



TEST REPORT

T.REX Titan Holster Environmental Test Report | May–June 2026 | Revision 0

T.REX ARMS, Inc. Titan Holster Environmental Testing Report

Tests Conducted May 18 – June 29, 2026

Report Published July 15, 2026



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This testing was performed in-house to observe the Titan Holster's durability and was not performed on equipment that has been scientifically certified and calibrated. It is not equivalent to, and should not be interpreted as, certified or accredited laboratory testing.



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Document History

Rev	Date	Change	Name
0	07/15/26	Initial Version	Isaac Rodriguez, Test Engineer; Rayburn Wisdom, Test Technician

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INTRODUCTION

The purpose of environmental testing on the Titan Holster is to identify harsh environmental conditions in habitable parts of the earth, apply those to the holster in an aggravated but controlled manner, and evaluate their effect on the functionality and longevity of the holster through simple tests. Rather than adhering to or referencing a holster-specific standard, testing was built as an analysis of cause and effect on the Titan Holster.

Data points were gathered with a written data log, photos, and electronic data logger exports.

Summary of Results

The Titan Holster remained functional at the end of every test.

Notes

- T.Rex Arms, Inc. is not an accredited laboratory.
- This test report does not adhere to any recognized standard.
- Testing was performed using equipment that was not traceably calibrated. Equipment was chosen based on availability at time of testing.

Environmental Conditioning Equipment

HEATING

- For test methods 1, 2, 4, 9, 10, and 11, Thermo Scientific Incubators were used, using ambient air. These units can maintain a high temperature within the chamber and generate humidity and control via relative humidity measurements.
- For test method 5, the salt fog machine maintains the chamber temperature.

COOLING

- For test methods 3, 4, and 11, a Thermo Scientific Ultra Low Freezer was used. This freezer maintains ultra-cold temperatures.
- For test method 8 chamber temperature, a basic display freezer was used.
- For test method 8 water temperature, a water chiller was used to maintain water in a reservoir at a chilled temperature.
- For test method 10 air cooling, a muffin fan was connected to a digital thermostat.

SALT FOG

- A 47L salt fog machine with variable chamber temperature, saturation barrel temperature, and air pressure. Fallout rate is measured manually via a funnel and receptacle.



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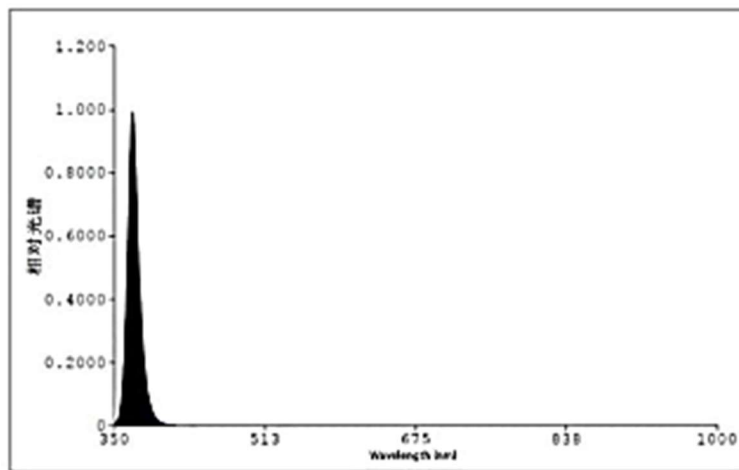
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FREEZING RAIN

- A pressure pump and valve were used to pump chilled water into a spray nozzle. A pneumatic piston was used to move the nozzle over a collection bin during off-water cycles. The pump, valve, and piston were controlled by a simple digital timer.

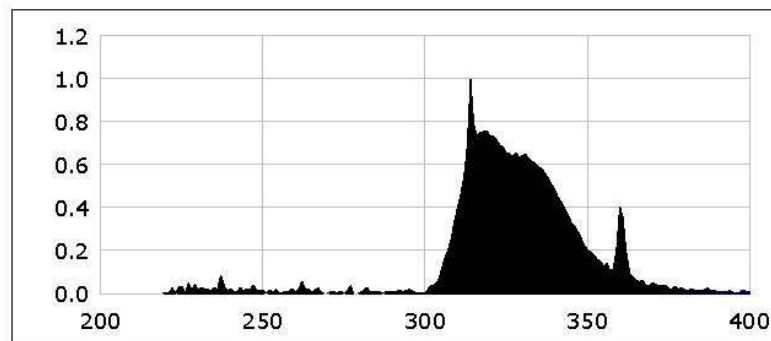
LIGHT

- For test methods 9 and 11, the following light sources were used. Energy for these lights was channeled through an analog timer to replicate diurnal cycles.
 - A UV-A 265-watt LED light panel was used. This light panel generates most of its radiance at 365nm.



- Two UV emitting 23-watt fluorescent bulbs were used. These are rated to emit both UV-A and UV-B.

Spectral Power Distribution Curve

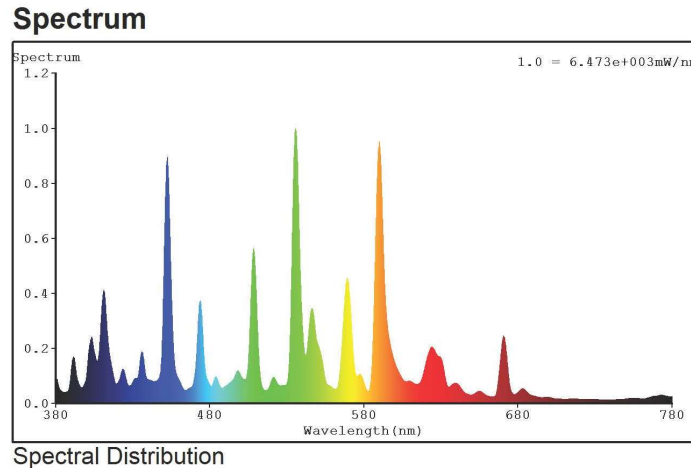


- For test method 10, the following light source was used. Energy for this light was channeled through an analog timer to replicate diurnal cycles.
 - A single 1000W metal halide lamp with an adjustable ballast, set to 100%.



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MEASUREMENT

- For temperature and humidity, Hioki data loggers were used. Probes were one of the following:
 - Type T exposed thermocouple.
 - Type T immersible stainless-steel thermocouple.
 - Combined temperature and humidity probe.
- For irradiance measurement, the following radiometers were used:
 - For UV measurement, a unit with a 0-199.9 mW/cm² range.
 - For visible measurement, a unit with a 0-1999 W/m² range.

Material

DUST

- Silica flour was used that was rated at 250 mesh (around 59µm).

SAND

- Quartz sand was used that was rated at a 70-20 mesh range (around 210-849µm).

WATER

- For test methods 2, 5, and 11, purified or distilled water was used. Only distilled water was used for making the salt solution in test method 5.
- For test method 8, tap water was used.

Tolerances

The “Detailed Environmental Test Plan” followed for testing has some parameters with tolerances and some without. An effort was always made to get as close to the requested parameter as possible with available measurement methods. The tolerances are meant to keep parameters in a range that help ensure that the purpose of the conditioning and testing is met. During mid-line tests or measurements (during conditioning), conditions would go outside parameters momentarily and return upon completion of the test.



BASELINE TESTS

Simple Function Test

OVERVIEW

This is a baseline test to compare all other simple function tests against.

TECHNIQUE

It is done by performing a controlled unholstering. All movements should be smooth and without any twisting or forcing. The holster can be held with a hand or mounted using the mounting area of the holster.

Schedule

Test Date: 2026-06-29

RESULTS

- Unit 75 – Holster functioned as designed.
- Unit 76 – Holster functioned as designed.

Ultimate Load Test

OVERVIEW

This test is more of a strength analysis of the active retention mechanism rather than a pass/fail test.

SETUP

It is performed by mounting the holster (via the mounting area of the holster) and pulling the firearm in as straight a direction as possible, until the firearm breaks free. The holster can then be analyzed for location and cause of breakage. Peak pound force is measured and recorded. This is a simple setup designed to get a general reading on the pull strength on the holster. The equipment used is not as precise as a uniaxial tensile test but sufficed for a general comparison across test methods.

Schedule

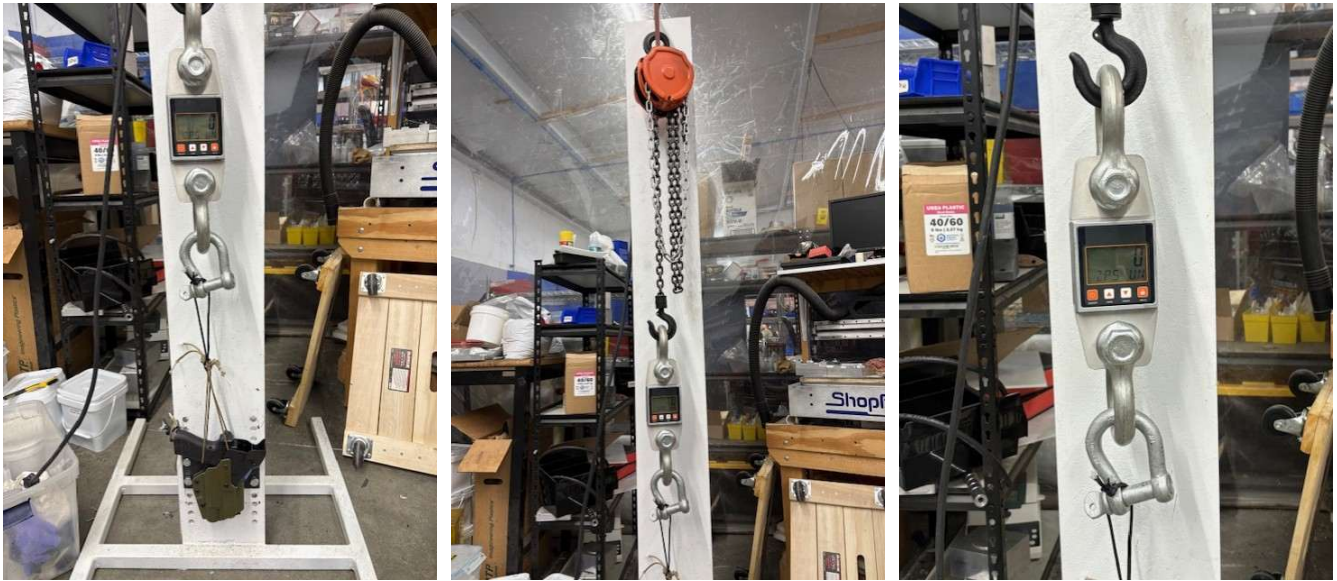
Test Date: 2026-06-29



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Photos



RESULTS

- Unit 78 – 502 Lbf
- Unit 79 – 474 Lbf



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ENVIRONMENTAL CONDITIONING TESTS

1. High Temperature - Dry

INTRODUCTION

A simple product conditioning of continuous heat that replicates some of the hottest open area conditions in the world, with resulting tests that analyze the effect of the heat on the functionality and strength of the holster.

SETUP

Description

The test is conducted in a high temperature chamber that generates and maintains its own high temperature and air movement. The chamber remains closed during the duration of the conditioning process at all times, except for specified testing periods.

The temperature and relative humidity probe is located near the holsters, not touching the sidewalls of the chamber.

Specs

- Thermo Scientific 3950 Incubator
- LR8514 Data Logger with LZ2011 temperature and humidity probe
- Test Unit SN and Description:
 - Unit 26
 - Unit 27
 - Unit 28
 - Unit 29

Photos





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CONDITIONING

Parameters

1. Temperature: 140 ± 15 °F
2. Humidity: 0–30% RH
3. Cycles: 7×24 -hour cycles

Schedule

- Condition Start Time: 08:23
- Conditioning Date Range: 2026-06-09 through 2026-06-16
- Total Conditioning Time Under Required Parameters: 168.95 hours

TESTING

Parameters

1. Once the cabinet has stabilized at temperature and RH, insert test item (without firearm).
2. After 72 hours, perform a simple function test.
3. After all cycles and stabilization at ambient temperature, perform an ultimate load test.

Results

Holster(s) functioned as designed with no detrimental effects from the conditions.

INTERRUPTIONS

None noted.

DATA

- Temperature Range (outside warm-up and mid-line test): $137^{\circ} - 138^{\circ}$ F
- Relative Humidity (outside warm-up and mid-line test): 10% – 13% RH
- Simple Function Test Result: Holster(s) functioned as designed with no detriment.
- Ultimate Load Test:
 - Unit 26 – 496 Lbf
 - Unit 27 – 546 Lbf
 - Unit 28 – 560 Lbf
 - Unit 29 – 458 Lbf

Log

Date and time recorded for holster positions, serial numbers, start and end times, function and ultimate load test results.

Raw Data

CSV and LUW files with chamber temperature and humidity measurements every 5 seconds.

CONCLUSIONS

Elevated temperature with low humidity within the measured parameters had no major effect on the function or durability of the Titan Holster.



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2. High Temperature - Humid

INTRODUCTION

A simple product conditioning with a combination of continuous heat and humidity that replicates some of the hottest, most humid conditions in the world, with resulting tests that analyze the effect of heat and humidity combination on the functionality and strength of the holster.

SETUP

Description

The holsters are situated with the mounting area facing downward, on the incubator shelf. They do not need to be rotated in any particular direction. They need to be in the center of the shelf, with at least 0.75 inches between holsters.

Specs

- Thermo Scientific 3950 Incubator
- LR8514 Data Logger with LZ2011 temperature and humidity probe
- Test Unit SN and Description:
 - Unit 5
 - Unit 6
 - Unit 7
 - Unit 8

Photos





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CONDITIONING

Parameters

1. Temperature: 140 ± 15 °F
2. Humidity: 80–100% RH
3. Cycles: 7×24 -hour cycles

Schedule

- Condition Start Time: 16:26
- Conditioning Date Range: 2026-05-18 through 2026-05-26
- Total Conditioning Time Under Required Parameters: 184.32 hours

TESTING

Parameters

1. Once the cabinet has stabilized at temperature and RH, insert test item (without firearm).
2. After 72 hours, perform a simple function test.
3. After all cycles and stabilization at ambient temperature, perform an ultimate load test.

Results

Holster(s) functioned as designed with no detrimental effects from the Humid-High Temperature conditions. Unit 7, an outlier, had moderately lower ultimate load results, but still met internal thresholds.

INTERRUPTIONS

None noted.

DATA

- Temperature Range (outside warm-up and mid-line test): $138^{\circ} - 139^{\circ}$ F
- Relative Humidity Range (outside warm-up and mid-line tests): 92% – 96% RH
- Simple Function Test Result: Holster(s) functioned as designed.
- Ultimate Load Test:
 - Unit 5 – 344 Lbf
 - Unit 6 – 326 Lbf
 - Unit 7 – 206 Lbf
 - Unit 8 – 380 Lbf

Log

Date and time recorded for holster positions, serial numbers, start and end times, function and ultimate load test results.

Raw Data

CSV and LUW files with chamber temperature and humidity measurements every 5 seconds.

CONCLUSIONS

Elevated temperature with high humidity within the measured parameters had no major effect on the function or durability of the Titan Holster.



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3. Low Temperature

INTRODUCTION

A simple product conditioning of low temperature that replicates some of the coldest conditions in the world, with resulting tests that analyze the effect of cold on the functionality and strength of the holster.

SETUP

Description

The holster is set in the chamber, with the mounting portion downward. The holster should not touch the walls of the freezer.

Specs

- Thermo Scientific TSU600D Freezer
- LR8515 Logger with a Type T thermocouple
- Test Unit SN and Description:
 - Unit 59
 - Unit 60
 - Unit 61
 - Unit 62

Photos





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CONDITIONING

Parameters

1. Temperature: -60 ± 10 °F
2. Soak Time: 72 hours

Schedule

- Condition Start Time: 7:15
- Conditioning Date Range: 2026-06-04 through 2026-06-12
- Total Conditioning Time Under Required Parameters: 191.78 hours

TESTING

Parameters

1. After the test item has been inserted (without firearm) and conditioned for 2 hours, perform a simple function test with a gloved hand.
2. After 72 hours of conditioning, perform another simple function test with a gloved hand.
3. Once the item has stabilized at ambient conditions, perform an ultimate load test.

Results

Holster(s) functioned as designed with no detrimental effects from the Low Temperature conditions.

INTERRUPTIONS

During last hour of test, freezer temperature rose by around 35°F. However, the test was already significantly beyond time parameters.

DATA

- The LR8515 data logger malfunctioned during this test. The built-in freezer RTD information was used to get full data.
- Temperature Range: -60° – -55° F (last test hour rose to -24° F)
- Simple Function Test Result: Holster(s) functioned as designed with no detrimental effects.
- Ultimate Load Test:
 - Unit 59 – 412 Lbf
 - Unit 60 – 314 Lbf
 - Unit 61 – 444 Lbf
 - Unit 62 – 468 Lbf

Log

Date and time recorded for holster positions, serial numbers, start and end times, function and ultimate load test results.

Raw Data

CSV file with chamber temperature measurements every 1 minute.

CONCLUSIONS

Low temperature conditioning within the measured parameters had no major effect on the Titan Holster.



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4. Combined Sequential: Low Temperature (I) – High Temperature (II)

INTRODUCTION

The purpose of this test is to analyze the combined effect of two extreme conditions on the functionality and durability of the holster. It is accomplished when the specified testing periods have been completed, testing has been conducted, and all information documented.

SETUP

Description

Combined Sequential Low Temperature and High Temperature is a combined conditioning of the holsters under first, an extreme low temperature and then, a high temperature for a prolonged period of time.

Specs

- Thermo Scientific 3950 Incubator
- LR8514 Data Logger with LZ2011 temperature and humidity probe (hot only)
- Thermo Scientific TSU600D Freezer
- LR8515 Logger with a Type T thermocouple (cold only)
- Test Unit SN and Description:
 - Unit 13
 - Unit 14
 - Unit 16
 - Unit 17

Photos





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CONDITIONING

Parameters

1. Low Temperature (I)
 - a. Temperature: -60 ± 10 °F
 - b. Soak Time: 72 hours
2. High Temperature (II)
 - a. Temperature: 140 ± 15 °F
 - b. Humidity: 0–30% RH
 - c. Cycles: 7×24 -hour cycles

Schedule

- Condition Start Time: 13:42
- Conditioning Date Range: 2026-05-19 through 2026-06-24 (Tests were not back-to-back due to other testing in place.)
- Total Low Temperature Conditioning Time Under Required Parameters: 161.83 hours
- Total High Temperature Conditioning Time Under Required Parameters: 191.8 hours

TESTING

Parameters

1. Condition the test items (without firearm) in the cold chamber for 72 hours.
2. Once the test items have stabilized at ambient temperatures, move them to the heat chamber.
3. Condition in high temperatures for 7 days, then perform a simple function test.
4. After stabilization at ambient conditions, perform an ultimate load test.

Results

Combined sequential low temperature and high temperature conditioning within the measured parameters had no major effect on the Titan Holster.

INTERRUPTIONS

None noted.

DATA

- Temperature Range (outside warm-up and mid-line test): Cold: -63°F – -60°F , Hot: 138°F – 139°F
- Relative Humidity Range (outside warm-up and mid-line test): Hot: 10% – 12% RH
- Simple Function Test Result: Holster(s) functioned as designed with no detrimental effects.
- Ultimate Load Test:
 - Unit 13 – 500 Lbf
 - Unit 14 – 590 Lbf
 - Unit 16 – 530 Lbf
 - Unit 17 – 444 Lbf

Log

Date and time recorded for holster positions, serial numbers, start and end times, function and ultimate load test results.



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Raw Data

CSV and LUW files with 1) hot: chamber temperature and humidity measurements every 5 seconds, and 2) cold: chamber temperature every 1 second.

CONCLUSIONS

Low temperature – High temperature conditioning within the measured parameters had no major effect on the Titan Holster.



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5. Salt Fog

INTRODUCTION

The Salt Fog test simulates a corrosive atmosphere found in coastal/marine environments with high humidity and salinity.

SETUP

Description

The Salt Fog test method is a conditioning of the holsters to a salt/water solution fog with intermittent drying cycles. The purpose of this test is to analyze the effect of salt buildup and the corrosive effect of salt on the holster. It is accomplished when the specified cycles have been completed, testing has been conducted, and all information documented.

Specs

- A single JK-60B 47L salt fog testing chamber.
- LR8515 Logger with Type T Thermocouple
- Test Unit SN and Description:
 - Unit 66
 - Unit 67
 - Unit 68
 - Unit 69

Photos





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CONDITIONING

Parameters

1. $5 \pm 3\%$ salt solution
2. Purified or distilled water
3. Temperature: 95 °F
4. Fallout receptacle rate: .6 – 2.0 mL/hr
5. Cycles: 8 alternating 24-hour cycles (wet/dry)

Schedule

- Condition Start Time: 9:42
- Conditioning Date Range: 2026-06-02 through 2026-06-11
- Total Conditioning Time Under Required Parameters: 221.68 hours (wet and dry cycles)

TESTING

Parameters

1. Condition test items (without firearm) in alternating 24-hour cycles of salt fog and drying.
2. After all cycles are completed, conduct a visible inspection and document corrosion or material changes.
3. Perform a simple function test three times and record results.

Results

After the third cycle, it was noted that the internal mechanism mechanical properties started to become affected. Since the mechanism spring is fully plastic, this was likely caused by thermal and hygric expansion combined with salt deposits on low tolerance early production parts. The internal mechanism engaged on the test gun but lost some functionality from reduced spring return until the holster had returned to ambient temperatures. Unit 68 exhibited lower ultimate load results as an outlier.

INTERRUPTIONS

None noted.



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DATA

- Chamber Temperature Range (outside warm-up and dry cycles): 91° F – 95° F
- Simple Function Test Result: Holster(s) functioned as designed with reduced response time (see note above).
- Ultimate Load Test:
 - Unit 66 – 298 Lbf
 - Unit 67 – 284 Lbf
 - Unit 68 – 154 Lbf
 - Unit 69 – 334 Lbf

Log

Date and time recorded for holster positions, serial numbers, start and end times, function and ultimate load test results.

Raw Data

CSV and LUW files with chamber temperature measurements every 5 seconds.

CONCLUSIONS

Salt Fog conditioning had minimal effect on holster function. Slight degradation in the internal mechanism was noted. However, full holster function returned once components were removed and exposed to ambient air for less than 24 hours. Screw surface rust did not affect holster function or strength.



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6. Dust

INTRODUCTION

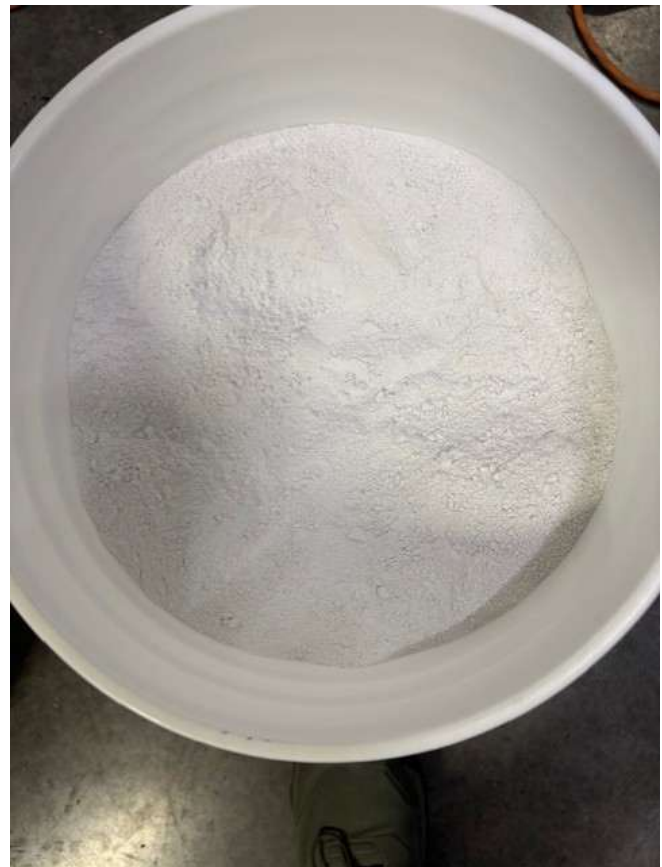
The dust test is a simple submersion of the holster in fine dust. The purpose is to analyze the buildup effect of dust that is a common size for “blowing dust” around the world, on the functionality of the holster.

SETUP

Specs

- A sealed bucket with fine silica flour (250 mesh, 59 microns).
- Test Unit SN and Description:
 - Unit 15
 - Unit 71

Photos





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TESTING

Parameters

1. With firearm engaged, fully submerge holster in dust. Move the holster in all directions to allow dust to enter all openings and fill holster cavities. Do not manually force dust into holster.
2. Remove the holster from the dust and perform a simple function test without removing dust.
3. If unholstering is not possible, document the dislodging method and attempt again.
4. Repeat until successful unholstering occurs.

Results

Silica (Dust) conditioning did not change the function of the Titan Holster.

INTERRUPTIONS

None noted.

CONCLUSIONS

Silica (Dust) testing within the measured parameters had no major effect on the Titan Holster.



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7. Sand

INTRODUCTION

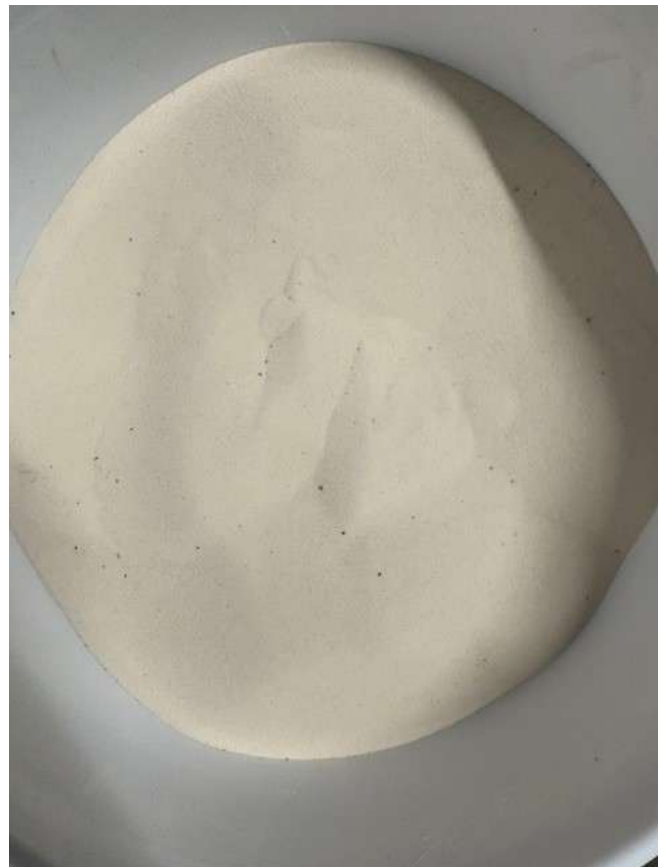
The sand test is a simple submersion of the holster in sand. The purpose is to analyze the buildup effect of sand that is a common size for “blowing sand” around the world, on the functionality of the holster.

SETUP

Specs

- A sealed bucket with quartz sand (70-20 mesh, 210-849 microns)
- Test Unit SN and Description:
 - Unit 80
 - Unit 81

Photos





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TESTING

Parameters

1. With firearm engaged, fully submerge holster in sand. Move the holster in all directions to allow sand to enter all openings and fill holster cavities. Do not manually force sand into holster.
2. Remove the holster from the sand and perform a simple function test without removing sand.
3. If unholstering is not possible, document the dislodging method and attempt again.
4. Repeat until successful unholstering occurs.

Results

Sand testing within the measured parameters had no major effect on the Titan Holster.

INTERRUPTIONS

None noted.

CONCLUSIONS

The introduction of sand had a negligible effect on the internal mechanism and holster function. Slight resistance was noted on the internal mechanism, but the resistance did not hinder function.



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8. Freezing Rain

INTRODUCTION

Freezing Rain is, as named, a replication of freezing rain on the holsters. The purpose of this test is to analyze the effect of freezing-rain accretion on the functionality of the holster. It is accomplished when the specified thickness of ice has accumulated, testing has been conducted, and all information documented.

SETUP

Description

The holster needs to be oriented in the up position, as mounted on a person. Two of the units will have the optic cover open, and two units will have the optic cover mounted and engaged.

Specs

- MinusForty 43-UDGF Freezer
- LR8515 Logger with Type T Thermocouple (chamber temperature)
- LR8515 Logger with Type T immersible probe (water inlet temperature)
- AS-AY300 Water Chiller
- Water pump
- Cycle timer
- Mist nozzle
- Pneumatic piston for drip control
- Test Unit SN and Description:
 - Unit 22
 - Unit 23
 - Unit 24
 - Unit 25

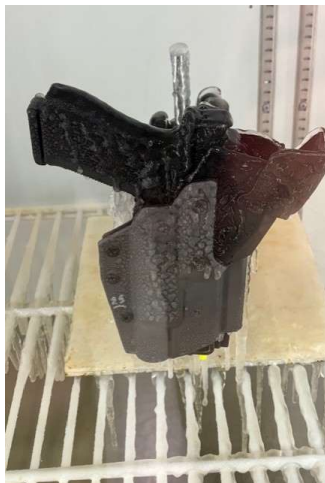
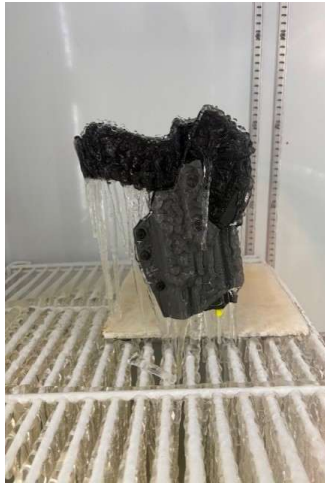
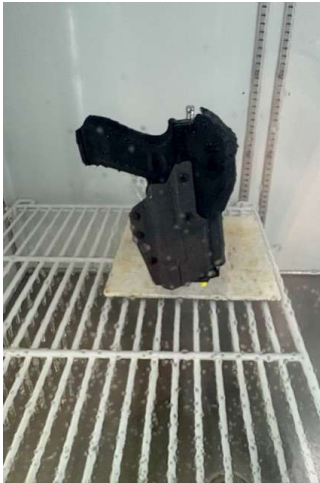
Photos





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CONDITIONING

Parameters

1. Position the holster vertically with installed firearm; spray from above.
2. Insert unconditioned holster to allow ingress of water into holster cavities before freezing occurs.
3. Lower chamber to target temperature and continue spray until ice measures 0.125 – 0.25 inches on a surface that is near horizontal.
4. Allow holster to freeze solid before testing.

Schedule

- Conditioning Date Range: 2026-05-29 through 2026-06-03
- Total Freezing Rain Conditioning Time Under Required Parameters:
 - Unit 23 – 4.05 Hours
 - Unit 22 – 3.63 Hours
 - Unit 24 – 4.03 Hours
 - Unit 25 – 4.70 Hours

TESTING

Parameters

1. Without thawing, perform a simple function test three times and record results.



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2. If unholstering fails, remove ice using a simple mechanical method (e.g., closed-fisted bump) and record details.
3. Repeat above steps three times while increasing deicing, or until successful unholstering.

Results

Freezing rain conditioning within the measured parameters had minimal impact on the function of the button and spring mechanism of the Titan Holster. The internal mechanism continued to function, even with ice build-up. The light and gun froze to the Kydex portion of the holster, which required multiple impacts to break the gun free.

INTERRUPTIONS

None noted.

DATA

- Temperature Range:
 - Unit 23 - Chamber: 9° – 49° F (after initial drop); Input Water Temp: 30° – 60° F (during water-on periods, after initial drop)
 - Unit 22 - Chamber: 14° – 41° F (after initial drop);
 - Unit 24 - Chamber: 5° – 42° F (after initial drop); Input Water Temp: 38° – 49° F (during water-on periods, after initial drop)
 - Unit 25 - Chamber: -2° – 33° F (after initial drop); Input Water Temp: 38° – 41° F (during water-on periods, after initial drop)
- Simple Function Test Result: nearly zero impact to mechanism function; Kydex portion required further effort to release gun.
- Ultimate Load Test:
 - Unit 23 – 446 Lbf
 - Unit 22 – 476 Lbf
 - Unit 24 – 406 Lbf
 - Unit 25 – 455 Lbf

Log

Date and time recorded for holster positions, serial numbers, start and end times, function and ultimate load test results.

Raw Data

CSV and LUW files with chamber temperature measurements every 1 second and water temperature measurements every 5 seconds.

CONCLUSIONS

The freezing rain conditioning impacted the function of the holster moderately. The internal mechanism had approximately 0.25 inches of ice buildup. This was released on the second activation of the internal mechanism. The test gun and light combination had ice buildup in the internal areas that required several direct impacts to remove the ice. Under this extreme simulation, the holster continued to function once a portion of the ice was removed. Of note, the firearm could not be cycled or operated under these conditions as well.



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9. UV Radiation

INTRODUCTION

The purpose of this test is to apply aggravated UV radiation (higher levels than that of the sun) and analyze its effect on the longevity of the holster.

SETUP

Description

UV Radiation is exposure of high UV radiation to the holster for a prolonged period of time. It is accomplished when the specified timeframe has passed under full irradiance; testing has been conducted, and all information documented.

Specs

- Thermo Scientific 3950 Incubator
- LR8514 Data Logger with LZ2011 temperature and humidity probe
- An electrical timer is used to turn the light sources on and off at specified time intervals.
- One UVA LED light bank is used to supply the majority of UV radiation. This light has a concentrated 365nm and has a supplied fan to keep the panel cool.
- Two E26 bulbs are used to add a little UVB irradiance. They also produce some UVA.
- Test Unit SN and Description:
 - Unit 18
 - Unit 19
 - Unit 20
 - Unit 21

Photos





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CONDITIONING

Parameters

1. ≥ 135 W/m² total UV
2. Air temperature target: 120 ± 20 °F
3. Test-item max temperature: 150 °F (priority limit)
4. Cycles: 5 × 24-hour cycles (20 h light, 4 h dark)

Schedule

- Condition Start Time: 16:02
- Conditioning Date Range: 2026-05-26 through 2026-06-01
- Total Conditioning Time Under Required Parameters: 135.45 hours

TESTING

Parameters

1. Place test items (without firearm) in the conditioned cabinet.
2. After 72 hours, perform a simple function test.
3. After all cycles and stabilization at ambient temperature, perform an ultimate load test

Results

UV Radiation testing within the measured parameters had no major effect on the Titan Holster.

INTERRUPTIONS

None noted.

DATA

- Chamber Temperature Range (outside warm-up and mid-line test): 118° – 138° F
- Chamber Relative Humidity Range (outside warm-up and mid-line test): 11% – 19% RH
- Recorded UV Irradiance Levels: 41.7 – 78 mW/cm²
- Simple Function Test Result: Holster(s) functioned as designed with no detriment.
- Ultimate Load Test:
 - Unit 18 – 418 Lbf
 - Unit 19 – 508 Lbf
 - Unit 20 – 504 Lbf
 - Unit 21 – 458 Lbf

Log

Date and time recorded for holster positions, serial numbers, start and end times, function and ultimate load test results, irradiance measurements.

Raw Data

CSV and LUW files with chamber temperature and humidity measurements every 5 seconds.

CONCLUSIONS

The UV conditioning had no effect on the internal mechanism.



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10. High Heat - Solar Radiation

INTRODUCTION

The purpose of this test is to apply full solar radiation (levels at highest sunlight) and analyze its effect on the longevity of the holster.

SETUP

Description

Solar Radiation is exposure of relatively full-spectrum radiation to the holster for a prolonged period of time. It is accomplished when the specified timeframe has passed under full irradiance, testing has been conducted, and all information documented.

Specs

- Thermo Scientific 3950 Incubator
- LR8514 Data Logger with LZ2011 temperature and humidity probe (chamber temperature)
- LR8515 Data Logger with Type T Thermocouple (holster temperature)
- An electrical timer is used to turn the light sources on and off at specified time intervals.
- A single 1000W full spectrum Metal Halide lamp is used to produce solar radiation.
- A MH ballast made to accommodate the above lamp is used.
- A cooling thermostat controls a fan (facing the holsters) to keep the holsters under the specified threshold. A thermocouple probe from the thermostat goes into the holster to trigger the thermostat when the holster gets too hot.
- Test Unit SN and Description:
 - Unit 1
 - Unit 2
 - Unit 3
 - Unit 4

Photos





TEST REPORT

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CONDITIONING

Parameters

1. Irradiance: 1120 W/m² total
2. Air temperature target: 120 ± 20 °F
3. Holster temp: 150 °F (priority limit)
4. Cycles: 5 × 24-hour cycles (20 h light, 4 h dark)

Schedule

- Condition Start Time: 15:16
- Conditioning Date Range: 2026-05-18 through 2026-05-26
- Total Conditioning Time Under Required Parameters: 184.33 hours

TESTING

Parameters

1. Place test items (without firearm) in the conditioned cabinet.
2. Place the thermocouples from the data logger and thermostat inside one of the holsters, against the Kydex, facing toward light source, with some thermal paste.
3. Leave the chamber door open to keep the chamber temperature from rising too high.
4. After 72 hours, perform a simple function test.
5. After all cycles and stabilization at ambient temperature, perform an ultimate load test.

Results

High heat combined with Solar radiation testing within the measured parameters had no major effect on the Titan Holster. Ultimate load tests produced lower results but still above internal threshold. Some discoloration of the Kydex was noted.

INTERRUPTIONS

Holster temperature rose momentarily beyond temperature limit. To learn from increased aggressiveness of the conditions, the test was continued to completion.

DATA

- Chamber Temperature Range (outside warm-up and mid-line test): 77° – 138° F
- Chamber Relative Humidity Range (outside warm-up and mid-line test): 11% – 45% RH



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- Holster Temperature Range (outside warm-up and mid-line tests and measurements): 77° – 160° F
- Simple Function Test Result: Holster(s) functioned as designed with no detriment.
- Ultimate Load Test:
 - Unit 1 – 255 Lbf
 - Unit 2 – 256 Lbf
 - Unit 3 – 244 Lbf
 - Unit 4 – 382 Lbf

Log

Date and time recorded for holster positions, serial numbers, start and end times, function and ultimate load test results, irradiance measurements.

Raw Data

CSV and LUW files with chamber and holster temperature and humidity (chamber only) measurements every 5 seconds.

CONCLUSIONS

The solar conditioning had no effect on the internal mechanism. “Browning” of the Kydex was observed as indicated in the pictures. The solar light produced heat that exceeded test parameters. The excess heat deformed the Kydex. Despite the deformation, the holster functioned as designed. Ultimate load test results were somewhat lower than others. This test was rerun later with increased cooling to keep holster temperature down, resulting in higher ultimate load test results.



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11. Combined Sequential: Low Temperature (I) – Humid, High Temperature, UV Radiation (II)

INTRODUCTION

This combined sequential test is a combination of extreme cold conditioning and then high and humid heat with high UV radiation exposure to the holster for a prolonged period of time. The purpose of this is to apply the worst conditions for polymers to the holster, and analyze their effect on the longevity of the holster. It is accomplished when all cycles are completed, testing has been conducted, and all information documented.

SETUP

Description

1. The holsters are situated with mounting area facing downward, on the freezer or incubator shelf.
2. For the heat/UV portion, the holsters need to be rotated periodically to get the same amount of irradiance (from the LEDs and bulbs).

Specs

- Low Temperature
 - Thermo Scientific TSU600D Freezer
 - LR8515 Logger with a Type T thermocouple
- Humid – High Temperature – UV Radiation
 - Thermo Scientific 3950 Incubator
 - LR8514 Data Logger with LZ2011 temperature and humidity probe.
 - An electrical timer is used to turn the light sources on and off at specified time intervals.
 - One UVA LED light bank is used to supply the majority of UV radiation. This light has a concentrated 365nm and has a supplied fan to keep the panel cool.
 - Two E26 bulbs are used to add a little UVB irradiance. They also produce some UVA.
- Test Unit SN and Description:
 - Unit 9
 - Unit 10
 - Unit 11
 - Unit 12

Photos





TEST REPORT

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CONDITIONING

Parameters

1. Low Temperature
 - a. Temperature: -60 ± 10 °F
 - b. Soak Time: 72 hours
2. UV Radiation
 - a. ≥ 135 W/m² total UV
 - b. Temperature target air: 120 ± 15 °F
 - c. Test-item max temperature: 150 °F (priority limit)
 - d. Cycles: 5 × 24-hour cycles (20 h light, 4 h dark)

Schedule

- Condition Start Time Low Temperature: 13:21
- Condition Start Time UV Radiation: 15:14
- Conditioning Date Range Low Temperature: 2026-05-19 through 2026-05-26
- Conditioning Date Range UV Radiation: 2026-06-01 through 2026-06-08
- Total Combined Sequential Low Temperature Humid UV Radiation Conditioning Time Under Required Parameters: 330.23 hours

TESTING

Parameters

1. Low Temperature
 - a. Condition the test items (without firearm) in the cold chamber for 72 hours.
 - b. Once the test items have stabilized at ambient temperatures, move them to the heat chamber.
2. UV Radiation
 - a. Place test items (without firearm) in the conditioned cabinet.
 - b. After all cycles and stabilization at ambient temperature, perform three simple function tests and perform an ultimate load test.



TEST REPORT

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Results

There were no effects on the function of the Titan Holster. Ultimate load test results varied between units, potentially pointing to some material weakening.

INTERRUPTIONS

None noted.

DATA

- Low Temperature:
 - Temperature Range: -63° – -57° F
- UV Radiation:
 - Chamber Temperature Range (outside warm-up and mid-line test and measurements): 124° – 142° F
 - Chamber Relative Humidity Range (outside warm-up and mid-line test and measurements): 50% – 71% RH
- Tests:
 - Simple Function Test Result: Holster(s) functioned as designed with no detriment.
 - Ultimate Load Test:
 - Unit 9 – 382 Lbf
 - Unit 10 – 208 Lbf
 - Unit 11 – 444 Lbf
 - Unit 12 – 183 Lbf

Log

Date and time recorded for holster positions, serial numbers, start and end times, function and ultimate load test results, irradiance measurements.

Raw Data

CSV and LUW files with 1) hot: chamber temperature and humidity measurements every 5 seconds, and 2) cold: chamber temperature every 1 second.

CONCLUSIONS

Combined sequential Low temperature and high heat UV radiation had no impact on the function of the Titan Holster, with some ultimate load test results coming in low, indicating weakening of the mechanism's maximum break strength.



TEST REPORT

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12. Immersion

INTRODUCTION

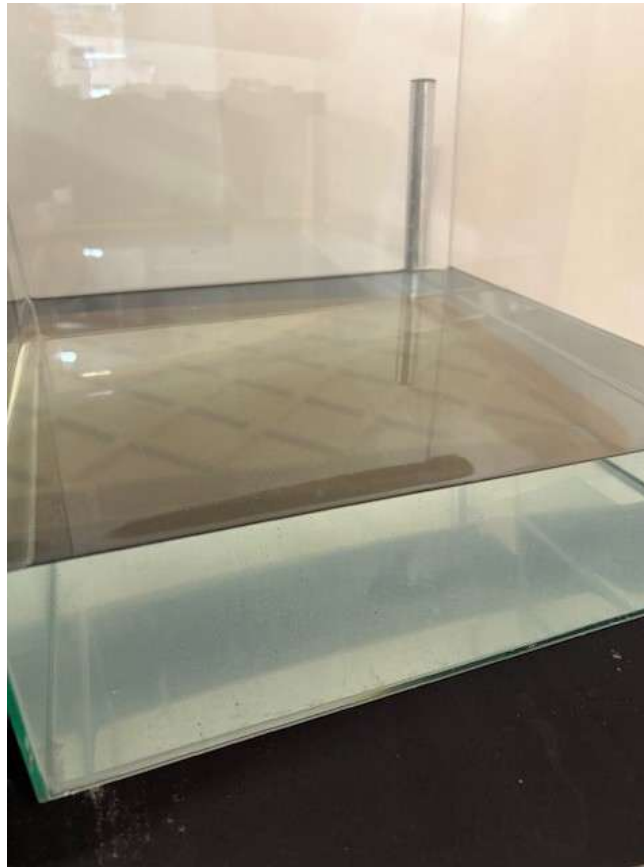
This test is a simple test of functionality of the holster while immersed under water. Though not an expected failure point, we wanted to cover our bases.

SETUP

Description

Testing is done in any reservoir with enough water to fully submerge test gun and holster. A glass tank is supplied to allow for visibility of the process.

Photos



CONDITIONING

Do three simple function tests while each holster and gun are fully submerged in water.

RESULTS

- Unit 73 – Holster functioned as designed when submerged.
- Unit 74 – Holster functioned as designed when submerged.