



Lightweight Concrete Ballistic Protection

Technical Whitepaper

UL752 Rev.12 (UL-RF-J) — .50 Cal BMG Rated

Force Protection · Critical Infrastructure · Grid Security

RH Worldwide Ventures

In partnership with REDOC Consulting & MFG

www.RHWorldwideLLC.com · www.TitanMk10X.com

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1. Executive Summary

The **TITAN Mk 10X** is a lightweight, modular concrete ballistic panel engineered to resist the most demanding small-arms and heavy-caliber threats while remaining transportable, customizable, and repairable in the field. Its 11-inch hybrid composite panel has been **independently tested and certified to UL752 Revision 12 (UL-RF-J)** against the .50 cal BMG threat, including a supplementary M2 armor-piercing (M2AP) round.

Unlike conventional ballistic concrete, the Mk 10X weighs approximately 50% less than traditional concrete of comparable protection, can be assembled into walls and modular shelters, and can be repaired on site rather than replaced. It is manufactured using up to 98% recycled materials (by weight) and delivers Level-10-class protection at pricing comparable to high-end Level 8 systems.

This whitepaper documents the panel's protection approach, the independent test results for the certified 11-inch panel, and the development roadmap for thinner 3-inch, 4-inch, and 6-inch variants currently in the testing program. Detailed manufacturing and material specifications are proprietary and are not disclosed here.

The Mk 10X is positioned for three primary markets: **defense and force protection**, **data center and critical-infrastructure security**, and **electric utility and grid hardening**. Section 8 details sector-specific applications, including the regulatory drivers shaping demand in the utility sector.

2. Product Overview

The Mk 10X is a hybrid composite cementitious armor system. It is manufactured using up to 98% recycled materials and is available in configurations ranging from UL752 Level 3 through the .50 cal BMG UL-RF-J class. Panels integrate directly into a range of deployable structures.

2.1 Core Capabilities

- **Ballistic protection:** Configurable from UL752 Level 3 to UL-RF-J (.50 cal BMG M2 Ball). The 11-inch panel is certified to UL-RF-J.
- **Lightweight:** Approximately 50% lighter than traditional concrete of equivalent protection.
- **Modular & mobile:** Forklift pockets and crane picking points at each corner; units assemble and disassemble in the field.
- **Field-repairable:** Damaged panels can be repaired in place rather than scrapped, reducing lifecycle cost and downtime.
- **Customizable:** Exterior walls with designed patterns; modular shelters with optional doors, windows, gun ports, and communications provisions.
- **Resilient:** Waterproof, fire-resistant, Seismic Rating E (SPS 125), and field-tested against high-temperature vertical-lift jet exhaust.
- **Cost-effective:** Pricing approximately equivalent to high-end Level 8 systems.

2.2 Representative Deployments

Current fielded configurations include a 192 sq. ft. Security Entrance Office with integrated restroom and climate control (UL752 Level 8) and a Security Guard Shack (UL752 Level 8). Optional build-outs include electrical fit-out, solar power, restrooms, soundproofing, and SCIF capabilities.

2.3 Modular Capabilities

Modularity is central to the Mk 10X platform. Because the system delivers heavy-caliber protection at roughly half the weight of conventional ballistic concrete, it can be configured into transportable, reconfigurable, and reusable protective structures that traditional precast barriers cannot match. Every unit features integrated forklift pockets and crane picking points at each corner for rapid placement, relocation, and recovery.

- **Lightweight modular T-walls:** Ballistic-rated T-wall barriers for perimeter, checkpoint, and blast/ballistic standoff applications. At approximately half the weight of conventional precast T-walls, they reduce transport and lifting requirements, deploy faster, and can be repositioned as the mission changes — rather than being abandoned in place. Additional features include reinforcement for vehicle-deterrent entry control.
- **Reusable modular shelters:** Complete protective structures — guard posts, entry-control points, equipment and personnel shelters, and command spaces — that assemble in the field and disassemble for relocation and reuse at a new site. This reusability turns protective infrastructure into a recoverable asset rather than a one-time, single-site expenditure. 360° video surveillance can be integrated.
- **Rapid deployment & recovery:** Modular units can be emplaced quickly with standard material-handling equipment and recovered just as quickly, supporting expeditionary operations, phased build-outs, and changing threat pictures.
- **Field-repairable:** Damaged wall panels can be repaired on site rather than scrapped, extending service life and reducing lifecycle cost across repeated deployments.
- **Customizable configurations:** Walls and shelters can be tailored with doors, windows, gun ports, communications provisions, climate control, power, and SCIF capability to suit the mission.

3. Panel Architecture

The TITAN Mk 10X is a proprietary multi-layer composite armor system. Its protection derives from an engineered combination of hardened strike faces, internal energy-absorbing layers, and a structural backing, working together as an integrated system rather than a single monolithic slab.

The architecture is deliberately redundant: protection is distributed across multiple independent layers so that no single element is the sole point of defeat. This layered approach is what allows the panel to deliver heavy-caliber protection at roughly half the weight of conventional ballistic concrete, while remaining modular, repairable, and customizable to a range of threat levels.

Detailed material composition, layer construction, and manufacturing specifications are proprietary to RH Worldwide Ventures and are not disclosed in this document. They are available to qualified parties under appropriate confidentiality agreements.

4. Protection Approach & Performance

Rather than relying on a single barrier, the Mk 10X defeats incoming threats through progressive energy extraction across its multiple layers. Each layer degrades a projectile in sequence, so that any energy surviving one layer is absorbed by those behind it. This redundancy is the basis for the system's consistent, repeatable performance — validated by independent testing (Section 5) rather than by modeling alone.

4.1 System Performance Summary

- **Single hit, perpendicular:** Near-certain defeat of the .50 cal BMG threat, with substantial margin demonstrated in independent testing.
- **Single hit, oblique angle:** Certain defeat. Any impact angle other than dead-perpendicular meaningfully increases the panel's effective resistance.
- **Multi-hit, dispersed:** Performs very well; the layered structure remains substantially intact after an initial impact, preserving protection against subsequent rounds.
- **Multi-hit, same location:** As with virtually all armor systems, repeated precise impacts on a single point are the most demanding case. At realistic engagement ranges the probability of multiple rounds striking the identical point is very low.

5. Independent Test Results

The 11-inch panel was independently tested by Close Focus Research (Report BTR-01-17-2026) on January 17, 2026, under the testing oversight of RH Worldwide Ventures' partner, REDOC Consulting & MFG.¹ Testing was conducted to the UL752 standard, including the Revision 12 UL-RF-J class.²

Parameter	Sample 1	Sample 2
Standard	UL752 Rev.11 Level 10	UL752 Rev.12 UL-RF-J
Projectile	.50 cal FMJ Military Ball	.50 cal BMG M2 Ball
Panel size	60.0 × 51.5 × 11.0 in.	60.0 × 51.5 × 11.0 in.
Panel weight	1,500 lbs	1,500 lbs
Impact velocity	2,821 ft/s	2,923 ft/s
Impact energy	12,544 ft-lbs	12,519 ft-lbs
Impact angle	90° (perpendicular)	90° (perpendicular)
Penetration	No penetration	No penetration
Spall	None observed	None observed
Result	PASSED	PASSED

¹Independent ballistic testing performed by Close Focus Research; report number BTR-01-17-2026.

²UL752 Revision 12 (October 17, 2023) renamed the former "Level 10" rating to "UL-RF-J." The two designations refer to the same .50 cal BMG threat class.

Across the test program, a total of four shots were taken on the samples — including a supplementary M2AP armor-piercing round — and all four passed with no complete penetration and no rear-face spall.

Measured penetration depths (impact surface to rear of projectile, plus the 1.8" steel core length) were approximately 4.4 inches on the first shot and 6.1 inches on a same-area second shot — in both cases well short of the 11-inch panel thickness, with no breach of the witness plate behind the panel.

6. Key Technical Properties

Property	Specification
Compressive strength	21,000 psi at 28-day cure — ~500% of standard high-quality Portland cement (4,000–5,000 psi)
Weight	~50% lighter than traditional concrete; ~100 lbs per sq. ft.
Ballistic rating	UL752 Rev.12 UL-RF-J (.50 cal BMG); configurable Level 3–Level 10
Seismic rating	Rating E; SPS 125
Environmental	Waterproof; fire-resistant; thermally tested against vertical-lift jet exhaust
Sustainability	Manufactured using up to 98% recycled materials (by weight)
Handling	Forklift pockets and crane picking points at each corner

Strength comparison reflects 28-day cure values.³

7. Development Roadmap: 3", 4" & 6" Panels

The certified product line is the 11-inch panel described above. To broaden the platform for applications where weight and thickness are at a premium — such as vehicle add-on armor, interior safe rooms, and rapidly deployable barriers — RH Worldwide Ventures is developing thinner 3-inch, 4-inch, and 6-inch variants of the Mk 10X composite.

Status note: The 3-inch, 4-inch, and 6-inch panels are currently in development and undergoing the testing and certification process. They are **not yet UL-certified**. The only configuration with completed, independent UL752 certification at the time of writing is the 11-inch panel. The 6-inch panel has passed a Level 10 protocol test at a non-UL-certified facility, which is a successful test result but not a UL752 certification. Performance characteristics and certification status for the thinner variants will be published upon completion of independent testing.

³Comparative figures refer to high-quality Portland cement, which typically reaches 4,000–5,000 psi at a 28-day cure. Refer to the manufacturer's warranty for applicable terms.

7.1 Intended Variant Applications

- **3" panel:** Targeted at lighter threat levels and weight-sensitive applications such as mobile barriers, interior partitions, and retrofit protection. Threat rating to be established by testing.
- **4" panel:** Targeted at intermediate protection where reduced thickness and weight are prioritized over the maximum .50 cal BMG capability of the 11-inch system. Threat rating to be established by testing.
- **6" panel:** A 6-inch panel was tested at the Georgia Public Safety Training Center and passed the Level 10 protocol. This was a successful test result, not a UL certification: the facility is not UL752 certified, so the result does not constitute formal UL752 certification of the 6-inch panel.

Except where a specific test result is stated above, all protection claims for the 3-inch, 4-inch, and 6-inch panels should be treated as design targets rather than certified performance until independent UL752 certification is issued.

8. Applications by Sector

The Mk 10X platform is engineered for three primary markets with distinct threat profiles and procurement drivers.

8.1 Defense & Force Protection

For military and expeditionary use, the Mk 10X provides certified .50 cal BMG protection — including against the M2AP armor-piercing round — in a transportable, rapidly deployable form. The system supports a range of force-protection missions:

- **Checkpoints & entry control:** Entry control points, guard towers, and checkpoints.
- **Modular T-walls:** Lightweight T-wall barriers for perimeter security, standoff, and blast/ballistic protection — deployable and recoverable at a fraction of the weight of conventional precast T-walls.
- **Hardened shelters:** Command, communications, and SCIF-capable structures.
- **Expeditionary basing:** Forward operating base protection, with crane and forklift handling for rapid setup and relocation.
- **Flight-line and vertical-lift operations:** the composite has been field-tested against high-temperature vertical-lift jet exhaust, relevant to rotary-wing and V/STOL environments.
- **Sustainment advantage:** field-repairability reduces the logistics burden of replacing damaged protective structures in theater.

8.2 Data Centers & Critical Infrastructure

Data center operators are increasingly hardening facilities against physical attack and forced entry, where continuity of operations is the paramount concern. The Mk 10X addresses this with protection that installs as modular structures rather than requiring poured-in-place construction:

- **Perimeter hardening:** Perimeter walls and vehicle-approach protection.
- **Critical equipment protection:** Enclosures for generators, fuel, switchgear, and cooling infrastructure — the support systems on which uptime depends.
- **Personnel & operations:** Security operations centers and personnel shelters.
- **Rapid deployment:** modularity supports phased build-out and fast hardening of newly identified vulnerabilities without extended construction timelines.
- **Resilience:** waterproof, fire-resistant, and Seismic Rating E (SPS 125) construction suits mission-critical facility standards.

8.3 Electric Utilities & Grid Hardening

Physical attacks on electric substations have risen sharply, and protecting critical grid assets is now both an operational and a regulatory priority. **NERC Reliability Standard CIP-014** requires owners of critical transmission substations and their control centers to assess physical-attack risk and implement security plans; its guidance specifically identifies ballistic protection of critical components as a recognized mitigation against gunfire.⁴ The standard was driven by the 2013 Metcalf substation sniper attack, in which rifle fire disabled multiple transformers.

The Mk 10X supports utility hardening programs through:

- **Critical equipment protection:** Ballistic protection of transformers, control houses, and critical relay/control equipment.
- **Perimeter defense:** Substation perimeter walls engineered to defeat rifle and heavy-caliber fire.
- **Retrofit capability:** Modular enclosures that can be retrofitted to existing, in-service substations with minimal site disruption.
- **Targeted hardening:** consistent with CIP-014 guidance, protection can be allocated to specific critical components rather than the entire site, controlling cost.

Note: CIP-014 applicability and compliance obligations should be confirmed with the utility's own compliance and regulatory teams.

8.4 Additional Applications

- **Government & commercial:** High-security government and commercial facilities.
- **Humanitarian & disaster relief:** Rapidly deployable barriers for relief and humanitarian operations.
- **Infrastructure:** Critical-infrastructure perimeter and structural walls.

⁴NERC Reliability Standard CIP-014 governs physical security of critical transmission substations and control centers. Buyers should confirm current applicability with their compliance teams.

9. Summary

The TITAN Mk 10X delivers independently certified .50 cal BMG protection in a lightweight, modular, field-repairable concrete panel at a cost comparable to high-end Level 8 systems. Its 11-inch hybrid composite has passed UL752 Rev.12 (UL-RF-J) testing, including a supplementary M2AP round, with no penetration and no spall. The platform is engineered for the demands of military force protection, data center and critical-infrastructure security, and NERC CIP-014-driven grid hardening. With 3-inch, 4-inch, and 6-inch variants now in the testing program, the Mk 10X is positioned to serve a broad range of protective applications across these sectors.

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Disclaimer: Ballistic figures for the 11-inch panel reflect specific independent tests under controlled conditions; field performance varies with installation, threat, and environment. Certification applies only to the configurations and standards stated; the 3-inch, 4-inch, and 6-inch panels are not yet UL-certified. This document contains proprietary information of RH Worldwide Ventures, is provided for evaluation purposes, and is subject to the manufacturer's warranty.