

MIL-STD-637A
13 February 1961

SUPERSEDING
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MILITARY STANDARD

MACHINE AND AUTOMATIC GUNS AND MACHINEGUN TRAINERS THROUGH 30-MM



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13 February 1961

ARMED FORCES SUPPLY SUPPORT CENTER
WASHINGTON 25, D. C.

Standardization Division

Machine and Automatic Guns and Machinegun Trainers Through 30-MM

MIL-STD-637A

13 FEBRUARY 1961

1. This standard has been approved by the Department of Defense and is mandatory for use by the Department of the Army, the Navy, and the Air Force.

2. In accordance with established procedure, the Standardization Division has designated the Ordnance Corps, the Bureau of Naval Weapons and Warner Robins Air Materiel Area, respectively, as Army-Navy-Air Force custodians of this standard.

3. Recommended corrections, additions, or deletions should be addressed to the Standardization Division, Armed Forces Supply Support Center, Washington 25, D.C.

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FOREWORD

The purpose of this standard list guide design selection and limit procurement for stock and issue of adopted Machine and Automatic Guns and Machinegun Trainers through 30-MM in FSC 1005.

Prepared by the Army Ordnance Corps in conjunction with the Department of Defense Standardization Program, it is one of a series of limitation standards which will encompass all FSC 1005 weapons, accessories, and related-equipment.

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1. SCOPE

1.1 This standard contains all machine and automatic guns, and machinegun trainers through 30-mm in FSC Class 1005 for which Department of Defense standardization classification has been established as standard (Standardization Code 1) for use by the Military departments Selection for all new engineering and design ap-

plications and for repetitive use shall be made from this document.

1.2 Limited standard and nonstandard machine and automotive guns, and machinegun trainers through 30-mm are contained in Supplement 1 to MSS 1005-19; Guns, Machine and Automatic (Including Trainers) Through 30-mm.

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2. REFERENCED DOCUMENTS

2.1 The issues of the following document in effect on the date of the invitation for bids form a part of this standard to the extent specified herein.

GOVERNMENTAL

MSS 1005-10-Supplement 1, Military Supply Limitation Standard, Guns, Machine and Automatic (Including Trainers) Through 30-mm.

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3. DEFINITIONS

3.1 STANDARDIZATION CLASSIFICATIONS. A classification assigned to an item to describe and record its status with regard to suitability for service use. Standardization classifications of items are defined below.

3.1.1 Standard (standardization code 1). Authorized for procurement, stock, and issue.

3.1.2 Limited standard (standardization code 2). Authorized for procurement only to support inservice materiel.

3.1.3 Nonstandard (standardization code 3). No longer needed and not authorized for procurement.

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4. GENERAL REQUIREMENTS

4.1 Standard machineguns, automatic guns, and machinegun trainers. The following is a compilation of all standard machine and automatic guns and machinegun trainers through 30-mm arranged by weapon type. These items are authorized for procurement, stock, and issue in the military supply system and shall be used, wherever practicable, in future design of military materiel. Detailed data on each item is contained in section 5 herein.

4.1.1 *Machineguns.*

4.1.1.1 *Caliber .30.*

- (a) Machinegun, caliber .30: M37.

4.1.1.2 *7.62-mm.*

- (a) Machinegun, 7.62-mm: M60.
- (b) Machinegun, 7.62 mm: fixed, M73.
- (c) Machinegun, 7.62-mm: flexible, M73C,

4.1.1.3 *Caliber .50.*

- (a) Machinegun, caliber .50: Browning, heavy barrel, (flexible), M2.

- (b) Machinegun, caliber .50; Browning, heavy barrel, (turret type), M2.
- (c) Machinegun, caliber .50: Browning, heavy barrel, (turret type), M2G.
- (d) Machinegun, caliber .50: fixed, M85.
- (e) Machinegun, caliber .50: flexible, M85C.

4.1.2 *Automatic guns.*

4.1.2.1 *20-mm.*

- (a) Gun, 20-mm, automatic: MK 12 MOD O.
- (b) Gun, 20-mm, automatic: MK 12 MOD 3.
- (c) Gun, 20-mm, automatic: M39A2.
- (d) Gun, 20-mm, automatic: M61.

4.1.3 *Machinegun trainers.*

4.1.3.1 *Caliber .22.*

- (a) Trainer, machinegun, caliber .22: M3.
- (b) Trainer, machinegun, caliber .22: M4.

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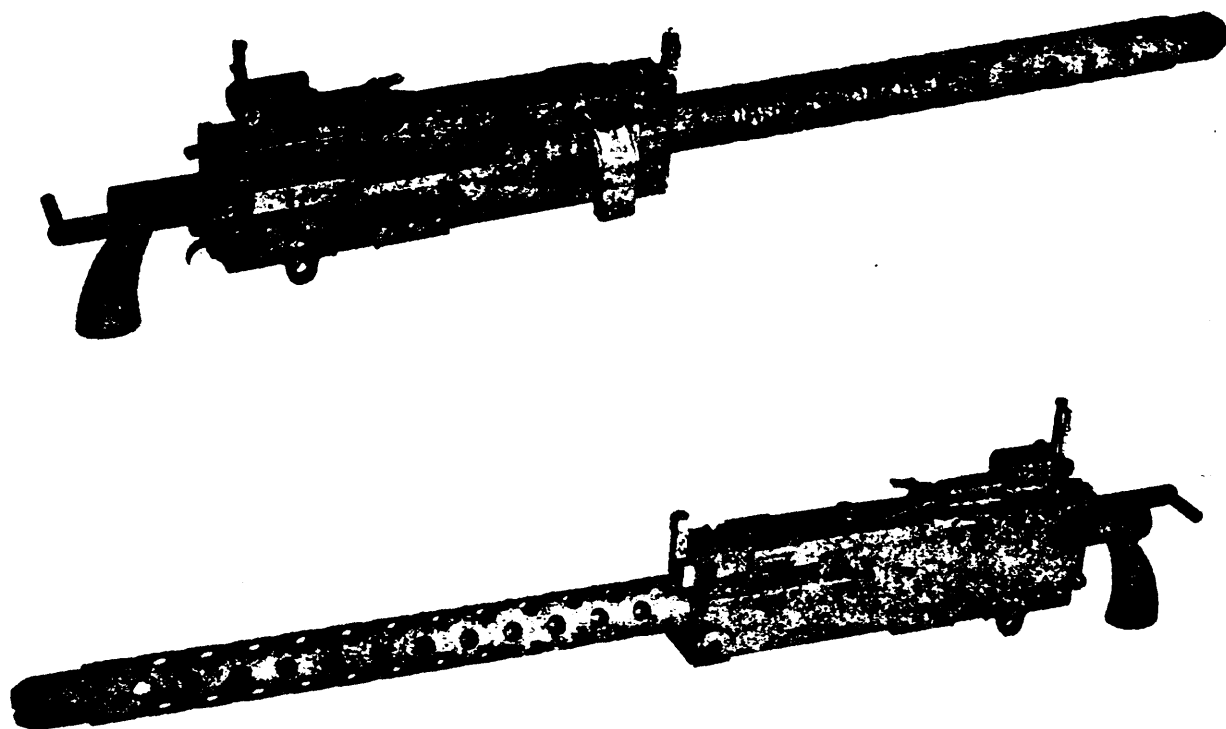


Figure 1. Machinegun, caliber 30: M37.

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5.1.2 7.62-mm Machinegun.

- 5.1.2.1 Machinegun 7.62-mm: M60**
FSN 1005-6W7710 w/e
FSN 100&752-764o w/o/e (see fig. 2).

Description and application:

The 7.62-mm, M60 machinegun is a light-weight, gas-operated, air-cooled, link-belt fed general purpose machinegun designed to replace all existing caliber .30 ground mounted machineguns. It is designed to fire the NATO standard 7.62-mm cartridge using the M13 link (the same cartridge-link combination used with the M73 machinegun) and is capable of being fired from either the hip, shoulder, or on the ground using its integral biped for the direct fire role and the M122 tripod mount for the prearranged fire role. The M60 machinegun is equipped with magazine bracket to accommodate 100 round magazine. It is used by the Army and Navy.

Physical and performance characteristics:

Weight of complete gun 23.75 lb.
Length, overall 43.1 in.
Width, silhouette w/biped and carrying handle folded. 5.75 in.
Height, silhouette w/biped, sight and carrying handle folded. 9.5 in.
Length between receiver mounting points. 5.17 in.

Barrel:

Length, complete w/socket and flash hider. 25.7 in.
Weight, complete w/socket and flash hider. 83 lb.
Quick change Yes

Method of operation Gas (cutoff and expansion)

Method of cooling Air

Rate of fire w/tripod mount 500-650 rpm

Cookoff protection Yes (open bolt).

Direction of feed In left side of receiver.

Trigger pull 6-11 1/2lb.

Belt pull, (rein) capability 8 lb.

Headspace Fixed

Method of charging gun Manual cocking handle (right side).

Force required to thaw gun, (max.). 60 lb. (approx).

Method of firing Manual trigger (pistol grip).

Type primer ignition Percussion.

Case ejection Right side of receiver.

Link ejection Right side of receiver.

Link belt pitch58in

Type link (M13) Push-through, metallic.

Type safety Lever switch, blocks sear.

Type rear sight Folding leaf (micrometer).

Type front sight Fixed post.

Type flash hider Prong.

Sight radius 212 in.

Sight graduation Meters.

Weight of 100 linked rounds 6 lb.

Accuracy At least nine shots of a 10-round burst shall be within or cut the edge of a 10.8 inch diameter circle at a 100-yard range.

Ammunition:

Cartridge, 7.62-mm, ball, NATO, M59.
Cartridge, 7.62-mm, high pressure, NATO, M60.
Cartridge, 7.62-mm, AP, NATO, M61.
Cartridge, 7.62-mm, tracer, NATO, M62.
Cartridge, 7.62-mm, dummy, NATO, M63.
Cartridge, 7.62-mm, ball, NATO, M80.
Cartridge, 7.62-mm, blank, NATO, XM82.

Links:

Link, cartridge, metallic belt, 7.62-mm, M13.

- 5.1.2.2 Machinegun, 7.62-mm: fixed, M73**
(see fig. 3).
FSN 1005-679-6763 w/e.

Description and application:

The 7.62-mm, M73, fixed machinegun is a light-weight, air-cooled, link-belt fed, combat vehicle mounted machinegun. It is recoil operated with

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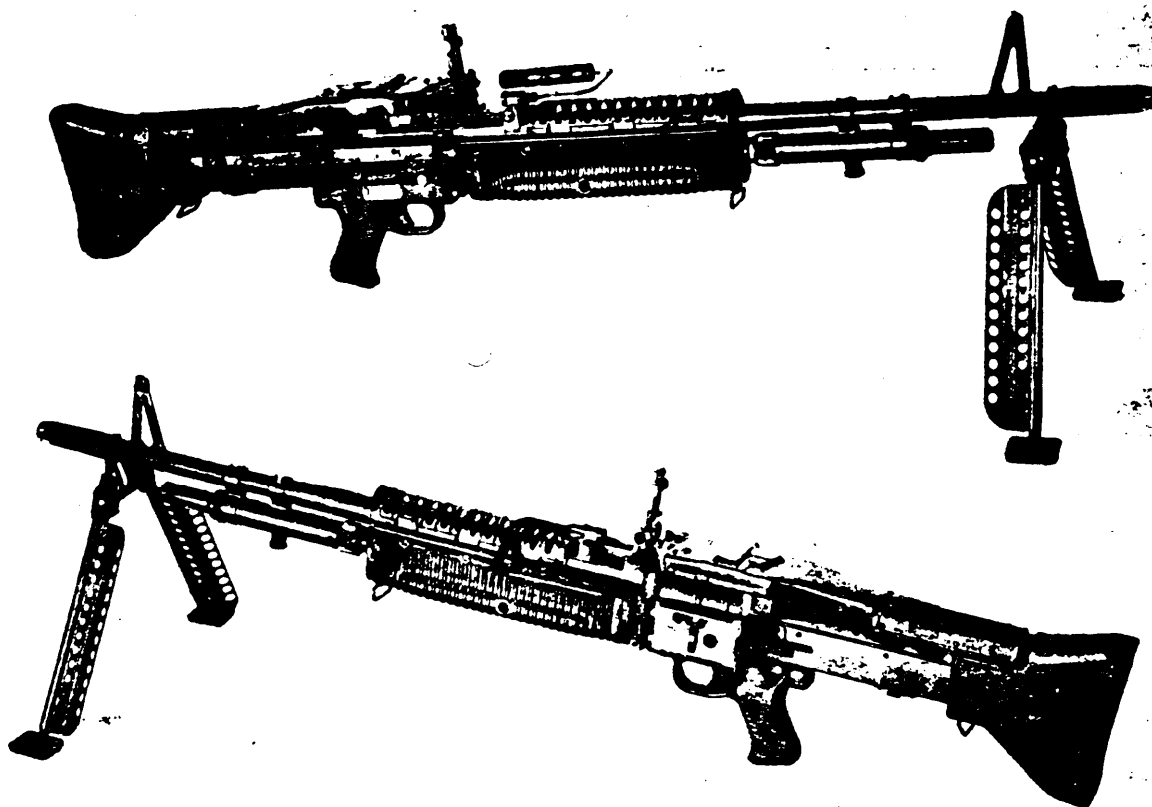


Figure 2. *Machinegun, 7.62-mm: M60.*

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booster assist, and has a short receiver, fixed headspace, a quick-change barrel, and a flash hider. The M73 fixed machinegun is designed to fire the NATO 7.62-mm cartridge using the M13 link—the same cartridge-link combination used with the M60 general purpose machinegun.

The ammunition belt can be fed from either side of the weapon with change in cover assembly from one side to the other accomplished by repositioning of parts. Empty links are discharged from the side opposite the ammunition belt; empty cartridge cases are ejected from the bottom of the receiver. The weapon is charged by means of an integral manual charger. Firing is by manual or solenoid operation from the open-bolt position. The M73 fixed machinegun is used by the Army.

Physical and performance characteristics:

Weight of gun (complete) 28 lb.
 Weight of barrel 5 lb. 10 oz
 Overall length of gun. 37 3/4 in.
 Overall length of barrel 22 in.
 Overall width of gun 44 13/32 in
 Overall height of gun 5 5/16 in.
 Method of operation Recoil-(gas booster assist).
 Method of cooling Air.
 Rate of fire (rigid mount) 350-600 rpm.
 Cookoff protection Yes (open bolt).
 Direction of feed Either side.
 Headspace Fixed.
 Method of charging gun. Manual charger.
 Method of firing Manual solenoid.
 Case ejection Bottom of receiver.
 Link ejection Side of receiver.
 Type link (M13) push through, metallic.
 Type safety Spring-loaded slide block trigger.
 Type sight None.
 Type flash hider Cone.
 Weight of 100 linked round 6 lb.

Accuracy Nine shots of a 10-round burst shall group within or cut the edge of a 10.8 dia. circle at a range of 100 yards.

Ammunition:

Cartridge, 7.62-mm, ball, NATO, M50.
 Cartridge, 7.62-mm, high pressure, NATO, M60.
 Cartridge, 7.62-mm, AP, NATO, M61.
 Cartridge, 7.62-mm, tracer, NATO, M62.
 Cartridge, 7.62-mm, dummy, NATO, M63.
 Cartridge, 7.62-mm, ball, NATO, M80.
 Cartridge, 7.62-mm, blank, NATO, XM82.

Links:

Link, cartridge, metallic belt, 7.62-mm, M13.

5.1.2.3 Machinegun, 7.62-mm: flexible, M73C
(see fig. 4)

FSN 1006-7914378 w/e.

Description and application:

The 7.62-mm, M73C machinegun is the flexible version of the M73 fixed machinegun and is identical to the M73 except that front and rear sights are mounted on the barrel jacket assembly designed to accept these sights and a pistol grip assembly is fastened to the back plate designed for this purpose. The M73C is used by the Marine Corps for vehicle armament and for ground use with the XM132 tripod mount.

Physical and performance characteristics:

The physical and performance characteristics are identical to the 7.62-mm, M73 fixed machinegun (FSN 1005-670-6763) except as follows:

Weight of gun complete 30 lb. (approx.)
 Overall length of gun w/pistol grip assembly. 42 3/4 in.
 Overall height of gun 7 3/4 in.
 Type rear sight Folding leaf (micrometer)
 Type front sight Post, fold-down.
 Sight radius 18.5 in.
 Sight graduations Mils.

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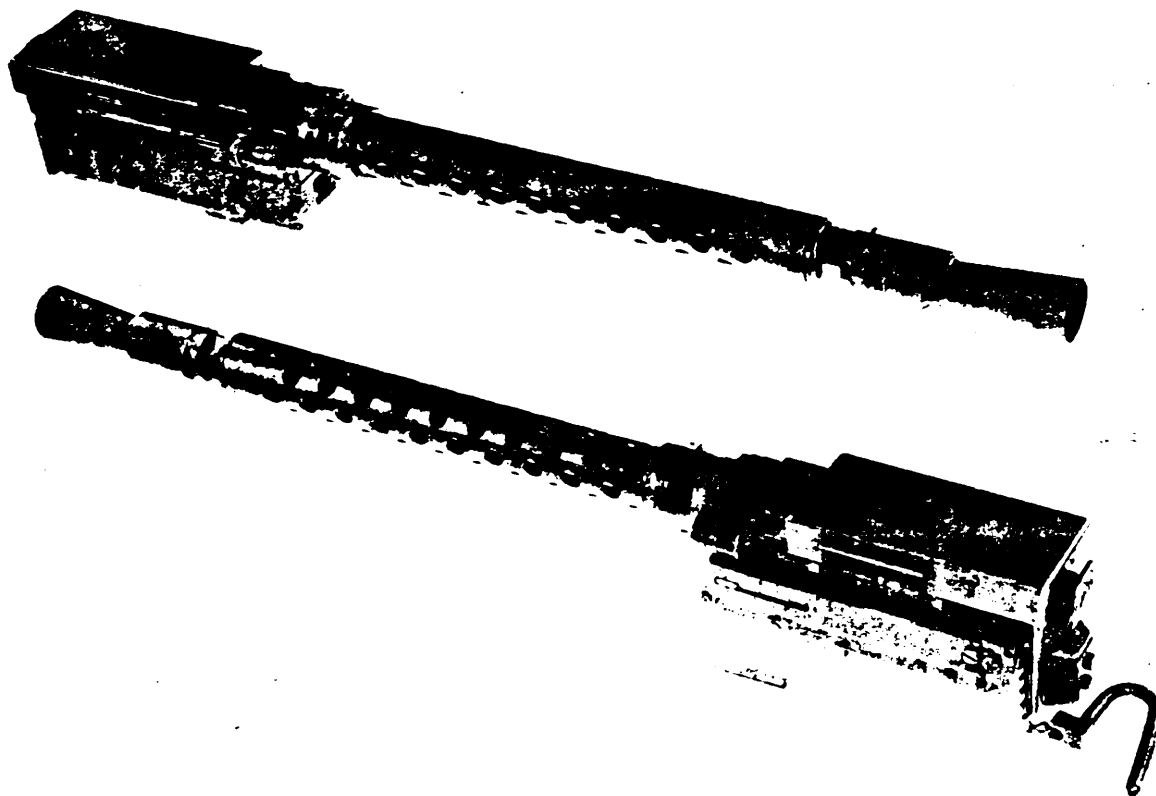


FIGURE 3. *Machinegun, 7.62-mm: fixed M73.*

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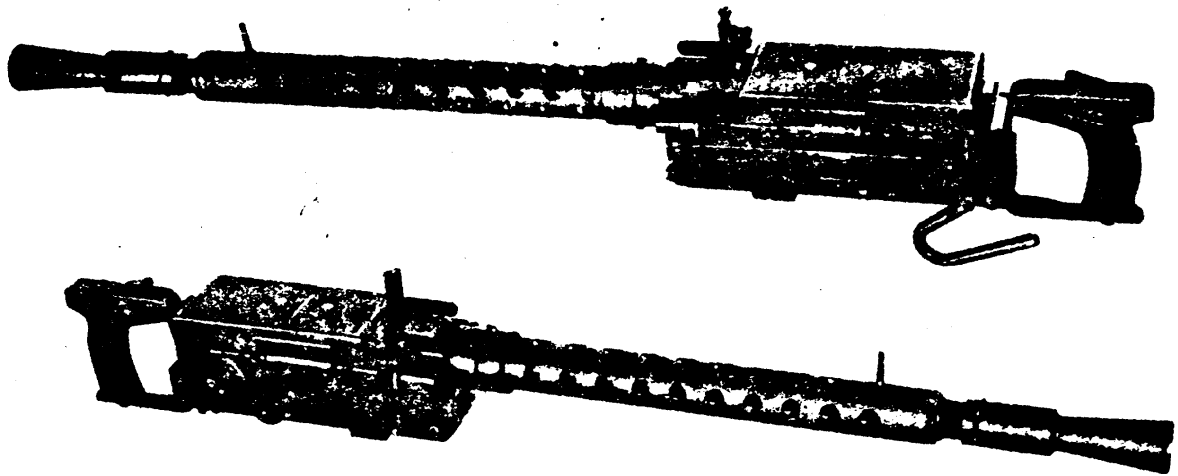


Figure 4. *Machinegun, 7.62-mm: flexible, M73C.*

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5.1.3 Caliber .50, *machineguns*

- 5.1.3.1** Machinegun, caliber .50: Browning, heavy barrel, (flexible), M2.
 FSN 1005-322-9715 w/e.
 FSN 1005-726-5636 w/o/e (see fig. 5).

Description and application:

The caliber .50, M2, heavy barrel (flexible) air-cooled machinegun is a heavy version of the basic recoil operated caliber .30 Browning mechanism. This weapon is designed for ground, tank, armored vehicle, or naval deck installation as a flexible mounted machinegun. It may be used on the M63 or M65 AA mounts or on the M3 tripod mount. The M2, HB (flexible) machinegun is used by the Army, Navy, and Air Force.

Physical and performance characteristics:

Weight of complete gun84 lb.
 Length, overall w/o flash hider 662 in.
 w/ flash hider.70.3 in.
 Width, silhouette8.9 in.
 Height, silhouette w/o barrel 7.6 in.
 carrier, w/sight folded.
 Receiver length w/back plate . . .26.4 in.
 Length between receiver 143 in.
 mounting points.
 Length, front of feedway to rear 25.4 in.
 of receiver w/back plate.
 Barrel w/o flash hider:
 Length45 in.
 Weight28 lb.
 Quick changeNo (screw type).
 Method of operationRecoil.
 Method of coolingAir.
 Rate of fire w/tripod mount400-600 rpm.
 Cookoff protectionNone.
 Direction of feedEither side of
 receiver.
 Force applied to trigger, (max.)16 lb. (approx.)
 Force applied to sear, (max.)23 lb.
 Force applied to sear slide,35 lb.
 (max.).
 Belt pull, (min.)20 lb.
 HeadspaceAdjustable (202 – 206
 in.)
 Method of charging gunManual or retracting
 slide (either side).

Force required to charge gun, 105 lb. (approx.).
 (max.).
 Method of firingManual back and side
 plate trigger.
 Type primer ignitionPercussion.
 Case ejectionBottom of receiver.
 Link ejectionEither side of receiver.
 Link belt pitch88 in.
 Type (link (M9)pull-out. metallic.
 Type safetyNo safety.
 Type back plateFlexible (spade grips).
 Type rear sightsFolding leaf (microm-
 eter).
 Type front sightFixed post.
 Type flash hiderCone.
 Sight radius19.9 in.
 Sight scale adjusted to2,600 yd.
 Weight of 100 linked rounds292 lb.
 AccuracyAll shots of a 10-round
 burnt shall group
 within an 8-inch
 circle at a 100-foot
 range when fired
 from a rigid mount.

Ammunition:

Cartridge, cal. .60, ball, M33.
 Cartridge, cal. .50, API, M8.
 Cartridge, cal. .50, API-T, M20.
 Cartridge, cal. .50, incendiary, M1,
 Cartridge, cal. .50, tracer, M17.
 Cartridge, cal. .50, dummy, M2.

Links:

Link, cartridge, metallic belt, cal. .50, M2.
 Link, cartridge, metallic belt, cal. .50, M9.

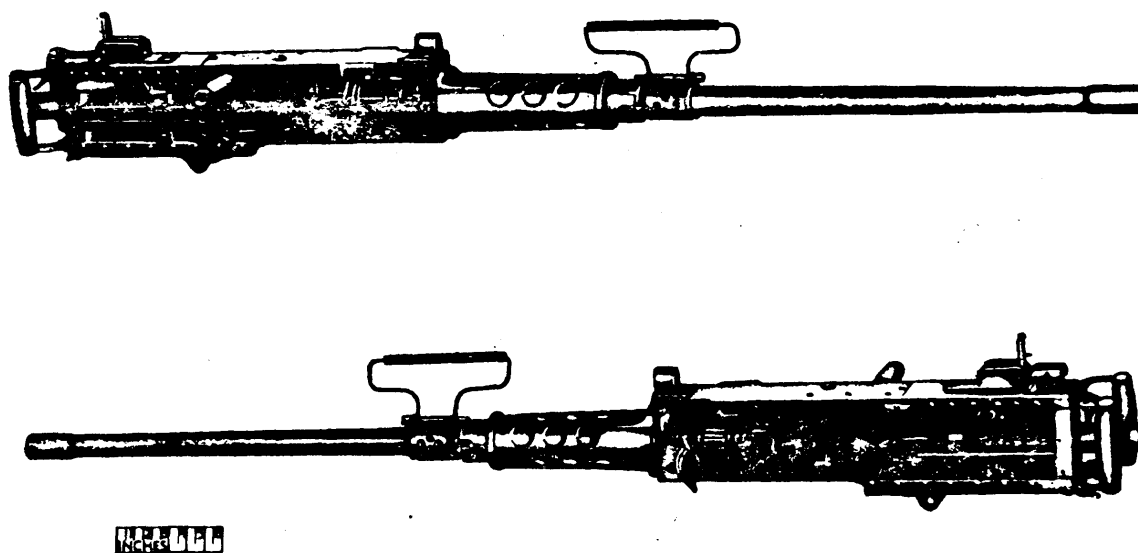
5.1.3.2 **Machinegun, caliber .50: Browning, heavy barrel (turret type), M2, (see fig. 6).**

FSN 1005-322-9721 w/e.

Description and application:

The caliber .50, M2, heavy barrel (turret type) air-cooled machinegun is a heavy version of the basic recoil operated caliber .30 Browning mechanism and is identical to the M2, HB (flexible) machinegun with the exception of a fixed type back plate (without spade grips, bolt latch, and trigger) rather than the flexible type back

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FIGURE 5. *Machinegun, caliber .50 Browning, heavy barrel (flexible), M2.*

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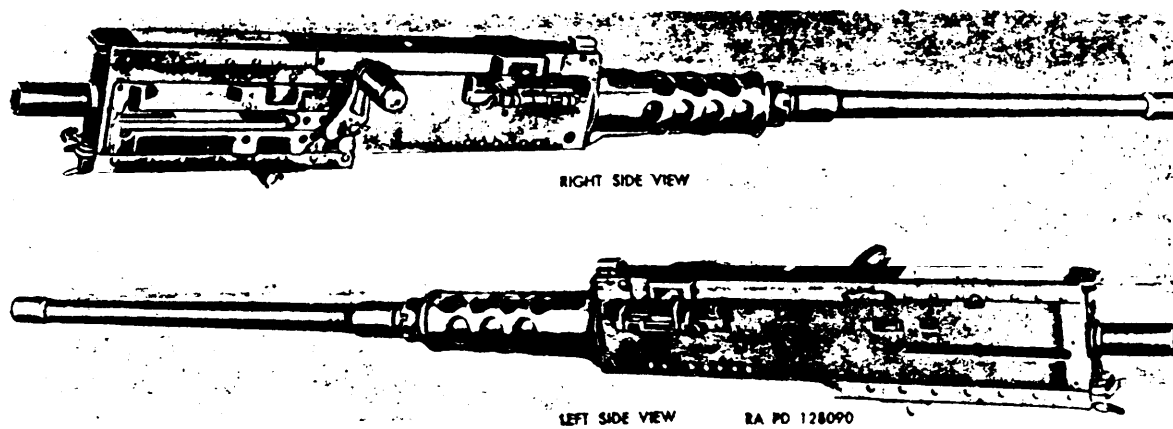


Figure 5. Machinegun, caliber 50: Browning, heavy barrel (flexible), M2.

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plate and the sights, flash hider, and barrel carrier removed. This weapon is used by the Army as an antiaircraft gun (with the M55 multiple trailer mount) and as a turret gun on armored vehicles and tanks (M59 armored vehicle, M48 series tanks, and M84 mortar carrier).

Physical and performance characteristics:

Weight of complete gun 80 lb.
 Length, overall 65.2 in.
 Width, silhouette 7.8 in.
 Height, silhouette 6.7 in.
 Receiver length w/back plate 26.4 in.
 Length between receiver mounting 143 in. points.
 Length, front of feedway to rear 25.4 in. of receiver w/back plate.

Barrel :

Length 45 in.
 Weight 28 lb.
 Quick change No (screw type).

Method of operation Recoil.
 Method of cooling Air.
 Rate of fire w/rigid mount 450-600 rpm.
 (deflection-250,000 lb/in).

Cookoff protection None.
 Direction of feed Either tide of receiver.
 Force applied to sear, (max.) 23 lb.
 Force applied to sear slide, (max.) 35 lb.
 Belt pull, (min.) 20 lb.
 Headspace Adjustable(202-206 in.)

Method of charging gun Manual or retracting elide (either side).

Force required to charge gun, 105 lb. (approx.) (max.).

Method of firing Electrical solenoid.
 Type primer ignition Percussion.
 Case ejection Bottom of receiver.
 Link ejection Either side of receiver.
 Link belt pitch88 in.
 Type link (M9) Pull-out, metallic.
 Type safety None.
 Type back plate Fixed (no trigger or spade grips).

Type rear sight None.
 Type front sight None.
 Type flash hider None.

Weight of 100 linked rounds 29.2 lb.
 Accuracy All shots of a 10-round burst shall group within an 8-inch circle at a 100-foot range when fired from a rigid mount.

Ammunition:

Cartridge, cal. .50, ball, M33.
 Cartridge, cal. .50, API, M8.
 Cartridge, cal. .50, API-T, M20.
 Cartridge, cal. .50, incendiary, M1
 Cartridge, cal. .50, tracer, M17.
 Cartridge, cal. .50, dummy, M2.

Links:

Link, cartridge, metallic belt, cd. .50, M2.
 Link, cartridge, metallic belt, cal. .50, M9.

5.1.3.3 Machinegun, caliber .50: Browning, heavy barrel, (turret type), M2G, w/o/e
 FSN 1005-602-2105.

Description and application:

The caliber .50, M2G, heavy barrel machinegun is a modification of the caliber .50, M2 heavy barrel, turret-type gun, designed for use with the M45-series multiple machinegun mounts. The M10 charger is attached in place of the retracting slide group, a 24-volt top plate solenoid is used in place of the original top plate, and certain components of the spade grip trigger group replace the side plate trigger to provide a manual triggering device. It is used by the Army.

Physical and performance characteristics:

The physical and performance characteristics are identical to the caliber .50, M2, heavy barrel machinegun (FSN 1005-322--9721) except as follows:

Method of firing Electric solenoid or manual trigger.
 Type safety Sliding latch on back. plate blocks trigger.
 Type back plate. Fixed (not spade grip).

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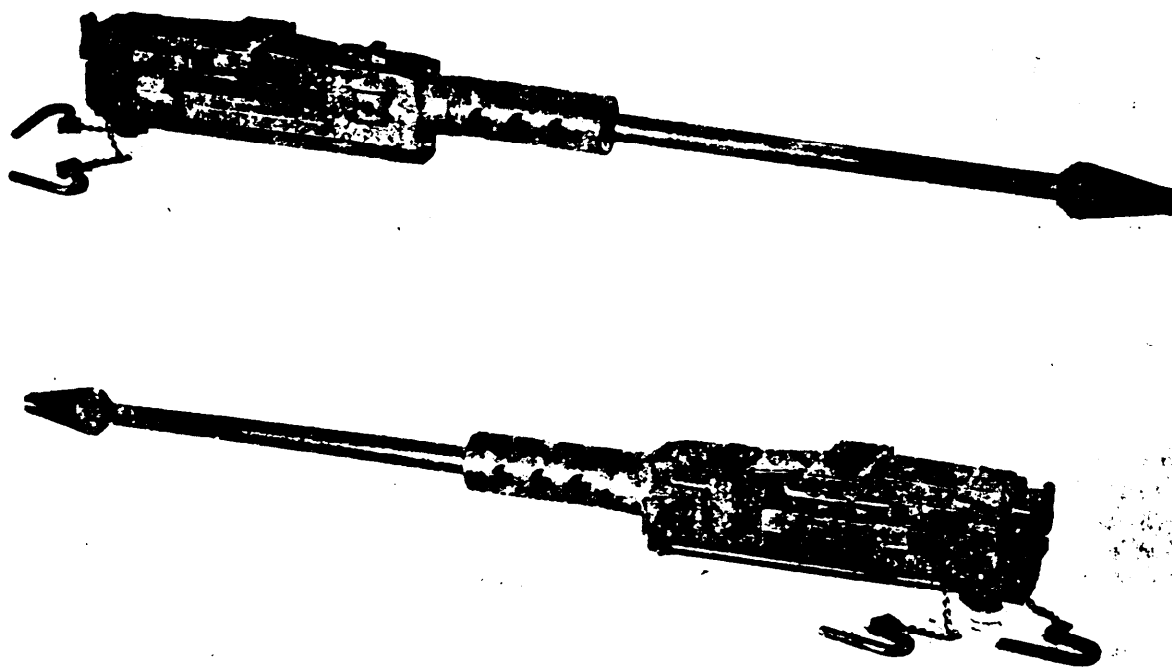


Figure 7. *Machinegun, caliber .50: fixed, M85.*

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5.1.3.4 Machinegun, caliber .50: fixed, M85.
 FSN 1005-690-2790 (see fig. 7).

Description and application:

The caliber .50, M85, fixed machinegun is an air-cooled, link-belt fed machinegun designed for tank cupola or coaxial installations. It is recoil operated, and has a short receiver, fixed headspace, a quick change barrel and a flash suppressor. The ammunition belt is fed from either side of the weapon with change from one side to the other accomplished by disassembling a limited number of components and repositioning them. Field stripping is easily and quickly performed as quick release pins and locking mechanisms are extensively used. The M85 fixed machinegun is used by the Army and the Marine corps.

Physical and performance characteristics

Weight of complete gun	61.5 lbs.
Length including flash suppressor.	54.5 in.
Width	53 in.
Height	6.0 in.
Barrel:	
Length	36.0 in
Weight	14.4 lb.
Quick change	Yes
Method of operation	Recoil.
Method of cooling	Air.
Rate of fire w/rigid mount:	
High	1050 ± 50 rpm.
Low	400 ± 50 rpm.
Cookoff protection	Yes (open bolt).
Direction of feed	Left or right.
Manual sear-off force (min.)	30 lb.
Belt pull	30 lb.
Headspace	Fixed.
Method of charging gun	Manual.
Method of firing gun	Manual or solenoid.
Case ejection	Side.
Link ejection	Side.
Type link (M15)	Push through metallic.
Type safety	Spring lock.
Type sight	None.

Type flash suppressor	Prong
Weight of 100 linked rounds	29.2 lbs.
Accuracy	(To be inserted when requirement have km fully estab- lished).

Ammunition:

Cartridge, cal. .50, ball, M33.
Cartridge, cal, 30, API M8.
Cartridge, cal. .50, API&T, M20.
Cartridge, cal. 50, incendiary, M1.
Cartridge, cd. .50, tracer, M17.
Cartridge, cal 50, dummy, M2.

Link:

Link, cartridge, metallic belt, cal. .50, M15.

5.1.3.5 Machinegun, caliber .50: flexible,
 M85C (see fig. 8)
 FSN 1005-791-3379 w/e.

Description and application:

The caliber .50, M85C machinegun is the flexible version of the M85 fixed machinegun and is identical to the M85 except that a front sight is mounted to the front of the receiver and a spade grip assembly is fastened to the rear of the receiver by means of a quick release device. A rear sight is mounted on the spade grip assembly. The M85C flexible machinegun is used on the XM133 tripod mount. It is used by the Army and Marine Corps.

Physical and performance characteristics:

The physical and performance characteristics are identical to the caliber .50, M85 fixed machinegun (FSN 1005-690-2790) except as follows:

Weight	66 lb. (approx.)
Height796 in.
Width6 in.
Length of complete gun w/spade grip assembly.	57.5 in.
Type of rear sight	Adjustable ramp.
Type of front sight	Post, fold-down
Sight radius	18.7 in.
Sight graduations	Meters.

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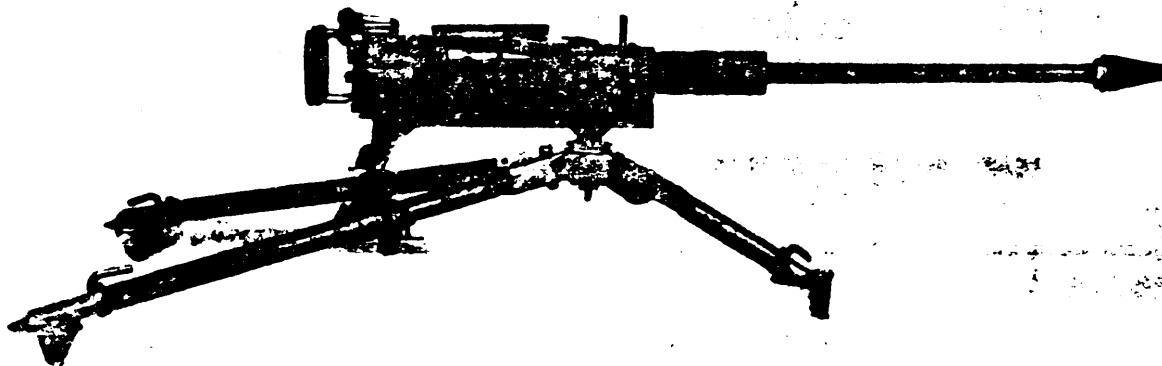


FIGURE 8. *Machinegun, caliber .50: flexible, M86C*
(shown on mount, tripod, machinegun: XM133).

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13 February 1961**5.1.4 20-mm automatic guns.****5.1.4.1 Gun, 20-mm, automatic: MK 12 MOD 0.**
FSN 1005-544-9251 (see fig. 9)*Description and application:*

The 20-mm MK 12 MOD 0 automatic gun is an air-tooled, link-belt fed, combination gas-blowback operated automatic gun used for fixed aircraft mountings. It is a redesign of the basic 20-mm M3 automatic gun mechanism and fires electric primed ammunition from the front seared (closed bolt) position. It is equipped with the pneumatic (MK 7 MOD 0 or MK 7 MOD 2) type feeder and is charged by an integral pneumatic charger. The MK 12 MOD 0 automatic gun is used only by the Navy.

Physical and performance characteristics:

Weight of complete gun and feeder	101.3 lb.
Weight of MK 7 feeder	13.3 lb.
Length, overall	75.1 in.
Width, silhouette w/MK 7 feeder.	628 in.
Height, silhouette w/MK 7 feeder.	7.3 in.
Recoil of receiver88 in. (min.), 13 in. (max.)
Barrel:	
Length	52.5 in.
Weight	31.31b.
Quick change	No (screw type).
Method of operation	Combination gas blowback.
Method of cooling	Air (deflection-250,000 lb/in.).
Rate of fire w/rigid mount	1000 rpm.
Horsepower-weight ratio	(Horsepower per lb. of gun wt.) 16.
Cookoff protection	None.
Direction of feed	Either side of receiver.
Belt pull, (min.)	70 lb.
Headspace	Adjustable.
Method of charging gun	Pneumatic charger (integral).
Method of firing	Electrical impulse firing pin.
Type primer ignition	Electric
Case ejection	Bottom of receiver.

Link ejection	Side of feed mechanism.
Link belt pitch	1.4 in.
Type link (MK 2 MOD 0 or 2)	Side-stripping, metallic.
Weight of 100 linked rounds	69.0 lb.

Ammunition:

Cartridge, 20-mm, electric, AP-T, ZT, MK 108.
Cartridge, 20-mm, electric, API, ZR, MK 107.
Cartridge, 20-mm, electric, HEI, ZQ, MK 106 and MODS.
Cartridge, 20-mm, electric, TP, ZS, MK 106.

Links:

Link, cartridge, disintegrating belt, 20-mm, MK 2 MOD 0 or 2 w/end Link, MOD 1.

5.1.4.2 Gun, 20-mm, Automatic: MK 12 MOD 3.
FSN 1005-544-9253 (see fig. 10) .*Description and application:*

The 20-mm MK 12, MOD 3 automatic gun is a modification of the 20-mm MK 12 MOD 0 designed to use the MK 9 MODS 2 and 4 (RH) and 3 and 5 (LH) rotary recoil operated feeder. It fires the electric primer cartridge from the front seared (closed bolt) position. It is used by the Navy in aircraft as a fixed mounted weapon.

Physical and performance characteristics:

Weight of complete gun w/cradle and feeder.	115 lb.
Weight of cradle	9.0 lb.
Weight of MK 9 MOD 5 feeder..	27.0 lb.
Length, overall	75.1 in.
Width, silhouette	6.25 in.
Height, silhouette	7.7 in.
Recoil of receiver88 in. (min.), 1.3 in. (max.)
Barrel:	
Length	52.5 in.
Weight	31.51b.
Quick change	No (screw type).
Method of operation	Combination gas-blowback recoil,
Method of cooling	Air (deflection-250,000 lb/in.)

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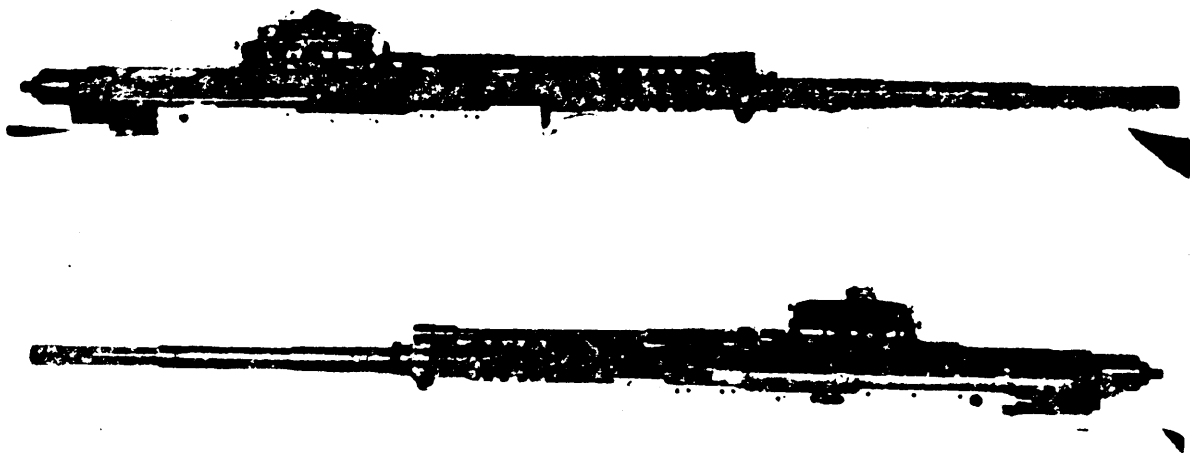


FIGURE 9. *Gun, 20-mm, automatic: MK 12 MOD 0.*



Figure 10. Gun, 20-mm, automatic: MK 12 MOD 3.

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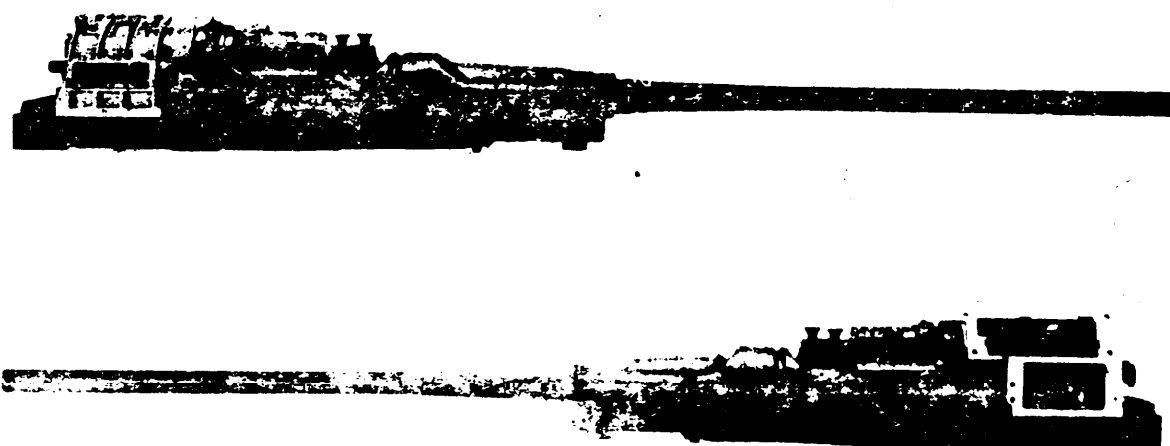


FIGURE 11. *Gun, 20-mm automatic: M39A2.*

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Rate of fire w/rigid mount 1000 rpm.
 Horsepower-weight ratio (Horsepower per lb.
 of gun wt.) 16.
 Cookoff protection None.
 Direction of feed Right side (MK9
 MODS 2 and 4).
 Left side (MK 9
 MODS 3 and 6).
 Belt, pull, (min) 70 lb.
 Headspace Adjustable.
 Method of charging gun Pneumatic charger,
 (integral) .
 Method of **firing** Electrical impulse to
 firing pin.
 Type primer ignition Electric.
 case ejection Bottom of receiver.
 Link ejection Side of feed
 mechanism.
 Link belt pitch 1.4h.
 Type link (MK2 MOD 0 or 2) Side-stipping,
 metallic.
 Weight of 100 linked rounds. 69.0 lb.

Ammunition:

Cartridge, 20-mm, electric, AP-T, ZT, MK 108.
 Cartridge, 20-mm, electric, API, ZR, MK 107.
 Cartridge, 20-mm, electric, HEI, ZQ, MK 103 and
 MODS.
 Cartridge, 20-mm, electric, TP, ZS, MK 106.

Links:

Link, cartridge, disintegrating belt, 20-mm, MK 2
 MOD 0 or 2 w/end link MOD 1.

5.1.4.3 Gun, 20-mm, automatic: M39A2.
 FSN 1005-566-0044 (R.H.).
 FSN 1005-566-0045 (L. H.) (see fig.
 11).

Description and application:

The 20-mm, M39A2 automatic gun is an air-cooled, link-belt gas-operated, revolver-type automatic gun for fixed or flexible mounting in aircraft. It fires electric primed ammunition from a 5-chamber drum which revolves about an axis parallel to the barrel bore; firing occurs as each drum chamber is indexed to a 6 o'clock position. Change from right-hand to left-hand feed is ac-

complished by replacing some parts and re-
 fitting other parts. It is used only by the Air
 Force.

Physical and performance characteristics:

Weight of complete gun 179 lb.
 Length, overall 72.2 in.
 Width, silhouette 10.4 in.
 Height, silhouette 8.4 in
 Receiver length 37.9 in
 Length between receiver
 Mounting points 26.5 in.
 Barrel:
 Length 53.5 in.
 Weight 29.4 lb.
 Quick change Yes (interrupted
 locking lugs).
 Method of operation Gas.
 Method of cooling Air.
 Rate of fire w/rigid mount (Deflection-250,000
 lb/in) 1500 rpm.
 Horsepower-weight ratio (Horsepower per lb of
 gun wt.) 9.8.
 Cookoff protection None.
 Direction of feed Either side of receiver.
 Belt pull, (min.) 100 lb.
 Headspace Fixed.
 Method of charge gun Manual.
 Force required to charge gun, 230 lb. (approx.).
 (max.).
 Method of firing Electrical impulse to
 firing pin.
 Type primer ignition Electric.
 Case ejection Rear or side of feeder.
 Link ejection Either side off feeder.
 Link belt pitch 1.8 in.
 Type link (M12) Push through.
 metallic.
 Type flash suppressor None.
 Weight of 100 linked rounds 72.0 lb.
 Accuracy The radial dispersion
 (standard deviation)
 shall not exceed 1%
 rolls in a burst of 50
 rounds when
 mounted on a
 structure having a
 rigidity of 250,000
 pounds per inch
 deflection.

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Ammunition:

Cartridge, 20-mm, electric, API, M53.
 Cartridge, 20-mm, electric, HEI, MS6A1.
 Cartridge, 20-mm, electric, ball, M56A1.
 Cartridge, 20-mm, dummy, MM.

Links:

Link, cartridge, disintegrating bell 20-mm, M12.

5.1.4.4 Gun, 20-mm, automatic: M61 FSN 1005-52042620 (see fig. 12).

Description and application:

The 20-mm, M61 automatic gun is an air-cooled, link-belt fed rotating multiple barrel-type automatic gun for fixed or turret-type mounting in aircraft. It is designed on the Gatling principle and fires electric primed ammunition from each of the six barrels as the rotating portion of the weapon turns through one revolution. The gun is externally operated by an electric or hydraulic drive depending upon the aircraft installation. It is used only by the Air Force,

Physical and performance characteristics

Weight of gun w/M2 or M3 feeder and w/M7 drive.	303 lb.
Weight of gun w/M2 or M3 feeder and w /M12 drive,	293.8 lb
Length, overall w/M2 or M3 feeder and w/M7 drive.	72.6 in.
Length, overall w/M2 or M3 feeder and w/M12 drive.	76.6 in.
Width, silhouette w/M2 or M3 feeder and w/M7 drive.	16.9 in.
Width, silhouette w/M2 or M3 feeder and w/M12 drive.	13.0 in.
Height, silhouette w/M2 or M3 feeder and w/M7 drive.	132 in.
Length, front of feeder opening to resr of housing w/M7 drive.	11.9 in.
Length between housing mounting points.	22.8 in.

Barrel:

Length	60.0 in.
Weight	18.0 lb.
Quick change	Yes (interrupted locking lugs) .

Method of operation	Electric(M7)or hydraulic (M12) drive.
Method of cooling	Air.
Rate of fire w/M7 drive	4,000 to 400 rpm to rpm.
Rate of fire w/M12 drive	6,000 to 7,200 rpm.
Homepower-weight ratio for 4,000 rpm.	(Horsepower per lb. of gun weight) 16.6.
Homepower-weight ratio for 4,000 rpm.	(Homepower per lb. of gun weight) 24.9.
Cookoff protection	Feeders M2 and M3.
Direction of feed	Right-hand aide-Stripping disintegrating belt.
Belt pull (max.)	100 lb
Headspace	Fixed.
Method of charging gun	self-charging by means of drives.
Method of firing	Electrical impulse to firing pin.
Type primer ignition	Electric.
Case ejection	Bottom of housing when battery is positioned at 12:00 o'clock.
Link ejection	Bottom of housing when battery is positioned at 12:00 o'clock.
Link belt pitch	1.6 in.
Type links (M14 and M17)	Side-stripping, metallic.
Type flash suppressor	None.
Weight of 100 linked rounds	.69.0 lb.
Accuracy	.80 percent of a 104-round burst shall be within an 8.0-inch diameter circle at 1000 inches, and the center of the 80 percent group shall be within 4.75 inches left or right and 25 inches above or below point of aim.

Ammunition:

Cartridge, 20-mm, electric, API, M53.
 Cartridge, 20-mm, electric, HEI, M56A1.
 Cartridge, 20-mm, electric ball, M55A1.
 Cartridge, 20-mm, dummy, M51-series.

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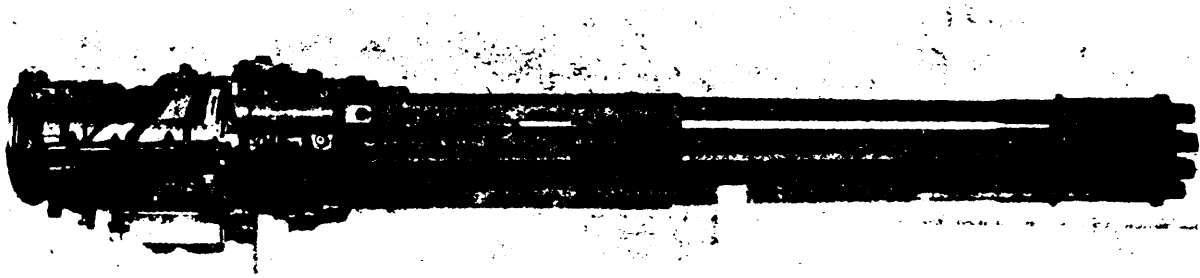


Figure 12. *Gun, 20-mm, automatic: M61.*

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FIGURE 12. - *Continued.*

Links:

- Link, metallic, cartridge, 20-mm, M14 (used with M2 feeder).
- Link, metallic, cartridge, 20-mm, M17 (used with M3 feeder).

5.1.5 Machinegun trainers.**5.1.5.1** Trainer, Machinegun, Caliber .22: M3
FSN 1005-678-7369 w/e (see fig. 13).*Description and application:*

The caliber .22, M3 machinegun trainer is a conversion of the caliber .30 M1917A1 water-cooled machinegun, designed to fire the caliber .22 long rifle cartridge. The functioning of the M3 trainer, which operates on the floating chamber principle, is identical to that of the M1917A1, except that 'the recoiling force is received from a piston rather than the barrel which is fixed. Conversion of the M1917A1 to the M3 trainer is accomplished by exchanging the main group assemblies. This trainer is used by the Army to simulate actual firing action of the caliber .30 M1917A1 machinegun.

Physical and performance characteristics:

Weight of complete trainer w/o water.	32.5 lb.
w/water.	39.6 lb.
Length, overall	38.6 lb.
Width, silhouette	4.6 in.
Height, silhouette68 in.
Receiver length w/backplate	19.2 in.
Length between receiver mounting points.	11.4 in.
Barrel length	22.8 in.
Method of operation	Recoil.
Method of coding	Water.
Amount of coolant	8 pt.
Rate of fire	450-600 rpm
Direction of feed	Left side of receiver.
Trigger pull	7-12 lb.
Method of charging trainer	Manual bolt handle, (right side).
Force required to charge trainer, 38 lb. (approx.) (max.).	
Method of firing	Manual trigger (pistol grip).

Type primer ignition	Percussion.
Case ejection	Bottom of receiver.
Fabric belt ejection	Right side of receiver.
Fabric belt pitch	51 in.
Type link	Fabric adapter belt.
Type back plate	Flexible (pistol grip).
Type safety	None.
Type rear sight	Folding leaf (micrometer).
Type front sight	Fixed post.
Type flash hider	None.
sight radius	26.3 in.
Sight scale adjusting to	2600 yd.

Ammunition:

Cartridge, cal. 22, commercial ball, long rifle.

Links:

A special fabric cartridge belt is provided for feeding the belt adapters (which hold the cal. 22 cartridge) to the gun.

5.1.5.2 Trainer, Machinegun, caliber .22: M4
FSN 1005-678-7370 w/e (see fig. 14).*Description and application:*

The caliber .22, M4 machinegun trainer is a conversion of the caliber .30 M1919A4 (flexible) machinegun designed to fire the caliber .22 long rifle cartridge. The functioning of the M4 trainer, which operates on the floating chamber principle, is identical to that of the M1919A4 except that the recoiling force is received from a piston rather than the barrel which is fixed. Conversion of the M1919A4 (flexible) gun to the M4 trainer is accomplished by exchanging the main group assemblies. This trainer is used by the Army to simulate actual firing action of the caliber .30 M1919A4 (flexible) machinegun.

Physical and performance characteristics:

Weight of complete trainer	32 lb.
Length, overall	41.1 in.
Width, silhouette	3.8 in.
Height, silhouette	7.4 in.
Receiver length w/black plate	192 in.

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FIGURE 13. *Trainer, machinegun, caliber 22: MS
(shown on mount, tripod, machinegun, cal. 30, M1917A1).*

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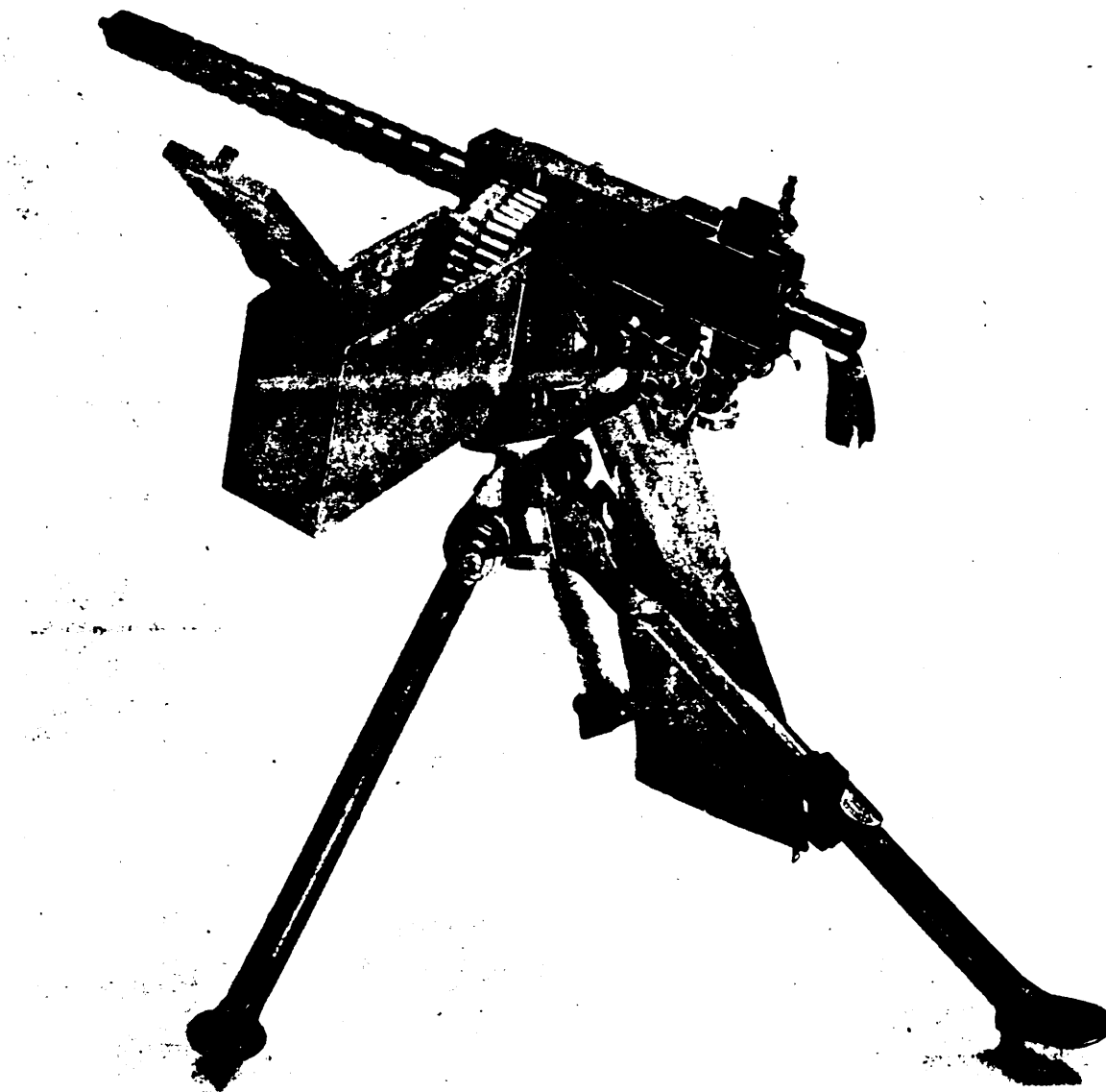


FIGURE 14. *Trainer, machinegun, caliber 22: M4
(shown on mount, tripod, machinegun, cal. 30, M1917A1).*

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Length between receiver mounting points	11.4 in.
Barrel length	22.8 in.
Method of operation	Recoil.
Method of cooling	Air.
Rate of fire	400-550 rpm.
Cook off protection	None.
Direction of fed	Left side of receiver.
Trigger pull7-121b.
Method of charge trainer	Manual bolt handle. (right side).
Force required to charge trainer (mu.).	36 lb. (approx.).
Method of firing	Manual trigger (pistol grip).
Type primer ignition	Percussion.
Case ejection	Bottom of receiver.
Fabric belt ejection	Right side of receiver.
Fabric belt pitch	51 in.
Type link	Fabric adapter belt.
Type backplate	Flexible (pistol grip).
Type safety.,	None.
Type rear sight	Folding leaf (micrometer).
Type front sight	Fired post.
Type flash hider	None.
Sight radius13.9 in.
Sight scale adjusted to	2400 yd.

Custodians:

Army-Ord
 Navy-Wep
 Air Force - WRA

Ammunition:

Cartridge, cal. 22, commercial ball, long rifle.

Links:

A special fabric cartridge belt is provided for feeding the belt adapter (which hold the cal. 22 cartridge) to the gun.

(Copies of specifications, standards, drawings, and publications required by contractor in connection with specific procurement functions should be obtained from the procurement agency or directed by the Office.)

(Copies of this standard for Military use may be obtained as indicated in the foreword to the Index of Military Specifications and Standards.)

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Preparing activity:

Army-Ord

APPENDIX A

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Form Approved
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This sheet is to be filled out by personnel either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity (as indicated on reverse hereof).

SPECIFICATION

ORGANIZATION (Of submitter)

CITY AND STATE

CONTRACT NO.

QUANTITY OF ITEMS PROCURED

DOLLAR AMOUNT

\$

MATERIAL PROCURED UNDER A

DIRECT GOVERNMENT CONTRACT

SUBCONTRACT

1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?

A. GIVE PARAGRAPH NUMBER AND WORDING.

B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES.

2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID

3. IS THE SPECIFICATION RESTRICTIVE?

 YES NO

IF "YES", IN WHAT WAY?

4. REMARKS (Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity)

SUBMITTED BY (Printed or typed name and activity)

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