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19. KEY WORDS (Continue on reverse side if necessary and identify by block number)
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Design Data Weapon Characteristics
Performance
This report

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)
Describes procedures for uniform collection of physical characteristics of guns and howitzers, mortars, small arms, recoilless rifles, and small rocket launchers.

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US ARMY TEST AND EVALUATION COMMAND
TEST OPERATIONS PROCEDURE

DRSTE-RP-702-102

*Test Operations Procedure 3-2-500
AD No.

9 November 1981

WEAPON CHARACTERISTICS

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1. SCOPE. This TOP lists all of the physical characteristics (as defined in AR 310-25¹)** to be obtained during testing of guns, howitzers, mortars, small arms, recoilless rifles, and small rocket launchers, undergoing Developmental Test II, as prescribed in AR 70-10.² It also provides guidance for developing characteristics data sheets.

Inspections and measurements of cannon are contained in TOP 3-2-800³, and physical characteristics of Army aircraft armament are covered in TOP/MTP 7-1-004.⁴

2. FACILITIES AND INSTRUMENTATION.

2.1 Facilities.

<u>ITEM</u>	<u>REQUIREMENT</u>
Maintenance shop facilities	
Cameras	movie and still; color and b/w
Hardstand	level and smooth

*This TOP supersedes TOP/MTP 3-2-500 dated 5 June 1971.

**Footnote numbers correspond to reference numbers in Appendix A.

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2.2 Instrumentation.

<u>ITEM</u>	<u>MAXIMUM PERMISSIBLE ERROR OF MEASUREMENT*</u>
Callipers (Including Vernier) Inside and outside	<u>+0.003</u> cm
Micrometers, required sizes	<u>+0.025</u> mm
Scales, weighing and linear measuring, required sizes	<u>+1%</u> of reading
Tape measure	

3. PREPARATIONS FOR TEST. As soon as possible after a weapon is received, prepare a comprehensive checklist of physical characteristics, based on referenced documents, engineer design drawings, and technical manuals provided with the test item. In listing these characteristics, make sure any details that have a security classification higher than that of the project as a whole are excluded. Identify any Government-furnished equipment that will not be evaluated.

Obtain the nomenclature from technical manuals and engineer design drawings. If the nomenclature is incomplete, use that contained in the Federal stock catalogs or professional publications.

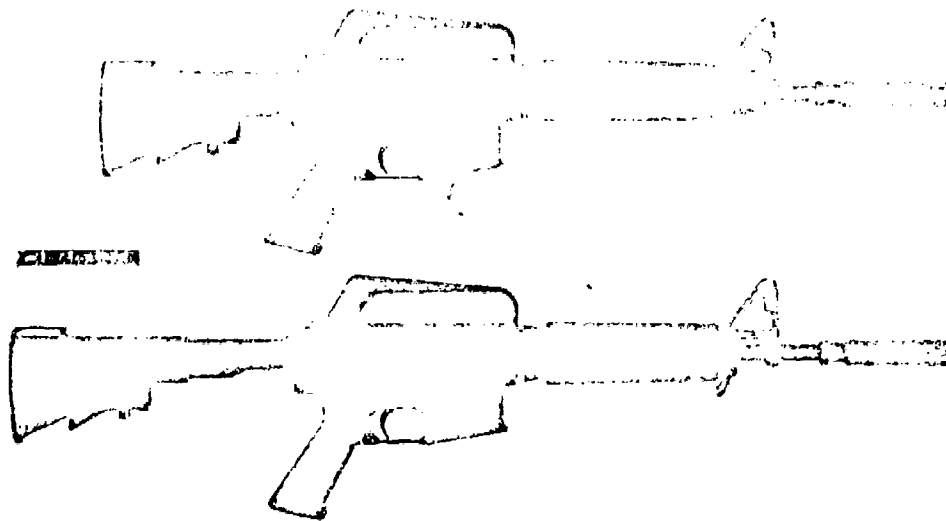
3.1 Characteristics Data Sheet. Prepare this sheet (see Figure 1) to use as a reference during a test. The characteristics data sheet consists of a page containing a photograph of the test item and a list of its principal dimensions and functional characteristics. After all characteristics have been confirmed (and the sheet corrected), it becomes part of the test report.

The data should include, but not be limited to, all characteristics that are applicable to the weapon or component. Any preliminary design data or tentative characteristics (to be confirmed during the test) must be identified as such on the data sheet.

The type of photograph depends on the depth of coverage desired (i.e., complete weapon or component). The photograph should be as large as possible (to preserve clarity after reduction) with unnecessary background features eliminated as much as possible. For artillery or mounted small arms weapons, a 3/4 view is usually the most effective, with the artillery piece shown at a slight elevation (see Figure 2). For mortars, recoilless rifles, rocket and missile launchers, use separate sheets to depict the ground- and carrier-mounted applications. An exploded view of a component (see Figure 3) may be appropriate.

Adequate characteristic listings, when published in a formal report, include all significant engineering and performance data, along with all physical attributes that affect the military value of the weapon.

*Values may be assumed to represent ± 2 standard deviations; thus, the stated tolerances should not be exceeded in more than 1 measurement of 20.



SUBMACHINE GUN, 5.56-MM, XM177E2

Weight of weapon -----	6.2 lb
Weight of weapon with sling and loaded	
20-round magazine -----	7.2 lb
Length (over-all) -----	29.7 in.
Length (over-all) with buttstock extended -----	33.0 in.
Length of barrel (from muzzle end of flash	
suppressor to face of bolt) -----	15.4 in.
Length of barrel (from muzzle end of barrel	
to face of bolt) -----	11.6 in.
Operation -----	Gas-operated, front-locking rotary bolt
Rifling -----	One turn in 12 in.
Muzzle velocity -----	2780 fps
Type of fire -----	Semi- and full automatic
Stock -----	Telescoping buttstock
Ammunition -----	5.56-mm, M193 ball and M196 tracer

Figure 1. Characteristics Data Sheet.

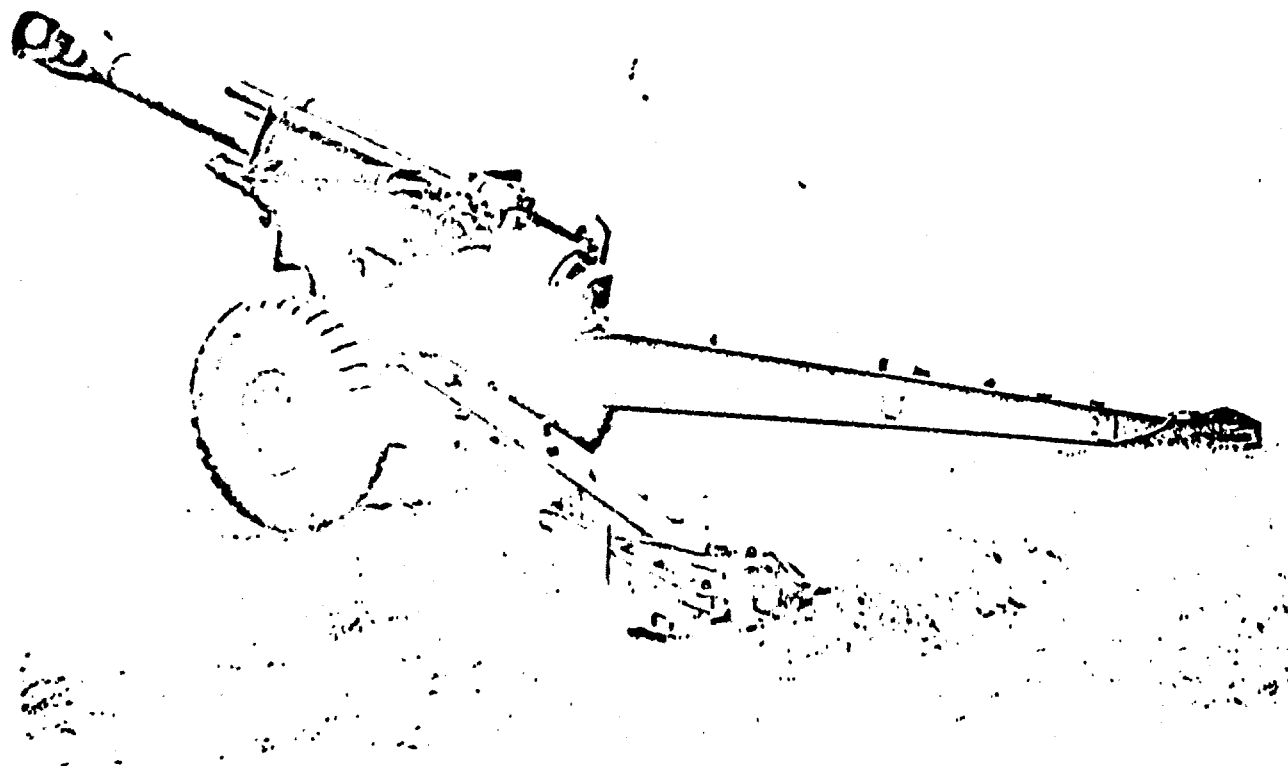


Figure 2. General View of an Artillery Weapon.

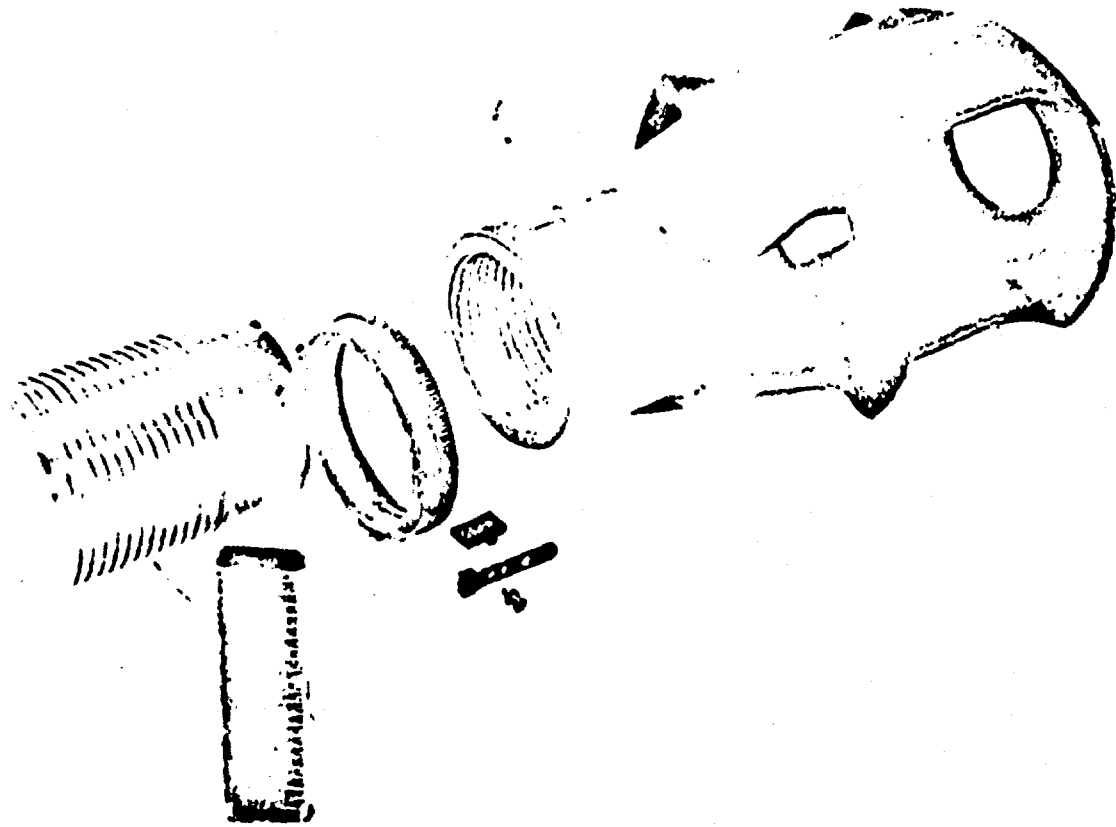


Figure 3. Exploded View of an Artillery Weapon Component.

4. DATA TO BE COLLECTED.**4.1 Pre-Test Data.**

a. Weigh, measure, and photograph the completely assembled test item, as well as its components, interfacing parts, and ancillary items. (Include a scale in all photographs.)

b. Repeat step a with the test item disassembled to minimum dimensions, if applicable.

c. Determine the center of gravity, if applicable, in accordance with TOP 2-2-800.⁵

d. Record the physical characteristics, including control markings or instruction plates, on the appropriate prepared checklist. NOTE: If the test item does not meet criteria for particular measurements, include in the test report an objective analysis for recommending further development, when necessary, or a subjective analysis, based on technical or military experience and judgment, of the effect this would have on the overall technical performance of the test item.

e. Record data on characteristics data sheet (see Figure 1).

4.2 Required Weapon Characteristics. Record the following, as appropriate, and if information is available; additional data may be included:

4.2.1 Howitzers, Guns, and Recoilless Rifles:

a. Nomenclature, serial and model numbers, and manufacturer

b. Weapon:

Caliber

Weight

Length, overall

Center of gravity

Length of bore (in calibers for howitzers and guns; in mm for recoilless rifles)

Number of lands and grooves

Rifling twist

Projectile travel distance in tube

Ammunition used

Muzzle velocity

Volume of chamber

Type of breech mechanism

Type of firing mechanism

Rate of fire, rapid and sustained

Any firing temperature limitations placed on the weapon/ammunition

Maximum effective range

For howitzers and guns, also record:

Upper pressure limit for propellant proof

Permissible individual maximum pressure

Muzzle attachments

Type of loading

For recoilless rifles, also record:

Width, overall
 Height, overall
 Permissible individual maximum pressure
 Diameter of tube or barrel
 Vent size
 Maximum permissible recoil force
 Fire control equipment

c. Recoil mechanism of howitzers and guns:

Type
 Total weight
 Normal and maximum recoil length
 Maximum piston rod pull
 Weight of recoiling parts
 Cycle times
 Precharge pressures

d. Carriage of howitzers and guns:

Total weight, with and without weapon
 Height of lunette, limbered
 Width of carriage, overall
 Tread width
 Trail spread
 Maximum elevation and depression
 Maximum traverse right or left
 Road clearance
 Time required to emplace and disemplace
 Total length, with weapon
 Height of trunnions above ground (emplaced)
 Distance from centerline of trunnions to muzzle
 Loading angles
 Type of firing support
 Type of brakes and wheels
 Type and size of tires
 Maximum height above ground (emplaced)
 Equilibrator type and number
 Fire control equipment

4.2.2 Mortars:

- a. Nomenclature, caliber, serial and model numbers, and manufacturer
 b. Weapon:

Length, overall, including basecap
 Length of tube
 Maximum range
 Permissible individual maximum pressures
 Method of loading and firing
 Temperature limitation
 Ammunition used
 Mount type
 Baseplate type

Weights: mortar w/basecap, complete mount, and baseplate
 Rate of fire, rapid and sustained
 Emplacement/disemplacement time
 Fire control equipment

4.2.3 Rocket or missile launcher:

- a. Nomenclature, serial and model numbers, and manufacturer
- b. Weapon:

Length, overall
 Length of tube
 Number of tubes
 Width, overall
 Height, overall, travel and emplaced
 Weight, overall
 Height of trunnions above ground (emplaced)
 Firing mechanism
 Fire control
 Mounting
 Ammunition used
 Maximum elevation and depression
 Maximum traverse, right or left
 Type and size of wheels and tires
 Type of brakes
 Emplacement/disemplacement time
 Maximum effective range
 Rate of fire

4.2.4 Small Arms and Automatic Weapons:

- a. Nomenclature, serial and model numbers, and manufacturer
- b. Weapon:

Caliber
 Weight, with and without magazine/accessories
 Empty and loaded
 Length, overall
 Rifling length
 Number of lands and grooves
 Pitch and direction
 Sight radius and type
 Range graduations, if applicable
 Barrel length
 With and without muzzle brake/suppressor, as applicable
 Muzzle velocity
 Maximum effective range

For handguns:

Type of operation
 Breech lock
 Type (single/double action, toggle, tilting barrel, etc.)

Firing position (open, closed)
 Type of fire (semi- or fully automatic; automatic fire cyclic rate)

For rifles:

Weight

Bayonet

Sling

Grenade launcher

Bipod

Cleaning kit

Length

With and without bayonet

Without bayonet, stock folded/retracted

Type of operation

Breech lock

Type (rotating bolt)

Firing position (closed)

Type of fire (semi- or fully automatic; automatic fire cyclic rate)

For machine guns:

Type of operation

Breech lock

Type (tilting, block, etc.)

Firing position (open, closed)

Assembly (quick change, fixed headspace)

Whether magazine- or belt-fed

Direction of feed, if belt-fed

Type of fire (automatic fire cyclic rate)

Type of firing position

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APPENDIX A
REFERENCES

1. AR 310-25, Dictionary of US Army Terms (Short Title: AD), 15 September 1975.
2. AR 70-10, Test and Evaluation During Development and Acquisition of Materiel, 29 August 1975.
3. TOP 3-2-800, Schedules for Inspections and Measurements of Cannon, 6 January 1976.
4. TOP/MTP 7-1-004, Army Aircraft Armament, 3 June 1970.
5. Test Operations Procedure 2-2-800, Center of Gravity, 18 July 1980.