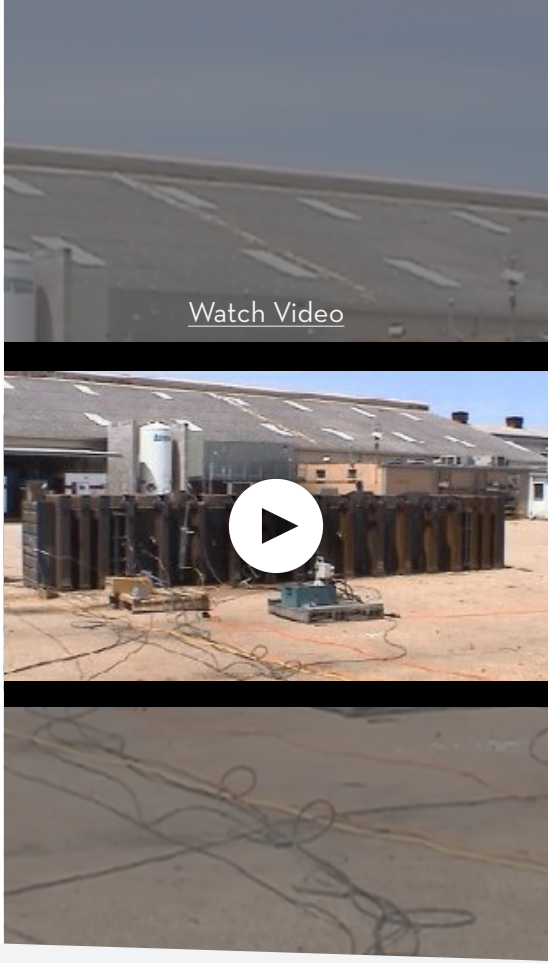
TEST VALIDATION

TEST PARAMETERS

- Proof of concept test
  - >15,000 psi hydrostatic
  - >100-lb on-axis projectile

RESULTS

- Enclosure slid a couple inches but contained hazards as designed





3 High Bay

- Example is 22’ x 22’ x 25’ tall but can be any size
- Hydraulics to open/close and lock doors
- Accomodates large test items





Case Study

PRESSURE TESTING HIGH BAY

REFER TO PAGE 10

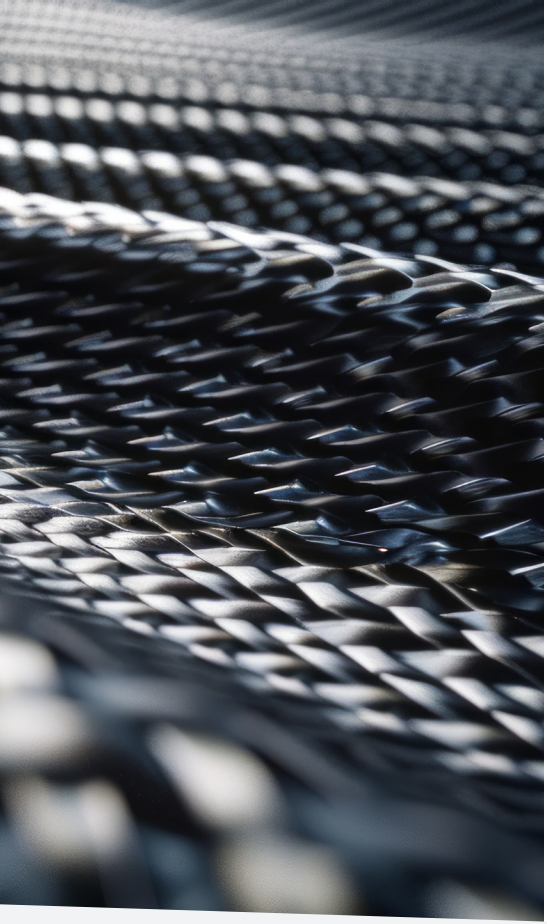
The operator needed to conduct pressure testing of very large vessels and equipment for aerospace applications using gas at moderate pressures and very significant volumes. The 25-ft cube enclosure was designed to contain relatively small potential projectiles that could be thrown in the event of an accidental failure or release.

The enclosure was also designed to contain blast loads from the sudden release of high-pressure gas in case of an accidental failure during pressure testing.

The enclosure features a 17-ft wide x 22-ft tall double door to allow access for bringing the large pressure vessels inside for testing.

The enclosure panels were prefabricated, and erection, assembly, and installation was completed on-site.

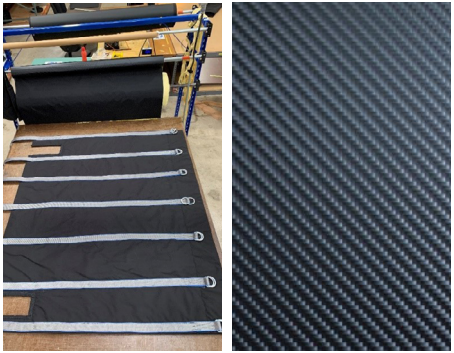




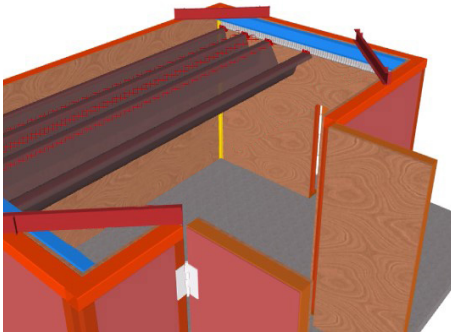
4 Ballistic Blankets

- Lightweight, flexible, and adaptable protection can be provided
- Many potential applications—some examples below

WRAPS AROUND TOOLS OR PRESSURE VESSELS



BACK SIDE VIEW WITH RETRACTABLE ROOF



5 Cart

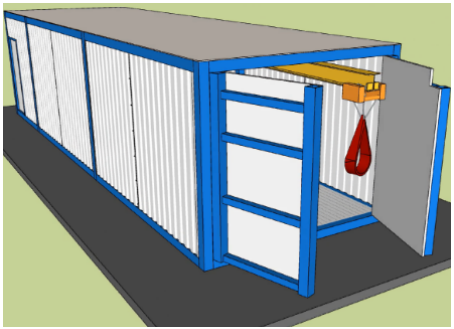
- Ideal for small items, limited available space, and low hazard severity
- Many other potential applications, such as:
  - Tabletop container
  - Small box





6 Walk-In Room

- Crane rail can be used to bring test items inside
- Floor can contain catch basin to retain spilt liquids from hydrostatic pressure test
- Can be adapted to double-wide and any length
- Control room toward the back





Why Choose SAFE™?

1 SATISFY CODES AND REGULATIONS

Keep people and infrastructure safe.

2 COST-EFFECTIVE MITIGATION

Fast-tracked to minimize on-site disruptions.

3 SINGLE POINT OF CONTACT

Simplify your staff's needs by interfacing with one person to free up your time.

4 CONFIDENCE

Know that SAFE™ will protect you if put to the test since it is designed by our world-class SMEs using state-of-the-art modeling, and it is backed by R&D and testing.





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