SALERIA
CREATE • PROTECT • SECURE

OBEX

Saleria's deployable barrier protects critical assets and saves lives. OBEX is a modular and scalable wall system that protects against blast and ballistic threats.

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Version 2.0

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Company Overview

Saleria is a US company based in Texas with a UK office in London. We have over 50 years of military engineering experience and a renowned blast engineer specialist leading the R&D team. We identify where improvements in protection systems can be made and what technologies and materials are well placed to deliver life-saving products.

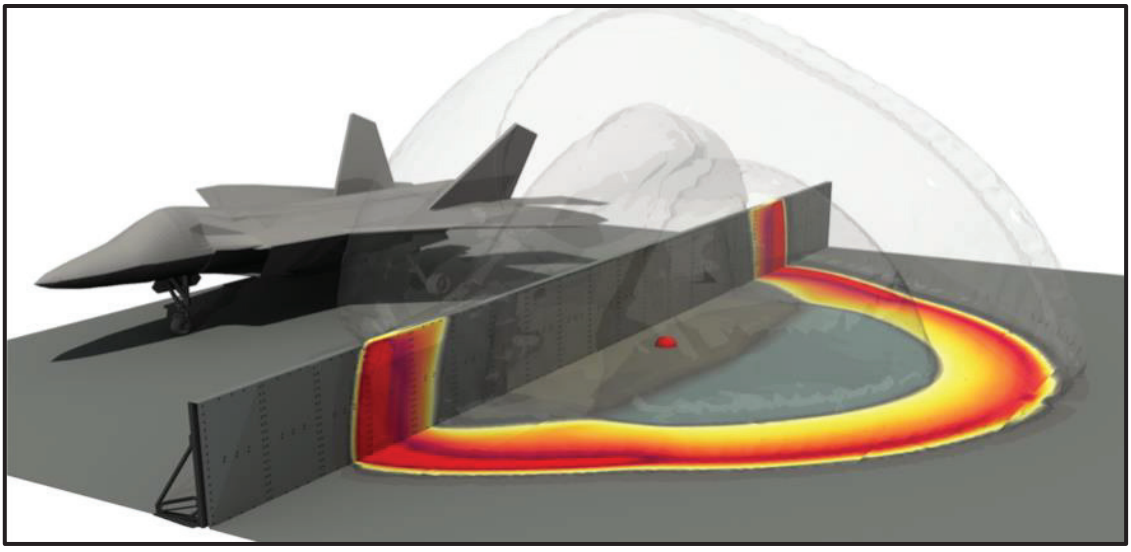
Saleria's mission is to create protection solutions to save lives. Founded to develop a newly invented technology, displaying extraordinary performance against the effects of explosive events, Saleria is an innovative Research and Development (R&D) company specializing in blast, ballistic, and thermal mitigation and containment.

Product Overview

OBEX is a modular and scalable blast and ballistic protection solution that utilizes the properties of two of our breakthrough technologies:

- **AIR®** (Advanced Impulse Reduction technology) is a multilayer technology that outperforms any other material in the marketplace at reducing explosive blast effects. AIR® is thinner and lighter than its counterpart products, making it a very versatile material with great utility.
- **HardTac** is a cost-effective fragment and ballistic protection solution that is as light as steel, but performs better against heat and incendiaries, and can be moulded to form complex shapes.

OBEX is designed to be constructed in 4ft sections of unlimited length, can be built up to 12ft high, can go around corners, and provide overhead protection. Constructed by hand, without the use of machinery, OBEX can be deployed as a standalone solution or retrofit existing structures and products. OBEX can be built as a temporary measure or as a permanent fixture, and can be easily redeployed (stripped, moved, and reassembled) when required. Delivered in 20ft containers it is air-portable and airmobile.



High fidelity modeling by Synthetik Applied Technologies, TX, showcasing OBEX providing blast protection for critical equipment in an explosive event.

Common Applications

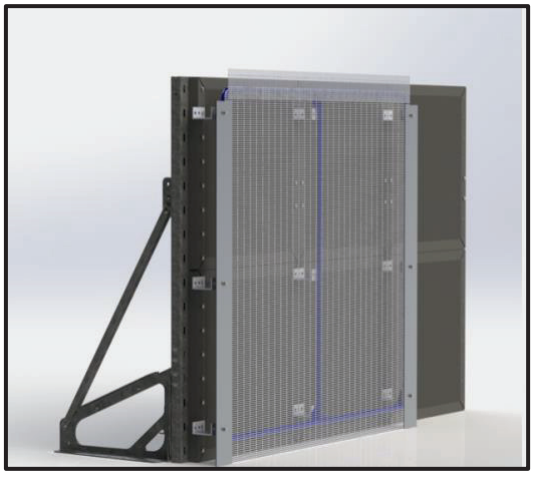
Perimeter Protection

Currently, most construction solutions used for military and domestic operations are based around concrete walling and HESCO gabion baskets which provide protection as a result of their bulk and mass. Utilizing these solutions requires logistics and machinery to construct and maneuver, and in the case of HESCO, large amounts of earthworks and aggregate fill. Difficult to move once in place, they offer the commander little flexibility for any change in circumstances and generate significant work in clearing up after the operation has concluded.

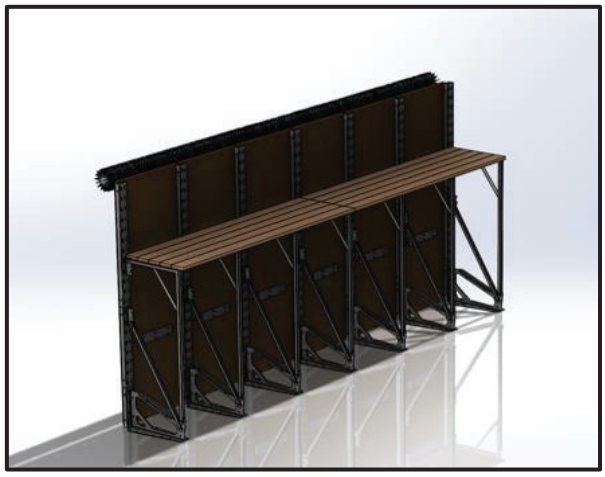
Large scale protests including the January 6, 2021, that devolved into an attack on the Capitol building in Washington, D.C. proved the requirement for quickly-deployable temporary barriers providing protection against antagonists, ballistics, and explosive blast, on domestic operations in addition to military deployments. Commanders of law enforcement, emergency responders and planners of large-scale events all require the ability to implement effective perimeter protection at short notice.

OBEX is an ideal solution for all these base and personal protection needs, as either a temporary or permanent structure.

- OBEX is quick and easy to assemble, is hand constructed, and can be deployed in both directions simultaneously.
- Delivered in 20ft/40ft containers and air delivered.
- If the perimeter needs to expand or contract, individual OBEX sections can be easily moved, and if damaged, can be replaced without removing other sections.
- OBEX can be stripped out, moved, and rebuilt elsewhere for continuous operations.
- OBEX can be fitted with an anti-climb mesh and a platform/ramp can be constructed on the non-attack face as a fighting platform for protectors.



OBEX fitted with Anti-Climb mesh



OBEX fitted with standing ramp

Critical Equipment Protection

During operational deployments, there is a requirement to protect critical equipment from sabotage, direct and indirect fire, and explosive events. Personnel and equipment may occupy existing buildings, which then need hardening, or equipment may be placed directly on to open ground. Compartmentalizing the real estate limits the damaging effects of an attack to only the compartment struck, leaving the remaining compartments protected.

Current construction solutions are based around concrete walling, HESCO gabion baskets, dry-stack walls, and sandbags. The limitations of which are described earlier. Most notably, the concrete walling and gabion baskets reduce the amount of useable real estate, and HESCO and sandbags require substantial amounts of earthworks and aggregate fill that may not be readily available.

OBEX is an ideal solution for hardening buildings and constructing compartments for critical equipment including aircraft, ammunition, and energy installations:

- OBEX takes up less real estate than current construction solutions.
- OBEX can be constructed on both hard and soft ground conditions.
- OBEX is constructed using hand tools with no need for heavy equipment.
- OBEX can be retrofit to existing structures providing both side and overhead protection.
- The double-sided OBEX construction can provide enhanced protection for the most critical equipment.

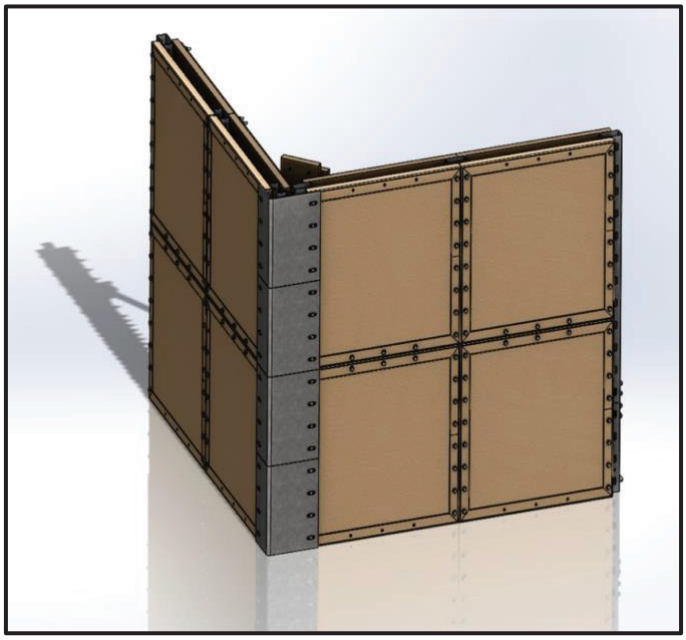


Image of Internal Corner Assembly

From left to right: HardTac panels, Modular frame and AIR panels

Product Detail

The standard OBEX product consists of AIR® Panels and HardTac Panels within a modular frame. OBEX can also be retrofit to existing buildings and products without the framing system.

AIR® Panel

The AIR® (Advanced Impulse Reduction) Panel provides protection primarily from the effects of explosive blast but also has some ballistic protection capability. The AIR® Panel is 4ft x 4ft and weighs 140lbs (2-person lift). It is waterproof and has a PU coating providing durability and is available in various colors.

The AIR® Panel is a multi-layer square panel that uses energy management strategies to reduce the peak load and impulse effects of an explosion (these are explained in more detail in the OBEX: Technical Reference).

HardTac Panel

The HardTac Panel primarily provides the ballistic protection but has also shown to perform well against pipe bombs and other incendiaries. The HardTac Panel is 3.9ft x 1.2ft (47 inches x 14 inches) and weighs 130lbs. It is waterproof and can be provided in different colors.

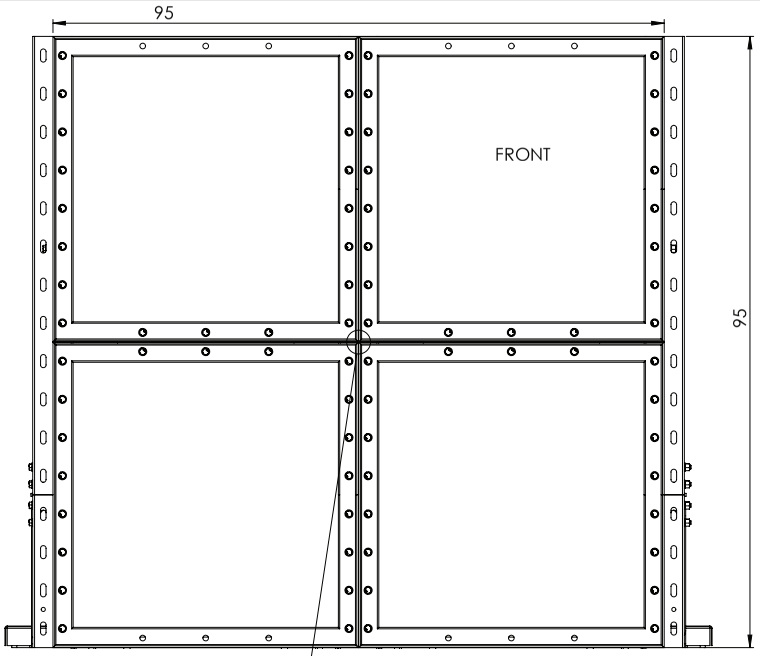
The HardTac Panel is a polymer containing dispersed aggregate. We have identified the most commonly seen direct and indirect fire threats on operations and tested them successfully against HardTac (see Design and Testing section).

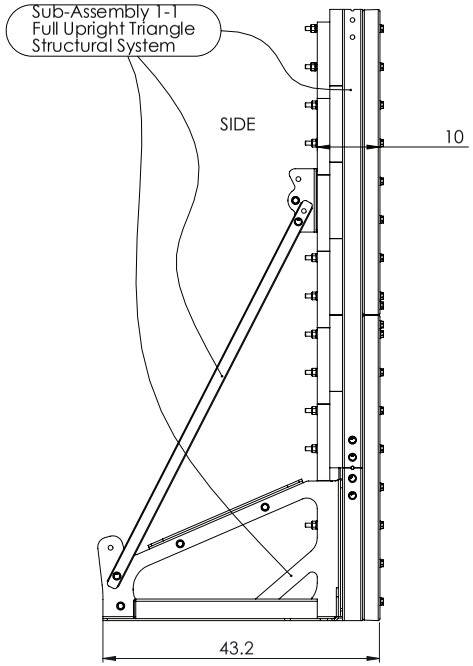
Modular Frame

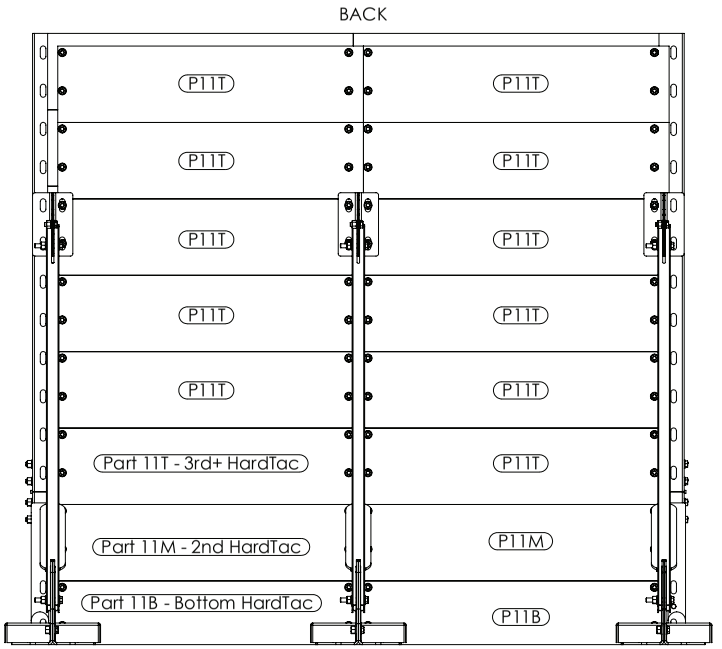
The modular framing system is a highly versatile component set comprised of box and plate sections. Made of steel, the largest component is a 6ft upright weighing 78.8lbs. The frame can be painted, galvanised or powder coated.

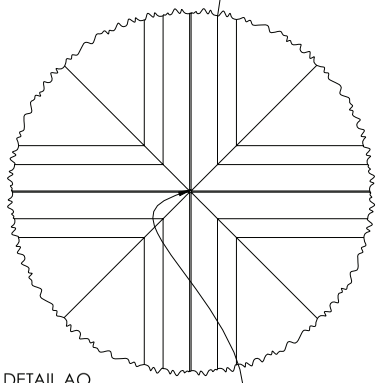
Manufacturing

OBEX prototypes have been manufactured in the USA and UK. All materials and components can be sourced in the USA in order to comply with the Berry Amendment.







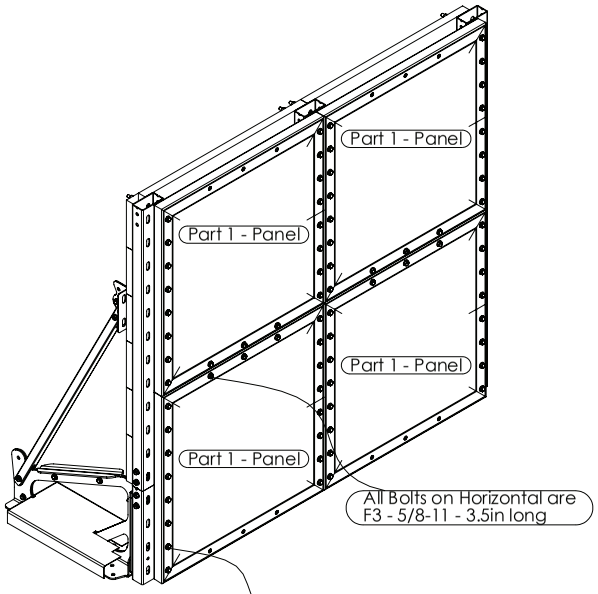


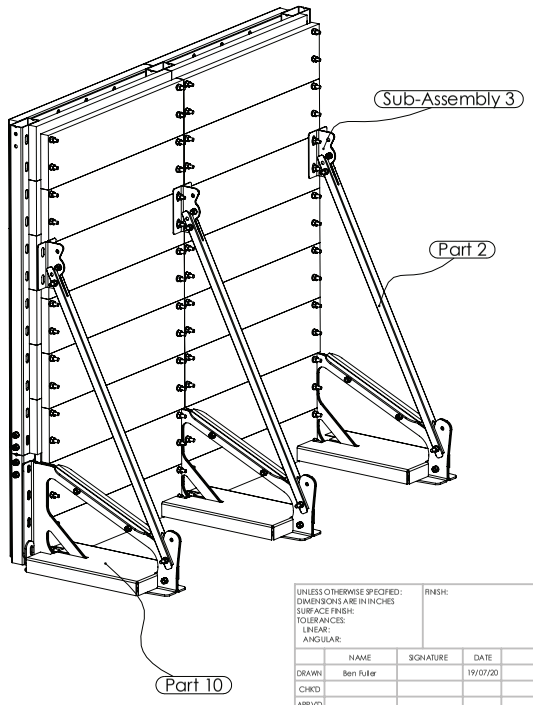
DETAIL AO
SCALE 1 : 1

DESIGNED WITH FOR NO GAP BETWEEN PANELS; CLEARANCE BUILT INTO HOLE/FASTENER SIZE SCHEME.

HORIZONTAL - 5/8-11 BOLT IN .87in WIDE SLOT

VERTICAL - 5/8-11 BOLT IN 2.05in LONG SLOT

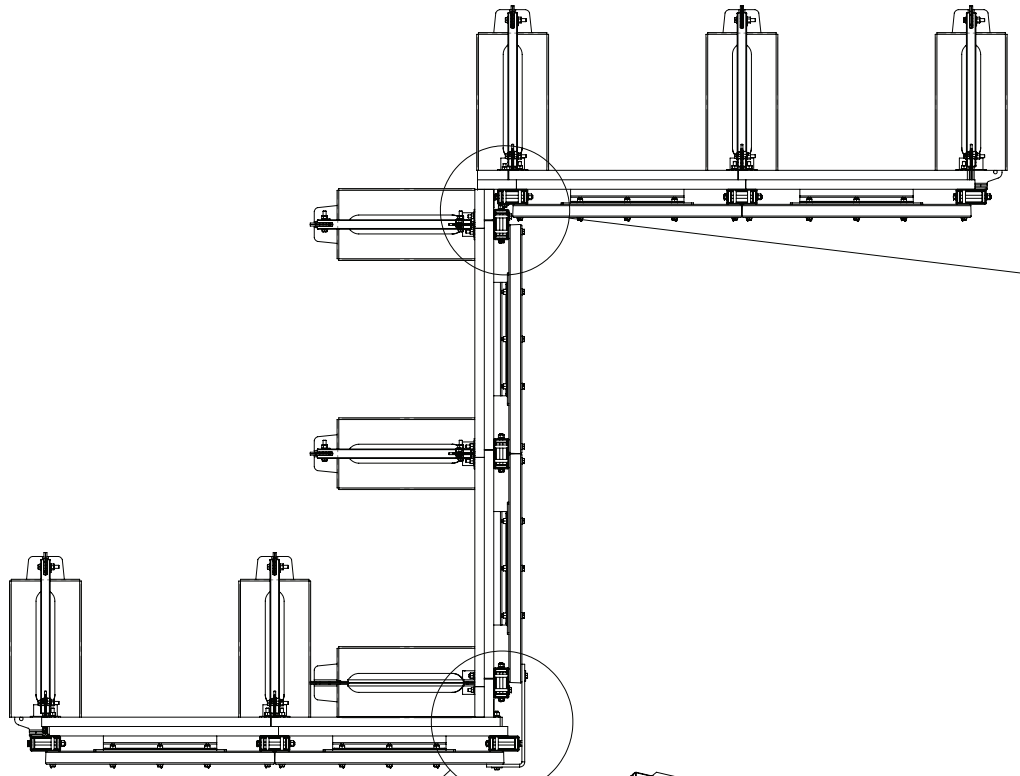


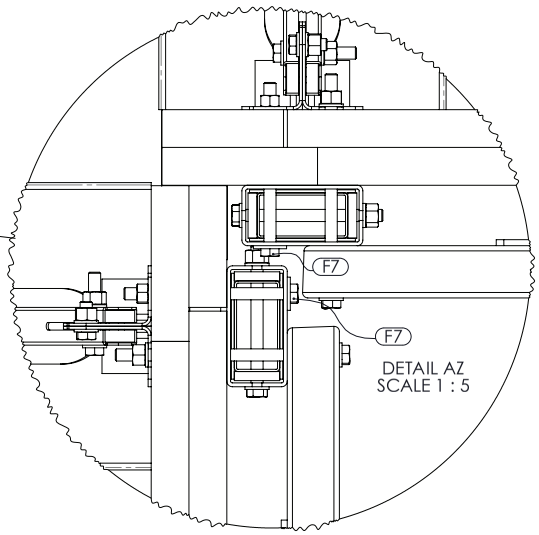


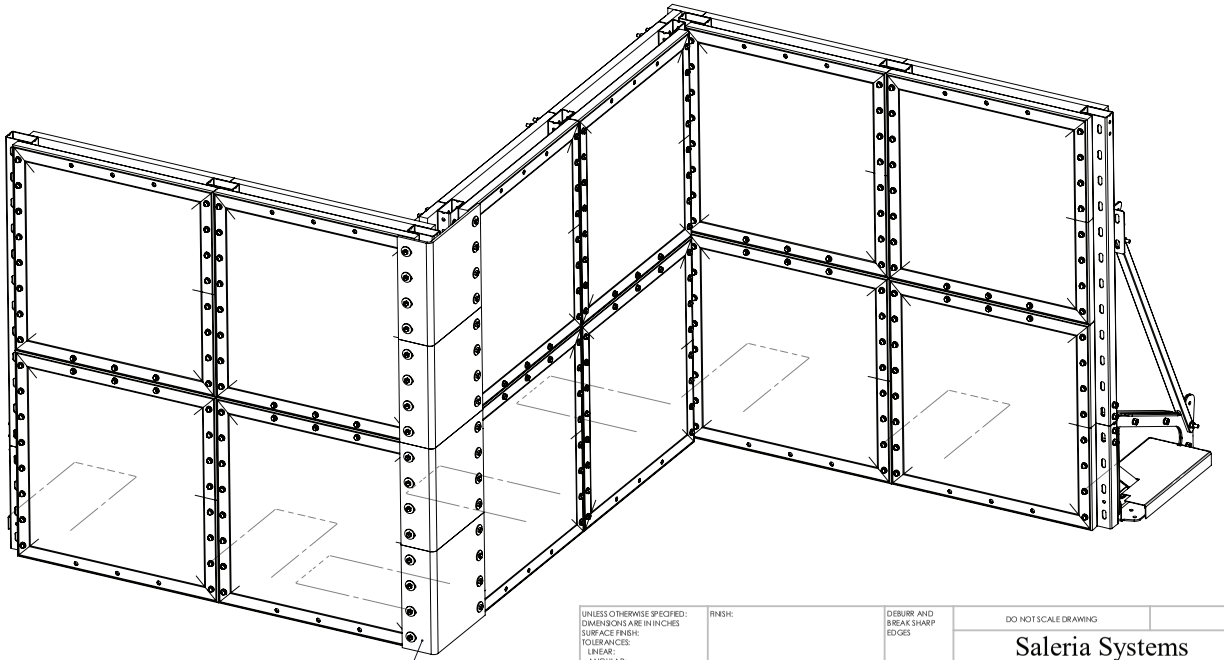
This configuration is shown with the standard AIR panel and 100mm thick HardTac protection on the rear face.

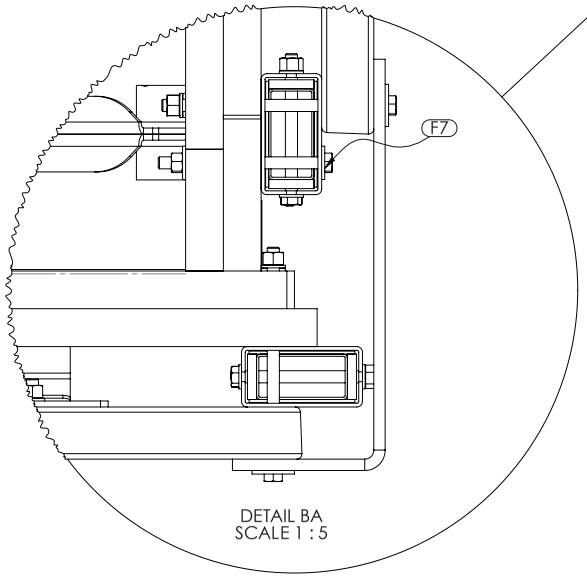
The weight of the two panel high as shown is ~1000kg/linear meter

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:	FINISH:	DEBURR AND BREAK SHARP EDGES	DO NOT SCALE DRAWING
			Saleria Systems
NAME / SIGNATURE / DATE			TITLE: General Assembly
DRAWN Ben Fuller 19/07/20			
CHKD			
APP'VD			
MFG			
Q.A	MATERIAL: various		DWG NO. SALUS-DSVHT-GA1-V8 A2
			SHEET 2 OF 31









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					Saleria Systems	
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CHKD						
APP'VD						
MFG						
Q.A				MATERIAL: various	DWG NO. SALUS-DSVHT-CNRGA1-V8	A2
				WEIGHT: -	SHEET 30 OF 31	

Design and Testing

We have worked extensively with world-leading third parties to verify the technology characteristics and performance of AIR® and HardTac, and their use in the products used in OBEX. Currently sat at TRL 7.

Date	Third Party	Summary of testing
2016 05	GTD Engineering, Vancouver	Blast testing
2016 06	Blastech, UK	Blast testing
2016 09	University of Houston, TX	Characterisation of material, blast testing and identifying ballistic performance
2016 12	Karagozian & Case, CA	Review of testing data and high fidelity physics modelling
2017 04	Southwest Research Institute, TX	Flame test and Ballistic test
2017 07	Defence Science and Technology Laboratory (DTSL), UK	Blast testing
2017 08	Blastech, UK	Blast testing
2017 11	Southwest Research Institute, TX	Blast testing
2018 06	Blastech, UK	Blast testing
TBC	Synthetik Applied Technologies, TX	High fidelity modelling

Our robust internal design and testing programme has been conducted in both the USA and UK. OBEX formed part of the UK's Army Warfighting Experiment (AWE) 2020, a program which aims to identify and exploit emerging technologies and products for defence. User trials have been completed with the USMC in Quantico in January 2022, and the UK's Corps of Royal Engineers and Royal Engineers Trials and Development Unit (RETDU) in October 2021.

Explosive Blast Testing (latest results)

Date	Location	Achieved testing
2018 11	Spadeadam, UK	40lbs TNT at 7.2ft
2021 10	Panthera Ranges, WV, USA	Surrogate 81mm Mortar

AIR® Panel testing, Spadeadam, UK. November 2018

HardTac Panel testing, Panthera Ranges, WV, USA. October 2021

Ballistic testing (latest results)

The most recent laboratory testing was conducted at Wiltshire Ballistic Services, UK. Testing was completed in accordance with ISO: 17025 and compromised of the following ammunition and fragmentation fired at individual HardTac panels.

Threat	Test Standard	Pass/Fail	Levels
9 x 19 mm (NATO Ball DM 41)	STANAG 2920	PASS	NIJ II
7.62 x 39 mm (PS) (Projectile Speed)	STANAG 2920	PASS	NIJ III
7.62 x 39 mm API (BZ) (Armor Piercing Incendiary)	STANAG 2920	PASS	NIJ L4+
5.56 x 45mm (SS109) (NATO Semi-Armor-Piercing)	STANAG 2920	PASS	NIJ III
5.56 x 45 mm (M193) (MagTech Ammunition)	STANAG 2920	PASS	NIJ III
7.62 x 54 mm API (B32) (Russian Armor Piercing Incendiary)	STANAG 2920	PASS	NIJ L4+
1.1g FSP (Fragment Simulating Projectiles)	STANAG 4569	PASS	
2.8g FSP	STANAG 4569	PASS	

The testing culminated in multiple shots of the following ammunition fired at a single HardTac Panel. The HardTac Panels did not fail and only penetrated a third of the thickness.

Multi Hit Shots at Single Panel		
Serial No.	Test Standard	Pass/Fail
Serial 1	20 shots of 9 x 19 mm (NATO Ball DM 41)	PASS
Serial 2	20 shots of 7.62 x 39 mm (BZ) (Armor Piercing Incendiary)	PASS
Serial 3	20 shots of 5.56 x 45 mm	PASS
Serial 4	20 shots of 1.1g FSP (Fragment Simulating Projectiles)	PASS
Serial 5	20 shots of 2.8g FSP	PASS

Planned Testing – Summer 2022

- USA. User trials, USMC.
- All-Up testing and demonstration of OBEX in both the USA and UK.
    - Blast testing: initial test of 40lbs TNT at 7.2ft, and then continuing until failure.
    - Ballistic testing: Surrogate 122mm shell.

Acronyms

AIR®	Advanced Impulse Reduction (a Saleria patent-pending technology)
API	Armor Piercing Incendiary
AWE	The UK MOD's Army Warfighting Experiment
DSTL	Defence Science and Technology Laboratory
FSP	Fragment Simulating Projectiles
ft	feet
ISO	International Organization for Standardization
lbs	pounds
mm	millimetres
NATO	North Atlantic Treaty Organization
NIJ	National Institute of Justice (classification of body armor)
PS	Projectile Speed
PU	Polyurethane
R&D	Research and Development
RETDU	Royal Engineers Trials and Development Unit
STANAG	NATO Standardization Agreement
TNT	Trinitrotoluene (high explosive)
TRL	Technology readiness level
USMC	United States Marine Corps