

Project 1596

Date 19 Oct 1945

JAPANESE AMMUNITION

PART V 75-mm

Negatives

2074

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JAPANESE 75-mm (2.95 in.) AMMUNITION

1. INTRODUCTION

There are ten or more different types of 75-mm guns in current use in the Japanese Army. Although the weapons vary considerably in design, length of tube and size of chamber, the bore diameters are constant (75-mm) and, in most cases, the projectiles are capable of being interchanged between the various guns when fitted to the suitable cartridge case. Cartridge cases and propellant charges, vary according to the weapons for which they are intended. In addition, the propellant charge used with each size of cartridge case may vary according to the projectile used. This study, therefore, will be divided into the following sections:

Specifications of cartridge cases.

Specifications of projectiles.

Specifications of complete rounds (shown under weapons from which fired).

To date, the following 75-mm weapons are known to be in use by the Japanese Army:

Type 38 (1905) Field Gun

Type 38 (1905) Field Gun (Improved)

Type 41 (1908) Mountain (Infantry) Gun

Type 41 (1908) Cavalry Gun

Type 88 (1928) Field AA Gun

Type 88 (1928) Field AA Gun (Special)

Type 90 (1930) Field Gun

* Type 90 (1930) Field Gun (Modified)

Type 94 (1934) Mountain Gun

Type 95 (1935) Field Gun

In addition to the above weapons, the Type 11 (1922) AA Gun may still be in use, although believed to be obsolete.

* The model number of this weapon has not yet been ascertained, although it was recently recovered at Luzon in a self-propelled role, mounted on the chassis of a Japanese Type 97 Medium Tank. From examination of the weapon, it appears to be a modified version of the Type 90 (1930) Field Gun, and is thought to be designated Type 2 (1942).

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All 75-mm ammunition is of the fixed type and is officially designated by the Japanese as "7-cm". Thus the Type 88 (1928) 75-mm Field AA Gun is usually referred to by the Japanese as the "7-cm Type 88 Field Gun". This nomenclature may lead to confusion in view of the existence of weapons of 70-mm caliber which are also designated "7-cm".

Despite the large variety of 75-mm weapons, all are of Army origin. The nearest Navy caliber to approximate this size is designated "8-cm", having a bore diameter of 3 inches (76.2-mm).

2. SPECIFICATIONS OF CARTRIDGE CASES

All cartridge cases are of the rimmed type and normally are of drawn brass construction, although steel cases have also been recovered for the Type 41 (1908) Mountain (Infantry) Gun, and have been reported for the Type 94 (1934) Mountain Gun.

Four different sizes of cartridge cases exist, as indicated below:

Length of case	Weapons with which used
7.3 in.	Type 41 (1908) Mountain (Infantry) Gun
11.5 in.	Type 38 (1905) Field Gun Type 38 (1905) Field Gun (Improved) Type 41 (1908) Cavalry Gun Type 94 (1934) Mountain Gun Type 95 (1935) Field Gun Type 11 (1922) AA Gun
16.7 in.	Type 90 (1930) Field Gun
19.5 in.	Type 88 (1928) Field AA Gun Type 88 (1928) Field AA Gun (Special)

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Three different types of screw-in percussion primers are known to be used in 75-mm cartridge cases.

The Type 40 (1907) primer is generally used when the propellant is loaded in a silk bag. Although many Type 40 (1907) primers have been captured, they have been superseded by the Type 96 (1936) and the Type 98 (1938) primers.

The Type 96 (1936) primer which fits in the same size primer hole as the Type 40 (1907), is characterized by a long perforated magazine. It is generally used when the propellant is loosely loaded into the cartridge case.

The Type 98 (1938) primer, is much larger in diameter (1.28 inches). It is usually found with antitank ammunition (i.e. Hollow Charge and AP rounds), and is the latest type encountered.

NOTE: Characteristics of propellants will be listed under specifications of complete rounds.



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a. 7.3 inch Cartridge Case

This cartridge case is characterized by its bottleneck shape and short length. Since it is used only with the Type 41 (1908) Mountain (Infantry) Gun, and is considerably shorter than any other 75-mm case, no gun designation is found stencilled on the case walls. Both brass and steel cartridge cases have been recovered.

Weight empty (with primer):

Brass case (Type 40 (1907) primer):	1.75 lb.
Steel case (Type 98 (1938) primer):	2.19 lb.

Length:	7.3 in.
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Diameter of neck:	3.0 in.
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Diameter of base:	3.3 in.
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Diameter of rim:	3.6 in.
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Types of primer:	Type 40 (1907) Type 96 (1936) Type 98 (1938)
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b. 11.5 inch Cartridge Case

This slightly bottlenecked cartridge case is used with six different 75-mm guns. However, propellant charges vary according to the guns, necessitating a system of marking complete rounds to avoid confusion. The Type 94 (1934) Mountain Gun takes a relatively small propellant charge. The Type 38 (1905) Field Gun, Type 38 (1905) Field Gun (Improved), Type 41 (1908) Cavalry Gun, and Type 95 (1935) Field Gun all use the same complete rounds incorporating a larger propellant charge. Indications are that the Type 11 (1922) AA Gun takes an even larger propellant charge, but no specimens of the ammunition have yet been recovered. In addition to the standard brass cartridge case, steel cases are thought to exist. The methods of marking cartridge cases will be shown below.

Weight empty (with Type 40 primer):	2.75 lb.
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Length:	11.5 in.
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Diameter of neck:	3.0 in.
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Diameter of base:	3.3 in.
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Diameter of rim:	3.7 in.
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Types of primer:	Type 40 (1907) Type 96 (1936) Type 98 (1938)
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Markings:

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Stencilled vertically
on case walls.

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Type 94 (1934) Mountain Gun	九四山
Type 38 (1905) Field Gun	三八野
Type 41 (1906) Cavalry Gun	四一騎
Type 38 (1905) Field Gun (Improved)	改造三八野
Type 95 (1935) Field Gun	九五野
Type 11 (1922) AA Gun	Not known

c. 16.7 inch Cartridge Case

This long, straight cartridge case is used with the Type 90 (1930) Field Gun. Only brass cases have been recovered.

Weight empty (with Type 40 primer):	3.9 lb.
Length:	16.7 in.
Diameter of neck:	3.0 in.
Diameter of base:	3.3 in.
Diameter of rim:	3.7 in.
Types of primer:	Type 40 (1907) Type 98 (1938)
Markings:	None

d. 19.5 inch Cartridge Case

This long, straight cartridge case is used with the Type 88 (1928) Field AA and Type 88 (1928) Field AA (Special) Guns. All recovered cases have been brass. In some instances cartridge case walls have been unmarked. When marked, they are as indicated below.

Weight empty (with primer):	2.2 lb.
Length:	19.5 in.
Diameter of neck:	3.0 in.
Diameter of base:	3.5 in.
Diameter of rim:	3.7 in.

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Type of primer:

Type 40 (1907)

Markings:

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3. SPECIFICATIONS OF PROJECTILES

At least two and possibly three color marking systems have been used by the Japanese to identify Army projectiles. Each successive system has been a simplification of its forerunner. No attempt will be made in this study to differentiate between one system and another. Instead, those markings which pertain to 75-mm projectiles, and which offer a means of recognition will be listed.

Body Color

<u>Type of projectile</u>	<u>Color</u>
HE, Hollow Charge, AP, Shrapnel, and Target	Black
Smoke	Black or white
Incendiary	Black or yellow
Illuminating	Black or red
Chemical	Grey

Color bands

At nose:

Red	Explosive-filled
Blue	Chemical-filled

Below bourrelet:

Yellow	HE
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At center of gravity:

Yellow	HE, Steel body
Green	HE, Semi-steel body
White	AP

On chemical shells (grey body):

Yellow	Blister gas
Blue	Choking gas
Red	Vomiting gas

Above rotating band:

White	Steel
Green	Semi-steel

Characters stencilled on projectile:

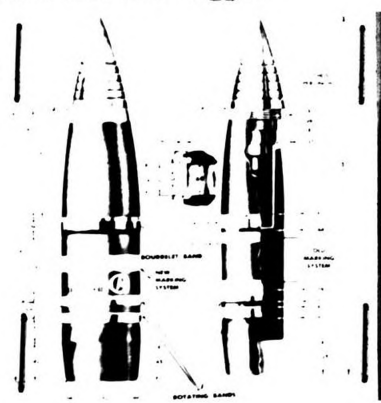
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T Hollow charge
 H Smoke
 P Illuminating
 E Target

a. Type 90 (1930) High Explosive - AA, Long-Pointed Projectile

This is the standard 75-mm AA projectile. Characterized by its streamlined shape, it has a copper bourrelet band and two copper rotating bands, and is fitted with a time fuse.

Weight (fused):	14.4 lb. *	
Length (fused):	13.5 in. *	
Length (w/o fuse):	10.1 in.	
Body material:	Steel	
Width of bourrelet band:	0.60 in.	
Width of each rotating band:	0.40 in.	
Composition of HE filling:	TNT, alternate, Picric Acid	
Weight of HE filling:	13.5 oz.	
Radius of burst:	22 yd. (approx.)	
Type of fuse:	Type 89 (1929) Time Fuse and Auxiliary Fuse; or Type 2 (1942) Combination Time or Impact Fuse.	

* With Type 89 (1929) Time Fuse.

b. Type 90 (1930) High Explosive - AA, Long-Pointed Substitute Projectile

This unrecovered projectile is designed for practice AA firing. The projectile body which is similar in shape to the Type 90 (1930) HE - AA, Long-Pointed, contains a black powder spotting charge in the forward part of the cavity, and sand in the rear portion. A time fuse sets off the black powder charge which flashes through ports drilled along the ogive, thus providing a spotting charge without an air burst.

Weight (fused):	13.8 lb.	
Length (fused):	13.5 in.	
Length (w/o fuse):	10.1 in.	
Body material:	Steel	
Width of bourrelet band:	0.60 in.	

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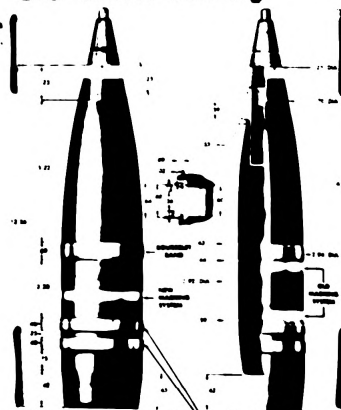
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Width of each rotating band: 0.40 in.
Weight of black powder: 5.3 oz.
Type of fuse: Type 89 (1929) Time Fuse

c. Type 90 (1930) High Explosive, Long-Pointed Projectile

Three varieties of this streamlined projectile have been recovered which are identical except for bourrelet and rotating bands. One variety has a copper bourrelet band and two rotating bands. The second variety has one copper bourrelet band and one rotating band. The third variety has one rotating band and a machined steel bourrelet.

Weight (fused):	14.0 lb. *
Length (fused):	14.8 in. *
Length (w/o fuse):	12.5 in.
Body material:	Steel
Width of bourrelet band:	0.60 in.
Width of each rotating band:	0.40 in.
Composition of HE filling:	TNT; alternate, Trinitrophenol.
Weight of HE filling:	1.19 lb.
Radius of burst:	22 yd. (approx.)
Type of fuse:	Type 88 (1928) Instantaneous, gun type; or Type 88 (1928) Short Delay, gun type.



* With Type 88 (1928) Instantaneous Fuse.

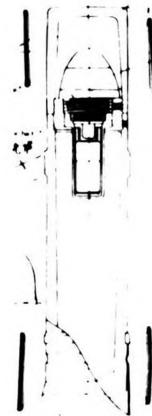
d. Type 3 (1943) Underwater Projectile

This unrecovered projectile is of unusual design and is apparently intended for firing in ship-mounted 75-mm field guns, against submarines and other craft. The projectile has no ogive and is fitted with a time fuse, covered by a cylindrical nose cap to prevent ricochet when the projectile strikes the water. An unusually large bursting charge is used and Japanese sources state that near misses are effective.

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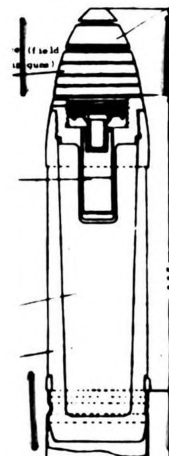
Weight (fused): 16.8 lb.
Exposed length (including nose cap): 12.7 in.
Weight of HE filling: 1.9 lb.
Type of fuse: Type 3 (1943)
Underwater
Projectile
Fuse.



e. Type 1 (1941) High Explosive, Time Fused Projectile

This body of this unrecovered projectile is characterized by a very short ogive to which is fitted a time fuse.

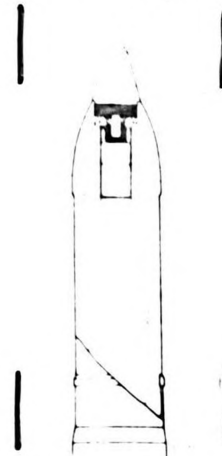
Weight (fused): 14.8 lb.
Exposed length (fused): 11.5 in.
Exposed length (w/o fuse): 8.9 in.
Composition of HE filling: TNT
Weight of HE filling: 1.4 lb.
Type of fuse: Type 1 (1941)
Time Fuse.



f. Type 98 (1938) High Explosive Projectile

The following specifications represent all that is known at present concerning this unrecovered projectile.

Weight (fused): 13.5 lb. *
Composition of HE filling: TNT; alternate Trinitrophenol.
Weight of HE filling: 1.8 lb.
Type of fuse: Type 98 (1938) Instantaneous or Short Delay fuse; or Type 92 (1932) Instantaneous or Short Delay fuse.



* With Type 98 (1938) Instantaneous or Short Delay Fuse.

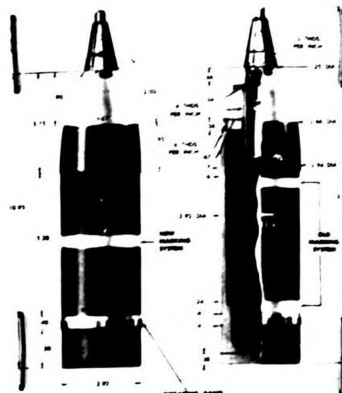
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g. Type 98 (1938) Modified High Explosive Projectile

This projectile has been converted from the Type 38 (1905) Shrapnel projectile by filling the projectile body with HE and fitting an ogival fuse adapter. The fuse adapter is painted white for ease of recognition.

Weight (fused):	10.0 lb. *
Length (fused):	13.2 in. *
Length (w/o fuse):	10.9 in.
Body material:	Steel
Width of rotating band:	0.40 in.
Composition of HE filling:	TNT
Weight of HE filling:	2.0 lb.
Type of fuse:	Type 88 (1928) Instantaneous, gun type; or Type 88 (1928) Short Delay, gun type.

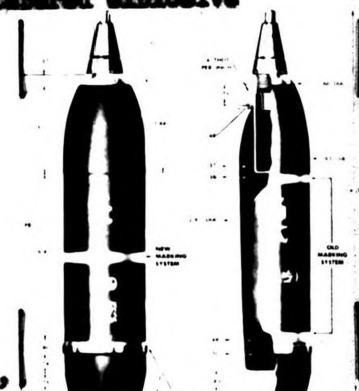


* With Type 88 (1928) Instantaneous Fuse.

h. Type 94 (1934) High Explosive Projectile

This is the most frequently encountered 75-mm HE projectile. It is characterized by a slight boat-tail and a slightly tapered explosive cavity.

Weight (fused):	13.3 lb. *
Length (fused):	14.1 in. *
Length (w/o fuse):	11.8 in.
Body material:	Steel
Width of rotating band:	0.40 in.
Composition of HE filling:	TNT; alternates, Trinitrophenotol, or Ammonium nitrate and RDX.
Weight of HE filling:	1.78 lb.
Radius of burst:	22 yd. (approx.)
Type of fuse:	Type 88 (1928) Instantaneous, gun type; or Type 88 (1928) Short Delay, gun type.



* With Type 88 (1928) Instantaneous Fuse.

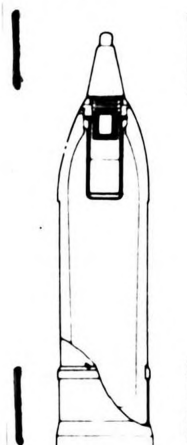
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1. Type 90 (1930) High Explosive Projectile

This unrecovered projectile is similar to the Type 94 (1934) HE except that it has no boat-tail, and the explosive cavity has no taper.

Weight (fused):	12.6 lb. *
Length (fused):	14.1 in. *
Length (w/o fuse):	11.8 in.
Body material:	Steel
Composition of HE filling:	TNT
Weight of HE filling:	1.9 lb.
Radius of burst:	27 yd. (approx.)
Type of fuse:	Type 88 (1928) Instantaneous, gun type; or Type 88 (1928) Short Delay, gun type.

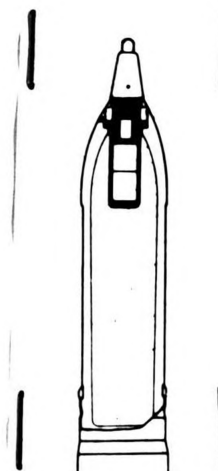


* With Type 88 (1928) Instantaneous Fuse.

2. Type 10 (1931) High Explosive Projectile

This limited-standard projectile is similar to the Type 90 (1930) HE except that it has a cannelure below the rotating band for a cartridge case crimp. This projectile has not been recovered.

Weight (fused):	12.3 lb. *
Length (fused):	14.1 in. *
Length (w/o fuse):	11.8 in.
Body material:	Steel
Composition of HE filling:	TNT
Weight of HE filling:	2.05 lb.
Type of fuse:	Type 88 (1928) Instantaneous, gun type; or Type 88 (1928) Short Delay, gun type.



* With Type 88 (1928) Instantaneous Fuse.

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k. Type "A" High Explosive Projectile

This unrecovered projectile is characterized by a time fuse which forms the entire ogive. The HE filling is in the form of two separately-wrapped preformed blocks.

Weight (fused): 14.2 lb.

Length (fused): 12.5 in.

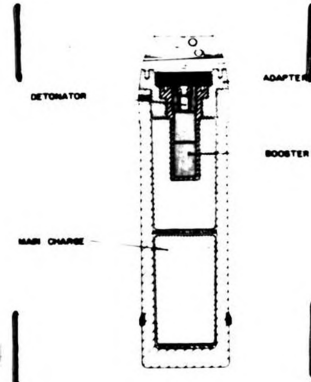
Length (w/o fuse): 10.6 in.

Body material: Steel

Composition of HE filling: Mixture of picric acid and dinitro-naphthalene.

Weight of HE filling: 1.38 lb.

Type of fuse: Type 3 (1914) Combination Time and Impact Fuse.



1. Type "B" High Explosive Projectile

This recently recovered projectile is apparently of the same design as the Type "A", except for the use of an ogival fuse adapter and impact fuse rather than the time fuse.

Weight (fused): 14.5 lb. *

Length (fused): 14.4 in. *

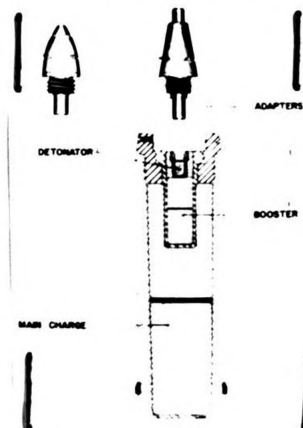
Length (w/o fuse): 12.1 in.

Body material: Steel

Composition of HE filling: Mixture of picric acid and dinitro-naphthalene.

Weight of HE filling: 1.38 lb.

Type of fuse: Type 88 (1928) Instantaneous, gun type; or Type 88 (1928) Short Delay, gun type.



* With Type 88 (1928) Instantaneous Fuse.

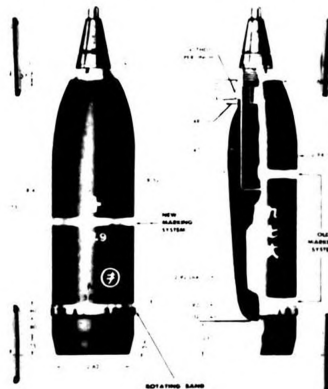
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a. Type 97 (1937) High Explosive, Semi-Steel

This projectile has a tapered explosive cavity, and a slight boat-tail. Because of the relatively low strength of the body material, the base of the projectile is unusually thick.

Weight (fused):	13.3 lb. *
Length (fused):	12.9 in. *
Length (w/o fuse):	10.6 in.
Body material:	Semi-steel
Width of rotating band:	0.40 in.
Composition of HE filling:	TNT
Weight of HE filling:	14.8 oz.



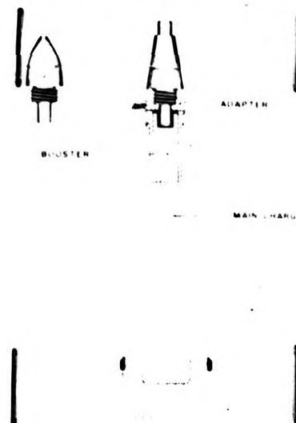
Type of fuse:	Type 88 (1928) Instantaneous, gun type; or Type 88 (1928) Short Delay, gun type.
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* With Type 88 (1928) Instantaneous Fuse.

a. Type 90 (1930) High Explosive, Semi-Steel Projectile

This unrecovered projectile has probably been replaced by the Type 97 (1937) HE Semi-steel, which it resembles except for its greater length.

Weight (fused):	13.6 lb. *
Length (fused):	15.7 in. *
Length (w/o fuse):	11.4 in.
Composition of HE filling:	Semi-steel
Weight of HE filling:	1.26 lb.
Radius of burst:	27 yd. (approx.)
Type of fuse:	Type 88 (1928) Instantaneous, gun type; or Type 88 (1928) Short Delay, gun type.



* With Type 88 (1928) Instantaneous Fuse.

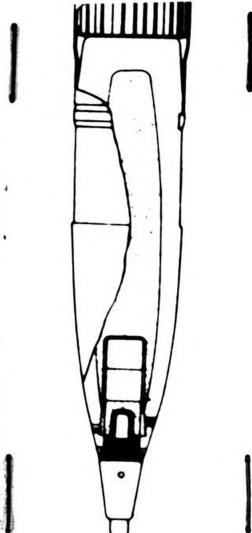
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o. Type 87 (1937) High Explosive, Semi-Steel, Long-Pointed Projectile

Japanese sources state that this streamlined projectile is fired only from the Type 58 (1905) Field Gun (Imperial). The projectile has a single rotating band and long post-tail. It has not been recovered to date.

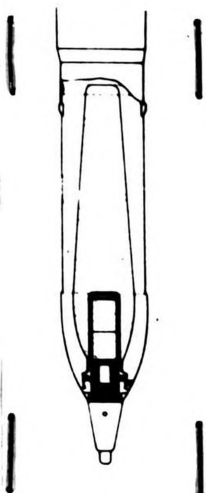
Weight (Tuned):	14.5 lb. *
Body material:	Semi-steel
Composition of the filling:	HE
Weight of the filling:	1.02 lb.
Radius of burst:	27 ft. (approx.)
Type of fuse:	Type 88 (1908) Instantaneous, Gun type, or Type 88 (1908) Short delay, Gun type.
* With Type 88 (1908) Instantaneous Fuse.	



p. Type 10 (1901) High Explosive, Semi-Steel Projectile

This unrecovered projectile has probably been replaced by the Type 97 (1937) HE, Semi-steel.

Weight (Tuned):	14.4 lb. *
Exposed length (Tuned):	12.2 in. *
Exposed length (w/o fuse):	9.9 in.
Body material:	Semi-steel
Composition of the filling:	HE
Weight of the filling:	1.01 lb.
Radius of burst:	27 ft. (approx.)
Type of fuse:	Type 88 (1908) Instantaneous, Gun type, or Type 88 (1908) Short delay, Gun type.
* With Type 88 (1908) Instantaneous Fuse.	



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q. Type 90 (1930) Substitute Projectile "A"

This unrecovered projectile, which is used for training purposes, is filled with a spotting charge of black powder and uses a time fuse. According to Japanese sources, two varieties exist, one having a rotating band of normal width (0.40 in.), the other having a rotating band 0.95 inches wide. The projectile with wide rotating band is for use with the Type 90 (1930) Field Gun, and possibly with the Type 88 (1928) AA Gun.

Weight (fused):	13.8 lb. *
Weight of black powder:	4.0 oz.
Type of fuse:	Type 3 (1914) Combination Time and Impact; or Type 5 (1916) Combination Time and Impact.

* With Type 3 (1914) Fuse.

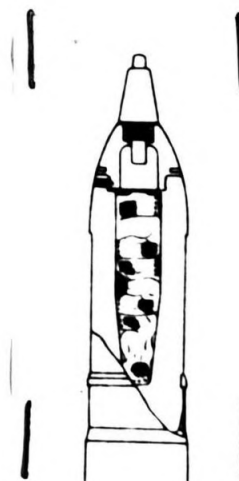


r. Type 90 (1930) Substitute Projectile "B"

This recently recovered projectile uses the same body and black powder filling as the Type 90 (1930) Substitute Projectile "A", but the time fuse has been replaced by an ogival fuse adapter and an impact fuse. Like the Type "A", this projectile may be fitted either with the normal 0.40 inch wide rotating band, or, when used with the Type 90 (1930) Field Gun and possibly the Type 88 (1928) AA Gun, with a 0.95 inch band.

Weight (fused):	14.1 lb. *
Length (fused):	12.3 in. *
Length (w/o fuse):	10.0 in.
Weight of black powder:	4.0 oz.
Type of fuse:	Type 88 (1928) Instantaneous, gun type; or Type 88 (1928) Short Delay, gun type.

* With Type 88 (1928) Instantaneous Fuse.



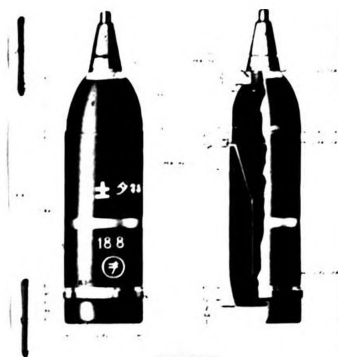
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a. Type 2 (1942) Hollow Charge Projectile

This projectile closely resembles the 70-mm Type 3 (1943) Hollow Charge Projectile, having a two-piece body consisting of an ogival nose, threaded to a cylindrical rear section. 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. The Japanese character is stencilled in white on the projectile body.

Weight (fused):	8.3 lb.
Length (fused):	11.7 in.
Length (w/o fuse):	9.4 in.
Body material:	Nose: Zinc die casting Rear: Steel
Width of bourrelet:	0.40 in.
Composition of HE filling:	TNT 50% Cyclonite 50%
Weight of HE filling:	1.2 lb.
Type of fuse:	Type 88 (1928) Instantaneous, gun type.



t. Type 95 (1935) Armor Piercing, High Explosive Projectile

This unrecovered projectile, according to Japanese documents, is "used to demolish field fortifications". The projectile body is pointed, resembling externally most Japanese armor piercing types. The projectile walls are thin, however, permitting the use of a large HE filling. The projectile is fitted with a base fuse.

Weight (fused):	13.7 lb.
Exposed length:	10.5 in.
Composition of HE filling:	TNT; alter- nate, Picric Acid and Dinitronaph- thalene.
Weight of HE filling:	1.02 lb.
Type of fuse:	Type 95 (1935) Small Base Fuse.

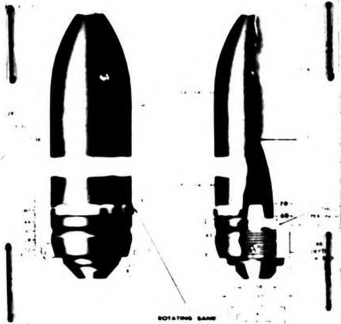


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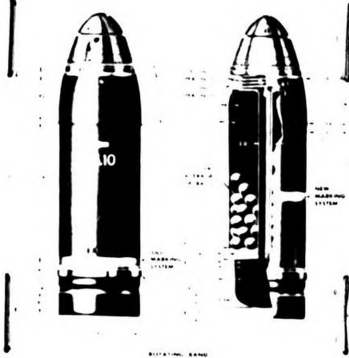
u. Type 1 (1941) Armor Piercing Projectile

This is the standard 75-mm AP projectile. Two varieties have been recovered. One is fitted with a single rotating band, the other, for use in the Type 90 (1930) Field Gun, is fitted with two bands. The projectile is characterized by its pointed ogive, base fuse, and crimping cannellure below the rotating band. The base fuse is usually fitted with a small tracer element.

Weight (fused):	14.5 lb.	
Length (fused):	10.2 in.	
Length (w/o fuse):	9.4 in.	
Body material:	Chilled steel	
Width of each rotating band:	0.40 in.	
Composition of HE filling:	Gylenite 87% Beeswax 13%	
Weight of HE filling:	2.4 oz.	
Type of fuse:	Type 1 (1941) Medium Base Fuse (with tracer)	
Color markings:	Black body, red tip, white band at center of gravity.	

v. Type 90 (1930) Shrapnel Projectile

The body of this projectile contains approximately 250 lead shrapnel balls below which is placed a black powder bursting charge. A central tube containing black powder leads from the time fuse to the bursting charge.

Weight (fused):	15.4 lb.	
Length (fused):	11.4 in.	
Length (w/o fuse):	9.1 in.	
Body material:	Steel	
Width of rotating band:	0.40 in. *	
Weight of bursting charge:	3.5 oz.	
Diameter of shrapnel ball:	0.5 in. (approx.)	
Total weight of shrapnel balls:	5.5 lb. (approx.)	

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Type of fuse: Type 5 (1916) Combination Time and Impact fuse.

* Japanese documents state that a 0.95 inch rotating band is fitted to these projectiles when fired from the Type 90 (1930) Field Gun.

v. Type 38 (1905) Shrapnel Projectile

This unrecovered projectile has probably been replaced by the Type 90 (1930) Shrapnel Projectile which it resembles closely in construction. Approximately 250 lead shrapnel balls are used, with a black powder bursting charge.

Weight (fused): 15.1 lb. *

Length (fused): 11.1 in. *

Length (w/o fuse): 9.2 in.

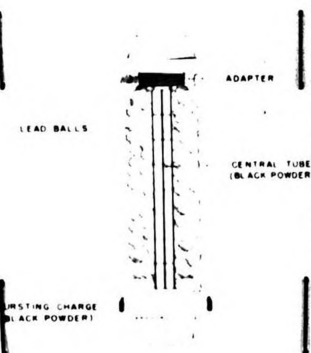
Body material: Steel

Weight of bursting charge: 3.5 oz.

Diameter of shrapnel ball: 0.5 in. (approx.)

Total weight of shrapnel balls: 5.5 lb. (approx.)

Type of fuse: Type 3 (1914) Combination Time and Impact; or Type 5 (1916) Combination Time and Impact.



* With Type 3 (1914) Fuse. (This fuse is used except when firing from Type 90 (1930) Field Gun and Type 88 (1928) AA Gun which take the Type 5 (1916) Fuse. Type 94 (1934) Mountain Gun may use either type fuse).

x. Type 10 (1921) Fragmentation, Time Fused Projectile

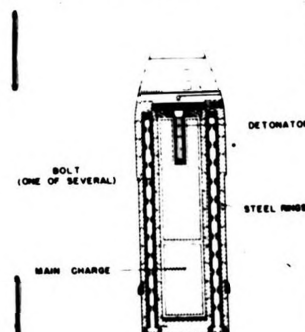
This unrecovered projectile is thought to have been developed for AA fire. Fitted with a time fuse, the projectile body is made up of layers of steel rings bolted together.

Weight (fused): 14.5 lb.

Exposed length (fused): 11.4 in.

Composition of HE filling: Picric Acid and Dinitro-naphthalene.

Type of fuse: Type 10 (1921) AA Time Fuse.

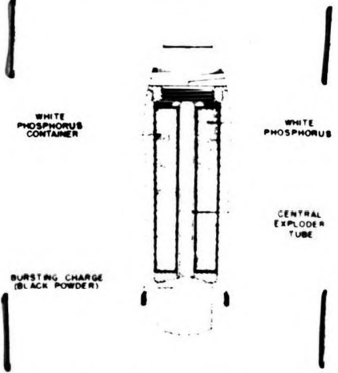


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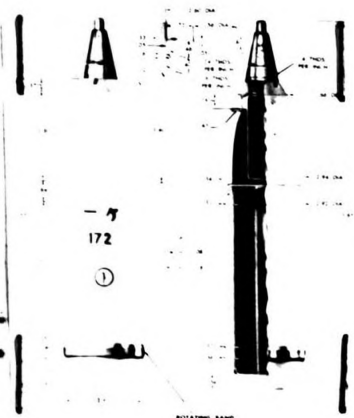
7. Type 11 (1922) Smoke Projectile

This unrecovered projectile has apparently been modified from the Type 38 (1905) Shrapnel Projectile. In place of the shrapnel balls, a sealed canister containing white phosphorus is used. A hole through the center of the canister permits the use of the conventional type powder train and bursting charge.

Weight (fused):	11.9 lb.	
Length (fused):	11.1 in.	
Length (w/o fuse):	9.2 in.	
Body material:	Steel	
Weight of white phosphorus:	1.63 lb.	
Weight of black powder:	0.7 oz.	
Type of fuse:	Type 3 (1914) Combination Time and Impact.	

8. Type 90 (1930) Smoke Projectile

This is apparently the standard 75-mm smoke projectile. The two-piece body screws together below the bourrelet. A large brass canister of white phosphorus is contained in the rear section and a small bursting charge in the forward section. The Japanese character 煙 (smoke) is stencilled on the projectile body.

Weight (fused):	12.6 lb.	
Length (fused):	13.7 in.	
Length (w/o fuse):	11.4 in.	
Body material:	Steel	
Width of rotating band:	0.40 in.	
Composition of HE filling:	Picric acid and Dinitro-naphthalene.	
Weight of HE filling:	3.5 oz.	
Weight of white phosphorus:	1.54 lb.	
Type of fuse:	Type 88 (1928) Instantaneous, gun type.	

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ca. Type 90 (1930) Incendiary Projectile

This unrecovered projectile is fitted with a time fuse, and is designed to expel an incendiary charge from the base of the projectile after a predetermined interval, or on impact. The Japanese character is stencilled on the projectile body. 7

Weight (fused): 15.3 lb.

Length (fused): 12.0 in.

Length (w/o fuse): 9.7 in.

Composition of expelling charge: Black powder

Weight of expelling charge: 9.7 oz.

Composition of incendiary igniter:

Barium peroxide	44%
Manganese dioxide	11%
Granulated aluminum	14%
Black powder	20%
Iron oxide, red	11%

Weight of incendiary igniter: 3.5 oz.

Composition of incendiary booster:

Powdered aluminum	13%
Metal ribbon	57%
Granulated aluminum	6%
Barium peroxide	44%

Weight of incendiary booster: 8.9 oz.

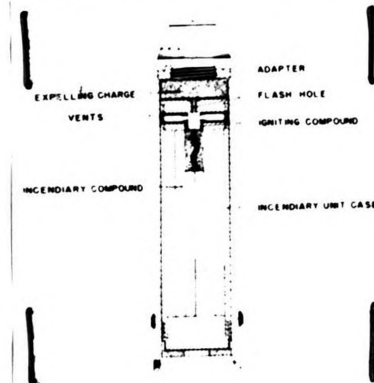
Composition of incendiary:

Powdered aluminum	15.6%
Metal ribbon	44.4%
Granulated aluminum	11%
Manganese dioxide	29%

Weight of incendiary: 1.17 lb.

Duration of incendiary: 30 seconds

Type of fuse: Type 5 (1916) Combination Time and Impact, gun type.

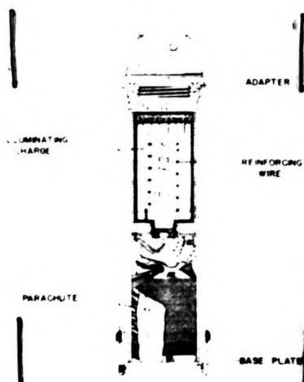


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bb. Type 90 (1930) Illuminating Projectile

This projectile contains a base-ejected parachute-supported flare and is fitted with a time fuse. A large parachute, 3.9 feet in diameter, is connected to the illuminating charge by a steel cable. A small pilot parachute, 1.3 feet in diameter, is connected to the large parachute by a cord 50 inches long. The Japanese character **P** is stencilled in white on the projectile body.

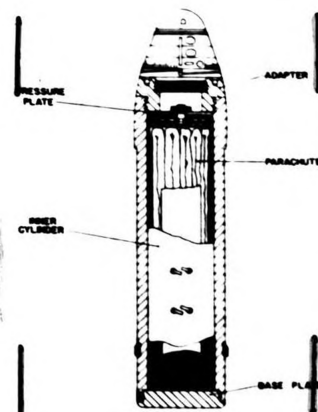
Weight (fused):	12.4 lb. *	
Length (fused):	12.0 in.	
Length (w/o fuse):	9.7 in.	
Composition of expelling charge:	Black powder	
Composition of illuminating charge:	Black powder, Barium nitrate, Magnesium, and paraffin.	
Weight of illuminating charge:	8.8 oz.	
Duration of illuminating charge:	20 seconds	
Intensity of illuminating charge:	90,000 candlepower	
Type of fuse:	Type 5 (1916) Combination Time and Impact Fuse.	

* An earlier version of this projectile weighs 12.1 pounds.

cc. Type 11 (1922) Target Projectile

This projectile has not been recovered, but is thought to contain a base-ejected parachute, used for AA practice. After ejection of the parachute, the empty projectile body probably remains attached and serves as a weight. A time fuse is fitted to permit ejection at the desired height. No ejection charge other than a black powder charge in the base of the fuse is indicated. The characters **E** ; and **赤** "Red"; or **白** "White" are stencilled on the projectile, indicating the color of the parachute.

Weight (fused):	11.1 lb.
Type of fuse:	Type 10 (1921) AA Time Fuse.



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dd. Liquid Incendiary Projectile

Although specimens of this projectile have been recovered, the type designation is not known. The projectile has no bursting charge other than the standard booster, and is filled with a solution of white phosphorus and rubber pellets in carbon disulfide. The projectile body is painted grey, with the Japanese character **力** stencilled in white.

Weight (fused): 12.1 lb.

Length (fused): 14.2 in.

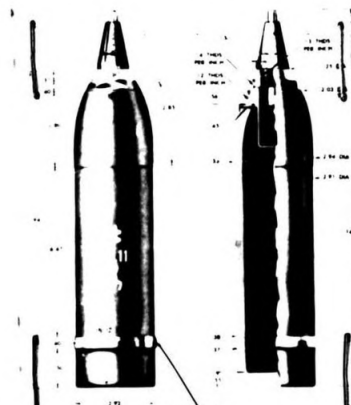
Length (w/o fuse): 11.9 in.

Body material: Steel

Width of rotating band: 0.40 in.

Composition of incendiary filling:

Solution of 87.8% white phosphorus and 12.2% carbon disulfide, containing 96 rubber pellets.



Weight of incendiary filling: 1.36 lb.

Type of fuse: Type 88 (1928) Instantaneous, gun type.

ee. Type 92 (1932) Vomiting Gas ("Red") Projectile

The projectile body is fitted with an inner canister, containing a large bursting charge, which extends the full interior length of the projectile. The space between the canister and the body of the shell contains a relatively small quantity of chemical agent.

Weight (fused): 13.8 lb.

Length (fused): 14.1 in.

Length (w/o fuse): 11.8 in.

Body material: Steel

Width of rotating band: 0.40 in.

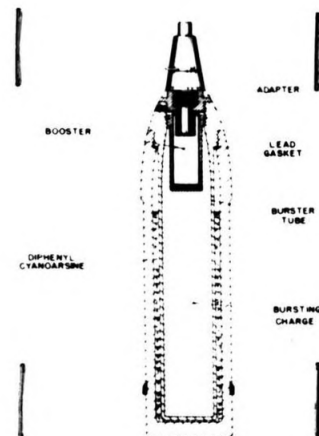
Composition of HE filling:

TNT 70%
Naphthalene
30%

Weight of HE filling: 15.9 oz.

Composition of chemical filling:

Diphenyl-arsine



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Weight of chemical filling: 6.3 oz.

Type of fuse: Type 88 (1928) Instantaneous,
gun type.

rr. Type 92 (1932) Blister Gas ("Yellow") Projectile

This projectile has no bursting charge, other than the standard 40 gram (1.4 oz.) booster which is normally fitted to the Type 88 instantaneous fuse.

Weight (fused): 12.3 lb.

Length (fused): 14.1 in.

Length (w/o fuse): 11.8 in.

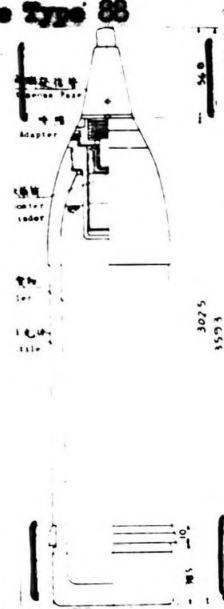
Body material: Steel

Composition of chemical filling:

Lewisite	50%
Mustard	50%

Weight of chemical filling: 1.80 lb.

Type of fuse: Type 88 (1928)
Instantaneous,
gun type.



ex. Type 92 (1932) Choking Gas and Smoke ("Blue/White") Projectile

The body of this shell is identical with that of the Type 92 (1932) Blister Gas Projectile. The filling consists of a mixture of phosgene and a smoke agent. This projectile has not been recovered.

Weight (fused): 12.1 lb.

Length (fused): 14.1 in.

Length (w/o fuse): 11.8 in.

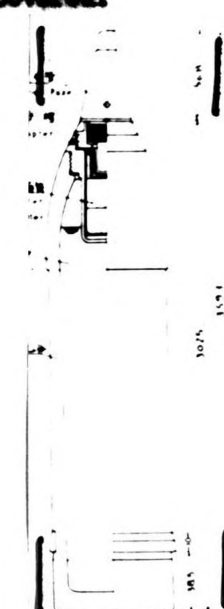
Body material: **Steel**

Composition of chemical filling:

Phosgene	90%
Smoke agent	
10%	

Weight of chemical filling: 1.67 lb.

Type of fuse: Type 88 (1928)
Instantaneous,
gun type.



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4. SPECIFICATIONS OF COMPLETE ROUNDS

In this section, the complete rounds known to be fired from each weapon will be listed under that weapon. Specifications and method of loading propellant and primer are given where known, plus a tabulation of complete round data.

a. Complete Rounds Fired From Type 41 (1908) Mountain (Infantry) Gun

To date all projectiles except the Type 2 (1942) Hollow Charge take a standard propellant charge when fired from this weapon.

The standard propellant consists of square flakes of powder designated "Mark I Square" by the Japanese.

The propellant charge may be loosely loaded in the cartridge case using the long Type 96 (1936) Primer, or it may be loaded into a silk bag for use with either the Type 40 (1907) or the Type 98 (1938) Primers. When either the Type 40 (1907) Primer or the Type 98 (1938) Primer is used, a small igniter charge of black powder is sewn to the bottom of the propellant bag. The Type 96 (1936) Primer contains sufficient black powder integrally to obviate the use of the extra igniter charge.

A cardboard spacer and retaining disc are employed to keep the propellant charge in position. Glued to the retaining disc is a piece of de-coppering foil.

Composition of propellant:	Nitrocellulose 99% Diphenylamine 1%
Dimensions of propellant grain:	0.35 x 0.35 x 0.02 in. (approx.)
Weight of propellant:	9.36 oz.
Weight of igniter charge:	0.18 oz.
Weight of de-coppering foil:	0.11 oz.

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TABULATION OF COMPLETE ROUNDS FIRED FROM TYPE 41 (1908) MOUNTAIN (INFANTRY) GUN

Projectile Type	Reference (see below)	Weight fused (in pounds)	Length fused (in inches)	Propellant weight (in ounces)	Muzzle velocity (in feet per second)	Maximum range (in yards)	Firing tables available in MID
Type 3, Underwater	A	19.2	20.0	9.36			
Type 1, HE, Time fused	-	17.2	18.8	9.36			
Type 98, HE	B	15.7		9.36			
Type 98, HE modified	C	12.4	19.0	9.36	1290		Partial
Type 94, HE	C	15.7	19.9	9.36	1160	7800	Yes
Type 90, HE	C	15.0	19.9	9.36	1180	6900	Yes
Type 10, HE	C	14.7	19.9	9.36			
Type "A", HE	-	16.6	18.4	9.36			
Type "B", HE	C	16.9	20.2	9.36			
Type 97, HE, Semi-steel	C	15.7	18.6	9.36			
Type 90, HE, Semi-steel	C	16.0	19.5	9.36			
Type 10, HE, Semi-steel	C	16.8	19.5	9.36			
Type 90, Substitute "A"	E,D	16.2		9.36			
Type 90, Substitute "B"	C,D	16.5	18.2	9.36	1150	7900	Yes
Type 2, Hollow Charge	E	10.6	18.1	6.85	1140		Partial
Type 95, APHE	G	16.1	17.8	9.36			
Type 1, AP	F	16.9	15.2	9.36			
Type 90, Shrapnel	-	17.8	17.6	9.36	1080	7100	Yes
Type 38, Shrapnel	H	17.5	16.9	9.36			
Type 11, Smoke	-	14.3	16.9	9.36			
Type 90, Smoke	-	15.0	19.5	9.36	1180	6900	Yes
Type 90, Incendiary	-	17.7	17.8	9.36			
Type 90, Illuminating	-	14.8	17.8	9.36	1200	6900	Yes
Liquid Incendiary	-	14.5	20.0	9.36			
Type 92, Vomiting Gas	-	16.2	19.9	9.36	1140	7000	Yes
Type 92, Blister Gas	-	14.7	19.9	9.36	1190	7000	Yes
Type 92, Choking Gas and Smoke	-	14.5	19.9	9.36	1200	7000	Yes

A Includes nose cap.

B Type 98 (1938) Instantaneous or short delay fuse.

C Type 88 (1928) Instantaneous fuse.

D Projectile with normal rotating band.

E Penetration: 3.24 inches, at normal, in Homogeneous Armor Plate.

F Penetration: 1.97 inches, at normal, at 550 yards in Homogeneous Armor Plate.

G Penetration: 0.79 inches, at normal, at 3300 yards in Armor Plate.

H Type 3 (1914) Fuse.

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b. Complete Rounds Fired From Type 94 (1934) Mountain Gun

Both a standard propellant charge and an increased charge are known to be used with this weapon. The following projectiles take the increased charge:

Type 90 (1930) HE, long-pointed

Type 95 (1935) APHE

Type 38 (1905) Shrapnel (when using the Type 5 (1916) Time Fuse, only)

Type 90 (1930) Shrapnel

Type 90 (1930) Substitute "A"

It is thought that all other projectiles take the standard charge, with the possible exception of the Type 2 (1942) Hollow Charge, which may take a reduced charge.

The specifications of the propellant "Mark I Square", igniter charge, de-coppering foil, primer, and methods of loading are as described for the Type 41 (1908) Mountain (Infantry) Gun. (See Paragraph 4a).

Weight of standard propellant charge:	11.2 oz.
Weight of increased propellant charge:	15.3 oz.

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TABULATION OF COMPLETE ROUNDS FIRED FROM TYPE 94 (1934) MOUNTAIN GUN

Projectile Type	Reference (see below)	Weight fused (in pounds)	Length fused (in inches)	Propellant weight (in ounces)	Muzzle velocity (in feet per second)	Maximum range (in yards)	Firing Tables available in MID
Type 90, HE, LP	A, D	17.5	24.0	13.3	1285	9100	Yes
Type 3, Underwater	H	20.3	24.2	11.2			
Type 1, HE, Time fused	-	18.3	23.0	11.2			
Type 98, HE	I	16.8		11.2			
Type 94, HE	A	16.8	24.1	11.2	1162	8000	Yes
Type "A", HE	-	17.7	22.6	11.2			
Type "B", HE	A	18.0	24.4	11.2	1120	7100	Yes
Type 90, HE, Semi-steel	A	17.1	23.7	11.2	1150	7900	Yes
Type 90, Substitute "A"	E, G	17.3		13.3	1145	7800	Yes
Type 90, Substitute "B"	A, G	17.6	22.4	11.2			
Type 2, Hollow Charge	B	11.7	22.3				
Type 95, APHE	-	17.2	22.0	13.3			
Type 1, AP	C, F	18.0	19.4	13.3	1200		
Type 90, Shrapnel,	-	18.9	21.8	13.3	1200	8000	Yes
Type 38, Shrapnel, w/Type 3 fuse	-	18.6	21.1	11.2	1100	7100	Yes
Type 38, Shrapnel, w/Type 5 fuse	-	18.9	21.5	13.3	1215	7800	Yes
Type 90, Smoke	-	16.1	23.7	11.2	1190	7000	Yes
Type 90, Incendiary	-	18.8	22.0	11.2	1095	7100	Yes
Type 90, Illuminating	-	15.9	22.0	11.2	1200	6900	Yes
Liquid Incendiary	-	15.6	24.2	11.2			
Type 92, Vomiting Gas	-	17.3	24.1	11.2			
Type 92, Blister Gas	-	15.8	24.1	11.2			
Type 92, Choking Gas and Smoke	-	15.6	24.1	11.2			

- A Type 88 (1928) Instantaneous fuse.
 B Penetration: 3 inches (approx.) at normal, in Homogeneous Armor Plate.
 C Penetration: 2.28 inches, at normal, at 300 yards in Homogeneous Armor Plate.
 D Projectiles with one rotating band and copper bourrelet, or with one rotating band and machined steel bourrelet.
 E Type 3 (1914) fuse.
 F Projectiles have one rotating band.
 G Projectile has normal rotating band.
 H Includes nose cap.
 I Type 98 (1938) Instantaneous or Short Delay fuse.

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c. Complete Rounds Fired From Type 38 (1905) Field Gun, Type 41 (1908) Cavalry Gun, Type 38 (1905) Field Gun (Improved), and Type 95 (1935) Field Gun

All projectiles, except the Type 87 (1927) HE Semi-steel, long-pointed and the Type 90 (1930) Illuminating, apparently take a standard propellant charge when fired from these weapons.

The standard propellant consists of long, flat powder strips designated "Mark I Strip" by the Japanese.

The propellant is loosely loaded in the cartridge case using either the Type 40 (1907) or the Type 98 (1938) Primer. A small igniter charge of black powder is sewn to a cup-shaped cardboard washer which fits over the primer.

A cardboard spacer and retaining disc are employed to keep the propellant charge in position. Glued to the retaining disc is a piece of de-coppering foil.

Composition of propellant:	Graphited nitrocellulose
Dimensions of propellant grain:	9.5 x 0.36 x 0.03 in. (approx.)
Standard weight of propellant:	1.32 lb.
Weight of igniter charge:	0.18 oz.
Weight of de-coppering foil:	0.11 oz.

NOTE: The Type 87 (1927) HE, Semi-steel long-pointed projectile uses a graphited nitrocellulose propellant charge of 1.8 pounds of "Mark II Strip" grain, measuring 9.1 x 0.55 x 0.05 inch, an igniter charge of 0.35 ounce, and may be fired only in the Type 38 (1905) Field Gun (Improved).

The Type 90 (1930) Illuminating Projectile uses a propellant charge of 14.4 ounces of the standard propellant, and takes the standard igniter charge.

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TABULATION OF COMPLETE ROUNDS FIRED FROM TYPE 38 (1905) FIELD GUN, TYPE 41 (1908) CAVALRY GUN, TYPE 38 (1905) FIELD GUN (IMPROVED) AND TYPE 95 (1935) FIELD GUN

Projectile Type	Reference (see below)	Weight fused (in pounds)	Length fused (in inches)	Propellant weight (in pounds)	Mass velocity (in feet per second) *	Maximum range (in yards) *	Firing tables available in MID
Type 90, HE, LP	A, C	18.1	24.0	1.32	1700	11,700	Yes
Type 3, Underwater	H	20.9	24.2	1.32			
Type 1, HE, Time fused	-	18.9	23.0	1.32			
Type 98, HE	B	17.4		1.32			
Type 98, Modified HE	A	14.1	23.2	1.32			
Type 94, HE	A	17.4	24.1	1.32	1710	10,060	Yes
Type 90, HE	A	16.7	24.1	1.32	1720	8,850	Yes
Type 10, HE	A	16.4	24.1	1.32	1760	8,850	Yes
Type "A", HE	-	18.3	22.6	1.32	1670	9,000	Yes
Type "B", HE	A	18.6	24.5	1.32	1660	9,500	Yes
Type 97, HE, Semi-steel	A	17.4	22.8	1.32	1710	9,400	Yes
Type 90, HE, Semi-steel	A	17.7	23.7	1.32	1690	10,000	Yes
Type 87, HE, Semi-steel, LP	A, D	18.4		1.80	1920	12,600	Yes
Type 10, HE, Semi-steel	A	18.5	23.7	1.32	1660	9,300	Yes
Type 90, Substitute "A"	E, F	17.9		1.32			
Type 90, Substitute "B"	A, E	18.2	22.4	1.32			
Type 95, APHE	-	17.8	22.0	1.32	1720		
Type 1, AP	G	18.6	19.4	1.32	1670	9,850	Yes
Type 90, Shrapnel	-	19.5	21.8	1.32	1610	9,500	Yes
Type 38, Shrapnel	F	19.2	21.1	1.32	1640	9,100	Yes
Type 11, Smoke	-	16.0	21.1	1.32			
Type 90, Smoke	-	16.7	23.7	1.32	1740	9,200	Yes
Type 90, Incendiary	-	19.4	22.0	1.32	1630	9,500	Yes
Type 90, Illuminating	-	16.2	22.0	0.90	1310	7,200	Yes
Liquid Incendiary	-	16.2	24.2	1.32			
Type 92, Vomiting Gas	-	17.9	24.1	1.32	1690	9,300	Yes
Type 92, Blister Gas	-	16.4	24.1	1.32	1760	9,000	Yes
Type 92, Choking Gas and Smoke	-	16.2	24.1	1.32	1760	9,000	Yes

* For Type 38 (1905) Field Gun (Improved)

A Type 88 (1928) Instantaneous fuse.

B Type 98 (1938) Instantaneous or Short Delay fuse.

C Projectiles with one rotating band and copper bourrelet, or with one rotating band and machined steel bourrelet.

D This round is fired only from the Type 38 (1905) Field Gun (Improved).

E Projectile with normal rotating band.

F Type 3 (1914) fuse.

G Projectiles have one rotating band.

H Includes nose cap.

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d. Complete Rounds Fired From Type 11 (1922) AA Gun

No complete rounds for use in this weapon have been recovered, and information from Japanese sources is scant. A standard propellant is thought to be used for all projectiles other than the Type 90 (1930) HE AA, Long-Pointed, the Type 90 (1930) Illuminating, and the Type 11 (1922) Target which use reduced charges.

The standard propellant is "Mark I Strip" grain, having the same composition and dimensions as shown in Paragraph 4c. The standard weight of propellant is 1.5 pounds.

NOTE: Type 90 (1930) HE AA, Long-Pointed Projectile uses 1.32 pounds of "Mark III Strip" grain consisting of graphited nitrocellulose measuring 13.4 x 0.71 x 0.06 inches. Type 90 (1930) Illuminating Projectile uses 14.1 ounces of "Mark I Square" grain and Type 11 (1922) Target Projectile uses 5.6 ounces of "Mark I Square" grain. (See Paragraph 4a).

TABULATION OF COMPLETE ROUNDS FIRED FROM TYPE 11 (1922) AA GUN

Projectile Type	Reference (see below)	Weight fused (in pounds)	Length fused (in inches)	Propellant weight (in pounds)	No firing data are available at present.
Type 90, HE AA, LP	-	18.5	22.9	1.32	
Type 98, HE	A	17.6		1.50	
Type 94, HE	B	17.6	24.1	1.50	
Type 90, Substitute "B"	B,C	18.8	22.4	1.50	
Type 10, Fragmentation	-	18.8	22.9	1.50	
Type 90, Illuminating	-	16.2	22.0	0.88	
Type 11, Target	-	14.1		0.55	

A Type 98 (1938) Instantaneous or Short Delay fuse.

B Type 88 (1928) Instantaneous fuse.

C Projectile with normal rotating band.

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c. Complete Rounds Fired From Type 90 (1930) Field Gun

Four different propellant charges are thought to be used in complete rounds fired from this weapon. They are listed according to projectiles used, as follows:

Propellant Weight (in pounds)	Propellant Designation	Projectiles Used
2.42	Mark II Strip	Type 90 (1930) HE long-pointed Type 1 (1941) AP
1.51	Mark I Strip	Type 92 (1932) Blister Type 92 (1932) Venitong Type 92 (1932) Choking/Buck Type 90 (1930) Incendiary
0.96	Mark I Strip	Type 90 (1930) Illuminating Type 2 (1942) Hollow Charge
1.44	Mark I Strip	Type 94 (1934) HE and all other projectiles not listed above.

In all instances the propellant grains are in strip form, tied together at the forward end and bundled in a cloth bag at the rear end. Either the Type 40 (1907) or the Type 98 (1938) Primers may be used. An igniter charge is sewn to the base of the bag.

For composition and dimensions of propellant grains see Paragraph 4c.

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TABULATION OF COMPLETE ROUNDS FIRED FROM TYPE 90 (1930) FIELD GUN

Projectile Type	Reference (see below)	Weight fused (in pounds)	Length fused (in inches)	Propellant weight (in pounds)	Muzzle velocity (in feet per second)	Maximum range (in yards)	Firing tables available in MID
Type 90, HE, LP	A	20.2	29.2	2.42	2230	15,300	Yes
Type 1, HE, Time fused	-	20.1	28.2	1.44			
Type 98, HE	B	18.6		1.44			
Type 94, HE	C	18.6	29.3	1.44	1710	10,100	
Type 90, HE	C	17.9	29.3	1.44			
Type 97, HE, Semi-steel	C	18.6	28.0	1.44			
Type 90, HE, Semi-steel	C	18.9	28.9	1.44			
Type 90, Substitute "A"	F,D	19.1		1.44	1680	10,300	Yes
Type 90, Substitute "B"	C,D	19.4	27.6	1.44	1680	10,400	Yes
Type 2, Hollow Charge	-	13.1	27.5	0.96			
Type 95, APHE	-	19.0	27.2	1.44			
Type 1, AP	E	20.8	24.6	2.42			
Type 90, Shrapnel	-	20.7	27.0	1.44			
Type 38, Shrapnel	F	20.7	26.7	1.44			
Type 90, Smoke	-	17.9	28.9	1.44			
Type 90, Incendiary	-	20.6	27.2	1.51			
Type 90, Illuminating	-	17.2	27.2	0.96			
Liquid Incendiary	-	17.4	29.4	1.44			
Type 92, Vomiting Gas	-	19.2	29.3	1.51			
Type 92, Blister Gas	-	17.7	29.3	1.51			
Type 92, Choking Gas and Smoke	-	17.5	29.3	1.51			

A All three versions of this projectile may be used.

B Type 98 (1938) Instantaneous or short delay fuse.

C Type 88 (1928) Instantaneous fuse.

D Projectile is thought to have wide rotating band.

E Projectiles have two rotating bands.

F Type 5 (1916) Fuse.

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f. Complete Rounds Fired from Type 88 (1928) Field AA Gun and Type 88 (1928) Field AA Gun (Special)

Five different propellant charges are thought to be used in complete rounds fired from this weapon. They are listed according to projectiles used, as follows:

Propellant Weight (in pounds)	Propellant Designation	Projectiles Used
3.06	Mark III Strip	Type 90 (1930) HE AA long-pointed Type 90 (1930) HE AA long-pointed substitute
2.97	Mark III Strip	Type 1 (1941) AP
2.75	Mark II Strip	Type 90 (1930) HE long-pointed
0.91	Mark I Strip	Type 90 (1930) Illuminating Type 11 (1922) Target
1.49	Mark I Strip	Type 94 (1934) HE and all other pro- jectiles not listed above.

The propellant grains are in strip form loosely loaded in the cartridge case, which is fitted with the Type 40 (1907) primer. A small igniter charge of black powder is sewn to a cup-shaped cardboard washer which fits over the primer. A cardboard spacer and retaining disc are employed to keep the propellant charge in position. Gined to the retaining disc is a piece of de-coppering foil.

Weight of igniter charge: 0.53 oz.

Weight of de-coppering foil: 0.21 oz.

For composition and dimensions of "Mark I Strip" and "Mark II Strip" grains see Paragraph 4c; for "Mark III Strip" see Paragraph 4d.

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In a few instances, rounds have been recovered containing a double-base (nitrocellulose and nitroglycerine) propellant in the form of cylindrical grains measuring 13.4 x 0.19 inches with a single perforation 0.12 inch in diameter.

TABULATION OF COMPLETE ROUNDS FIRED FROM TYPE 88 (1928) AA GUN AND TYPE 88 (1928) AA GUN (SPECIAL)

Projectile Type	Reference (see below)	Weight fused (in pounds)	Length fused (in inches)	Propellant weight (in pounds)	Muzzle velocity (in feet per second)	Maximum range (in yards)	Firing tables available in MID
Type 90, HE-AA, LP	A,F	19.8	30.9	3.06	2360	15,100	Yes
Type 90, HE-AA, LP, Substitute	-	19.2	30.9	3.06			
Type 90, HE, LP	B,C	18.9	32.0	2.35			
Type 98, HE	D	17.1		1.49			
Type 94, HE	E	17.1	32.1	1.49			
Type 90, Substitute "A"	H,I	17.6		1.49			
Type 90, Substitute "B"	H,I	17.9	30.4	1.49			
Type 95, APHE	-	17.5	30.0	1.49			
Type 1, AP	G	19.8	27.4	2.97	2260	11,700	Yes
Type 90, Shrapnel	-	19.2	29.8	1.49			
Type 38, Shrapnel	H	19.2	29.5	1.49			
Type 90, Illuminating	-	15.6	30.0	0.91			
Type 11, Target	-	15.9		2.35			

- A Type 89 (1929) Time fuse.
- B When used in Type 88 (1928) AA Gun (Special) a reduced propellant is used, indicated by Roman numeral II stencilled on cartridge case wall.
- C All three versions of this projectile apparently may be used.
- D Type 98 (1938) Instantaneous and Short Delay fuse.
- E Type 88 (1928) Instantaneous fuse.
- F Estimated maximum effective ceiling: 23,700 feet.
- G Projectiles have two rotating bands.
- H Type 5 (1916) Fuse.
- I Projectile is thought to have wide rotating band.

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