DEPARTMENT OF DEFENSE · UFC 4-179-02 COMPLIANT · ETL/UFC CERTIFIED

# TROY ACOUSTICS

SERIOUS. ACOUSTIC. SOLUTIONS.

CORPORATION · EST. 25+ YEARS

# SHOOTING RANGE ACOUSTICS

## FOR THE U.S. MILITARY

USAF · U.S. Army · U.S. Marine Corps · U.S. Navy · US Coast Guard  All DoD Agencies

**The Standard Behind the DoD UFC — Written From Troy's Own Field Data**

ETL Compliant · 18+ USAF Installations · DoD RT60 Guaranteed · Blast Overpressure Reduction Certified

troyacoustics.com | 800-987-3306 | Brunswick, Georgia

# From Field Data to Federal Mandate

How Troy Acoustics data collection became the DoD Unified Facilities Criteria standard

**25+**

USAF ETL/UFC compliant ranges completed

**UFC 4-179-02**

DoD standard built on Troy's acoustic research

**15+ Years**

High-speed digital acoustic data collection on live military ranges

## THE PROBLEM TROY SOLVED

Before Troy Acoustics, there was no recognized standard for shooting range acoustics on military installations. Military personnel were exposed to two serious and under-addressed hazards:

**HEARING DAMAGE**: Prolonged noise exposure from uncontrolled reverberation — shot after shot compounding in hard-walled ranges with no acoustic treatment.

**BLAST OVERPRESSURE**: The pressure wave from each fired weapon impacts the entire body. In an untreated concrete range, that pressure reflects off every surface and compounds with each shot — creating total body pressure loads that exceed safe thresholds and are linked to cardiovascular, neurological, and long-term physiological harm.

## TROY DATA → DOD UFC STANDARD

Over 15+ years, Troy engineers collected comprehensive acoustic and pressure data on military ranges using high-speed digital recording equipment — including personal-mounted pressure sensors worn by shooters to measure actual blast overpressure on the body.

That dataset was submitted to and reviewed by the U.S. Department of Defense. The criteria Troy developed are now codified in DoD Unified Facilities Criteria UFC 4-179-02 — the mandatory standard governing all new range construction on military installations.

Troy was the first to pioneer psi and psi(t) blast overpressure measurement in ranges, developing the custom measurement modules now offered to qualified military and research institutions.

# Blast Overpressure — Protecting the Whole Warfighter

Troy System absorption dramatically reduces psi(t) pressure on the body — Fort Bragg, NC verified data

## Blast Overpressure (BOP) & psi(t) — What They Mean for Personnel

psi(t) — Pound-Force per Square Inch Time — is the integral of the pressure curve over the full event duration. It captures total pressure energy absorbed by the body, not just peak pressure. Troy Acoustics pioneered this metric for shooting range evaluation. MIL-STD-1474D addresses hearing conservation only — Troy's work goes further, measuring the full-body physiological impact.

**BOP exposure is linked to:**

- Hypertension and cardiovascular stress
- Neurological effects — headaches, TBI risk, cognitive impairment
- Anxiety, sleep disturbance, mood and judgment disruption

## FORT BRAGG, NC (SOF SPECIAL FORCES COMPLEX) — BEFORE vs. AFTER TROY SYSTEM

Pre- and post-installation testing was conducted at Fort Bragg, NC using Troy's high-speed 16-channel digital recording system with personal pressure sensors mounted on shooters and at body-level positions. The range RT60 was reduced from 4.62 seconds to 0.85 seconds (544% improvement). The following psi(t) data shows the corresponding reduction in total body blast overpressure:

### 1 Shooter — SAW 5.56 Auto (6 rounds, prone, Lane 7)

| BEFORE | AFTER |
|---|---|
| 3,873 psi(t) | 563 psi(t) |

**688% improvement**

Exposure time: 2.9 sec → 1.0 sec

### 7 Shooters — M4 5.56 (simultaneous, Lanes 1,3,5,7,9,11,13)

| BEFORE | AFTER |
|---|---|
| 10,746 psi(t) | 680 psi(t) |

**1,581% improvement**

Exposure time: 3.0 sec → 1.2 sec

### 2 Shooters — M240 7.62 Auto (6 rounds, prone, 25m line)

| BEFORE | AFTER |
|---|---|
| 12,680 psi(t) | 2,673 psi(t) |

**474% improvement**

Exposure time: 3.7 sec → 1.7 sec

## FEDERAL LAW — BLAST OVERPRESSURE SAFETY ACT (S.4109 / H.R.8025)

Congress recognized Blast Overpressure as a federal health crisis in the 118th Congress (2023–2024), requiring the Secretary of Defense to report annually on the number of Armed Forces members impacted by BOP, and the Commander of U.S. Special Operations Command to report on brain health impacts. Troy Acoustics' psi(t) measurement methodology and BOP reduction data directly support this congressional mandate.

*The Troy System's high-absorption properties absorb gunfire energy rather than allowing it to reflect and compound. The reduction in RT60 directly reduces psi(t) blast overpressure — protecting the whole warfighter, not just their hearing. Troy offers its custom psi(t) measurement modules to qualified DoD research institutions.*

# The Troy System — Certifications No Competitor Can Match

UL certified, DoD validated, USAF approved, BOP verified — the only complete solution in the market

| ZERO (0) | ZERO (0) | 20+ Years |
|---|---|---|
| Flame Spread — UL R27255 | Smoke Developed — UL R27255 | Continuous UL Certification |

***No competing system holds this certification. Competitors do not even have materials that comply with ASTM E84 Class A.***

### Blast Overpressure — Ft. Bragg Certified

Troy pioneered psi(t) measurement for shooting ranges. At Fort Bragg, Troy reduced psi(t) by 474%–1,581% across weapon types. No other acoustic system has measured or documented BOP reduction.

### UFC 4-179-02 RT60 Compliance

Troy guarantees the DoD requirement of RT60 ≤ 1.3 seconds post-construction. Sole source specifications available. Fort Bragg achieved 0.85 sec — beating the 1.3 sec mandate by 35%.

### USAF Anti-Ricochet Certified

Independently tested at Lackland AFB by HQ AFSFC. Approved for 9mm, 5.56mm, 7.62mm ball, frangible, and tracer rounds. Replaces FR plywood — no other system has this clearance.

### NRC & USACE Ratings

NRC 1.0 (absorption ceiling) · NRC 0.89 (walls) · NRC 0.85 (baffles). The only acoustic system rated Excellent by the USACE following a comprehensive case study — driving USACE procurement specs.

### Anti-Microbial & Anti-Fungal

ASTM E2180: 99.9999% reduction of S. aureus and K. pneumoniae. ASTM G21: zero fungal growth over 28 days across all 5 test fungal species. Critical for high-throughput military training ranges.

### 5-Year Warranty + Pre/Post Testing

Troy engineered designs include a 5-Year Materials Replacement Warranty covering bullet strikes, plus mandatory pre and post acoustic testing to certify UFC and ETL compliance.

# Military Installations & Range Solutions

A proven partner across every branch of the U.S. Armed Forces

### DoD UFC Indoor Ranges

- RT60 ≤ 1.3 sec guaranteed post-install
- BOP reduction — Fort Bragg certified
- Full baffle, ceiling & wall coverage
- 1" Troy Board + 2" Troy Wool system
- Sole source specs available

### Outdoor Baffled Ranges

- Meets OSHA CFR29 & ETL 11-18
- Anti-ricochet — no FR plywood needed
- Complete baffle system design
- Pre & post acoustic testing included
- Maxwell AFB, Barksdale AFB certified

### Modular Range Systems

- First UFC 4-179-02 compliant modular range
- Rapid deployment capability
- Sole source procurement available
- Pre-engineered for full UFC compliance
- Compatible with any target system

### Acoustic Canopy & Roof

- USMC: 3–6 dB reduction for multiple shots
- Canopy retrofit for existing structures
- LED dimmable for low-light operations
- AR steel lining available
- SDZ/VDZ ballistic containment

### ETL / UFC COMPLIANT USAF INSTALLATIONS

- Andrews AFB (Joint Base Andrews)
- Barksdale AFB
- Eglin AFB
- Kadena AB (Japan — sole-sourced) · Misawa AB Japan (sole-sourced)
- Keesler AFB
- Maxwell AFB
- Offutt AFB
- Patrick AFB · Tyndall AFB · Whiteman AFB · Wright-Patterson AFB

### U.S. ARMY · USMC · FEDERAL AGENCIES

- Fort AP Hill · Fort Bragg (sole-sourced)
- Fort Campbell (sole-sourced)
- Fort Carson (sole-sourced) · Fort Drum
- Fort Lewis · Parris Island (USMC)
- USMC Miramar · USMC Camp Lejeune · USMC Camp Lejeune MARSOC
- FBI Headquarters & FBI Quantico
- U.S. Secret Service
- U.S. Customs & Border Protection

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