HWH Protective Structures

Tested **Protection**

Contact Us:
2510 S. Church St.
Paris, TX 74560
TF: (800) 442-8326
(903) 783-3618 or (903) 905-3270
www.hwhprotectivestructures.com
info@hwhprotectivestructures.com

Protective Structures, LLC., was created to provide a modular solution to protect your critical infrastructure & personnel.

Our solution provides upwards of 6 times the protection but at the same cost of what is available on the market today.

Whether your goal is to provide a safe zone or a complex of hardened structures, Protective Structures has a solution that can be tailored to your individual need.

We Provide Modularized Solutions for Your Critical Infrastructure Protection

- **Blast Resistant Modules Protection Tested & Rated**
  - AT/FP high explosive resistance for blasts (65 psi / 18 ms)
  - Vapor cloud explosion resistance (35 psi / 200 ms)
  - Resistant to hurricane and tornado force winds
  - Earthquake or seismic related shear protection
  - Fire resistant rated
  - Ballistic and projectile resistance
  - Sound protection volume standard compliance
- **Blast Resistant Modules Interior Outfitting**
  - Alloy stud assembly with a higher strength than mild-steel
  - Optional RPG/Mortar screen system provides protection and pre-detonation of explosive projectile threats
  - Electrical / power wiring
  - Telecom / data wiring
  - Water / wastewater plumbing
  - Interior design to specification
- **Blast Resistant Modules Standard Sizes**
  - Standard sizes include 12x20, 12x40, 24x20, 24x40
  - Each of our units can be customized, our solution allows for more flexibility over welded plate steel systems

Providing Protection Against Serious Threats

- Anti-Terrorism/Force Protection (ATFP), High Explosives
- Education Security and Protection
- Vapor Cloud Explosions (VCE)
- Industrial Accidents

Tested Designs Against Real-World Threats

- Engineering and blast simulations completed by Protective Technologies in San Diego, CA
- Laboratory testing completed at University of California- San Diego Structural Engineering Blast Center
- Real-World testing completed at ARA - Pecos Full Scale Research and Testing Facility in Pecos, TX

Actual BRM during testing in Pecos, TX

BRM versus Plate Steel

You be the judge

As an Antiterrorism/Force Protection (ATFP) specialist, HWH Protective Structures has created a blast resistant modular (BRM) building system to withstand a high explosive (HE or ATFP) and a vapor cloud explosion (VCE). Due to advanced material usage, weight and cost of BRM units in comparison to competition is equivalent or slightly lower.

Comparison Chart

Type	Peak Reflected Pressure (psi)	Impulse (psi-msec)	Duration (msec)	Response Criteria	Residual Surface Deflection (in)	Ballistic Protection	Construction Materials
BRM (HE)	63	346	18	Low*	0.20	Up to .50 cal	Composite
BRM (VCE)	35	1,179	200	Low*	0.29	Up to .50 cal	Composite
Competition	8 to 20	Unknown	200	Medium**	Unknown	Up to 7.62mm	Steel

*ASCE defines low damage response criteria as localized building/component damage. Building can be used; however repairs are required to restore integrity of structural envelope (there is no lower level).
**ASCE defines medium damage response criteria as widespread building/component damage. Building cannot be used until repaired. Total cost of repairs is significant.

The BRM system combines proprietary steel alloy studs with custom interior and exterior sheathing, and an optional wall system upgrade adding up to UL 752 Level 10 ballistics resistance, compared to the more common level 8 rating. This performance was validated in simulations as well as real world testing at the University of California at San Diego (UCSD) Englekirk Structural Engineering Center (Dr. Gil Hegemier) and the Applied Research Associates (ARA) full-scale research and testing facilities in Pecos, Texas. Additionally the BRM has established ASTM E 413-04 ratings for sound protection; wind & seismic protection in accordance with EC 003-2012; 60 minutes of forced entry protection; and ASTM E-119-08 and CAN/ULC S101-07 ratings for 1-hour and 2-hour fire resistance.

Details on capabilities, copies of third party validation reports and videos of live testing are available at www.hwhprotectivestructures.com located on the media page.

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