

MIL-T-63222(AR)

20 July 1977  
SUPERCESSION DATA  
See Section 6

## MILITARY SPECIFICATION

### TRAINER, FIELD ARTILLERY, 14.5MM: M31

This specification is approved for use by Watervliet Arsenal, Department of the Army, and is available for use by all Departments and Agencies of the Department of Defense.

#### 1. SCOPE

1.1 This specification covers a 14.5MM Field Artillery Trainer used for gunnery practice.

#### 2. APPLICABLE DOCUMENTS

2.1 Issues of documents. The following documents of the issue in effect on the date of invitation for bids or request for proposal, form a part of the specification to the extent specified herein.

#### SPECIFICATIONS

##### Military

- MIL-C-13931 - Cannons, General Specification for
- MIL-P-14232 - Parts, Equipment and Tools for Army Materiel, Packaging and Packing of
- MIL-G-23827 - Grease, Aircraft and Instrument, Gear and Actuator Screw
- MIL-I-45607 - Inspection Equipment, Acquisition, Maintenance and Disposition of

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Watervliet Arsenal, ATTN: DRDAR-LCB-SAS, Watervliet, NY 12189 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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## STANDARDS

### Military

MIL-STD-109 - Quality Assurance Terms and Definitions  
MIL-STD-129 - Marking for Shipment and Storage

## DRAWINGS

### U.S. Army Armament Research and Development Command

A7309999 - General Data Governing Protective Finish  
B11585183 - Gage, Special Plug  
B11585184 - Gage, Special Plug  
C11585185 - Gage, Flush Pin

## PUBLICATIONS

### U.S. Army Armament Research and Development Command

MLSQAP 11578676 - Master Index of Supplementary Quality Assurance  
Provisions - Trainer, Field Artillery, M31  
DL 11578676 - Index of Inspection Equipment Data Lists - Trainer,  
Field Artillery, M31  
P11578676 - Packaging Data Sheet - Trainer, Field Artillery, M31  
P11578634 - Packaging Data Sheet - Cannon Assembly 14.5MM

(Copies of specifications, standards, drawings and publications required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

## 3. REQUIREMENTS.

3.1 First article. When specified in the contract, the contractor shall submit a first article. Unless otherwise specified (see 6.1), the first article shall be included in the sample package (see 5.1).

3.2 Materials and construction. The artillery trainer and parts thereof shall conform to this specification, to MIL-C-13931 and to the applicable drawings.

3.2.1 Material soundness. Unless otherwise specified on the applicable drawing, parts shall be free from cracks as determined by specified examination or test (see 4.5.2.14).

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3.3 Functioning. The artillery trainer and parts thereof shall function smoothly without interference, erratic movement, binding or malfunction.

3.4 Marking. Marking shall conform to the drawings and to MIL-C-13931.

3.4.1 Functional marking. Marking specified for operation, handling, adjustment or assembly shall be in accordance with the applicable drawings.

3.5 Lubrication of mating surfaces. All contact surfaces of metal parts, except surfaces on which freedom from lubrication is specified, shall be coated with a film of grease, per MIL-G-23827, immediately before assembly.

3.6 Final finish. When specified, phosphate coating shall be in accordance with the applicable drawings and A7309999. When required, painting shall be as specified on the drawings.

3.7 Test firing. Each trainer shall be test fired in accordance with 4.5.3.1 and 4.5.3.2.

3.8 Workmanship. Surfaces shall be free from visible irregularities or defects that may adversely affect the function, strength or serviceability or may detract from good appearance. Fins, burrs, and other excess metal shall be removed.

#### 4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 The contractor shall perform, as a minimum, inspections in accordance with the specifications, quality assurance provisions, and the contract. These minimum inspections shall not relieve the contractor of his responsibility, under terms of the contract, to furnish the Government with items conforming to all requirements of the contract, drawings, and specifications.

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4.1.2 The inspections and tests listed in Section 4 of this specification shall become a part of the contractor's overall inspection system or quality program. Inspections and tests not listed in this specification shall not relieve the contractor of his responsibility to assure that all items furnished to the Government conform to all requirements of the contract, drawings, and specifications.

4.2 Quality assurance terms and definitions. Quality assurance terms and definitions used herein are in accordance with MIL-STD-109.

4.3 Classification of inspections. The inspection requirements specified herein are classified as follows:

1. First article inspection (see 4.4)
2. Quality conformance inspection (see 4.5)

4.4 First article inspection. A first article shall be submitted for inspection in accordance with the contract requirements. The first article shall be representative of the production processes to be used during quantity production. The first article shall be subjected to the quality conformance inspections specified herein and such other inspection as is necessary to determine compliance with the requirements of the contract.

4.5 Quality conformance inspection.

4.5.1 Inspection provisions and methods. Inspection provisions and methods shall be in accordance with MIL-C-13931.

4.5.1.1 Material inspection. Material used for parts shall be inspected in accordance with material specifications referenced on the part drawings.

4.5.1.2 Parts. Parts, subassemblies and assemblies shall be inspected in accordance with MIL-C-13931 and the applicable Supplementary Quality Assurance Provisions (SQAPs) listed in MLSQAP 11578676, Master Index of Supplementary Quality Assurance Provisions.

4.5.1.3 Inspection equipment. Data lists containing drawing numbers of inspection equipment used in the inspection of parts, subassemblies, and the assembled artillery trainer are listed in DL 11578676, Index of Inspection Equipment Data Lists.

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4.5.1.3.1 Acquisition, maintenance, and disposition. Unless otherwise specified (see 6.1), responsibility for acquisition, maintenance, and disposition of acceptance inspection and test equipment prescribed on DL 11578676 and for all other inspection equipment required to perform inspection prescribed by applicable specifications, shall be in accordance with MIL-I-45607.

4.5.1.3.2 Accuracy of standard measuring equipment. When commercial and modified-commercial inspection and test equipment is used, it shall be capable of repetitive measurements to an accuracy of 10 percent of the total tolerance of the characteristic being inspected.

#### 4.5.2 Examinations.

4.5.2.1 Artillery trainer. Final examination of each artillery trainer shall be performed as specified. Each step in the examination shall include a visual examination for proper cleaning, presence of the specified coating and lubrication of mating surfaces. The trainer shall also be visually examined to determine the general quality, completeness of manufacture and assembly as well as clarity and legibility of marking. Artillery trainers that fail to meet the requirements shall be rejected.

#### 4.5.2.2 Carriage assembly elevating function.

(a) Elevate and depress the barrel assembly, using the elevating handwheel, through its range five (5) times to assure smooth operation and freedom from erratic movement.

(b) Raise the rapid elevating locking plate and rotate the elevating bracket group upward. Manually elevate and depress the barrel assembly through its range five (5) times to assure smooth operation and freedom from erratic movement.

#### 4.5.2.3 Carriage assembly traversing function.

(a) Traverse the trainer, using the traversing handwheel, through its range five (5) times to assure smooth operation and freedom from erratic movement.

(b) Depress the rapid traverse lever, rotate the trainer through its range five (5) times to assure smooth operation and freedom from erratic movement.

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4.5.2.4 Extraction. Extraction shall be tested before the firing tests using a dummy cartridge case. The body bolt shall move through its full range of travel and extract the cartridge case from the barrel without binding.

4.5.2.5 Ejection. Ejection shall be tested before the firing tests using a dummy cartridge case. When the bolt is retracted manually, the cartridge case shall be ejected completely out of the trainer.

4.5.2.6 Firing pin protrusion. Firing pin protrusion shall be inspected on each trainer. Inspection shall be performed by means of gage C11585185, listed on DL 11578676, or an approved equivalent gage.

4.5.2.7 Headspace. Headspace shall be inspected on each trainer. Inspection shall be performed by means of gages B11585183 and B11585184 both listed on DL 11578676, or approved equivalent.

4.5.2.8 Safety. The safety shall be capable of being manually moved from the fire "F" to the safe "S" position and shall remain in that position until reset manually. The safety shall be placed in each position to assure that when the safety is in the "fire" position, it allows the firing pin to be released and when the safety is in the "safe" position the firing pin can not be released.

4.5.2.9 Trigger function. With the bolt handle in a fully closed position and the safety on "fire", manually depress the trigger. The firing pin will be released. The operation shall be smooth and free from erratic movement or binding.

4.5.2.10 Trunnion caps. Visually and manually examine to assure that the caps hold the barrel assembly securely on the mount assembly.

4.5.2.11 Carriage locking screw. Manually examine the function of the carriage locking screw to assure that it securely locks the carriage assembly to the base.

4.5.2.12 Tripod legs. Manually examine the function of the tripod legs, observe the markings. The adjusting sleeves shall function smoothly without interference or binding.

4.5.2.13 Leg locking lever. Manually examine the leg locking lever to assure that when in the locked position the legs are held securely in place.



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4.5.2.14 Material soundness. Magnetic particle examination shall be performed in accordance with the applicable drawings and specifications on those components where magnetic particle examination is specified on the part drawing. Material not conforming to the acceptance criteria shall be rejected.

4.5.2.15 Marking. Parts and assemblies shall be visually examined to determine compliance with the applicable drawings and MIL-C-13931. All functional markings shall conform to the applicable drawings.

4.5.2.16 Workmanship. Workmanship shall be visually examined and shall conform to the requirements as specified in MIL-C-13931 and 3.8.

#### 4.5.3 Tests.

4.5.3.1 Pressure resistance. Each cannon assembly shall be test fired and inspected by the Government. The test shall consist of firing one round of M183PD charge 1 ammunition. After firing, the exterior surface of the cannon shall be magnetic-particle inspected and the cannon bore shall be examined by means of an approved optical device. Any evidence of cracks, deformation, or other damage shall be cause for rejection. Cartridge cases shall be visually examined for bulges, splits, rings and other defects caused by defective barrels.

4.5.3.2 Target firing. Each trainer shall be test fired and inspected by the Government. The test shall consist of firing 5 rounds at a target placed at a range of 50 meters. All rounds shall impact within a rectangular area of 30 centimeters (vertical) by 15 centimeters (horizontal). If any round does not impact within the specified target area, an additional 5 rounds may be fired. Failure to impact within the specified target area shall be cause for the Government to conduct a failure analysis consisting of a dimensional, physical and visual examination of the components which are suspected to be the cause of failure or malfunction. Trainers, parts, subassemblies and assemblies not conforming to all requirements of the contract, drawings and specifications shall be returned to the contractor for repair or replacement.

4.5.4 Inspection of packaging. Unless otherwise specified (see 6.1), inspection to determine compliance with cleaning, preservation, packaging, packing and marking requirements of the applicable packaging data sheets for the level designated in the contract shall be performed in accordance with MIL-P-14232.

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## 5. PACKAGING.

5.1 Sample package. On each contract, a sample package shall be provided in accordance with 3.1. The sample package for the artillery trainer shall be unit packaged for the level of protection specified in the contract and packed Commercial. Unit packaging and packing shall be in accordance with MIL-P-14232 and Packaging Data Sheets P11578634 and P11578676. Marking of the sample package shall be in accordance with MIL-STD-129.

5.2 Unit packaging, packing and marking of the trainer. The artillery trainer shall be unit packaged and packed in accordance with the requirements of MIL-P-14232 and Packaging Data Sheets P11578634 and P11578676 for the level of protection specified in the contract (see 6.1). Marking shall be in accordance with MIL-STD-129.

5.3 Unit packaging, packing and marking of repair parts. Repair parts shall be unit packaged and packed in accordance with the requirements of MIL-P-14232 and Packaging Data Sheets P11578634 and P11578676 for the level of protection specified in the contract (see 6.1). Marking shall be in accordance with MIL-STD-129.

## 6. NOTES.

6.1 Ordering data. Procurement documents should specify the following:

- a. Title, number and date of this specification.
- b. Shipping instructions for first article sample and sample package, if different.
- c. Place of final inspection and acceptance.
- d. Lists of acceptance inspection equipment to be furnished the contractor and responsibilities for other Government property to be furnished the contractor.
- e. Packaging examination and testing, if different (see 4.5.4).
- f. Procedures and methods for demilitarizing of rejected material.
- g. Disposition of Government-furnished property.
- h. Responsibility for test firing facilities and operating procedures.



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6.2 When action by a testing agency is required, work programming will be effected with the testing agency at the earliest practicable date.

6.3 When warranted, the contract should specify the application of MIL-I-45208 on the Management Control Systems Summary List, DD Form 1660.

6.4 Unless otherwise specified, the contract should specify the application of MIL-I-45607 and MIL-C-45662 on the Management Control Summary List, DD Form 1660.

6.5 Use of an adapter system for the cannon. When used as a subcaliber device by field artillery teams, the 14.5MM cannon assembly is mounted in the applicable adapter system for firing in the primary weapon. Use of the adapter system allows the firing battery to experience "hands on" training with assigned weapons, utilizing on-carriage sighting and fire control equipment.

6.6 The fit of the sights is controlled by SQAP 11578699.

6.7 Supercession data. This specification includes the requirements of Watervliet Arsenal Purchase Description WYPD 1056A dated 15 April 1977.

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