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Materiel Test Procedure 5-3-530
U. S. Army Artillery Board

U. S. ARMY TEST AND EVALUATION COMMAND
COMMON ENGINEERING TEST PROCEDURE

SECTORS OF FIRE AND CHANGING TARGETS

1. OBJECTIVE

The purpose of this Materiel Test Procedure (MTP) is to outline testing techniques, methodology, and requirements for evaluating a missile or rocket system's capability of engaging targets through the sectors of fire required and desired by its Qualitative Materiel Requirement (QMR) or other applicable research and development documents.

2. BACKGROUND

Ordinarily, a missile or rocket system will be employed against pre-planned targets. Nevertheless, time and events sometimes will cancel a target before it can be attacked. The system therefore must be adaptable to shifting from initial orientation to alternate target or targets of opportunity. Changing targets necessitates recomputation and application of firing data. Directional changes may tax a system's capability to respond without repeating the complete sequence of occupation of position and preparation for firing. Desirably, a system should be capable of shifting direction readily, clockwise or counterclockwise, permitting timely attack on targets of opportunity throughout a 6400-mil section with minimum essential changes to firing data.

3. REQUIRED EQUIPMENT

As specified in the commodity service test MTP applicable to the test item.

4. REFERENCES

- A. QMR for the test item
- B. Commodity Service Test MTP applicable to test item
- C. MTP 3-1-002, Confidence Intervals and Sample Size
- D. MTP 5-3-500, Preoperational Inspection and Physical Characteristics
- E. MTP 5-3-503, Personnel Training
- F. MTP 5-3-528, Accuracy

5. SCOPE

5.1 SUMMARY

This MTP outlines the methods used to determine the test item's sector of fire and its ability to change targets including the following:

- a. Preparation for test - A verification that the test item is in satisfactory condition prior to testing, and necessary training of personnel.
- b. Sector of fire - A determination of the maximum traverse of the test item in the clockwise and counterclockwise directions from its initial orientation.

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c. Changing Targets - A determination of the test item's capability and adaptability of changing to other targets, within and without its sector of fire, after having been prepared initially to attack a preplanned target.

5.2 LIMITATIONS

None

6. PROCEDURES

6.1 PREPARATION FOR TEST

6.1.1 Preoperational Inspection and Physical Characteristics

Determine the condition and record the parameters of the test item as described in the applicable sections of MTP 5-3-500.

6.1.2 Personnel Training

Ensure the availability of personnel trained in the handling, maintenance, and firing of the test item as described in the applicable section of MTP 5-3-503 and record all appropriate data.

6.1.3 Scheduling

- a. Ensure the availability of the appropriate firing range
- b. Ensure the availability of all required equipment (see paragraph 3)

6.2 TEST CONDUCT

6.2.1 Sectors of Fire

Determine and record the maximum traverse, clockwise and counterclockwise, with respect to its initial orientation, as follows:

- a. Emplace the test item in its normal firing position.
- b. Traverse the test item to its maximum clockwise position, on carriage (launcher), and record the following:
 - 1) Maximum clockwise traverse from initial orientation
 - 2) Time from initial orientation position to maximum traverse
- c. Repeat step b in a counterclockwise traverse.
- d. Repeat steps b and c a minimum of 5 times.
- e. Repeat steps a through d with the test item carriage (launcher) or remote laying instrument requiring a shift.

6.2.2 Changing Targets

NOTE: 1. Prior to the performance of this test determine the sample size required to evaluate the effect of changing targets

on test item accuracy, during firing missions, as described in the applicable sections of MTP 3-1-002.

2. During the procedure countdown holds of varying length, and during various points of the countdown shall be made as stipulated in the test directive or by the test officer.

- a. Prepare the test item for launching, simulated or live and initiate countdown.

- b. Prior to final scheduled hold, cancel the prepared mission and assign a new target requiring computation and insertion of new firing data including the following:

- 1) Range
- 2) Azimuth
- 3) Height of burst
- 4) Warhead (yield) change, as required
- 5) Meteorological data correction

- c. Record the time required to compute the changes in firing data from the announcement of new target or desired ground zero (DGZ).

- d. Apply the changes in data to the test item.

NOTE: The changed data may be applied either in the form of scale settings or insertion of a tape program.

- e. Record the time required to apply the changed data:

- 1) Within the test item's normal sector of fire (on carriage or launcher).
- 2) Outside the test item's normal sector of fire, including repositioning time of the launcher or remote laying instrument.

- f. Resume or restart countdown, as applicable, and record any difficulties resulting from traverse.

NOTE: For changing target into a sector that includes the shifting of the carriage or remote laying instrument, it may be necessary to restart the countdown.

- g. Record the overall time from announcement of each change to the resumption of the firing sequence procedure (countdown).

- h. Upon the completion of countdown determine and record the following:

- 1) For simulated and live firings:

Effects of the holds on the completion of the changed target mission

- 2) For live firings only:

The effects of changing targets on the system performance and

accuracy as described in the applicable sections of MTP 5-3-528.

NOTE: Assistance of White Sands Missile Range may be requested for computerized analysis of trajectory (program) and burst data.

1. Repeat the changing target operations (steps a through h) to include a minimum of required number of sample firing missions in each of the sectors described in 6.2.1 and simulated missions as stipulated in the test directive or directed by the test officer.

6.3 TEST DATA

6.3.1 Preparation for Test

6.3.1.1 Preoperational Inspection and Physical Characteristics

Record data collected as described in the applicable sections of MTP 5-3-500.

6.3.1.2 Personnel Training

Record data collected as described in the applicable sections of MTP 5-3-503.

6.3.2 Test Conduct

6.3.2.1 Sectors of Fire

Record the following for each traverse:

- a. Direction (clockwise, counterclockwise)
- b. Mode (on-carriage, launcher shift)
- c. Maximum traverse in degrees
- d. Time required to reach maximum traverse in seconds
- e. Test run (1, 2, etc.)

6.3.2.2 Changing Targets

Record the following for each changed target:

a. For target data:

- 1) Type (original, changed)
- 2) Mission number
- 3) Range, in miles
- 4) Azimuth
- 5) Height of burst, in feet
- 6) Warhead (yield)
- 7) Meteorological data

- b. Time required for, in seconds:
 - 1) Computing new data.
 - 2) Applying the changed data.
 - 3) Completing target changing (time from announcement of new target to resumption of countdown).
- c. For countdown hold:
 - 1) Length of hold in seconds
 - 2) Point of hold in sequence
- d. Effect of traverse on resumed countdown, if applicable

6.4 DATA REDUCTION AND PRESENTATION

Data shall be developed, analyzed, and presented in accordance with the test items Commodity Service Test MTP and the following:

- a. For sector of fire:

Compute the rate of traverse for each operation and determine the maximum and average rates of traverse for each of the following:

- 1) Clockwise on carriage
- 2) Counterclockwise on carriage
- 3) Clockwise requiring carriage on remote laying instrument shift
- 4) Counterclockwise requiring carriage or remote laying instrument shift

- b. For live firings:

Data shall be analyzed as described in the applicable section of MTP 5-3-528 and compared to accuracy data of the test item without target changes.