

FreeETarget

Fifty Meter

Test Procedure

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SUMMARY

This document is the test procedure for validating FreeEtarget operation using 22cal ammunition on a fifty meter target

The purpose of the test is to validate different target materials and the performance of the target sensors. Particular emphasis on determining the tolerance between making and missing a shot.

The document is made up as:

Required Equipment – What is needed to perform the test

Rifle Target – Dimensions and materials for rifle targets

Pistol Target – Dimensions and materials for pistol targets

Ammunition – Spread between competition target and plinking ammunition

APPLICABLE DOCUMENTS

ISSF Rule Book: https://usashooting.org/app/uploads/2022/04/2013_USAS_GTR.pdf

Sections 6.3.4.2 50 Meter Rifle Target

https://backoffice.issf-sports.org/getfile.aspx?mod=docf&pane=1&inst=458&file=ISSF_-Technical-Rules-Rule_Book_2023_Approved_Version.pdf

REQUIRED EQUIPMENT

The following are required for the test

| Item | Quantity | Description |
|------|----------|--|
| 1 | 1 | Oscilloscope |
| 2 | 1 | Test cable harness |
| 3 | 1 | PC with development software |
| 4 | 1 | USB interface |
| 5 | 2 | 150 Foot Cat 5 cable |
| 6 | 1 | FreeETarget Air Pistol, 165 dia |
| 7 | 1 | FreeETarget Pistol Target, 500mm dia |
| 8 | 10 | 50 meter rifle target (10 meter pistol target may be used) |

FREETARGET

| | | |
|----|----|----------------------------------|
| 9 | 10 | 50 meter pistol target |
| 10 | 1 | 22Cal rifle |
| 11 | 1 | 22 Cal pistol |
| 12 | 50 | Target velocity rifle ammunition |
| 13 | 50 | High velocity rifle ammunition |
| 14 | 50 | Target pistol ammunition |
| 15 | 50 | High velocity pistol ammunition |
| 16 | 1 | Notebook |
| 17 | 5 | Thin rubber material |
| 18 | 5 | Thick rubber material |
| 19 | 1 | WiFi router |
| | | |
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| | | |

RIFLE TARGET

The specifications for a 50meter rifle target are provided below

50m Rifle Target

| | | | | | |
|---------|--------|-----------------|--------|---------|-----------------|
| 10 Ring | 10.4mm | (± 0.1 mm) | 5 Ring | 90.4mm | (± 0.5 mm) |
| 9 Ring | 26.4mm | (± 0.1 mm) | 4 Ring | 106.4mm | (± 0.5 mm) |
| 8 Ring | 42.4mm | (± 0.2 mm) | 3 Ring | 122.4mm | (± 0.5 mm) |
| 7 Ring | 58.4mm | (± 0.5 mm) | 2 Ring | 138.4mm | (± 0.5 mm) |
| 6 Ring | 74.4mm | (± 0.5 mm) | 1 Ring | 154.4mm | (± 0.5 mm) |

Inner Ten = 5mm (± 0.1 mm).

Black from part of 3 to 10 rings = 112.4mm (± 0.5 mm).

Ring Thickness: 0.2mm to 0.3mm.

Minimum visible size of target card: 250mm x 250mm.

Scoring ring values 1 – 8 are printed in the scoring zones in vertical and horizontal lines, at right angles to each other.

The 9 and 10-point zones are not marked with a number. Insert targets (200mm x 200mm) may be used.

For the purposes of this test, a 10 meter pistol target may be used

25m Precision and 50m Pistol Target

(for the 50m Pistol and 25m Standard Pistol events and the precision stage of the 25m Centre Fire and the 25m Pistol events)

| | | | | | |
|---------|-------|------------------------|--------|-------|------------------------|
| 10 Ring | 50mm | ($\pm 0.2\text{mm}$) | 5 Ring | 300mm | ($\pm 1.0\text{mm}$) |
| 9 Ring | 100mm | ($\pm 0.4\text{mm}$) | 4 Ring | 350mm | ($\pm 1.0\text{mm}$) |
| 8 Ring | 150mm | ($\pm 0.5\text{mm}$) | 3 Ring | 400mm | ($\pm 2.0\text{mm}$) |
| 7 Ring | 200mm | ($\pm 1.0\text{mm}$) | 2 Ring | 450mm | ($\pm 2.0\text{mm}$) |
| 6 Ring | 250mm | ($\pm 1.0\text{mm}$) | 1 Ring | 500mm | ($\pm 2.0\text{mm}$) |

Inner ten: 25mm ($\pm 0.2\text{mm}$).

Black from 7 to 10 rings = 200mm ($\pm 1.0\text{mm}$).

Ring thickness: 0.2mm to 0.5mm.

Minimum visible size of target card: width: 550mm;

height: 520mm - 550mm.

Scoring ring values 1 – 9 are printed in the scoring zones, in vertical and horizontal lines, at right angles to each other. The 10-point zone is not marked with a number. Zone numbers must be approximately 10mm high, 1mm thick and must be read easily with normal spotting telescopes at the appropriate distance.

TEST PROCEDURE (RIFLE)

- Setup the target 50 meters from the firing point
- Connect the sensor cable harness to the oscilloscope
- Connect the oscilloscope to the PC using one of the 150 foot ethernet cables
- Open a web browser and connect to the target
- Connect the target to the PC using one of the 150 foot ethernet cables.
- Launch the Visual Studio program to monitor the internals of the target
- Connect target to the using a WiFi connection
- Launch the PC client
- Verify that all connections are working

- For each test on the test data sheet, record the required data

The test is performed by arming the oscilloscope and firing a shot into the approximate ring location. The actual location of the shot does not need to be accurate.

Once fired, the following are recorded

- Computed shot location
- Actual shot location
- Amplitude of each of the sensors North to West

A shot is deemed a success if the target recognizes the shot and computes a location for the shot.

A test may be abandoned if it fails to identify three or more shots into the target

RIFLE TEST

Using 10 meter air rifle target

SIMPLE TEST FIRE, PAPER TARGET, TARGET RIFLE AMMUNITION

| Test | Aiming Point | EST Score | Paper Score | North | Eash | South | West |
|------|--------------|-----------|-------------|-------|------|-------|------|
| 1 | 10 ring | | | | | | |
| 2 | 9 | | | | | | |
| 3 | 8 | | | | | | |
| 4 | 7 | | | | | | |
| 5 | 6 | | | | | | |
| 6 | 5 | | | | | | |
| 7 | 4 | | | | | | |
| 8 | 3 | | | | | | |
| 9 | 2 | | | | | | |
| 10 | 1 | | | | | | |

Notes

SIMPLE TEST FIRE, RUBBER ROLL TARGET, TARGET RIFLE AMMUNITION

| Test | Aiming Point | EST Score | Paper Score | North | Eash | South | West |
|------|--------------|-----------|-------------|-------|------|-------|------|
| 1 | 10 ring | | | | | | |
| 2 | 9 | | | | | | |
| 3 | 8 | | | | | | |
| 4 | 7 | | | | | | |
| 5 | 6 | | | | | | |
| 6 | 5 | | | | | | |
| 7 | 4 | | | | | | |
| 8 | 3 | | | | | | |
| 9 | 2 | | | | | | |
| 10 | 1 | | | | | | |

Notes

SIMPLE TEST FIRE, DENSE RUBBER MAT, TARGET RIFLE AMMUNITION

| Test | Aiming Point | EST Score | Paper Score | North | Eash | South | West |
|------|--------------|-----------|-------------|-------|------|-------|------|
| 1 | 10 ring | | | | | | |
| 2 | 9 | | | | | | |
| 3 | 8 | | | | | | |
| 4 | 7 | | | | | | |
| 5 | 6 | | | | | | |
| 6 | 5 | | | | | | |
| 7 | 4 | | | | | | |
| 8 | 3 | | | | | | |
| 9 | 2 | | | | | | |
| 10 | 1 | | | | | | |

Notes

Based on the results of the target velocity ammunition, repeat one or more tests using supersonic ammunition

SIMPLE TEST FIRE, PAPER TARGET, SUPERSONIC AMMUNITION

| Test | Aiming Point | EST Score | Paper Score | North | Eash | South | West |
|------|--------------|-----------|-------------|-------|------|-------|------|
| 1 | 10 ring | | | | | | |
| 2 | 9 | | | | | | |
| 3 | 8 | | | | | | |
| 4 | 7 | | | | | | |
| 5 | 6 | | | | | | |
| 6 | 5 | | | | | | |
| 7 | 4 | | | | | | |
| 8 | 3 | | | | | | |
| 9 | 2 | | | | | | |
| 10 | 1 | | | | | | |

Notes

SIMPLE TEST FIRE, RUBBER ROLL, SUPERSONIC AMMUNITION

| Test | Aiming Point | EST Score | Paper Score | North | Eash | South | West |
|------|--------------|-----------|-------------|-------|------|-------|------|
| 1 | 10 ring | | | | | | |
| 2 | 9 | | | | | | |
| 3 | 8 | | | | | | |
| 4 | 7 | | | | | | |
| 5 | 6 | | | | | | |
| 6 | 5 | | | | | | |
| 7 | 4 | | | | | | |
| 8 | 3 | | | | | | |
| 9 | 2 | | | | | | |
| 10 | 1 | | | | | | |

Notes

SIMPLE TEST FIRE, RUBBER MAT, SUPERSONIC AMMUNITION

| Test | Aiming Point | EST Score | Paper Score | North | Eash | South | West |
|------|--------------|-----------|-------------|-------|------|-------|------|
| 1 | 10 ring | | | | | | |
| 2 | 9 | | | | | | |
| 3 | 8 | | | | | | |
| 4 | 7 | | | | | | |
| 5 | 6 | | | | | | |
| 6 | 5 | | | | | | |
| 7 | 4 | | | | | | |
| 8 | 3 | | | | | | |
| 9 | 2 | | | | | | |
| 10 | 1 | | | | | | |

Notes

PISTOL TEST

Using 500 mm test grid

SIMPLE TEST FIRE, PAPER TARGET, TARGET PISTOL AMMUNITION

| Test | Aiming Point | EST Score | Paper Score | North | Eash | South | West |
|------|--------------|-----------|-------------|-------|------|-------|------|
| 1 | 10 ring | | | | | | |
| 2 | 9 | | | | | | |
| 3 | 8 | | | | | | |
| 4 | 7 | | | | | | |
| 5 | 6 | | | | | | |
| 6 | 5 | | | | | | |

FREETARGET

| | | | | | | | |
|----|---|--|--|--|--|--|--|
| 7 | 4 | | | | | | |
| 8 | 3 | | | | | | |
| 9 | 2 | | | | | | |
| 10 | 1 | | | | | | |

Notes

SIMPLE TEST FIRE, RUBBER ROLL TARGET, TARGET PISTOL AMMUNITION

| Test | Aiming Point | EST Score | Paper Score | North | Eash | South | West |
|------|--------------|-----------|-------------|-------|------|-------|------|
| 1 | 10 ring | | | | | | |
| 2 | 9 | | | | | | |
| 3 | 8 | | | | | | |
| 4 | 7 | | | | | | |
| 5 | 6 | | | | | | |
| 6 | 5 | | | | | | |
| 7 | 4 | | | | | | |
| 8 | 3 | | | | | | |
| 9 | 2 | | | | | | |
| 10 | 1 | | | | | | |

Notes

SIMPLE TEST FIRE, DENSE RUBBER MAT, TARGETPISTOL AMMUNITION

| Test | Aiming Point | EST Score | Paper Score | North | Eash | South | West |
|------|--------------|-----------|-------------|-------|------|-------|------|
| 1 | 10 ring | | | | | | |
| 2 | 9 | | | | | | |
| 3 | 8 | | | | | | |

FREETARGET

| | | | | | | | |
|----|---|--|--|--|--|--|--|
| 4 | 7 | | | | | | |
| 5 | 6 | | | | | | |
| 6 | 5 | | | | | | |
| 7 | 4 | | | | | | |
| 8 | 3 | | | | | | |
| 9 | 2 | | | | | | |
| 10 | 1 | | | | | | |

Notes

Based on the results of the target velocity ammunition, repeat one or more tests using supersonic ammunition

SIMPLE TEST FIRE, PAPER TARGET, SUPERSONIC AMMUNITION

| Test | Aiming Point | EST Score | Paper Score | North | Eash | South | West |
|------|--------------|-----------|-------------|-------|------|-------|------|
| 1 | 10 ring | | | | | | |
| 2 | 9 | | | | | | |
| 3 | 8 | | | | | | |
| 4 | 7 | | | | | | |
| 5 | 6 | | | | | | |
| 6 | 5 | | | | | | |
| 7 | 4 | | | | | | |
| 8 | 3 | | | | | | |
| 9 | 2 | | | | | | |
| 10 | 1 | | | | | | |

Notes

SIMPLE TEST FIRE, RUBBER ROLL, SUPERSONIC AMMUNITION

| Test | Aiming Point | EST Score | Paper Score | North | Eash | South | West |
|------|--------------|-----------|-------------|-------|------|-------|------|
|------|--------------|-----------|-------------|-------|------|-------|------|

FREETARGET

| | | | | | | | |
|----|---------|--|--|--|--|--|--|
| 1 | 10 ring | | | | | | |
| 2 | 9 | | | | | | |
| 3 | 8 | | | | | | |
| 4 | 7 | | | | | | |
| 5 | 6 | | | | | | |
| 6 | 5 | | | | | | |
| 7 | 4 | | | | | | |
| 8 | 3 | | | | | | |
| 9 | 2 | | | | | | |
| 10 | 1 | | | | | | |

Notes

SIMPLE TEST FIRE, RUBBER MAT, SUPERSONIC AMMUNITION

| Test | Aiming Point | EST Score | Paper Score | North | Eash | South | West |
|------|--------------|-----------|-------------|-------|------|-------|------|
| 1 | 10 ring | | | | | | |
| 2 | 9 | | | | | | |
| 3 | 8 | | | | | | |
| 4 | 7 | | | | | | |
| 5 | 6 | | | | | | |
| 6 | 5 | | | | | | |
| 7 | 4 | | | | | | |
| 8 | 3 | | | | | | |
| 9 | 2 | | | | | | |
| 10 | 1 | | | | | | |

Notes