

RESTRICTED



**JAPANESE AMMUNITION**

**PART IV 25mm - 70mm**

20 JULY 1945

MILITARY INTELLIGENCE DIVISION, WAR DEPARTMENT  
WASHINGTON, D.C.

RESTRICTED

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JAPANESE 25-mm -- 70-mm AMMUNITION

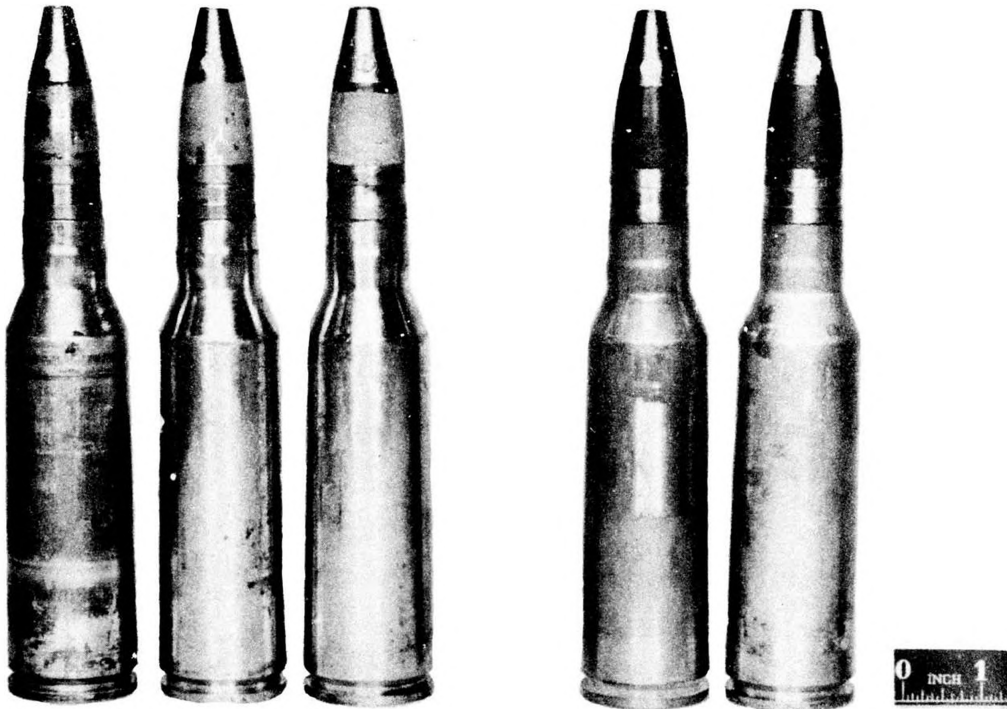
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25-mm

JAPANESE 25-mm (0.98 in.) AMMUNITION

1. GENERAL

Japanese 25-mm ammunition was developed from that used with the French 25-mm Hotchkiss AT gun. In spite of different cartridge case dimensions, the two types closely resemble each other. The ammunition has a relatively large cartridge case with a pronounced bottle neck. Projectiles are streamlined and although generally fitted with two copper rotating bands, they are so deeply seated in the case that only the upper band is visible in the complete round.



2. WEAPONS FROM WHICH FIRED

To date, this ammunition is known to be used only in the Type 96 (1936) 25-mm AA/AT Machine Cannon. This excellent Navy weapon exists in single and multiple mounts.

### 3. SPECIFICATIONS OF CARTRIDGE CASE AND PROPELLANT

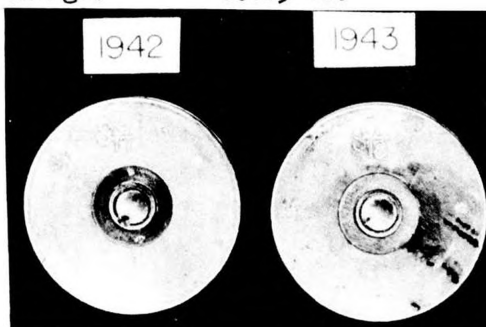
Both brass and steel cartridge cases have been recovered. Specifications of these cases are identical except for weight. Markings stamped on the base of the cartridge case indicate arsenal and date of loading.

Weight, empty (with primer)

Brass case:	11.5 to 11.8 oz.
Steel case:	11.0 oz.
Length:	6.4 in.
Diameter of rim:	1.7 in.
Diameter of base:	1.6 in.
Diameter of neck:	1.0 in.
Composition of brass case:	Copper 69%, Zinc 31%
Composition of propellant:	Nitrocellulose 92.9% Dinitrotoluene 5.7% Diphenylamine 1.1% Graphite 0.3% <hr/> 100.0%
Weight of propellant:	3.6 oz. to 3.8 oz. Varies slightly according to pro- jectile used.
Weight of complete primer:	0.45 oz.
Composition of primer charge:	Mercury fulminate Potassium chlorate Antimony sulfide
Weight of primer charge:	0.035 oz.



Brass case on left  
Steel case on right



Typical base markings

4. SPECIFICATIONS OF COMPLETE ROUNDS

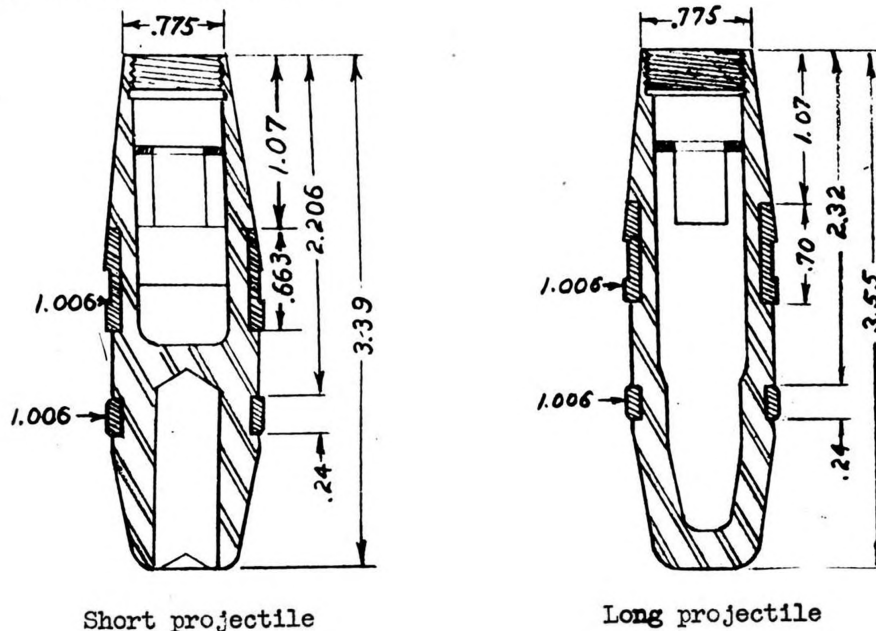
The following types of ammunition are known to exist:

High Explosive  
 High Explosive Tracer  
 High Explosive Tracer (Self-destroying)  
 High Explosive Incendiary  
 Armor Piercing Tracer  
 Tracer  
 Practice

With exception of the Armor Piercing Tracer round, all filled 25-mm projectiles are of two basic lengths. The short type has two cavities separated by a steel septum, and is fundamentally a high explosive tracer. The long projectile has only one cavity, sealed at the base, and is a high explosive without tracer. However, both basic types have in some instances been modified.

The short projectile has been found with a drilled septum, thus converting it to a self-destroying tracer. Similarly, the base of the long round has been drilled and a tracer element inserted. In addition, the long round has also been modified by the inclusion of an incendiary element in the high explosive cavity.

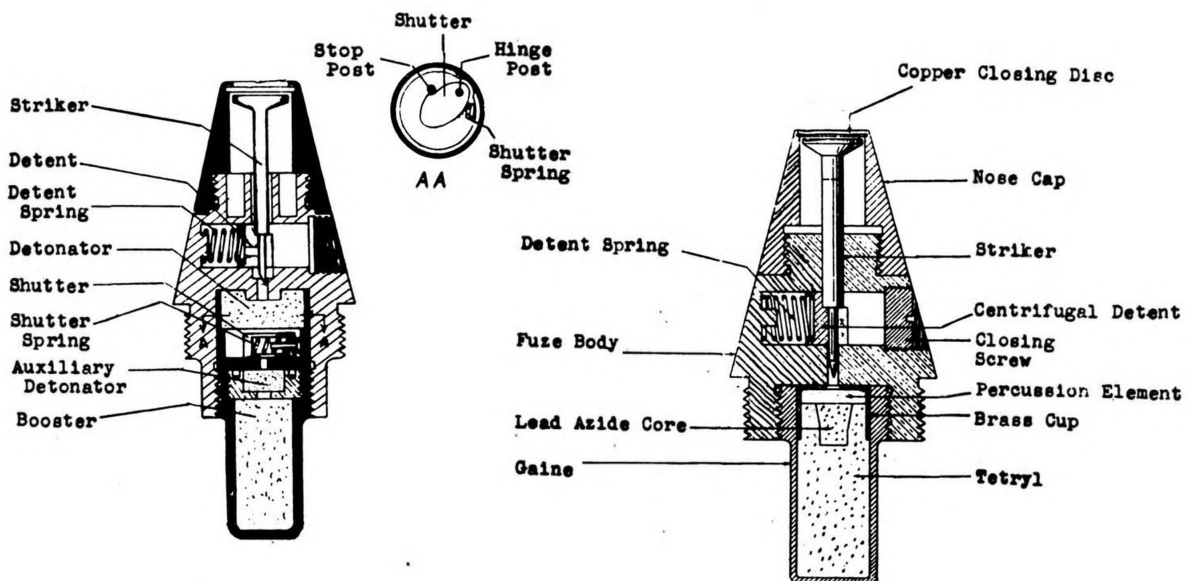
Although there is a difference of 0.16 inches between the length of the long and short projectiles, the difference is not apparent in the complete rounds, because of the positioning of the projectiles within the cartridge cases.



All but the Armor Piercing Tracer round are fitted with two copper rotating bands, the forward one 0.70" wide; the rear one 0.24" wide. The Armor Piercing Tracer round, however, has one large rotating band 0.93" wide with two bearing surfaces corresponding to the two normal bands. Projectiles of all types are retained in the cartridge case by means of a continuous crimp between the rotating bands.

Color markings follow the navy system; the projectile body being painted a solid color to indicate the type (i.e. HE, APT, HEI, etc.). Originally a green band was painted below the fuze to indicate that the projectile body was filled. However, in rounds of recent manufacture the use of this green band has apparently been discontinued.

All fuzed projectiles may be fitted with either the Type 1 (1941) or the Type 4 (1944) fuzes.



Type 1 (1941) Fuze

Type 4 (1944) Fuze

These fuzes are similar in action but differ in weight because of the elimination of the centrifugal shutter and the shortening of the body of the Type 4 (1944) fuze. The weights of the fuzes are:

Type 1 (1941): 1.51 oz.

Type 4 (1944): 1.36 oz.

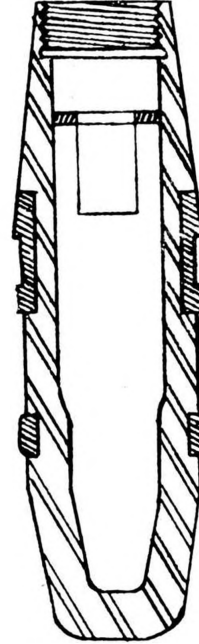
The use of the Type 4 (1944) fuze, however, permits the projectile filling to be increased by 2.0 to 2.1 grams (0.0706 to 0.074 oz.). Consequently, projectiles of the same type weigh approximately 0.08 oz. less when fitted with the Type 4 (1944) fuze, even though the filling has been increased.

In the specifications of complete rounds, weights given will be for the Type 1 (1941) fuze.

(a) 25-mm High Explosive

The projectile of this round is of the long type and contains a single HE charge.

Weight of complete round:	24.12 oz.
Length of complete round:	9.15 in.
Weight of projectile (fuzed):	8.85 oz.
Length of projectile (fuzed):	4.50 in.
Body Material:	Steel
Composition of HE filling:	TNT 60% Aluminum 40%
Weight of HE filling:	0.60 oz.
Type of fuze:	Type 1 (1941) or Type 4 (1944)
Color markings:	Maroon body, with or without green band below fuze.



Modifications of this round have been recovered containing 0.57 oz. of Tetryl or 0.48 oz. of Cast TNT, with total weights of complete rounds varying accordingly.

(b) 25-mm High Explosive Tracer (Short Body)

The following two models of this round exist:

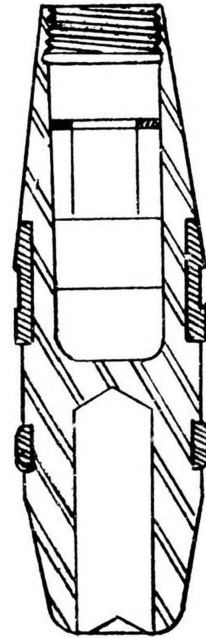
- (i) Basic model, with orange body.
- (ii) Model II, with red body.

The only apparent difference between these two models, other than color is that the basic model weighs 0.106 oz. more than the Model II. As previously stated, both models may be fitted with either the Type 1 (1941) or Type 4 (1944) fuze, making the complete round either a Modification 1 or Modification 2 respectively.

The following specifications relate to the basic Model, Modification 1.

(b) 25-mm High Explosive Tracer (Short Body) (Continued)

Weight of complete round:	24.2 oz.
Length of complete round:	9.11 in.
Weight of projectile (fuzed):	8.69 oz.
Length of projectile (fuzed):	4.34 in.
Body material:	Steel
Composition of HE filling:	TNT 60% Aluminum 40%
Weight of HE filling:	0.30 oz. (contained in 2 pellets)
Composition of tracer:	Barium peroxide 50.3% Magnesium 23.6% Sodium oxalate 19.6% Wax 6.5%
Composition of tracer igniter:	Barium peroxide 79.8% Magnesium 13.4% Wax 6.8%
Weight of tracer and tracer igniter:	0.33 oz.
Color of tracer:	Yellow, or blue and red*
Duration of tracer:	5.9 sec. (Yellow) or 4.5 sec. (Blue and Red)
Type of fuze:	Type 1 (1941)
Color markings:	Orange body, with or without green band.



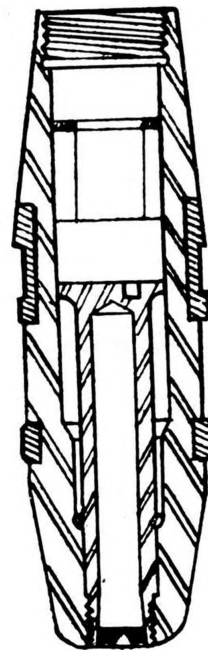
Note: A version of the basic model projectile has been recovered containing two pellets of straight TNT.

\* Apparently tracer burns first blue, then red.

(c) 25-mm High Explosive Tracer (Long Body)

The projectile of this round appears to be converted from the High Explosive Projectile mentioned in paragraph (a) of this section. The base of the projectile has been tapped and a tracer container, in the form of a metal liner, inserted.

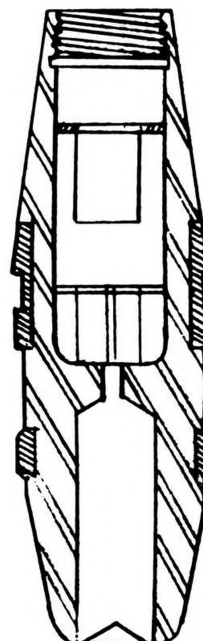
Weight of complete round:	23.1 oz.
Length of complete round:	9.15 in.
Weight of projectile (fuzed):	8.20 oz.
Length of projectile (fuzed):	4.50 in.
Body material:	Steel
Composition of HE filling:	Tetryl
Weight of HE filling:	0.2 oz. (contained in 2 pellets)
Composition of tracer	Probably contains Strontium nitrate
Color of tracer:	Red
Duration of tracer:	17 seconds static; (probably about 6 seconds in flight)
Type of fuze:	Type 1 (1941)
Color markings:	Orange body. Car- tridge case primer painted red.



(d) 25-mm High Explosive Tracer (Self-Destroying)

The projectile of this round is an adaption of the standard HET (Short) projectile, the metal septum having been drilled to permit the self-destroying action.

Weight of complete round:	23.23 oz.
Length of complete round:	9.11 in.
Weight of projectile (fuzed):	8.56 oz.
Length of projectile (fuzed):	4.34 in.
Body material:	Steel
Composition of HE filling:	TNT 60% Aluminum 40%
Weight of HE filling:	0.30 oz. (contained in 2 pellets)
Composition of tracer:	Barium peroxide 50.3% Magnesium 23.6% Sodium oxolate 19.6% Wax 6.5%
Composition of tracer igniter:	Barium peroxide 79.8% Magnesium 13.4% Wax 6.8%
Color of tracer:	Yellow
Duration of tracer:	6 sec. (approx.)
Type of fuze:	Type 1 (1941)
Color markings:	Red body

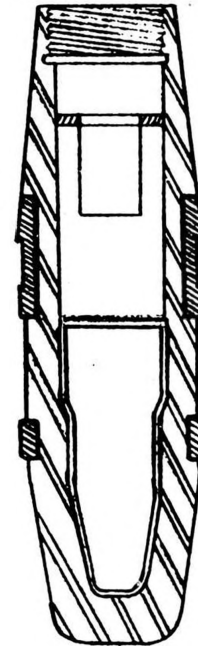
(e) 25-mm High Explosive Incendiary

The projectile of this round is identical to the standard HE except for the filling, which consists of a lead-encased white phosphorus pellet and a reduced HE charge.

Weight of complete round:	24.35 oz.
Length of complete round:	9.15 in.
Weight of projectile (fuzed):	9.0 oz.
Length of projectile (fuzed):	4.50 in.

(e) 25-mm High Explosive Incendiary (Continued)

Body material:	Steel
Composition of HE filling:	TNT 60% Aluminum 40%
Weight of HE filling:	0.195 oz. (contained in 2 pellets)
Composition of incendiary filling:	White phosphorus
Weight of incendiary filling:	0.50 oz. (including lead cover)
Type of fuze:	Type 1 (1941) or Type 4 (1944)
Color markings:	Green body

(f) 25-mm Armor Piercing Tracer

This round has a solid steel, fuzeless projectile with a small tracer cavity situated in the base. Unlike any other type of projectile recovered to date, it is fitted with only one rotating band which has a forward and rear bearing surface. The groove between the two bearing surfaces receives the crimp of the cartridge case.

Weight of complete round:	25.2 oz.
Length of complete round:	9.20 in.
Weight of projectile:	10.0 oz.
Length of projectile:	3.94 in.
Body material:	Steel (Brinell hardness from shoulder to nose 496 to 509)
Weight of tracer:	0.30 oz.
Duration of tracer:	18 seconds static; (probably about 6 seconds inflight)



(f) 25-mm Armor Piercing Tracer (Continued)

Color markings: White body \*  
Armor penetration: 2.36 in. at 550 yards  
(reported).

\* As the undercoating of the projectile is black, damaged rounds have been erroneously reported to be black with white markings.

(g) 25-mm Tracer

No specimens of this round have been recovered, but Japanese sources indicate that two modifications exist. The following specifications are common to both modifications.

Weight of projectile: 8.70 oz.  
Length of projectile: 4.34 in.  
Type of fuze: None  
Color markings: Red body

Modification I has a blue and red tracer \* with a duration of 5.9 seconds.

Modification II has a yellow tracer with a duration of 4.5 sec.

(h) 25-mm Practice

The only information relating to this round has been obtained from Japanese sources.

Weight of projectile: 8.90 oz.  
Length of projectile: 4.50 in.  
Type of fuze: None  
Color markings: Black body

\* Apparently tracer burns first blue, then red.

5. FIRING DATA

(i) Muzzle velocity: \*2985 f/s (for new gun)  
\*2850 f/s (after 2100 rds.)

(ii) Ballistic performance:  
(\*Against ground targets; based on muzzle velocity of  
2850 f/s)

<u>Range</u> (in meters)	<u>Time of Flight</u> (in seconds)	<u>Terminal Velocity</u> (in meters per second)
200	0.2	790
400	0.5	713
600	0.8	641
800	1.1	576
1000	1.5	516
1200	1.9	463
1400	2.4	414
1600	2.9	376
1800	3.5	340
2000	4.1	318
2500	5.7	286
3000	7.6	261
3500	9.7	237
4000	12.1	217
4500	14.8	199
5000	17.8	185
5500	21.4	175
6000	25.7	169

These figures apply to HE, HE Tracer, Tracer and Practice projectiles.

\* From Japanese Sources.

JAPANESE 30-mm (1.18 in.) AIRCRAFT AMMUNITION1. GENERAL

To date very few rounds of this type have been recovered. In general appearance they may be likened to an expanded version of the 20-mm Oerlikon short round. It is believed that filled projectiles use a rotor-type fuze similar, except for size, to that used with the 20-mm ammunition.

The specifications given below have been derived for the most part from Japanese sources.

2. WEAPONS FROM WHICH FIRED

Type 2 (1942) 30-mm Navy Aircraft Machine Cannon

3. SPECIFICATIONS OF CARTRIDGE CASE AND PROPELLANT

The rimless brass case is of typical Oerlikon design.

Length:	3.62 in.
Composition:	Copper 70%
	Zinc 30%

4. SPECIFICATIONS OF PROJECTILES

All known projectiles have steel bodies fitted with a single copper rotating band.

(a) 30-mm High Explosive Projectile

This projectile has a solid base and a tapered cavity containing 3 pellets of high explosive filling.

(a) 30-mm High Explosive Projectile (Continued)

Weight (fuzed):	9.3 oz.
Length (fuzed):	3.54 in.
Composition of HE filling:	TNT 50% PETN 50%
Weight of HE filling:	1.02 oz.
Type of fuze:	Rotor type
Color markings:	Maroon body

(b) 30-mm High Explosive Incendiary Projectile

The body of this projectile is believed to be identical to that of the HE projectile. The filling consists of a small explosive charge plus a canister of white phosphorus.

Weight (fuzed):	9.3 oz.
Length (fuzed):	3.54 in.
Composition of HE filling:	TNT 50% PETN 50%
Weight of HE filling:	.078 oz.
Composition of incendiary filling:	White phosphorus
Weight of incendiary filling:	.71 oz.
Type of fuze:	Rotor type
Color markings:	Yellow body

(c) 30-mm High Explosive Tracer Projectile

This projectile body has two cavities separated by a steel septum. Two pellets of HE filling are contained in the forward cavity; the tracer composition is contained in the rear cavity.

Weight (fuzed):	9.7 oz.
Length (fuzed):	3.54 in.
Composition of HE filling:	TNT 50% PETN 50%
Weight of HE filling:	0.74 oz.
Weight of tracer filling:	0.18 oz.
Type of fuze:	Rotor type
Color markings:	Red body with maroon band around rotating band.

(d) 30-mm Armor Piercing Incendiary Projectile

This projectile has an unfuzed pointed steel body. An incendiary filling is loaded into a cavity in the base and is sealed with a base plug.

Weight:	10.4 oz.
Length:	3.15 in.
Composition of incendiary filling:	Nitrocellulose, Sodium nitrate, and Aluminum
Weight of incendiary filling:	0.41 oz.
Color markings:	White body

(e) 30-mm Tracer Projectile

The two-cavity projectile body is similar to that of the HE tracer round. The forward cavity apparently is filled with an inert substance; the rear cavity contains the tracer element. A dummy fuze is fitted to the nose.

Weight:	9.6 oz.
Length:	3.54 in.
Weight of tracer filling:	0.18 oz.
Color of tracer:	Yellow
Color markings:	Black body with red nose.

(f) 30-mm Practice Projectile

This solid based projectile has a cavity which probably contains an inert filling. A dummy nose fuze is fitted.

Weight:	9.4 oz.
Length:	3.54 in.
Color markings:	Black body

5. FIRING DATA

Muzzle velocity:	2330 f/s
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JAPANESE 37-mm (1.46 in.) AMMUNITION1. GENERAL

At least eight different Japanese 37-mm weapons have been identified, and as a consequence, considerable confusion has resulted concerning the ammunition for each gun.

In the main, projectiles appear to be common to all weapons of this caliber. In all instances projectiles are fitted with a single copper rotating band. Five different sizes of cartridge case have been recovered, and a sixth size is known to exist, although no specimen has yet been encountered.

To avoid unnecessary repetition, detailed specifications of cartridge cases and propellants will be limited to one section (Paragraph #2) of this study. Similarly, projectiles will be limited to one section (Paragraph #3). Pertinent characteristics of complete rounds and their performance will be indicated in Paragraph #4 under the specific weapons for which they are intended.



Comparison of various types of 37-mm ammunition, illustrating differences in cartridge cases.

- A. "HO 203" Aircraft Cannon (case 4.4 inches long)
- B. "Type 94 (1934) Tank Gun (case 5.3 inches long)
- C. "Type 94 (1934) Antitank Gun (case 6.5 inches long)
- D. "Type 97 (1937) Antitank Gun (case 9.8 inches long)

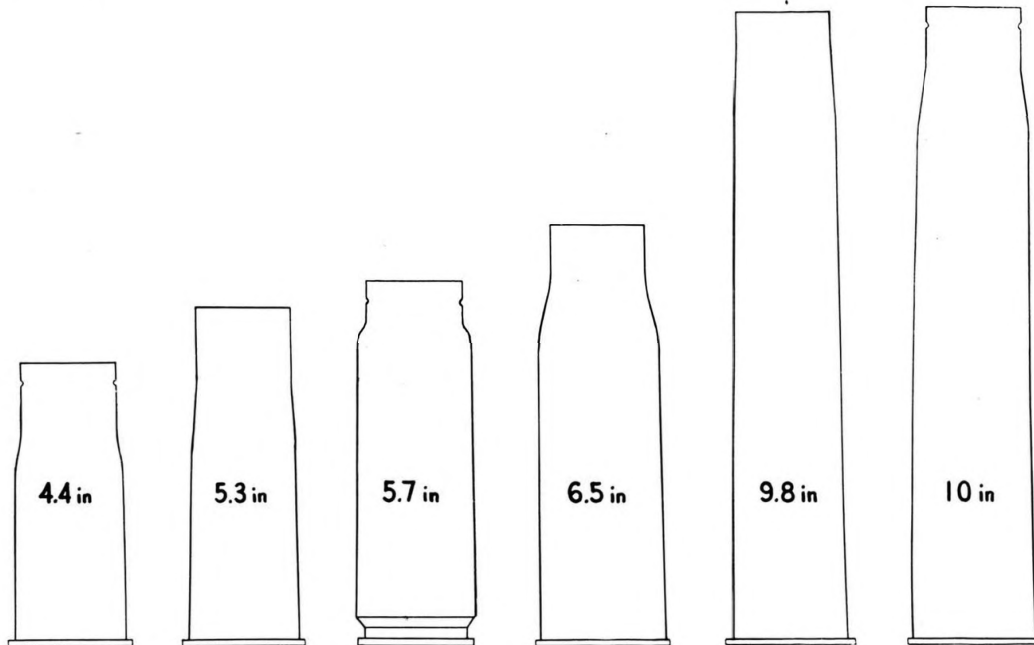
The following ammunition is not illustrated above:

- For "HO 204" Aircraft-Cannon (case 5.7 inches long)
- For "Type 1 (1941) Tank Gun (case 10 inches long approx.)

## 2. SPECIFICATIONS OF CARTRIDGE CASES AND PROPELLANTS

To date all cartridge cases recovered have been made of drawn brass and have been fitted with the Type 40 (1907) primer, weighing 0.49 ounces. All cartridge cases are joined to their projectiles by a deep continuous crimp. The designation of the gun or guns for which the cartridge case is designed is usually found painted on the case wall.

The quantity of propellant charge varies according to the size of cartridge case. In most instances the propellant charge is standard to each size of cartridge case irrespective of the type of projectile used. Instances occur, however, where a specific projectile requires the use of a special charge. Where such deviations occur they will be included in Paragraph #4 in the specifications of those complete rounds.



The above figure illustrates the comparative lengths of the six different 37-mm cartridge cases.

(a) 37-mm 4.4 inch Cartridge Case -- used with  
Type 11 (1922) 37-mm Gun and "HO 203" Aircraft Cannon

This cartridge case has a slight bottleneck and a rimmed base. The propellant is loosely loaded into the cartridge case and consists of rectangular flakes. No separate igniter charge is used.

Length: 4.38 in.  
 Diameter of neck: 1.49 in.  
 Diameter of base: 1.73 in.  
 Diameter of rim: 1.85 in.  
 Markings: Stencilled on case walls

木	HO		十	11
二	2		平	flat
0	0	or	歩	infantry
三	3			

Weight of propellant: 1.80 oz. (Type 11 (1922) Gun)  
 2.12 oz. ("HO 203" A/C Cannon)

Composition of propellant charge: Graphited nitrocellulose with diphenylamine stabilizer.

(b) 37-mm 5.3 inch Cartridge Case -- used with  
Type 94 (1934) Tank Gun

This rimmed cartridge case is an elongated version of the 4.4 inch size, having the same neck, base, and rim diameters. The propellant is loosely loaded into the cartridge case and consists of rectangular flakes. No separate igniter is used. A piece of metal foil weighing 0.053 ounces is included for de-coppering purposes.

(b) 37-mm 5.3 inch Cartridge Case (Continued)

Length:	5.27 in.
Diameter of neck:	1.49 in.
Diameter of base:	1.73 in.
Diameter of rim:	1.85 in.
Markings:	Stencilled on case walls
	九 9
	四 4
	戰 tank
Composition of propellant:	Graphited nitrocellulose
Weight of propellant:	2.85 oz.

(c) 37-mm 5.7 inch Cartridge Case -- used with "HO 204"  
Aircraft Cannon

This cartridge case is characterized by a rimless base and slight bottleneck, and therefore differs in appearance from any other 37-mm case. The propellant is loosely loaded and consists of flakes 0.157 inches square. No de-coppering foil or separate igniter is used.

Length:	5.68 in.
Diameter of neck:	1.49 in.
Diameter of base:	1.72 in.
Diameter of rim:	1.72 in.
Markings:	Stencilled on case walls
	ホ HO
	二 2
	0 0
	四 4
Composition of propellant:	Graphited nitrocellulose
Weight of propellant:	2.65 oz.

(d) 37-mm 6.5 inch Cartridge Case -- used with  
Type 94 (1934) AT Gun, Type 98 (1938) Tank Gun,  
and Type 100 (1940) Experimental Tank Gun\*

This rimmed cartridge case is characterized by a pronounced bottleneck and large base diameter. The propellant charge of cylindrical grains is contained in a silk bag to the lower end of which is sewn an igniter pad containing 0.106 ounces of black powder. A cardboard spacer keeps the propellant bag in position. A piece of de-coppering foil weighing 0.054 ounces is attached to the bottom of the cardboard spacer.

Length:	6.54 in.
Diameter of neck:	1.49 in.
Diameter of base:	1.95 in.
Diameter of rim:	2.13 in.
Markings:	Stencilled on case walls 九 9 四 4 砲 gun
Composition of propellant:	Nitrocellulose and nitroglycerine, plus diphenylamine or other stabilizers.
Weight of propellant:	4.27 oz.

\* Not recovered

(e) 37-mm 9.8 inch Cartridge Case -- used with Type 97 (1937) AT Gun

This rimmed cartridge case is characterized by its unusual length and slight bottleneck. The propellant charge of cylindrical grains is contained in a silk bag to the lower end of which is sewn an igniter pad containing 0.106 ounce of black powder. A cardboard spacer keeps the propellant bag in position. A piece of de-coppering foil weighing 0.054 ounce is attached to the bottom of the cardboard spacer.

(e) 37-mm 9.8 inch Cartridge Case (Continued)

Length:	9.84 in.
Diameter of neck:	1.49 in.
Diameter of base:	1.79 in.
Diameter of rim:	2.01 in.
Composition of propellant:	Nitrocellulose and nitroglycerine, plus diphenylamine or other stabilizers.
Weight of propellant:	5.08 oz.

(f) 37-mm 10 inch Cartridge Case -- used with Type 1 (1941) Tank Gun

This rimmed cartridge case has not been recovered. It apparently is an elongated version of the 6.5 inch case. The following specifications are based on measurements of the chamber and breech of the gun.

Length:	10 in. (approx.)
Diameter of neck:	1.49 in.
Diameter of base:	1.95 in.
Diameter of rim:	2.13 in.

3. SPECIFICATIONS OF PROJECTILES(a) Type 94 (1934) 37-mm High Explosive Projectile

This is the standard high explosive projectile used apparently in all 37-mm weapons.

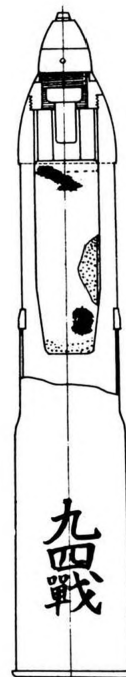
Weight (fuzed):	1.42 lb.
Length (fuzed):	5.80 in.
Length (without fuze):	4.88 in.
Exposed length (fuzed):	4.8 in.
Body material:	Medium carbon steel
Width of rotating band:	0.32 in.
Composition of HE filling:	Two pellets; upper pellet picric acid, lower pellet TNT.
Radius of burst:	8 yards (approx)
Weight of HE filling:	2.05 oz.; (0.70 oz. picric acid, 1.35 oz. TNT)
Type of fuze:	Type 93 (1933) Small, instantaneous.
Color markings:	Black body, red band around fuze adapter, yellow band at center of gravity.



(b) Type 94 (1934) 37-mm High Explosive Substitute Projectile

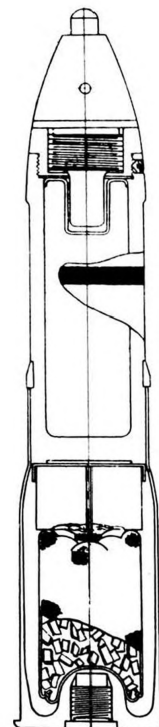
This projectile has not been recovered and is known only from Japanese documents. Used for practice firing, it is filled with black powder and designed to approximate the ballistic performance of the Type 94 (1934) HE projectile. It is presumed that similar to the Type 94 (1934) HE projectile it is fired from all 37-mm weapons.

Weight (fuzed):	1.40 lb.
Exposed length (fuzed):	4.8 in.
Body material:	Steel
Composition of HE filling:	Black powder
Weight of HE filling:	0.95 oz.
Type of fuze:	Type 93 (1933) small, instantaneous.

(c) Type 13 (1924) 37-mm High Explosive Projectile

According to Japanese sources, this projectile was captured from the Chinese during the Manchurian Incident (1931-1934). It is thought to have been replaced by the Type 94 (1934) HE projectile. The Type 13 (1924) was used in both the Type 11 (1922) and Type 94 (1934) AT guns, and may be identified by the large nose fuze which forms the major part of the ogive.

Weight (fuzed):	1.46 lb.
Exposed length (fuzed):	4.77 in.
Composition of HE filling:	TNT
Weight of HE filling:	2.18 oz.
Type of fuze:	Type 14 (1925) Small, instantaneous, "A", for Type 11 (1922) AT Gun; Type 13 (1924) Small, instantaneous, "B", for Type 94 (1934) AT Gun.



(d) 37-mm High Explosive Incendiary Projectile (Fuzed)

This projectile has been recovered only with 4.4 inch and 5.7 inch cartridge cases. It is fired from the "HO 203" 37-mm Aircraft Cannon and "HO 204" 37-mm Aircraft Cannon.

The projectile, which is considerably shorter than the Type 94 (1934) HE, is made in two sections threaded together forward of the bourrelet.

Weight (fuzed):	1.02 lb.
Length (fuzed):	4.26 in.
Length (without fuze):	3.50 in.
Body material:	Steel
Width of rotating band:	0.4 in.
Composition of HE filling:	RDX
Weight of HE filling:	1.06 oz.
Composition of incendiary filling:	Barium Nitrate 46.8%, Mag- nesium met- al 32.4%, Aluminum metal 16.5%, Wax 4.3%.
Weight of incendiary filling:	0.28 oz.
Type of fuze:	* Type 100 (1940) Instantaneous (made of aluminum).
Color markings:	Black body, red band at nose, yellow band above rotating band. Japanese characters



ホ二〇三 ("HO 203") or  
ホ二〇四 ("HO 204") painted in white.

\* An air column fuze with built-in booster, similar to that used with some "HO 5" 20-mm rounds, may also be fitted.

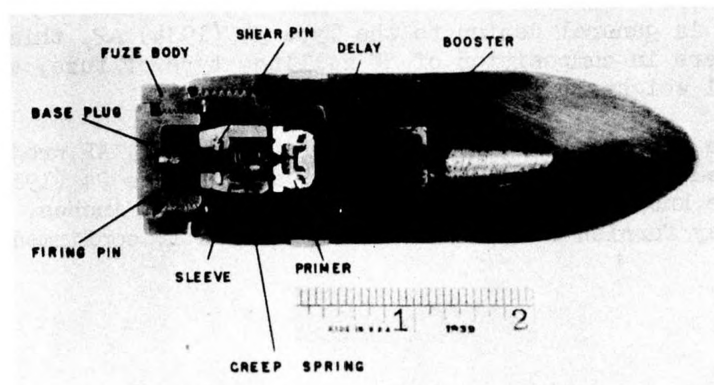
(e) "MA 351" 37-mm High Explosive Incendiary Projectile (Fuzeless)

No details are known of this fuzeless projectile, which is fired from the "HO 203" 37-mm Aircraft Cannon and possibly from the "HO 204" 37-mm Aircraft Cannon. It is thought to be similar in construction to the "MA 202" 20-mm High Explosive Incendiary (fuzeless) round, which consists of a metal nose-cap containing PETN and a steel body containing an incendiary mixture.

(f) Type 94 (1934) 37-mm Armor Piercing Projectile

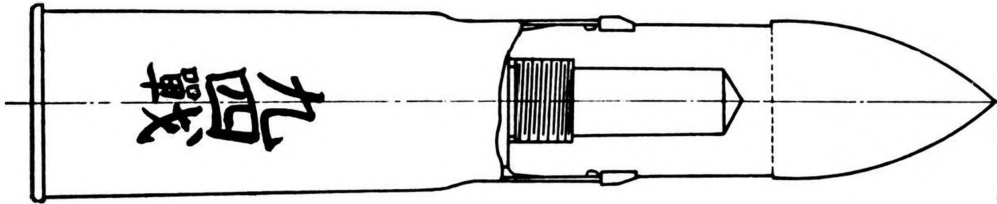
Although possibly being replaced by the Type 1 (1941) AP projectile, the Type 94 (1934) AP projectile is still standard and is frequently encountered. When fitted to the suitable cartridge case it is probably fired from all Japanese 37-mm weapons.

Weight (fuzed):	1.54 lb.
Length (fuzed):	4.88 in.
Exposed length:	3.70 in.
Body material:	High carbon steel
Composition of HE filling:	Picric acid (in 2 pellets)
Weight of HE filling:	0.3 oz. (approx.)
Type of fuze:	Type 94 (1934) Small, base.
Color markings:	Black body, red tip, white band at center of gravity.



(g) Type 94 (1934) 37-mm Armor Piercing Substitute Projectile

This projectile is used for training purposes. Designed to approximate the ballistic performance of the Type 94 (1934) AP projectile, it has a pointed steel body with a small base cavity for an inert filling. It is probably fired from all Japanese 37-mm guns, when fitted to the suitable cartridge case.



Weight:	1.54 lb.
Length:	4.86 in.
Exposed length:	3.70 in.
Body material:	Steel

(h) Type 1 (1941) 37-mm Armor Piercing Projectile

This new projectile has probably been designed to replace the standard Type 94 (1934) AP projectile. Although no specimens have been recovered, Japanese sources indicate that this round may be fired from all 37-mm guns, when fitted to the suitable cartridge case.

Similar in general design to the Type 94 (1934) AP, this projectile differs in composition of HE filling, type of fuze, and greater total weight.

Japanese sources indicate that the Type 1 (1941) AP projectile has an exposed length of 3.3 inches, whereas the Type 94 (1934) AP projectile is known to have an exposed length of 3.7 inches. This difference may furnish a means of identification if confirmed by recovery.

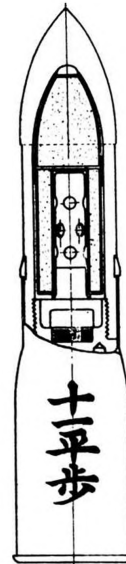
(h) Type 1 (1941) 37-mm Armor Piercing Projectile (Continued)

Weight (fuzed):	1.60 lb.
Exposed length:	3.3 in.
Body material:	Steel
Composition of HE filling:	Cyclonite 90% Paraffin 10% (in 2 pellets).
Weight of HE filling:	0.28 oz. (Top pellet 0.17 oz.; bottom pellet 0.11 oz.)
Type of fuze:	Type 1 (1941), Mark I Small base.

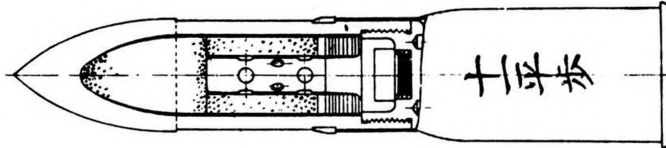
(i) Type 12 (1923) 37-mm Armor Piercing High Explosive Projectile

This unrecovered projectile is characterized by a pointed steel body, large explosive cavity, and base fuze. It is believed to be fired only from the Type 11 (1922) 37-mm gun.

Weight (fuzed):	1.43 lb.
Exposed length:	4.14 in.
Body material:	Steel
Composition of HE filling:	TNT ( in 2 pellets)
Weight of HE filling:	1.48 oz.
Type of fuze:	Type 12 (1923) base.

(j) Type 12 (1923) 37-mm Armor Piercing High Explosive Substitute Projectile

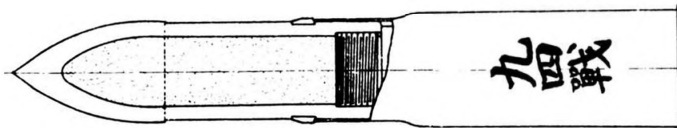
Japanese sources indicate that this projectile is used for training purposes and is designed to approximate the ballistic performance of the Type 12 (1923) APHE projectile. It differs in type and weight of filling, and is fired only from the Type 11 (1922) 37-mm gun.

(j) Type 12 (1923) 37-mm Armor Piercing High Explosive Substitute Projectile (Continued)

Weight (fuzed):	1.43 lb.
Exposed length:	4.14 in.
Body material:	Steel
Composition of HE filling:	Black powder
Weight of HE filling:	1.76 oz.
Type of fuze:	Type 12 (1923) base

(k) Type 96 (1936) 37-mm Improved Armor Piercing High Explosive Substitute Projectile

This unrecovered projectile is used for training purposes. It is characterized by a pointed steel body with a large sand-filled cavity. No fuze is fitted. It is believed to be fired only from the Type 94 (1934) 37-mm Tank Gun.



Weight (filled):	1.58 lb.
Exposed length:	4.23 in.
Weight of sand filling:	4.06 oz.

(1) 37-mm Practice Projectile

This pointed, unfuzed projectile has a small sawdust-filled cavity sealed with a base plug. In general appearance, it closely resembles the Type 94 (1934) Armor Piercing Substitute Projectile (see paragraph g of this section).

Weight:	1.6 lb.
Length (with plug):	4.88 in.
Exposed length:	3.74 in.
Markings:	Black body, with Japanese characters $\rightarrow \tau 00$ ("MA 700") painted in white.

4. SPECIFICATIONS OF COMPLETE ROUNDS

As stated in Paragraph #1, the majority of 37-mm projectiles may be fitted to any of the six different sized cartridge cases. However, only specifications of projectiles and cartridge cases, definitely known to form complete rounds are shown in this section. Such complete rounds have been tabulated under the weapon from which they are fired.

In view of the possibility of other projectile/cartridge case combinations being encountered, an approximation of the principle specifications of the complete round may be obtained by applying the following procedure:

(i) Overall length: may be determined by adding the exposed length of the fuzed projectile (Paragraph #3) to the length of the appropriate cartridge case (see below).

(ii) Weight of complete round: may be determined by adding the weight of the fuzed projectile (Paragraph #3) to that of the appropriate cartridge case and its contents. The following weights, which represent the total of the cartridge case, primer, propellant charge and bag, igniter charge, de-coppering foil, and spacers, will be used for this purpose.

<u>Length of case</u>	<u>Weight of case and contents</u>
4.38 in.	0.68 lb.
5.27 in.	0.73 lb.
5.68 in.	1.05 lb.
6.54 in.	1.12 lb.
9.84 in.	1.30 lb.

(a) Complete Rounds Fired From Type 11 (1922) 37-mm Gun(i) Type 94 (1934) High Explosive

Weight (fuzed): 2.1 lb.  
 Length (fuzed): 9.2 in.  
 Muzzle velocity: 1480 f/s

(ii) Type 94 (1934) High Explosive Substitute

Weight (fuzed): 2.08 lb.  
 Length (fuzed): 9.2 in.  
 Muzzle velocity: 1480 f/s

(iii) Type 13 (1924) High Explosive

Weight (fuzed): 2.14 lb.  
 Length (fuzed): 9.15 in.

(iv) Type 94 (1934) Armor Piercing

Weight (fuzed): 2.2 lb.  
 Length: 8.1 in.  
 Muzzle velocity: 1434 f/s

(v) Type 94 (1934) Armor Piercing Substitute

Weight: 2.2 lb.  
 Length: 8.1 in.  
 Muzzle velocity: 1434 f/s

(vi) Type 12 (1923) Armor Piercing High Explosive

Weight (fuzed): 2.11 lb.  
 Length: 8.52 in.  
 Armor penetration: 0.315 in. at 1640 yds.

(a) Complete Rounds Fired From Type 11 (1922) 37-mm Gun (Continued)

(vii) Type 12 (1923) Armor Piercing High Explosive Substitute

Weight (fuzed): 2.11 lb.

Length: 8.52 in.

(viii) Blank Cartridge

Weight: 9.8 oz.

Length: 4.38 in.

Weight of filling: 0.71 oz.

(b) Complete Rounds Fired From "HO 203" 37-mm Aircraft Cannon

(i) High Explosive Incendiary (Fuzed)

Weight (fuzed): 1.71 lb.

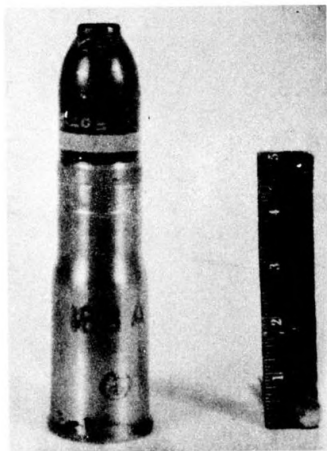
Length (fuzed): 7.75 in.

(ii) "MA 351" High Explosive Incendiary (Fuzeless)

No specifications known.

(iii) Practice

No specifications known.



(c) Complete Rounds Fired From Type 94 (1934) Tank Gun(1) Type 94 (1934) High Explosive

Weight (fuzed): 2.15 lb.

Length (fuzed): 10.1 in.

Muzzle velocity: 1900 f/s

Ballistic performance:

<u>Range</u> <u>(in meters)</u>	<u>Time of Flight</u> <u>(in seconds)</u>	<u>Terminal Velocity</u> <u>(in meters per second)</u>
200	0.4	512.2
400	0.8	452.7
600	1.3	402.9
800	1.8	362.4
1000	2.4	331.3
1200	3.0	308
1400	3.6	289
1600	4.3	274
1800	5.0	261
2000	5.8	249
2500	8.0	223
3000	10.4	203
3500	13.3	186
4000	16.7	171
4500	21.0	161
5000	27.8	160



(c) Complete Rounds Fired From Type 94 (1934) Tank Gun (Continued)(ii) Type 94 (1934) High Explosive Substitute

Weight (fuzed): 2.13 lb.  
 Length (fuzed): 10.1 in.  
 Muzzle velocity: 1900 f/s  
 Ballistic performance: Same as for Type 94 (1934)  
 HE (see paragraph (C-1)  
 of this section)

(iii) Type 94 (1934) Armor Piercing

Weight (fuzed): 2.27 lb.  
 Length: 8.97 in.  
 Muzzle velocity: 1880 f/s  
 Armor penetration:

(Results of test firing against average quality  
 homogeneous steel plate)

<u>Range</u>	<u>Normal</u>	<u>30° from normal</u>
Point blank	1.63 in.	1.30 in.
300 yards	1.47 in.	1.14 in.
1000 yards	1.02 in.	0.83 in.



(c) Complete Rounds Fired From Type 94 (1934) Tank Gun (Continued)(iii) Type 94 (1934) Armor Piercing (Continued)

Ballistic performance:

<u>Range (in meters)</u>	<u>Time of Flight (in seconds)</u>	<u>Terminal Velocity (in meters per second)</u>
200	0.4	511.6
400	0.8	457.7
600	1.3	411.8
800	1.8	373.4
1000	2.4	342.2
1200	3.0	319
1400	3.6	300
1600	4.3	285
1800	5.0	272
2000	5.7	260
2500	7.7	237
3000	9.8	220
3500	12.2	207
4000	14.7	198
4500	17.4	192
5000	20.2	188
6000	27.0	187
7000	39.5	207

(c) Complete Rounds Fired From Type 94 (1934) Tank Gun (Continued)(iv) Type 94 (1934) Armor Piercing Substitute

Weight: 2.27 lb.  
 Length: 8.97 in.  
 Muzzle velocity: 1880 f/s  
 Ballistic performance: Same as for Type 94 (1934) AP  
 (see paragraph (C-iii) of  
 this section).

(v) Type 1 (1941) Armor Piercing

Weight: 2.33 lb. (estimated)  
 Length: 8.57 in. (estimated)  
 Muzzle velocity: 1880 f/s  
 Ballistic performance:

<u>Range</u> <u>(in meters)</u>	<u>Time of Flight</u> <u>(in seconds)</u>	<u>Terminal Velocity</u> <u>(in meters per second)</u>
200	0.4	508.5
400	0.8	453.6
600	1.2	407.5
800	1.6	369.4
1000	2.2	338.5
1200	2.8	313
1400	3.5	294
1600	4.2	279
1800	4.9	266
2000	5.7	254
2500	7.8	231
3000	10.0	214
3500	12.5	199

(c) Complete Rounds Fired From Type 94 (1934) Tank Gun (Continued)(v) Type 1 (1941) Armor Piercing (Continued)

<u>Range (in meters)</u>	<u>Time of Flight (in seconds)</u>	<u>Terminal Velocity (in meters per second)</u>
4000	15.4	187
4500	18.6	178
5000	22.3	174
5500	26.9	173

(vi) Type 96 (1936) Armor Piercing High Explosive Substitute

Weight: 2.31 lb.  
Length: 9.5 in.

(vii) Blank Cartridge

Length: 5.27 in.  
Weight of filling: 1.06 oz.  
Weight of igniter charge: 0.106 oz.

(d) Complete Rounds Fired From "HO 204" 37-mm Aircraft Cannon(i) High Explosive Incendiary (Fuzed)

Weight (fuzed): 2.07 lb.  
Length (fuzed): 8.93 in.

(ii) Practice

Weight: 1.65 lb.  
Length: 9.42 in.



(e) Complete Rounds Fired From Type 94 (1934) AT Gun  
and Type 98 (1938) Tank Gun(1) Type 94 (1934) High Explosive

Weight (fuzed): 2.54 lb.  
 Length (fuzed): 11.34 in.  
 Muzzle velocity: 2320 f/s (Type 94  
 (1934) AT Gun)

Ballistic performance: .

(For Type 98 (1938) Tank Gun)

<u>Range (in meters)</u>	<u>Time of Flight (in seconds)</u>	<u>Terminal Velocity (in meters per second)</u>
200	0.3	632.0
400	0.7	563.3
600	1.1	499.0
800	1.5	441.2
1000	2.0	394.9
1200	2.5	360
1400	3.1	332
1600	3.7	309
1800	4.3	290
2000	5.0	273
2500	7.0	242
3000	9.3	219
3500	11.9	199
4000	14.9	182
4500	18.6	168
5000	23.3	161

(e) Complete Rounds Fired From Type 94 (1934) AT Gun  
and Type 98 (1938) Tank Gun (Continued)

(ii) Type 94 (1934) High Explosive Substitute

Weight (fuzed): 2.53 lb.  
 Length (fuzed): 11.34 in.  
 Muzzle velocity: 2320 f/s  
 Ballistic performance: Same as for Type 94 (1934)  
 HE (see paragraph (e-1)  
 of this section).

(iii) Type 13 (1924) High Explosive

Weight (fuzed): 2.54 lb.  
 Length (fuzed): 11.3 in.  
 \*Propellant weight: 3.35 oz.

\* This round has a smaller propellant charge than other rounds using the 6.5 inch cartridge case.

(iv) Type 94 (1934) Armor Piercing

Weight (fuzed): 2.67 lb.  
 Length: 10.2 in.  
 Muzzle velocity: 2300 f/s (Type 94  
 (1934) AT Gun)  
 Armor penetration: Approximately 2  
 inches at 100  
 yards.



(e) Complete Rounds Fired From Type 94 (1934) AT Gun  
and Type 98 (1938) Tank Gun (Continued)(iv) Type 94 (1934) Armor Piercing (Continued)

Ballistic performance:

(For Type 98 (1938) Tank Gun)

<u>Range (in meters)</u>	<u>Time of Flight (in seconds)</u>	<u>Terminal Velocity (in meters per second)</u>
200	0.4	580
400	0.8	510
600	1.2	450
800	1.7	400
1000	2.3	360
1200	2.9	330
1400	3.5	300
1600	4.1	280

(For Type 94 (1934) Antitank Gun)

<u>Range (in meters)</u>	<u>Terminal Velocity (in meters per second)</u>
350	575
800	420
1000	380

(v) Type 94 (1934) Armor Piercing Substitute

Weight: 2.67 lb.  
 Length: 10.2 in.  
 Muzzle velocity: 2300 f/s (Type 94 (1934)  
 AT Gun)

Ballistic performance: Same as for Type 94 (1934) AP  
 (see paragraph (e-iv) of  
 this section)

(e) Complete Rounds Fired From Type 94 (1934) AT Gun  
and Type 98 (1938) Tank Gun (Continued)(vi) Type 1 (1941) Armor Piercing

Weight: 2.72 lb.

Length: 8.8 in.

Armor penetration:

(For Type 94 (1934) AT Gun)

<u>Range (in yards)</u>	<u>Penetration (in inches)</u>
275	1.8
550	1.6
825	1.4
1090	1.2
1370	1.0
1620	0.9
2190	0.75

(f) Complete Rounds Fired From Type 97 (1937) AT Gun(i) Type 94 (1934) High Explosive

Weight (fuzed): 2.73 lb.

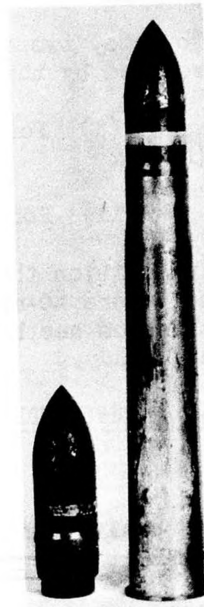
Length (fuzed): 14.28 in.

(Projectile illustrated is fitted with fuze plug)



(f) Complete Rounds Fired From Type 97 (1937) AT Gun (Continued)(11) Type 94 (1934) Armor Piercing

Weight: 3.5 lb.  
 Length: 13.53 in.

(g) Complete Rounds Fired From Type 1 (1941) Tank Gun(1) Type 1 (1941) Armor Piercing

No information is available concerning the weight and length of this complete round. The following armor penetration figures have been obtained from Japanese sources:

<u>Range</u> <u>(in yards)</u>	<u>Penetration</u> <u>(in inches)</u>
275	2.0
550	1.7
825	1.5
1090	1.3
1370	1.1
1620	1.0
2190	0.8

JAPANESE 40-mm (1.58 in.) AMMUNITION1. GENERAL

To date, two different groups of 40-mm ammunition are known to be produced by the Japanese:

(i) For 40-mm Vickers Armstrong, water-cooled Antiaircraft Gun (Navy).

(ii) For 40-mm "HO 301" Aircraft Cannon (Army).

In addition the Japanese are known to have made use of captured Allied Bofors 40-mm Antiaircraft guns. As no Japanese ammunition for this gun has been recovered, specifications will not be included in this study.

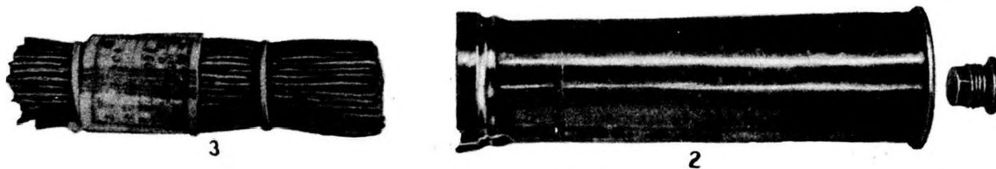
2. 40-mm AMMUNITION FOR VICKERS ARMSTRONG GUN(a) GENERAL

Although only a limited variety has been recovered, rounds of both British and Japanese manufacture have been found.

All recovered Japanese rounds have been of Navy manufacture, with characteristic markings appearing on both projectile and cartridge case. In each instance, projectiles are fitted with a single, copper rotating band 0.63 inches wide.

(b) SPECIFICATIONS OF CARTRIDGE CASE AND PROPELLANT

This rimmed case has a very slight taper and is characterized by a deep continuous crimp. The propellant consists of cylindrical sticks measuring 4.2 inches long by 0.02 - 0.04 inches in diameter which are bound together to form a bundle. The nature and weight of propellant are standard to all types of projectiles.



1. Primer
2. Cartridge case
3. Propellant

(b) SPECIFICATIONS OF CARTRIDGE CASE AND PROPELLANT --  
VICKERS ARMSTRONG (Continued)

Weight, empty (with primer):	10.5 oz.
Length:	6.2 in.
Diameter of rim:	1.9 in.
Diameter of base:	1.7 in.
Diameter of neck:	1.6 in.
Weight of primer (complete):	0.71 oz.
Composition of propellant:	Nitrocellulose 60.3%
	nitroglycerine 39.0%
	diphenylamine 0.7%
Weight of propellant:	3.4 oz.

(c) SPECIFICATIONS OF COMPLETE ROUNDS(1) 40-mm High Explosive (AA)

The projectile of this round is fitted with a time fuze, graduated in units from 1 to 10. It is believed that these graduations indicate thousands of feet.

Weight of complete round:	2.82 lb.
Length of complete round:	11.6 in.
Weight of projectile (fuzed):	1.96 lb.
Weight of projectile (w/o fuze):	1.74 lb.
Length of projectile (fuzed):	6.3 in.
Length of projectile (w/o fuze):	5.1 in.
Body material:	Steel
Composition of HE filling:	TNT
Weight of HE filling:	2.47 oz.
Type of fuze:	Time (graduated from 1000 to 10,000 feet)



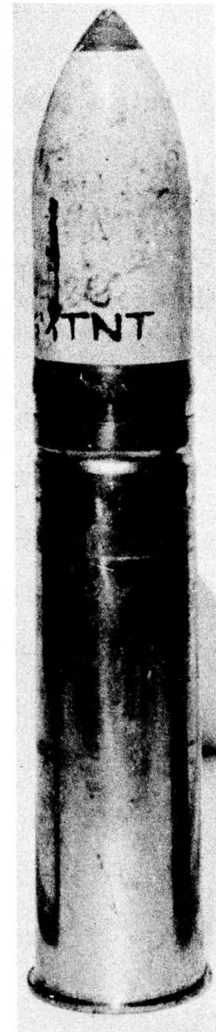
(1) 40-mm High Explosive (AA) (Continued)

Markings: Maroon projectile body with green band below fuze. Arsenal markings, date of loading, and Naval anchor device in white paint above rotating band.

(11) 40-mm Armor Piercing

The projectile is of typical Japanese AP design, employing a base fuze. The explosive cavity, however, is relatively large.

Weight of complete round: 2.84 lb.  
 Length of complete round: 10.6 in.  
 Weight of projectile (fuzed): 1.98 lb.  
 Length of projectile (fuzed): 5.24 in.  
 Body material: Forged steel  
 Composition of HE filling: TNT  
 Weight of HE filling: 0.81 oz.  
 Type of fuze: Small base fuze.  
 Markings: White projectile body with green tip. Arsenal markings, date of loading, and Naval anchor device in white paint above rotating band.



(111) 40-mm Tracer

The body of this projectile is constructed in two parts, threaded together forward of the bourrelet. The tracer element, in the base of the projectile, is contained in a steel tube and is activated by an initiating cap which is retained by a lead cap and copper washer.

The cavity of the projectile is unfilled. However, the fact that the body is of two piece construction and that the nose cap is provided with wrench flats, suggests that a filling may be added.

Weight of complete round: 2.9 lb. (approx)  
 Length of complete round: 11.6 in.  
 Weight of projectile: 2.0 lb. (approx)  
 Length of projectile: 6.3 in.  
 Body material: Steel

Composition of tracer:  
 Barium nitrate 31.3%, Barium carbonate 21.9%, Potassium nitrate 16.5%, Magnesium 19.5%, Aluminum 6.3%, Sulphur 3.2%, Oil 1.3%.

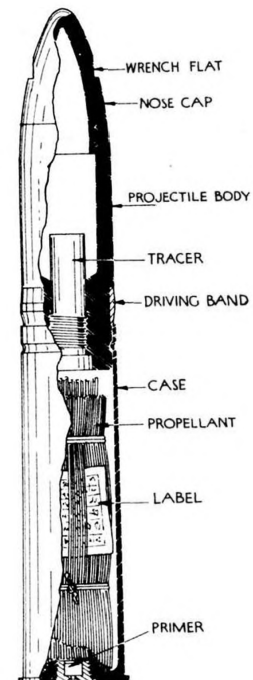
Weight of tracer compound: 0.106 oz.

Weight of initiating cap: 0.212 oz.

Markings: Orange projectile body. Arsenal markings and Naval anchor device in black paint above rotating band.

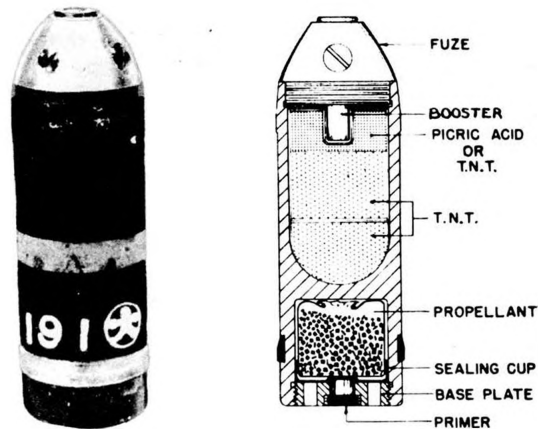
(d) FIRING DATA

Muzzle velocity: 2000 f/s (approx)



3. 40-mm AMMUNITION FOR "HO 301" AIRCRAFT CANNON(a) 40-mm High Explosive

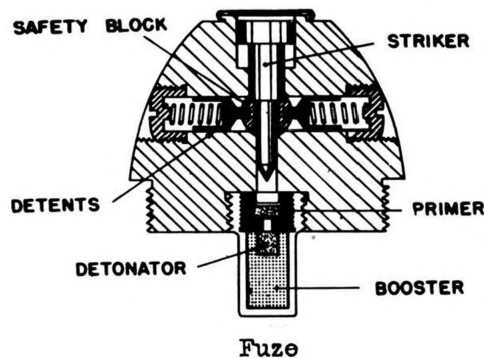
This ammunition is unique in that the propellant and primer are contained in the base of the projectile, thus eliminating the use of a conventional cartridge case.



The projectile body is divided into two cavities, the upper containing the HE filling and the lower the propellant charge. The flake propellant is loaded into a silk bag and sealed in the cavity by an aluminum cup which is retained by a perforated base plug, containing the primer.

When fired, the propellant gases break through the aluminum cup and escape through the perforations in the base plug. The duration of burning of the propellant is only momentary, the propellant gases taking effect while the projectile is in the bore.

The projectile is fitted with a centrifugally armed, aluminum nose fuze and a copper rotating band 0.31 inches wide.



(a) 40-mm High Explosive (Continued)

Weight of complete round:	1.29 lb.
Length of complete round:	5.25 in.
Body material:	Steel
Composition of HE filling:	TNT; or picric acid and TNT (in 3 pellets)
Weight of HE filling:	2.0 oz.
Type of fuze:	Centrifugally-armed impact fuze.
Markings:	Black body, red band below fuze, yellow band at center of gravity.

Note: In addition to the HE round, Japanese sources indicate that a practice round exists which is painted black without color bands and is fitted with a dummy fuze.

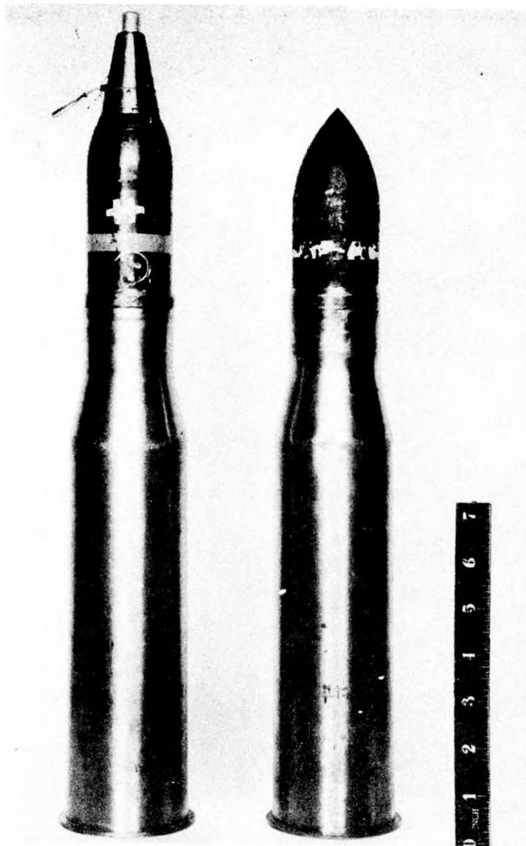
JAPANESE 47-mm (1.85 in.) AMMUNITION1. GENERAL

Two different groups of 47-mm ammunition are known to be produced by the Japanese:

- (i) For Type 1 (1941) 47-mm Antitank Gun  
and Type 1 (1941) 47-mm Tank Gun
- (ii) For Naval 5-cm Short Gun (47-mm)  
and Naval 5-cm Short Dual Purpose Gun (47-mm)

2. 47-mm AMMUNITION FOR TYPE 1 (1941) AT GUN AND TYPE 1 (1941)  
TANK GUN(a) GENERAL

Armor piercing and high explosive are the only types of this ammunition recovered to date. Japanese sources indicate the existence of a hollow charge projectile. However, no specifications of this round are known. Projectiles are fitted with a single, copper rotating band 0.4 inches wide.

High  
ExplosiveArmor  
Piercing

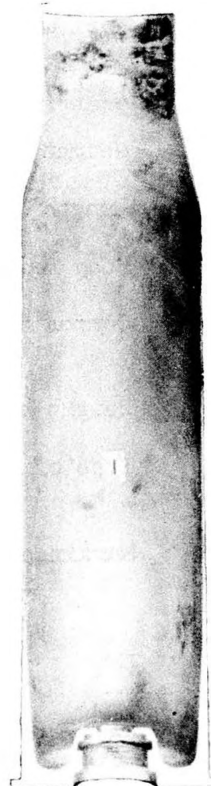
(b) SPECIFICATIONS OF CARTRIDGE CASE AND PROPELLANT

This rimmed cartridge case is characterized by a pronounced bottleneck. The primer, unlike that used with any other known Japanese ammunition, has a maximum diameter of 1.14 inches.

The propellant is in the form of cylindrical tubes measuring 0.15 inches in diameter by 0.45 inches in length, loaded into a silk bag. At the bottom of this bag is an igniter charge of black powder weighing 0.106 ounce. A piece of de-coppering foil weighing approximately 0.1 ounce is included in the case.

Projectiles are joined to the cartridge case by a continuous crimp.

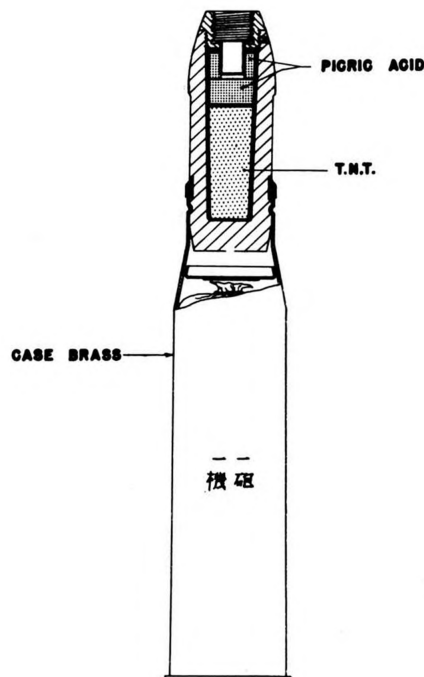
Weight, empty (with primer):	1.98 lb.
Length:	11.2 in.
Diameter of rim:	2.83 in.
Diameter of base:	2.56 in.
Composition of propellant:	Graphited nitro-cellulose and nitroglycerine, with carbamite as stabilizer.
Weight of propellant:	14.8 oz.
Markings:	Japanese characters 一戦 and 一機砲 ("1 Tank") ("1 Mobile Gun") are stencilled on cartridge case walls.



(c) SPECIFICATIONS OF COMPLETE ROUNDS

(1) 47-mm High Explosive

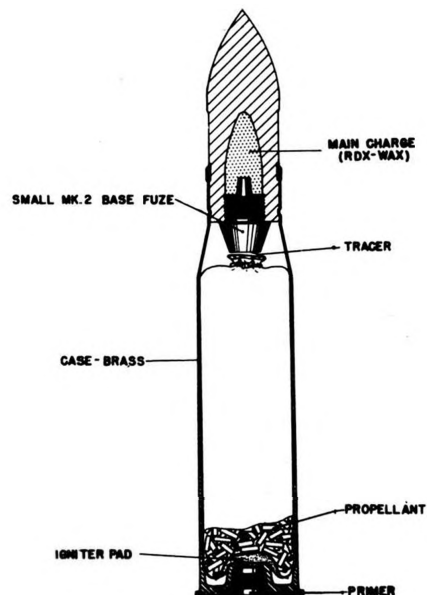
Weight of complete round: 6.2 lb.  
Length of complete round: 17.6 in.  
Weight of projectile (fuzed): 3.1 lb.  
Length of projectile (fuzed): 7.8 in.  
Body material: Steel  
Composition of HE filling: 2 pellets of Picric acid  
1 pellet of TNT  
Weight of HE filling: 2.7 oz.  
Type of fuze: Type 88 (1928) Instantaneous;  
Gun type.  
Markings: Black projectile body, red  
band below fuze, yellow  
band between rotating  
band and bourrelet.



(11) Type 1 (1941) 47-mm Armor Piercing

Weight of complete round:	6.40 lb. *
Length of complete round:	15.6 in.
Weight of projectile:	3.30 lb. *
Length of projectile (w/o fuze):	5.6 in.
Body material:	Carbon steel
Composition of HE filling	RDX 90% Wax 10%
Weight of HE filling:	0.6 oz.
Type of fuze:	Type 1 (1941) Mark 2, small base fuze, with tracer.
Markings:	Black projectile body, red tip, white band between rotating band and bourrelet.

\* Note: Indications are that early specimens of this projectile weighed 3.24 pounds and contained 0.40 ounces of HE filling.



(a) FIRING DATA(i) Muzzle velocity:

HE projectile: 2735 f/s (Type 1 (1941) AT Gun)  
 AP projectile: 2720 f/s (Type 1 (1941) AT Gun)  
 2650 f/s (Type 1 (1941) Tank Gun)  
 (Type 1 (1941) AP ammunition)

(ii) Armor penetration:

Japanese penetration charts show conflicting data, but generally agree in a maximum penetration of approximately 3 inches at ranges up to 300 yards. Recent combat performance of both the AT and tank guns against U.S. armor has confirmed this figure.

(iii) Ballistic performance:

(Type 1 (1941) AT Gun, firing Type 1 (1941) AP Ammunition)

<u>Range</u> <u>(in meters)</u>	<u>Time of Flight</u> <u>(in seconds)</u>	<u>Terminal Velocity</u> <u>(in meters per second)</u>
200	0.2	765.5
400	0.5	705.4
600	0.8	648.5
800	1.1	594.0
1000	1.5	541.4
1200	1.9	493
1400	2.3	450
1600	2.8	413
1800	3.3	381
2000	3.8	354
2500	5.2	308
3000	6.9	278
3500	8.7	256
4000	10.8	239
4500	13.0	225
5000	15.4	214
5500	18.1	205
6000	20.9	199
6500	24.1	196
6900	26.8	195

(Type 1 (1941) Tank Gun, firing Type 1 (1941) AP ammunition)

<u>Range</u> <u>(in meters)</u>	<u>Time of Flight</u> <u>(in seconds)</u>	<u>Terminal Velocity</u> <u>(in meters per second)</u>
200	0.2	745.6
400	0.5	685.7
600	0.8	629.0
800	1.1	574.5
1000	1.5	521.7
1200	1.9	474
1400	2.4	433
1600	2.9	398
1800	3.4	368
2000	3.9	343
2500	5.4	301
3000	7.2	272
3500	9.1	251
4000	11.2	235
4500	13.4	221
5000	15.9	211

3. 47-mm AMMUNITION FOR NAVAL 5-cm SHORT GUN AND NAVAL 5-cm SHORT DUAL PURPOSE GUN

(a) GENERAL

Few rounds of this ammunition have been recovered to date. In each instance the projectiles have been pointed, filled with black powder, and fitted with a base fuze.

(b) SPECIFICATIONS OF CARTRIDGE CASE AND PROPELLANT

This cartridge case is bottlenecked, has only a slight rim, and is joined to the projectile by short crimps.

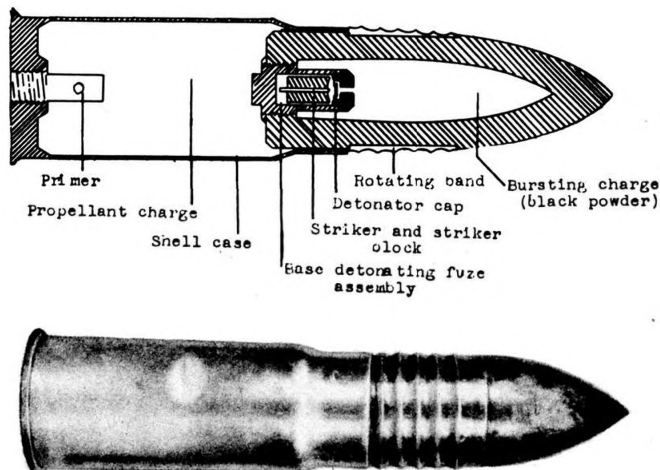
Length:	5.1 in.
Diameter of rim:	2.38 in.
Composition of propellant:	Nitrocellulose and nitroglycerine
Weight of propellant:	2.4 oz.

(c) SPECIFICATIONS OF COMPLETE ROUNDS

(1) 47-mm Explosive (Black Powder Filled)

Two different types of rotating bands have been recovered fitted to this projectile. One is of conventional design; the other is an unusually wide, corrugated band and is thought to be "limited standard".

The base fuze is labeled "Hotchkiss Pattern". It strongly resembles that used in an early British "3-pounder" Naval gun which is believed to have been the prototype of the Japanese weapons.



(1) 47-mm Explosive (Black Powder Filled) (Continued)

Weight of complete round: 3.2 lb.  
 Length of complete round: 9.25 in.  
 Weight of projectile (fuzed): 2.4 lb.  
 Length of projectile (fuzed): 5.31 in.  
 Body material: Steel  
 Composition of rotating band: Copper or brass  
 Width of rotating band  
 (corrugated type): 1.7 in.  
 Composition of filling: Black powder  
 Weight of filling: 1.76 oz.  
 Markings: Maroon projectile body,  
 green tip.

In addition to the high-explosive rounds, Japanese sources indicate the existence of a practice round. The practice projectile is painted black with a yellow tip, and has been made with both types of rotating band. To date no other specifications are available.

(d) FIRING DATA: (For both guns, firing either Explosive or Practice Ammunition)(1) Muzzle velocity: 1475 f/s(ii) Ballistic performance:

<u>Range</u> <u>(in meters)</u>	<u>Time of Flight</u> <u>(in seconds)</u>	<u>Terminal Velocity</u> <u>(in meters per second)</u>
200	0.5	396
400	1.0	360
600	1.6	334
800	2.2	315
1000	2.8	299
1200	3.5	286
1400	4.2	274
1600	4.9	263
1800	5.7	253
2000	6.6	245
2500	8.7	226
3000	11	208

JAPANESE 57-mm (2.25 in.) AMMUNITION1. GENERAL

This ammunition is of conventional Japanese design and was developed for use in low-velocity tank guns. Originally only high explosive and armor piercing rounds were produced, but recently the existence of hollow charge projectiles has been confirmed. This new development will undoubtedly be more effective than the armor piercing rounds which were limited in penetration by the low velocity of the weapons. Projectiles are fitted with a single, copper rotating band 0.4 inches wide.

Type 92 (1932)  
Armor Piercing



Type 90 (1930)  
High Explosive

2. WEAPONS FROM WHICH FIRED

Type 90 (1930) 57-mm Tank Gun

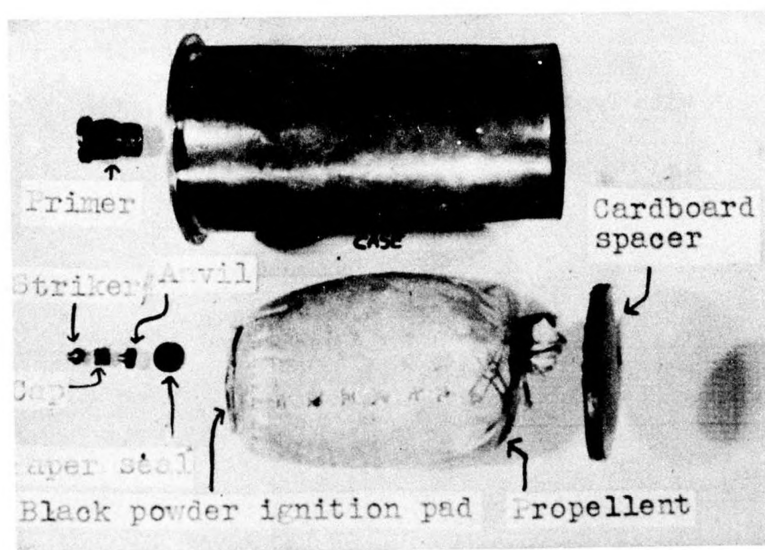
Type 97 (1937) 57-mm Tank Gun

### 3. SPECIFICATIONS OF CARTRIDGE CASE AND PROPELLANT

This short, rimmed, brass cartridge case is characterized by a very slight bottleneck, and is fitted with a Type 40 (1907) Primer, weighing 0.49 ounce. No markings are shown on the case to indicate from which gun the ammunition is fired.

The propellant is loaded into a silk bag, to the base of which is sewn a black powder igniting charge weighing 0.106 ounce.

Weight of case, empty (with primer):	14.94 oz.
Length:	4.77 in.
Diameter of rim:	2.69 in.
Diameter of base:	2.38 in.
Diameter of neck:	2.24 in.
Composition of propellant:	Graphited nitrocellulose and nitroglycerine, in rectangular flakes measuring 0.38 inch square.
Weight of propellant:	3.98 oz.



4. SPECIFICATIONS OF COMPLETE ROUNDS

(a) Type 90 (1930) 57-mm High Explosive

Weight of complete round: 6.40 lb. \*

Length of complete round: 12.7 in. \*

Weight of projectile (fuzed): 5.20 lb. \*

Length of projectile (fuzed): 7.13 in. \*

Body material: Steel

Composition of HE filling: TNT, or alternately  
Amatol or Trinitrophenol.

Composition of booster: Picric acid (3 pellets)

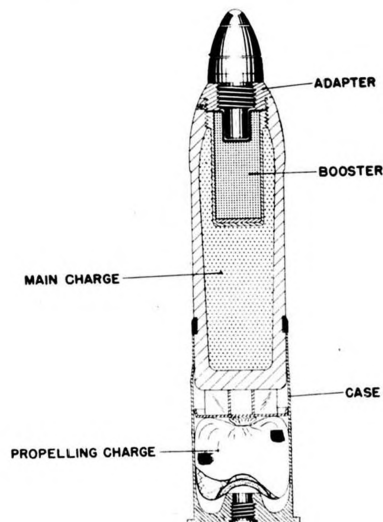
Weight of booster: 1.4 oz.

Type of fuze: Type 88 (1928) Instantaneous or Type 88 (1928) Short delay; Gun type.

Radius of burst: 16 yd. (approx.)

Markings: Black body, red band below fuze, yellow band at center of gravity.

\* With Type 88 (1928) Short delay fuze.



(b) Type 90 (1930) 57-mm High Explosive Substitute

This unrecovered round, which is used for training, is designed to approximate the ballistic performance of the Type 90 (1930) High Explosive. The projectile is fitted with a nose fuze and is filled with black powder.

Weight of complete round:	6.40 lb. *
Length of complete round:	12.4 in. *
Weight of projectile (fuzed):	5.20 lb. *
Body material:	Steel
Composition of HE filling:	Black powder
Weight of HE filling:	2.65 oz.
Type of fuze:	Type 88 (1928) Instantaneous or Type 88 (1928) Short delay; Gun type.

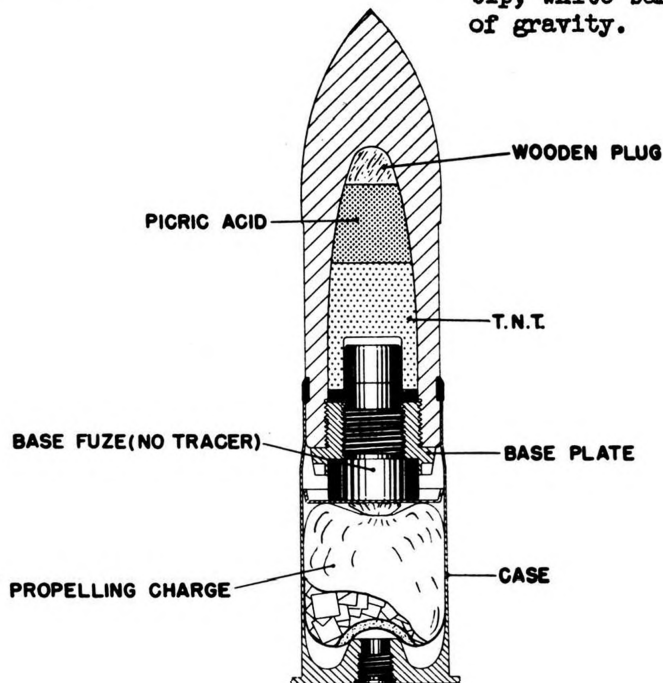
\* With Type 88 (1928) Short delay fuze.

(c) Type 92 (1932) 57-mm Armor Piercing

Weight of complete round:	6.89 lb.
Length of complete round:	11.18 in.
Weight of projectile (fuzed):	5.68 lb.
Length of projectile (w/ofuze):	7.25 in.
Body material:	Steel
Composition of HE filling:	Picric acid in forward pellet, TNT in rear pellet

(c) Type 92 (1932) 57-mm Armor Piercing (Continued)

Weight of HE filling: 3.63 oz.  
 Type of fuze: Type 93 (1932) Short delay base fuze.  
 Markings: Black projectile body, red tip, white band at center of gravity.



(d) Type 3 (1943) 57-mm Hollow Charge

Japanese sources indicate that this projectile is similar in design to recovered 70-mm and 75-mm hollow charge shells.

The two-piece projectile body consists of an ogival nose piece which is threaded into the body just forward of the bourrelet. A funnel-shaped, steel liner is used to shape the explosive charge and leads, by means of a flash channel, to an exploder pellet in the base of the shell.

Unlike the 70-mm and 75-mm hollow charge projectiles, which use the Type 88 (1928) Instantaneous Nose Fuze, the 57-mm hollow charge projectile is fitted with a Type 100 (1940) Nose Fuze.

It is not known whether the standard 57-mm propellant charge is used with this projectile.

(a) Type 3 (1943) 57-mm Hollow Charge (Continued)

Length of complete round: 10.8 in.  
 Weight of projectile (fuzed): 3.97 lb.  
 Length of projectile (fuzed): 7.45 in.  
 Length of projectile (w/o fuze): 6.7 in.  
 Composition of HE filling: Cyclonite/TNT  
 Type of fuze: Type 100 (1940) Small Instantaneous. Nose Fuze (for hollow charge projectiles).

5. FIRING DATA(a) Muzzle velocity:

Type 90 (1930) HE projectile: 1160 f/s  
 Type 92 (1932) AP projectile: 1140 f/s  
 Type 3 (1943) Hollow Charge projectile: 1240 f/s

(b) Ballistic data:

Type 97 (1937) 57-mm Tank Gun firing Type 90 (1930) HE Ammunition

<u>Range</u> <u>(in meters)</u>	<u>Time of Flight</u> <u>(in seconds)</u>	<u>Terminal Velocity</u> <u>(in meters per second)</u>
200	0.6	334.5
400	1.2	316.8
600	1.9	301.6
800	2.6	288.7
1000	3.3	277.7
1200	4.0	268
1400	4.7	259
1600	5.5	251
1800	6.3	244
2000	7.1	237
2500	9.3	222
3000	11.7	210
3500	14.4	199
4000	17.5	191
4500	20.9	185
5000	25.1	183

## 57-mm (Continued)

(b) Ballistic data (Continued)

Type 97 (1937) 57-mm Tank Gun, firing Type 92 (1932) AP Ammunition.

<u>Range</u> <u>(in meters)</u>	<u>Time of Flight</u> <u>(in seconds)</u>	<u>Terminal Velocity</u> <u>(in meters per second)</u>
200	0.7	329.7
400	1.3	313.4
600	2.0	299.6
800	2.6	287.9
1000	3.3	277.9
1200	4.0	270
1400	4.8	262
1600	5.5	254
1800	6.3	248
2000	7.1	242
2500	9.2	229
3000	11.5	218
3500	13.9	210
4000	16.5	203
4500	19.4	198
5000	23.1	195

Type 97 (1937) 57-mm Tank Gun, firing Type 3 (1943) Hollow Charge Ammunition.

<u>Range</u> <u>(in meters)</u>	<u>Time of Flight</u> <u>(in seconds)</u>	<u>Terminal Velocity</u> <u>(in meters per second)</u>
100	0.3	343.8
200	0.6	320.5
300	0.9	303.6
400	1.2	290.4
500	1.6	279.6
600	1.9	270.8
700	2.3	263.1
800	2.6	256.3
900	3.0	250.2
1000	3.4	244.6
1100	3.8	239
1200	4.2	234
1300	4.6	229
1400	5.0	224
1500	5.5	219
1600	5.9	215

JAPANESE 70-mm (2.76 in.) AMMUNITION

1. GENERAL

Two different groups of 70-mm ammunition are known to be produced by the Japanese:

(i) For Type 92 (1932) 70-mm Howitzer (Battalion Gun)

(ii) For Type 94 (1934) 70-mm Tank Gun

Although projectiles are generally common to both weapons, there are differences in the propellants, cartridge cases, and methods of loading. Projectiles are fitted with a single, copper rotating band 0.4 inches wide.

2. 70-mm AMMUNITION FOR TYPE 92 (1932) 70-mm HOWITZER (BATTALION GUN)

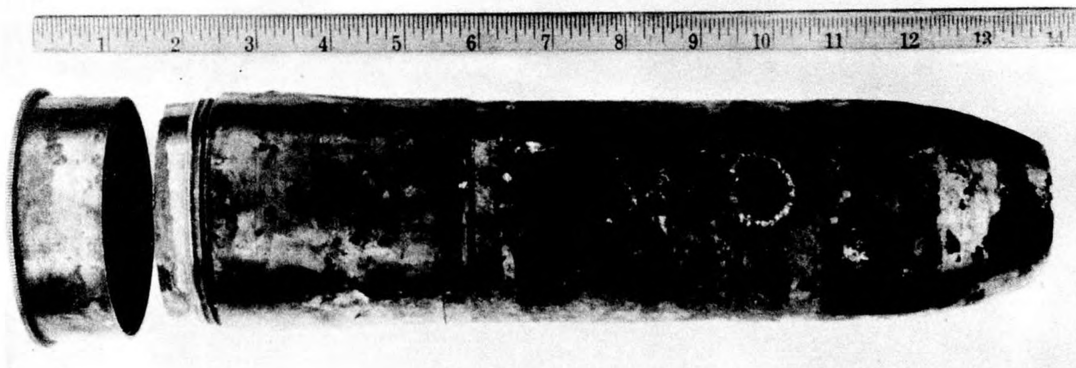
(a) GENERAL

Ammunition for this weapon is of both the semi-fixed and fixed type. HE projectiles use a propellant charge consisting of four increments.

With Hollow Charge projectiles, however, only one large fixed charge is employed.

(b) SPECIFICATIONS OF CARTRIDGE CASE AND PROPELLANT

Two types of rimmed cartridge case are used with the Type 92 (1932) 70-mm Howitzer. The older type, designated "A", is crimped to the projectile and is fitted with a removable threaded base. The newer type "B" is of conventional one-piece construction and is a slip fit over the base of the projectile. Both types are made of brass and use the Type 40 (1907) primer which weighs 0.49 ounce. Either "A" or "B" type cartridge cases may be fitted to HE and Hollow Charge projectiles.

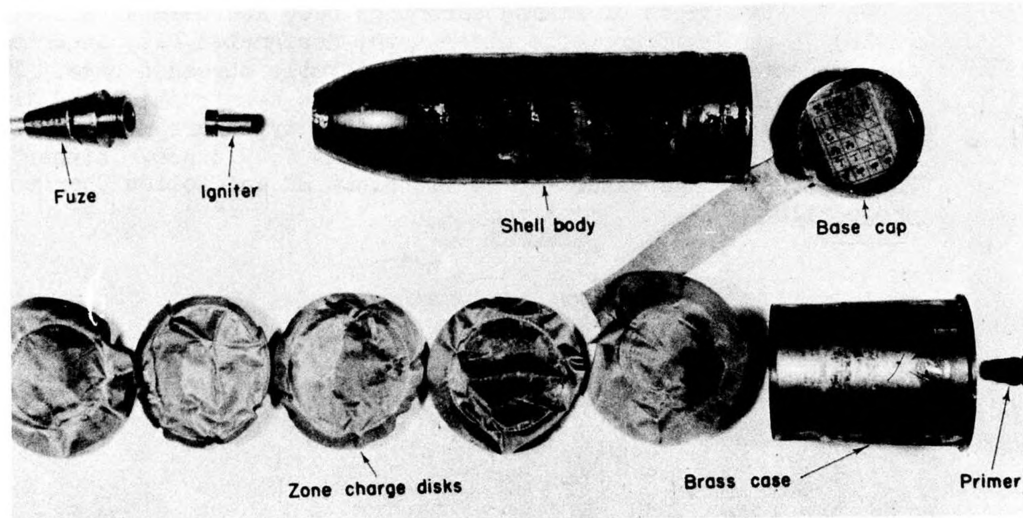


(b) SPECIFICATIONS OF CARTRIDGE CASE AND PROPELLANT (Continued)

The propellant is in the form of flakes measuring 0.03 inches square and 0.008 inches thick. For the HE and AP rounds the propellant is loaded in silk bags forming four increments. These increments are marked 甲 (A), 乙 (B), 丙 (C), and 丁 (D), and weigh 0.60 ounce, 0.62 ounce, 0.32 ounce, and 0.18 ounce respectively. These increments may be combined to form four charges as follows:

<u>Charge I</u>	<u>Charge II</u>	<u>Charge III</u>	<u>Charge IV</u>
D - 0.18	D - 0.18	D - 0.18	A - 0.60 oz.
C - 0.32	C - 0.32	A - 0.60	
B - 0.67	A - 0.60		
A - 0.60	—	—	
1.77 oz.	1.10 oz.	0.78 oz.	

The use of these increments is shown on a charge table attached to a cardboard retaining disk on the top of the cartridge case. An igniting charge of black powder weighing 0.106 ounce is placed in a silk bag in the bottom of the cartridge case, directly over the primer.



(b) SPECIFICATIONS OF CARTRIDGE CASE AND PROPELLANT (Continued)

In the case of the Hollow Charge rounds a propellant charge of 1.77 ounces, equalling that of Charge I, is loaded into a silk bag to which the standard black powder igniter of 0.106 ounce is attached.

Weight, empty (with primer):	Type "A" 1.5 lb. Type "B" 1.2 lb.
Length:	4.0 in.
Diameter of rim:	3.2 in.
Diameter of base:	3.0 in.
Diameter of neck:	2.8 in.
Composition of cartridge case:	Brass
Composition of propellant:	Nitrocellulose 98.4% Diphenylamine 1.3% Graphite .3%
Total weight of propellant:	1.77 oz.
Markings:	Japanese characters 九二步 ("92 Infantry") and 甲 ("A") or 乙 ("B") are stencilled on car- tridge case walls, reading from right to left.

(c) SPECIFICATIONS OF COMPLETE ROUNDS

(1) Type 92 (1932) 70-mm High Explosive

Weight of complete round ("B" case): 9.6 lb. \*

Length of complete round: 14.3 in. \*

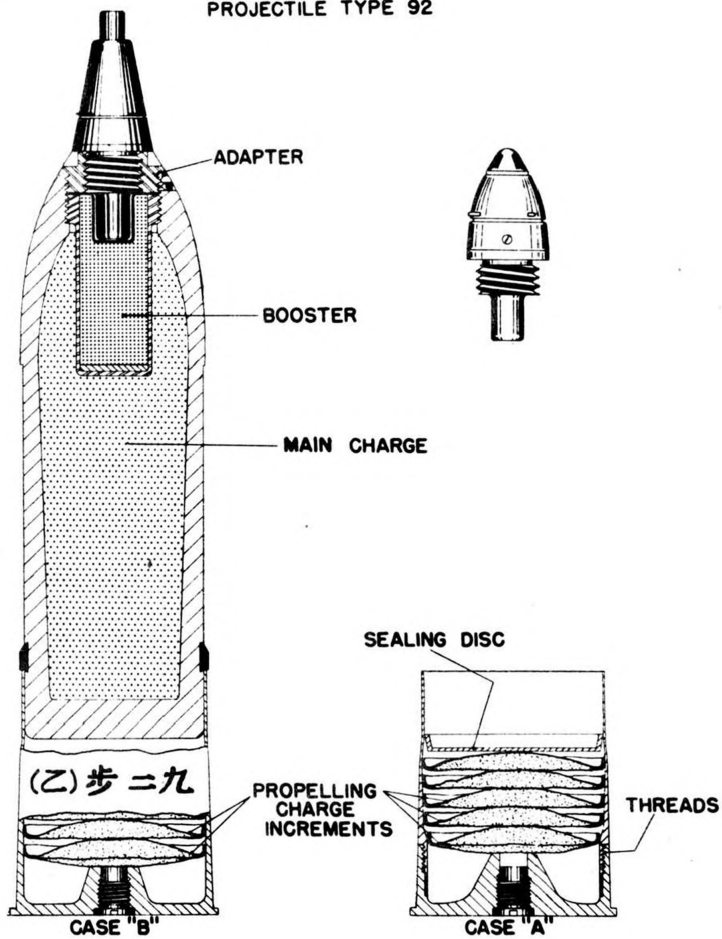
Weight of projectile (fuzed): 8.38 lb. \*

Length of projectile (fuzed): 11.5 in. \*

Body material: Steel

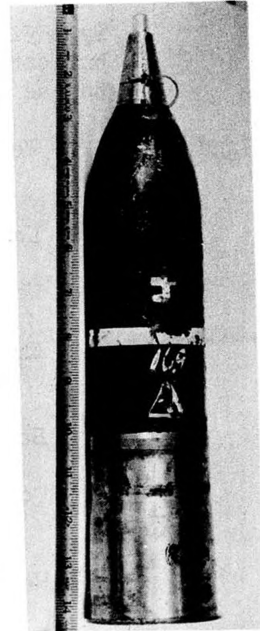
\* With Type 88 (1928) Instantaneous fuze.

COMPLETE ROUND FOR TYPE 92 INFANTRY GUN (HOWITZER)  
PROJECTILE TYPE 92



(1) Type 92 (1932) 70-mm High Explosive (Continued)

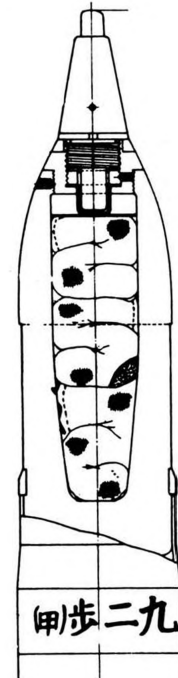
Composition of HE filling:	TNT; or alternately a mixture of RDX and ammonium nitrate.
Weight of HE filling:	1.28 lb.
Type of fuze:	Type 88 (1928) Instantaneous or Type 88 (1928) Short delay; Howitzer type.
Markings:	Black body, red band below fuze, yellow band at center of gravity.
Radius of burst:	22 yards

(11) Type 92 (1932) 70-mm High Explosive Substitute

This unrecovered round, which is used for training, is designed to approximate the ballistic performance of the Type 92 (1932) High Explosive. The cast-iron projectile is fitted with a nose fuze and is filled with black powder.

Weight of complete round ("B" case):	9.6 lb. *
Length of complete round:	12.4 in. *
Weight of complete round:	8.38 lb. *
Length of projectile (fuzed):	9.6 in. *
Weight of black powder filling:	4.0 oz.
Type of fuze:	Type 88 (1928) Instantaneous or Type 88 (1928) Short delay; Howitzer type.

\* With Type 88 (1928) Instantaneous fuze.



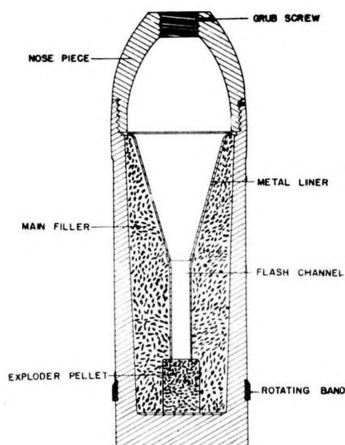
(iii) Type 98 (1938) 70-mm High Explosive

This unrecovered round apparently differs from the Type 92 (1932) HE shell in that the projectile is 0.4 inch shorter, but contains 1.06 oz. more of high explosive. It is also reported to use a different fuze.

Weight of complete round ("B" case):	9.6 lb.
Length of complete round:	13.9 in.
Weight of projectile (fuzed):	8.4 lb.
Exposed length of projectile (fuzed):	9.8 in.
Body material:	Steel
Composition of HE filling:	TNT; or alternately Trinitrophenotol.
Weight of HE filling:	1.36 lb.
Type of fuze:	Type 98 (1938) Combination, instantaneous or short delay.

(iv) Type 3 (1943) 70-mm Hollow Charge

The two-piece projectile body of this round consists of an ogival nose which is threaded into the body just forward of the bourrelet. A funnel-shaped, metal liner is used to shape the explosive charge and leads, by means of a flash channel, to an exploder pellet in the base of the shell.



(iv) Type 3 (1943) 70-mm Hollow Charge (Continued)

This round uses either the Type "A" or Type "B" cartridge case and one large fixed propellant charge. (see paragraph #2 (b)).

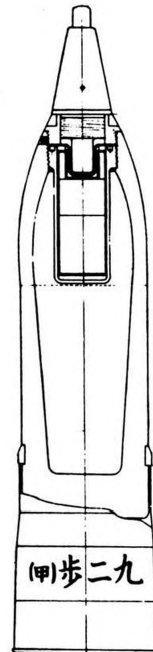
Weight of complete round ("B" case):	8.6 lb. (approx.)
Length of complete round:	14.2 in. (approx.)
Weight of projectile (fuzed):	7.4 lb.
Length of projectile (fuzed):	11.3 in.
Body material:	Steel, with cast iron nose piece.
Composition of HE filling:	TNT 50% Cyclonite 50%
Weight of HE filling:	1.04 lb.
Composition of exploder pellet:	RDX, PETN, and lead azide, in aluminum container.
Type of fuze:	Type 88 (1928) Instantaneous; Howitzer type.
Markings:	Black body, red band below fuze, yellow and white bands near center.
Penetration in armor plate:	3 in. (approx.) by test.



(v) Type 97 (1937) 70-mm High Explosive, Semi-Steel

This round has not been recovered and is known only from Japanese sources. It is possible that the production of semi-steel projectiles was undertaken in an effort to conserve higher-grade steels for other uses. The low strength of material requires a thick projectile wall and base, resulting in a low charge/weight ratio. However, the Japanese claim that this shell produces effective fragmentation against personnel.

Weight of complete round ("B" case):	9.9 lb. *
Length of complete round:	13.5 in. *
Weight of projectile (fuzed):	8.6 lb. *
Exposed length of projectile (fuzed):	9.6 in. *
Body material:	Semi-steel
Composition of HE filling:	TNT
Weight of HE filling:	13.0 oz.
Type of fuze:	Type 88 (1928) Instantaneous or Type 88 (1928) Short delay; Howitzer type.



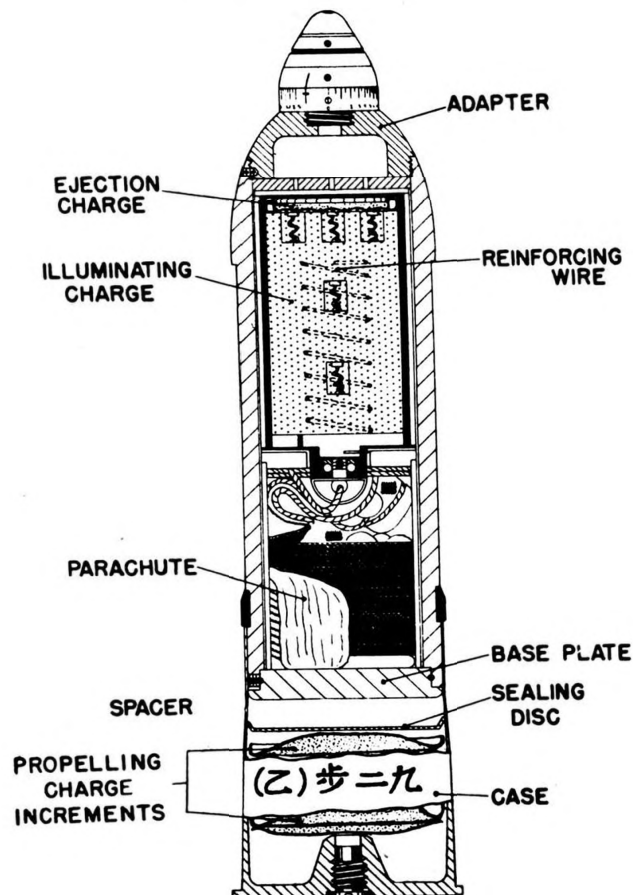
\* With Type 88 (1928) Instantaneous fuze.

(vi) Type 95 (1935) 70-mm Illuminating

This round has not been recovered. Japanese sources indicate that the projectile is fitted with an adjustable time fuze. After the predetermined time delay, a small black powder ejection charge at the top of the projectile is ignited, blowing off the base plate of the projectile and expelling a parachute-supported illuminating charge through the base.

Weight of complete round ("B" case):	9.0 lb.
Length of complete round:	13.0 in.
Weight of projectile (fuzed):	7.7 lb.
Exposed length of projectile (fuzed):	9.0 in.
Body material:	Steel

(vi) Type 95 (1935) 70-mm Illuminating (Continued)



Composition of illuminating charge:	Magnesium, aluminum, and barium nitrate.
Weight of illuminating charge:	1.04 lb.
Duration of illuminating charge:	20 seconds (approx.)
Intensity of illumination:	90,000 candlepower
Type of fuze:	Type 89 (1929) Small, time.

(a) FIRING DATA:

- (i) For Type 92 (1932) HE Projectile and  
Type 92 (1932) HE Substitute Projectile.

<u>Propellant</u>	<u>Charge I</u>	<u>Charge II</u>	<u>Charge III</u>	<u>Charge IV</u>
Muzzle velocity (in feet per second)	648	495	397	334
Maximum range (in yards)	3070	2025	1370	985

- (ii) For Type 3 (1943) Hollow Charge Projectile

Muzzle velocity: 657 f/s

<u>Range (in meters)</u>	<u>Time of Flight (in seconds)</u>
100	0.5
200	1.0
300	1.5
400	2.1
500	2.6
600	3.2
700	3.7
800	4.3
900	4.8
1000	5.4
1100	6.0
1200	6.6
1300	7.2
1400	7.8
1500	8.5
1600	9.2
1700	9.9
1800	10.6
1900	11.4
2000	12.2

3. 70-mm AMMUNITION FOR TYPE 94 (1934) TANK GUN(a) GENERAL

Neither this gun nor the ammunition for it have been recovered to date. According to Japanese sources the same cartridge case and some of the same projectiles are used as with the Type 92 (1932) Howitzer ammunition (see paragraph #2 (b)). Although employing the howitzer cartridge case, all ammunition is fixed and uses a much larger single propellant charge.

(b) SPECIFICATIONS OF CARTRIDGE CASE AND PROPELLANT

The Type "B" cartridge case, weighing 1.2 lb. and the Type 40 (1907) primer are used with this ammunition. The cartridge case is apparently fixed to the projectile by means of a thick coat of shellac at the joint. For specifications of cartridge case see paragraph #2 (b).

The propellant charge of square flakes is contained in a silk bag, to the lower end of which is sewn an igniter pad containing 0.106 ounce of black powder. A cardboard spacer keeps the propellant bag in position. A piece of de-coppering foil weighing 0.054 ounce is attached to the bottom of the cardboard spacer.

## Markings:

Japanese characters

九四戦

("94 Tank" - reading

from right to left)

are stencilled on

cartridge case walls.

## Weight of propellant:

4.8 oz. for HE rounds;

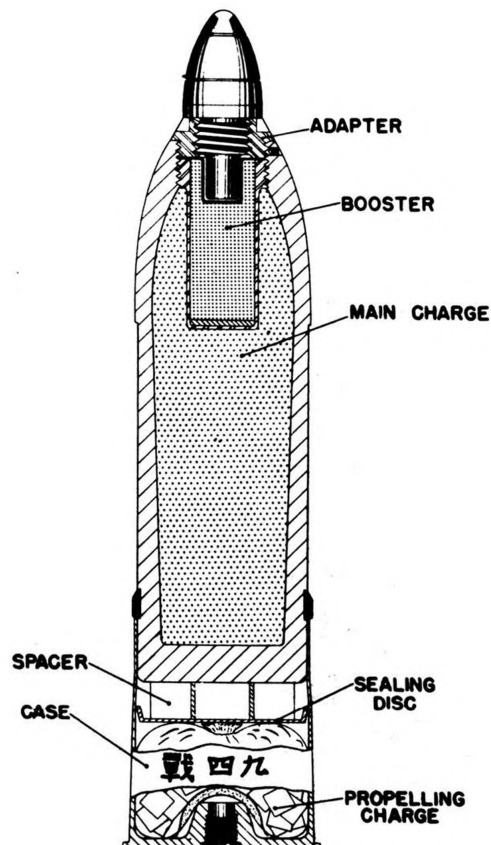
4.2 oz. for AP rounds.

(c) SPECIFICATIONS OF COMPLETE ROUNDS

Both the Type 92 (1932) HE projectile and Type 92 (1932) HE Substitute projectile are used in the Type 94 (1934) 70-mm Tank Gun. However, indications are that only the Type 88 (1928) Short Delay fuze, Gun type, is used. Specifications of these projectiles are identical to those listed in paragraph #2 (c) except as follows:

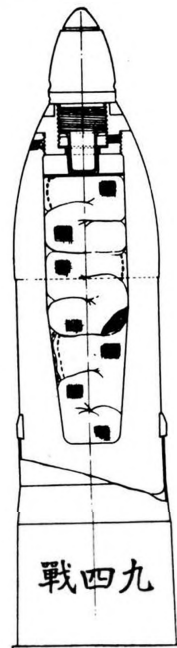
(1) Type 92 (1932) 70-mm High Explosive

Weight of complete round:	9.7 lb.
Length of complete round:	13.8 in.
Weight of projectile (fuzed):	8.4 lb.
Length of projectile (fuzed):	11.0 in.
Type of fuze:	Type 88 (1928) Short delay; Gun type.



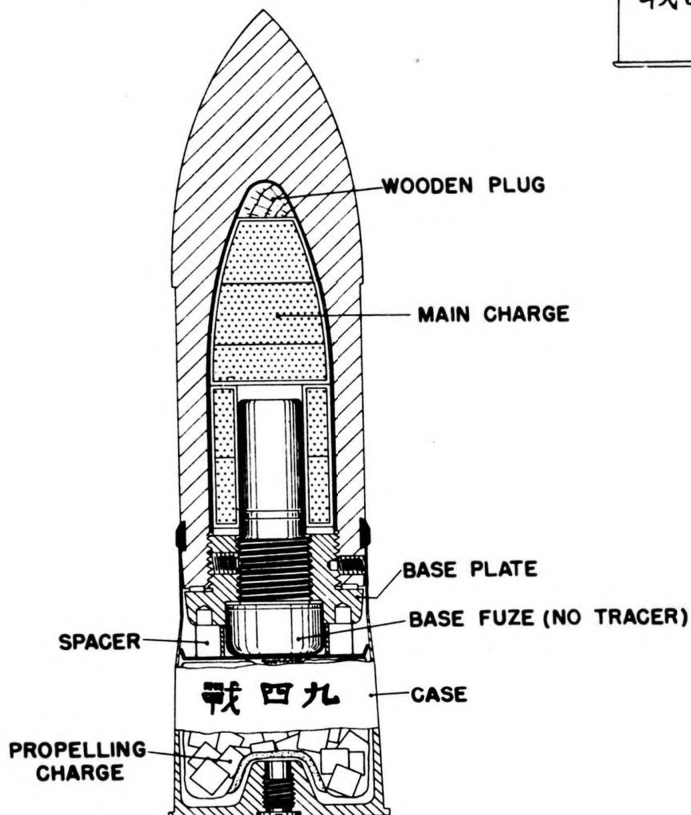
(ii) Type 92 (1932) 70-mm High Explosive Substitute

Weight of complete round: 9.7 lb.  
 Length of complete round: 11.9 in.  
 Weight of projectile (fuzed): 8.4 lb.  
 Length of projectile (fuzed): 9.1 in.  
 Type of fuze: Type 88 (1928)  
 Short delay;  
 Gun type.



(iii) Type 95 (1935) 70-mm Armor Piercing

Weight of complete round: 11.1 lb.  
 Length of complete round: 12.1 in.  
 Weight of projectile (fuzed): 9.8 lb.



(iii) Type 95 (1935) 70-mm Armor Piercing (Continued)

Exposed length of projectile: 8.1 in.  
 Body material: Steel  
 Composition of HE filling: Picric acid 90%,  
 Paraffin 10% in  
 forward pellet;  
 TNT in rear pellet.  
 Weight of HE filling: 6.0 oz.  
 Type of fuze: Type 95 (1935) Small,  
 base.

(d) FIRING DATA:

- (i) For Type 92 (1932) HE projectile and  
 Type 92 (1932) HE Substitute projectile.

Muzzle velocity: 1143 f/s  
 Maximum range: 5040 yards at 20° elevation.

- (ii) For Type 95 (1935) AP projectile.

Muzzle velocity: 985 f/s

<u>Range</u> <u>(in meters)</u>	<u>Terminal Velocity</u> <u>(in meters per second)</u>	<u>Armor Penetration</u> <u>(in millimeters)</u>
1000	252	25
3000	200	20