

C.A.D.O. / 1050

RESTRICTED

**SECTION B
SMALL ARMS AMMUNITION
&
AIRCRAFT CANNON
CARTRIDGES UP TO 25MM**

**JAPANESE
AMMUNITION LEAFLETS**

**THEY MUST NOT FALL
INTO ENEMY HANDS**

KIRKEE

1945.

**THIS LEAFLET MUST NOT
FALL INTO ENEMY HANDS**

D. OF A. (INDIA)

SECTION B.

JAPANESE AMMUNITION LEAFLETS.

LEAFLET B 1

INTRODUCTION

DIVISION OF SECTION

This Section is intended to cover all Japanese Small Arms Ammunition and Aircraft Cannon cartridges up to 25-mm. calibre. Cartridges of calibres above 25-mm. will be dealt with in Section E, under Gun Ammunition.

2. The following division of this Section has been arranged tentatively and J. A. Ls. as they become ready will be issued as below:—

- B. 1—Introduction.
- B. 2—Cartridges, S. A., 6.5-mm. (.256-in.), Semi-rimless.
- B. 3—Cartridges, S. A., 7.7-mm. (.303-in.), Semi-rimless.
- B. 4—Cartridges, S. A., 7.7-mm. (.303-in.), Rimless.
- B. 5—Cartridges, S. A., 7.7-mm. (.303-in.), Rimmed.
- B. 6—Cartridges, S. A., 7.92-mm. (.311-in.), Rimless.
- B. 7—Reserved.
- B. 8—Reserved.
- B. 9—Pistol and Machine Carbine ammunition.
- B. 10—Reserved.
- B. 11—Cartridges, S. A., A. A., 13-mm.
- B. 12—A. C. Cannon Cartridges 12.7-mm. (.5-in.)—General Notes.
- B. 13—A. C. Cannon Cartridges 12.7-mm. (.5-in.)—Detailed Description.
- B. 14—Reserved.
- B. 15—Cartridges, S. A., 20-mm.—General Notes.
- B. 16—Cartridges, S. A., 20-mm. for type '97 A. T. machine gun.
- B. 17—Cartridges, S. A., A. A./A. T., for type '98 machine gun.
- B. 18—Cartridges, S. A., 20 mm., for type '99 Aircraft Cannon.
- B. 19—Reserved.
- B. 20—Reserved.
- B. 21—Cartridges, S. A., A. A./A. T. 25-mm.

STANDARDIZATION AND TYPES

3. If the Japanese have ever made any serious attempt in recent years to standardize small arms and small arm ammunition there is little evidence of it in the many different calibres and types in use by them in the present war. No country except perhaps Italy has anything approaching the number of different calibres and types of small arm ammunition used by the Japanese.

4. At the beginning of the century, following the example of other great powers, Japan adopted small calibre bore weapons and a cartridge somewhat similar to the U. S. Navy experimental 6-mm. (Lee) cartridge was introduced but, following the example of Italy and a number of other European countries, a calibre of 6.5-mm. (.256-in.) was standardized. Initially the bullet was round nosed but following the example of Great Britain (Mk. 7 Ball) and the U. S. A. (M. 1906) a pointed bullet was introduced at the same time (1904-06) that these countries adopted pointed bullets.

The British service cartridge (.303-in.) had a *rimmed* case while the American (.30-in.) had a *rimless* case. A somewhat similar position existed among the countries of Europe, e.g. Russia used a *rimmed* case, Germany a *rimless* case. The Japanese adopted a *semi-rimless* case; the only Service small arm semi-rimless case used by any power in the world. This form of head is a compromise, the success of which is questionable. Nevertheless Japan has adhered to it even in the change a few years ago to a larger calibre, i.e. 7.7-mm. (.303-in.).

5. The Japanese 6.5-mm. cartridge has a 138 grain bullet fully jacketed with a cupro-nickel or gilding metal envelope and lead core. It has been reported from American sources that two propellant loads are used for this cartridge. The standard cartridge being loaded to give about 2,700 f. s. muzzle velocity for rifles, while a slightly lighter load is used for cartridges intended for machine guns. All 6.5-mm. ammunition is issued in 5 round clips packed in small cardboard cartons each holding 15 rounds. A label on the carton states "38 Type rifle" and if the ammunition is reduced charge for machine guns, there is a G in a circle on the edge of the label. This machine gun ammunition is reported to give a muzzle velocity of about 2,400 f. s. The two types of ammunition are interchangeable for rifle or machine gun.

This reduced charge ammunition for machine guns is probably desirable owing to the type of mechanism employed which allows the breech to open with a high residual pressure leading to rupture of the case and occasional stoppages in the case of high velocity ammunition.

Although large quantities of 6.5-mm. ammunition have been examined at Kirkee only one propellant load has been found, 30 grains of square flaked graphited N. C. In the type Meiji 38 long rifle (about 30-in. barrel) this gave an observed mean velocity of about 2290 f. s. at 90 feet (muzzle velocity of the order of 2350 f. s.). If higher velocity 6.5-mm. ammunition does exist, it cannot have been used to any wide extent in the Burma theatre.

6. The change to the larger calibre of 7.7-mm. commenced shortly after 1930 and the 7.7-mm. *semi-rimless* cartridge was introduced for heavy machine guns. About 1939 a 7.7-mm. rifle and light machine gun were introduced but the cartridge for them was *rimless*.

7. It will be useful here to explain a point which has caused some confusion in regard to the interchangeability of 7.7-mm. *semi-rimless* and 7.7-mm. *rimless* cartridges. The 7.7-mm. *semi-rimless* cartridges are invariably packed for the Hotchkiss type (Type '92) 7.7-mm. heavy machine guns which are designed to take a *semi-rimless* cartridge. The protruding rim of the *semi-rimless* case of this cartridge will not fit properly in the recess in the bolt head of the 7.7-mm. rifle and light machine gun which are designed to take a *rimless* cartridge, and jams will occur if attempts are made to use this cartridge. On the other hand, however, the *rimless* cartridge can be used in the 7.7-mm. heavy machine gun without difficulty.

8. The change to a larger bore was not confined only to Japan, a number of countries have changed since the First World War. Noticeably Italy, which was changing to 7.65-mm. bore just before the present war. This change to a larger calibre is probably influenced by:—

(a) The need for greater ranging for medium machine guns and better striking energy at fighting ranges of A. P. ammunition.

(b) The greater facility with which the larger bullet can be used for A. P., incendiary, tracer and explosive roles.

(c) Standardization and the better prospect of obtaining machine tools, gauges, etc.

9. Between 1930 and 1940 the Japanese adopted machine guns of Lewis and Vickers types taking .303-in. ammunition, termed 7.7-mm. *rimmed*. These guns are direct copies of the British and the ammunition has also been copied very closely. In addition much captured British guns and ammunition are used. The Japanese manufactured ammunition can be distinguished by the stamped base markings and coloured annulus, details of which are given in this J. A. L. This 7.7-mm. rimmed ammunition is fully interchangeable with British .303-in. ammunition although it may not function so well in automatic weapons.

10. German influence is apparent from about 1938 when aircraft machine guns of German design were introduced. The Japanese Type '98 A. C. machine gun is a copy of the well-known German 7.92-mm. M. G. 15 free (flexible) A. C. machine gun, while the Type '00 A. C. machine gun is similar to the Continental (Bren Type) L. M. G. Some of the 7.92-mm. ammunition received here for examination was of German and some of Japanese manufacture. The Japanese air force appears to use 7.92-mm. ball in A. C. machine guns unlike the Luftwaffe which normally uses only A. P. and semi A. P.

11. It should be noted that this 7.92-mm. ammunition is fully interchangeable with British 7.92-mm. B. E. S. A. ammunition, although it may not function so well in B.E.S.A. machine guns.

12. What we usually term a *medium* machine gun i.e. a machine gun mounted on a tripod for sustained fire, is usually termed by the Japanese as a *heavy* machine gun. The earliest heavy machine gun which is still in use appears to be the 6.5-mm. Type Taisho 3 (1914). This is a Hotchkiss type fed by a metal strip. In 1932 the 7.7-mm. semi-rimless Type '92 heavy machine gun was introduced, which follows generally the same lines as the 6.5-mm. Type Taisho 3.

13. In pistol calibres an 8-mm. (Nambu) cartridge (full jacketed bullet) is used for S. L. (semi automatic) pistols while a 9 mm. S. & W. type cartridge (unjacketed lead bullet) is used for revolvers. The former is an unusual cartridge, not used by any other Power. It is a bottle necked semi-rimless cartridge something like the .30 (sometimes termed 7.65-mm. Luger) Luger cartridge but considerably different in dimensions. It will be seen from the Summary that this is used in three different types of S. L. pistols. The M. V. is reported to be about 900 f. s. but it has not been possible yet to check this at Kirkee.

So far as is known there is only one type of revolver used, the Type Meiji 26 (1893). This is modelled on the old American .45 Schofield Smith and Wesson revolver and in appearance is very much like the British Service (Webley) revolver. The cartridge has a solid lead unjacketed 150 grain bullet, with a propellant charge of about 3 grains of a small greenish-gray pillow shaped N. C. powder. The bullet is seated deeply in the case over a leatherboard cup-shaped wad. The cartridge can be fired from the .380-in. No. 2 pistol (British Service, Webley). Small trials using this weapon (5-in. barrel) gave a mean observed velocity at 30 feet of 517 f. s. The cartridge case of the Japanese round, being slightly longer than the standard Smith and Wesson .38-in. revolver cartridge case, will not fit the .38 Smith and Wesson revolvers or similar revolvers with a raised shoulder in the chamber. It is considered that the velocity obtained above in the No. 2 pistol is the same as that to be expected in the Japanese revolver, and M. V. of the order of 530 f. s. No Japanese revolver was available for trials.

The use of an unjacketed bullet by the Japanese is worthy of attention in view of the strong objections raised by the Germans and Italians to our use of unjacketed bullets in .455-in. or .390-in. cartridges. It will be recollected that Allied troops caught in possession of these cartridges were liable to be summarily shot.

14. Information on sub-machine carbine ammunition is vague. One main type of machine carbine only has been reported, a copy of the German Solothurn taking the standard 8-mm. (Nambu) pistol ammunition. Another report states that the carbine is of 7.63-mm. calibre; possibly taking a cartridge similar to the .30 in Mauser automatic pistol cartridge. Further information is awaited.

15. The 12.7-mm. aircraft cannon cartridge is a close copy of the Italian Breda cartridge, although the gun is reported to be of the Browning type. Captured 12.7-mm. ammunition has been of both Japanese and Italian manufacture. It is believed that this gun is also used in an A. A. A. T. role, and reports say it is used by the Japanese Navy for A. A. work. It is not likely to be *very* effective in either role owing to its low velocity.

16. A 13-mm. (sometimes described as 13.2-mm.) A. A., A. T. machine gun is known to exist. This is the Type '93 (Hotchkiss) which is thought to be an old design not widely used except perhaps in Home areas. Little information on the ammunition is available and no drawings or definite details have been received in Kirkee. No reports of its use in the Burma theatre have been received.

17. In the 20-mm. calibre there are four different weapons chambered for different types of cartridges. The largest cartridge is used for the Type '98 A. A./A. T. Machine gun; the length of the cartridge case is 5.6". The next largest is the Type '97 A. T. machine gun which, suitably modified, is reported to be used also as an aircraft cannon; the length of this cartridge case is 4.9". The next cartridge in size is that for the Type HO 5.20-mm. (Browning mechanism) fixed aircraft cannon; the size of this cartridge case is 3.7". The smallest cartridge is used in the Type '99 A. C. cannon and more recent weapons similarly chambered; the length of the cartridge case is 2.8". This latter weapon appears to be widely used and samples of practically all types were captured in Assam and Burma. This machine gun is reported to be used also in a ground role for A. A./A. T. purposes or as light automatic artillery. Full details to assist the identification of each type are given in the summary, while the photograph at Plate D shows typical cartridges for the Type '97, '98 and '99 machine guns.

The 20-mm. ammunition for the type HO 5 aircraft cannon has only just been received, and it is not possible to include a photograph of it in this issue. Full details will be given as soon as possible in the detailed J. A. L.

18. A weapon whose role is similar to that of the 20 mm. Type '98 A. A./A. T. machine gun is the 25 mm. Type '96 A. A./A. T. Naval machine gun. Its cartridge is dealt with in the Summary and Plate D.

19. The Japanese also use a 30 mm. Naval machine gun/aircraft cannon equipment and the following ammunition is reported—Tracer; H. E./Tracer; H. E.; H. E./Incendiary; and A.P./H.E.

Little is known of the ammunition other than that it is of the Oerlikon type and that the shell has a pronounced bourrelet. The incendiary type is reported to have a white phosphorus container and small bursting charge. The fuze is of the rotor type. Further information is awaited.

HANDLING AND TRANSPORT

20. Generally speaking, Japanese small arm ammunition can be dealt with on the same lines as the equivalent British service types. Some points, however, require special attention:—

(a) Incendiary bullets in the 7.7-mm. and 7.92-mm. calibres are filled with white phosphorus. While there is no evidence to suggest that this phosphorus is not well sealed in the bullet it is reasonable to assume that this is not so well sealed as in the British type. In any case the equivalent W. P. British B Mk. 4 type is disliked because of possible exudation and consequent fire risk. Any Japanese W. P. filled S. A. A. should, therefore, be isolated in storage and if there is any indication of exudation the rounds concerned should be dumped in deep water. It would be wise to keep a receptacle handy filled with water for initial dousing. Further, if loose rounds are captured which have obviously been subject to adverse storage conditions immediate destruction, preferably by dumping in deep water, is desirable.

(b) In the 7.7-mm. and 12.7-mm. calibres the Japanese make use of an explosive bullet (probably more for its observation value than for its explosive effect). This bullet is filled with R. D. X and P. E. T. N. in the nose and is functioned by a pointed brass hollow cone also filled with R. D. X. and P. E. T. N. Again, there is no evidence to suggest that this bullet is unduly sensitive but careful handling is advisable. A report from the South West Pacific refers to incendiary and explosive types of bullets requiring an extremely small amount of heat to ignite and that cases have occurred of rounds exploding in store-houses or when lying loose in the open. It is thought that this is unlikely to happen with ammunition in good condition and which is stored in reasonably cool storage. Nevertheless, this aspect must always be considered when dealing with these types.

(c) The Japanese use a number of different types of fuzed shell in 12.7-mm., 13-mm. and 20-mm. calibres. Generally speaking, these fuzes in good condition and properly stored present no abnormal risk. But against very severe handling and jolting might be sufficient to initiate the gaine which usually contains pellets of lead azide etc. with no shutter or other safety device below.

Blind shells from these calibres, however, present serious risk. In practically all cases the fuze is probably fully armed and the striker point may even be resting in the detonator. Destruction *in situ*, whenever practicable, is strongly recommended. If they must be moved, use a long-handled shovel and guard, treating the shell very carefully, or use a vehicle towing some form of improvised spade, etc. The shell should be moved only as far as necessary before destroying it. Powerful explosives are used in these shell, and despite their small size the explosive effect is quite severe. Fragments may carry considerable distances. Cover should therefore, always be used.

(d) It must be remembered always that small arm ammunition lends itself readily to use as a "booby trap" with a considerable nuisance value at the least. For instance, it is not at all difficult to fill the case of a 6.5-mm. or 7.7-mm. cartridge with high explosive and to fit a small detonator in line with the cap. What happens when the round is fired will be obvious. If Japanese ammunition is to be used by friendly troops it is desirable to use ammunition from original packages, or ammunition which it is reasonable to suppose is not likely to be "booby trapped". Actually, so far as is known, no instances of cartridges being booby trapped in this way have been reported. It is, however, a possibility, even if remote.

21. From the above there is little need to emphasize how unwise it is for any one to retain rounds, bullets, cannon shell and small fuzes etc. as souvenirs. Nevertheless, these items have a great attraction for troops, and I. O. Os, and Engineer officers can do much to discourage this practice by emphasizing the dangers involved whenever an opportunity occurs.

IDENTIFICATION

22. As explained above the Japanese use many calibres and types of small arm ammunition and to assist identification the following Plates and Summary are included at the end of this J. A. L.:—

**PLATE A.—DETAILED DRAWINGS OF 6·5-mm., 7·7-mm.
SEMI-RIMLESS AND 7·7-mm. RIMLESS CARTRIDGES.**

In addition to the types of 6·5-mm. cartridges shown, three other types have since come to light:—

(i) A blank cartridge which has a crimped mouth somewhat similar to the British service; Blank, .303-in. L, Mk. 5 round.

(ii) A hollow pink paper bullet which is presumably a blank cartridge used to function machine guns similar to the British service bulletted Blank, .303-in. L, Mk. 7.

(iii) A tracer round, of which very little details are available.

In the 7·7-mm. rimless cartridge additional types of A.P., tracer, etc. have since been found, and these are described briefly in the Summary.

**PLATE B.—DETAILED DRAWINGS OF 7·7-mm. RIMMED, 7·92-mm. RIMLESS
AND 8·0-mm. RIMLESS.**

The 7·7-mm. rimmed cartridges are direct copies of British .303-in. cartridges. The Japanese appear to copy these with great accuracy, even to the extent of securing the bullet by indents at mouth of case and using a coloured annulus to indicate the type of bullet, although the colours used do not agree with those used in the British service. They have not used their usual method of a coloured band at the junction of the mouth of the case and the bullet.

The sketch of the explosive round shown has been built up only from information received, and it seems reasonable that this is the ordinary explosive bullet from the 7·7-mm. *semi-rimless* cartridge loaded in a 7·7-mm. *rimmed* case. The cartridges, S. A., 7·92-mm. rimless are accurate copies of the German service cartridge, and in some cases cartridges captured have been of German manufacture. There is little doubt, however, that 7·92-mm. cartridges are also being made in Japan. The 8·0-mm. cartridge shown is used in other weapons than the Type '94 S. L. pistol. Full details are given in the Summary.

**PLATE C.—COMPARATIVE PHOTOGRAPH OF TYPICAL 6·5-mm., 7·7-mm.,
7·92-mm., 12·7-mm. AND 20·0-mm., CARTRIDGES.**

This photograph will assist quick identification of the different types, and the distinction between rimmed, semi-rimless and rimless cartridge can be seen clearly. Note that the colours pink, black, etc. refer to colour bands of paint or varnish at the junction of the mouth of the case and bullet. Note also the truncated tip of the 7·7-mm. explosive bullet, item 3.

**PLATE D.—COMPARATIVE PHOTOGRAPH OF 12·7-mm., 20·0-mm.
25·0-mm. AND 37·0-mm. CARTRIDGES.**

This gives a good general idea of the relative sizes and appearance of the cartridges. No samples of the 20-mm. cartridges for the Type '97 machine gun have been examined at Kirkee and the photograph (item 6) has been built up from dimensions and other details reported. An explanatory chart is attached to this plate.

SUMMARY

23. This provides major details of the different types of S. A. A. and the weapons in which they are used in a form suitable for quick reference. Dimensions and markings have been included to enable cartridges to be identified readily. Fuller details will be given in the separate J. A. Ls. on each type of cartridge.

The "V" shown in the remarks column against certain items indicates that the ammunition has been examined at Kirkee and the details given are correct.

24. It will be useful to mention some characteristics of Japanese small arm ammunition which may help identification.

(a) Base markings appear to be omitted from 6·5-mm., 7·7-mm. *semi-rimless*, 7·7 mm. *rimless* and 12·7-mm. *semi-rimless* cartridges. In the case of the 7·7-mm. rimmed cartridge which, as mentioned earlier, is a copy of the British .303-in. cartridge, base stamping (see Plate B) has been used.

(b) Similarly, with the exception of the 7.7-mm. rimmed cartridge, no coloured marking on the annulus is used. Where coloured annuli is found or markings on the base the cartridge concerned has probably been manufactured outside Japan or the coloured varnish is used only to waterproof the cap.

(c) The cap in 6.5-mm. cartridge is generally pressed in and secured by three stabs (or stakes). This stabbing is heavy in this calibre and the cap is sunk considerably below the base of the cartridge case.

(d) In all calibres of small arms brass caps appear to be used exclusively. No instance of copper caps have been found.

INTERCHANGEABILITY

25. To know what Japanese ammunition can be used in our weapons and what ammunition of ours can be used in Japanese weapons is extremely useful if not essential. Some brief information on this subject is, therefore, included.

To say that certain calibres of S. A. A. can be used in this or that weapon may be misleading and dangerous unless there is a proper understanding of what is meant by the term "interchangeable" in its application to the use of S. A. A. in weapons for which it was not manufactured. It will be useful, therefore, to make some brief remarks on this aspect:—

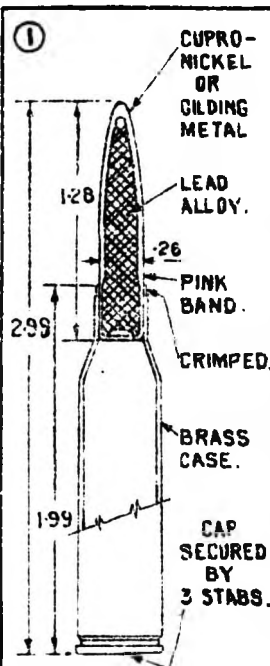
(a) The fact that two weapons may have the same calibre is no indication whatever that they take the same ammunition, i.e. that the cartridges manufactured for each are interchangeable. For instance, the Italian 6.5-mm. cartridge is quite unlike the Japanese 6.5-mm. cartridge and one cannot be used in the weapon intended for the other; they are *not interchangeable*.

(b) It may be taken as a sound rule that if the calibres listed are different they are definitely not interchangeable. There are one or two exceptions to this but they do not concern Japanese ammunition and can be ignored.

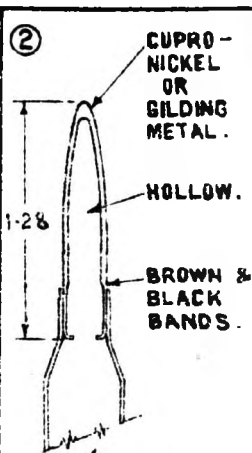
(c) The fact that a cartridge can, under certain conditions, be loaded and fired in a weapon other than that for which it is intended, even if it is of the same calibre, does not mean that it is interchangeable with the correct cartridge in any sense. For instance, the Japanese 6.5-mm. cartridge can be placed by hand in the chamber of the Italian 6.5-mm. rifle and with difficulty be fired. The combination is, however, dangerous and may result in a burst case and severe escape of gas to the rear. The .45-in. M. 1911 cartridge (Auto-Colt or Thompson Machine Carbine) can under certain conditions be fired in the .455-in. No. 1 pistol; the result can be a burst cylinder and serious injuries to the firer. Other less dangerous combinations will occur where results may be only difficult loading, hard extraction, or bad accuracy, etc. None of these combinations is, however, correct and the cartridges are *not interchangeable*.

(d) For two cartridges to be classed as interchangeable, they must be identical in the form of the case and dimensions, and give approximately the same ballistic performance, i.e. muzzle velocity and pressure, etc. Nevertheless, they may not feed properly from magazines or correct automaticity may be impossible in automatic weapons. It is, therefore, desirable to use the term "fully interchangeable" where it is known that the cartridges can be expected to behave the same under all conditions. Even so, trials are generally necessary to confirm that cartridges intended for one weapon will give one hundred percent correct functioning in another even though the design of both is the same.

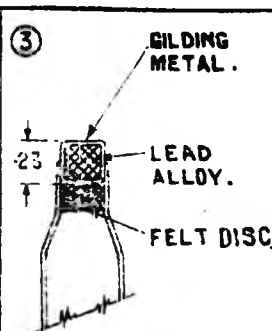
26. A chart has been included at the back of Plate D to indicate, in a form for quick reference, what cartridges, if any, of the main belligerent Powers are interchangeable, or fully interchangeable, with Japanese S. A. A. cartridges. Detailed information on cartridges of other Powers can, if required, be obtained through the Director of Armaments, G. H. Q. (I).



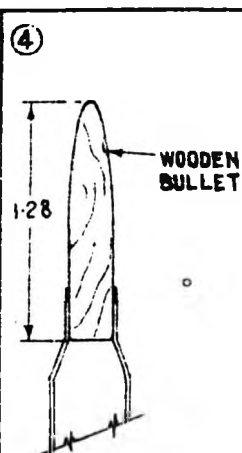
- COMPLETE ROUND -
- BALL -
- TYPICAL -



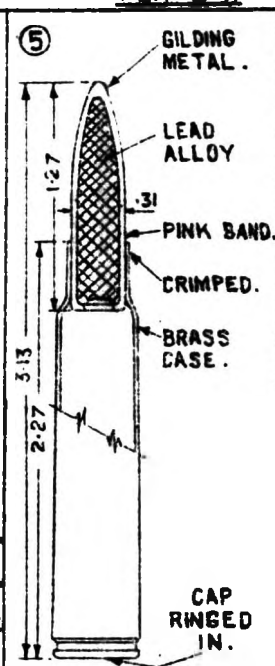
- GUARD -



(SNUB-NOSED)
- TRAINING -



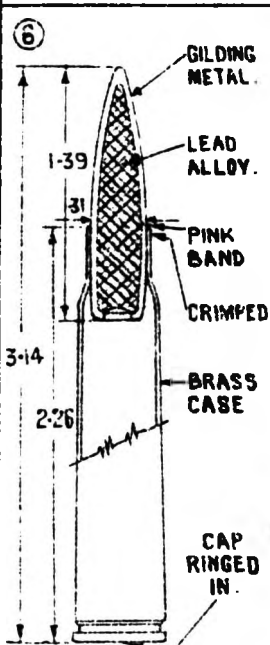
- RIFLE GRENADE -



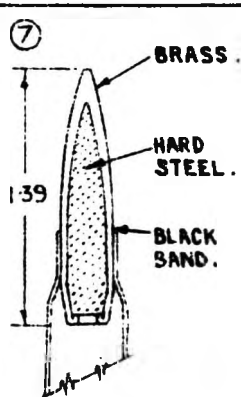
WT. OF BULLET 181 GRs.
CAP RINGED IN.
CARTRIDGE
S.A. BALL
7.7 MM. RIMLESS.

BULLET (TYPE).	WT. OF BULLET.	PROPELLANT.
BALL	138 GRs.	N.C. FLAKES 29.5 GRs.
GUARD	55 GRs.	N.C. FLAKES 27.3 GRs.
TRAINING	34 GRs.	BLACK POWDER 6.2 GRs.
RIFLE GRENADE.	-	-

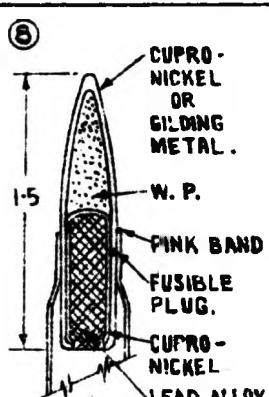
- CARTRIDGE, S.A., 6.5 MM., SEMI-RIMLESS -



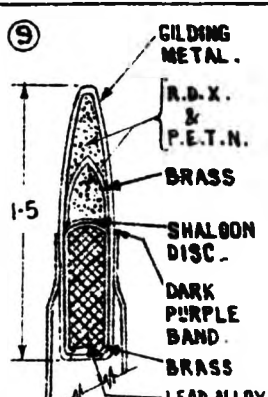
- COMPLETE ROUND -
- BALL -
- TYPICAL -



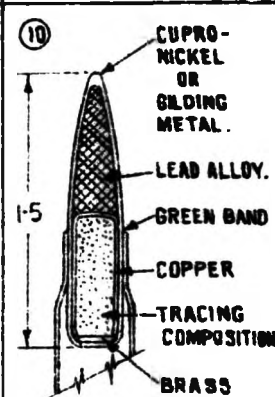
ARMOUR PIERCING.



INCENDIARY.



EXPLOSIVE.



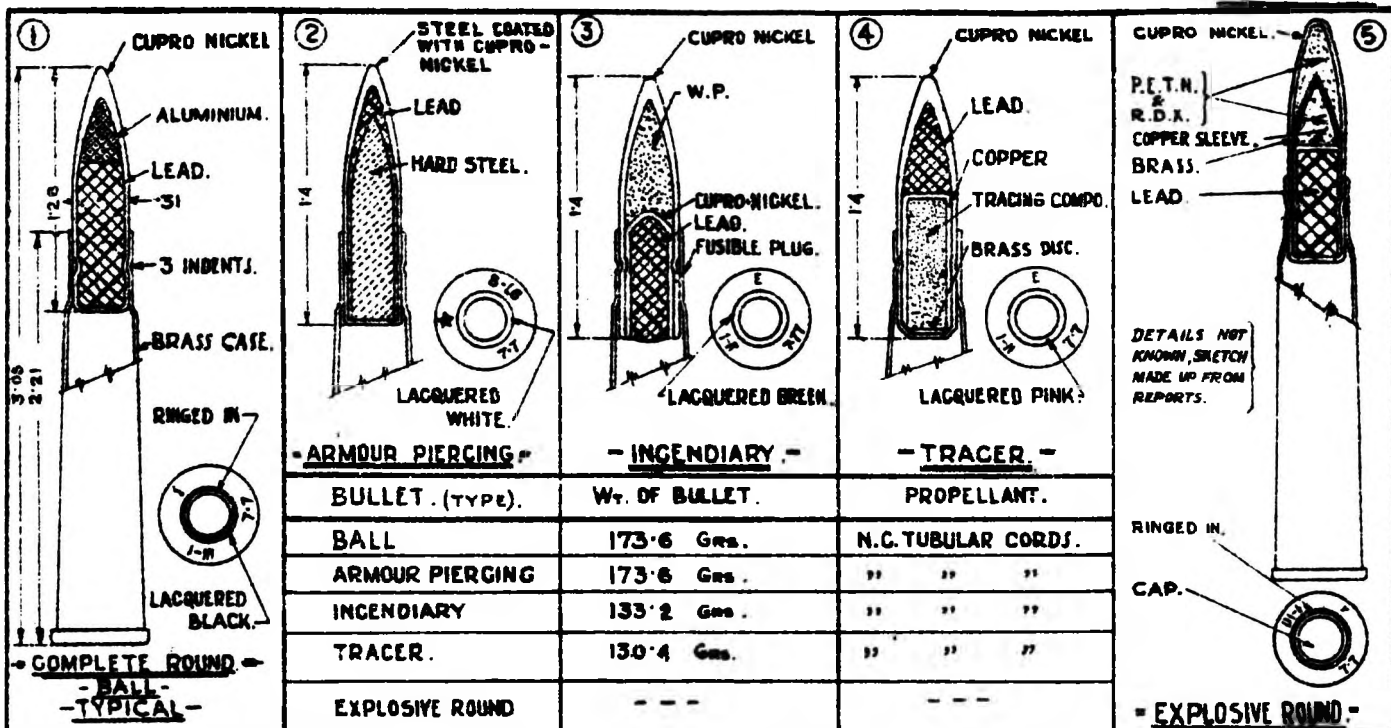
TRACER.

BULLET (TYPE).	WT. OF BULLET.	PROPELLANT. (APPROX.)
BALL	203 GRs.	N.C. TUBULAR CORDS 45 GRs.
ARMOUR PIERCING.	162 GRs.	" " " " " "
INCENDIARY	162 GRs.	" " " " " "
EXPLOSIVE	162 GRs.	" " " " " "
TRACER	155 GRs.	" " " " " "

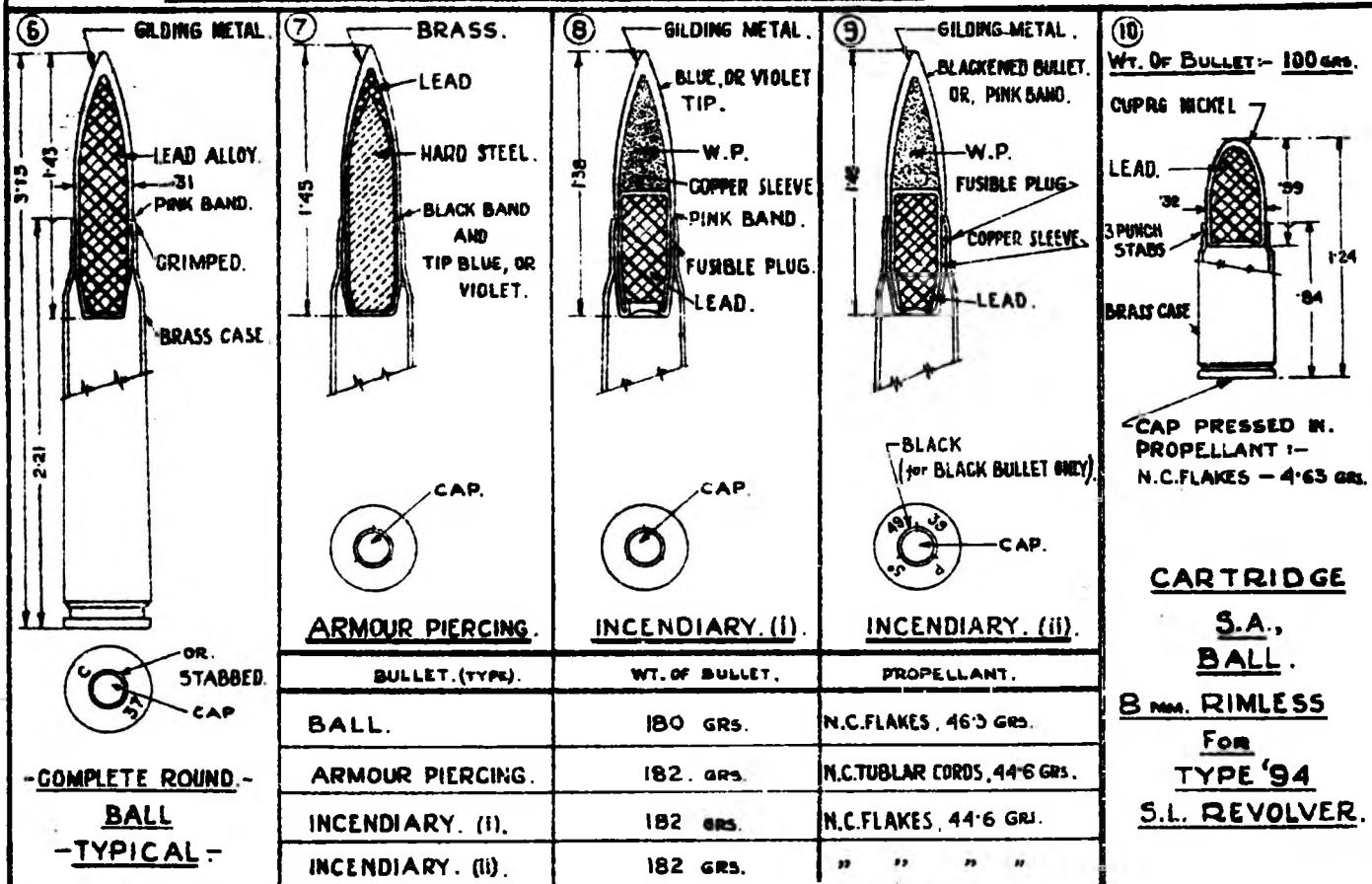
- CARTRIDGE, S.A., 7.7 MM., SEMI-RIMLESS -

RESTRICTED.

- JAPANESE SMALL ARMS AMMUNITION -
FOR RIFLES & MACHINE GUNS.



CARTRIDGE, S.A., 7.7 MM., RIMMED.



CARTRIDGE

S.A., BALL.

8 MM. RIMLESS

FOR

TYPE '94

S.L. REVOLVER.

RESTRICTED.

JAPANESE SMALL ARMS AMMUNITION.

FOR RIFLES, MACHINE GUNS & PISTOLS.

DIMENSIONS IN INCHES.

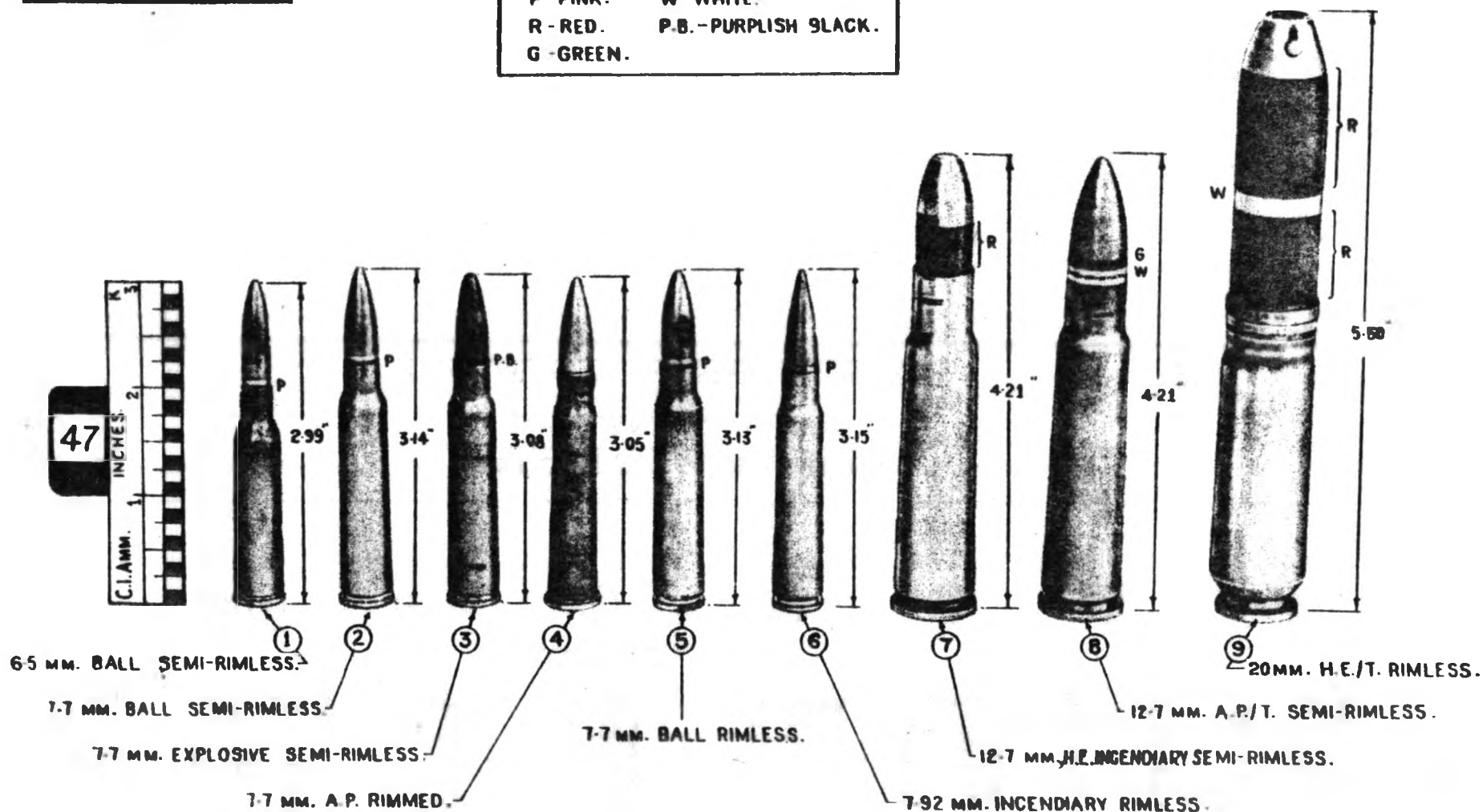
C.I. Arms. 5/1027.
KIRKLE, MARCH 26.

G.P.I.P. FORM 10-28.

RESTRICTED.

KEY TO COLOUR BANDS:-

P - PINK. W - WHITE.
R - RED. P.B. - PURPLISH BLACK.
G - GREEN.



JAPANESE SMALL ARMS AMMUNITION.

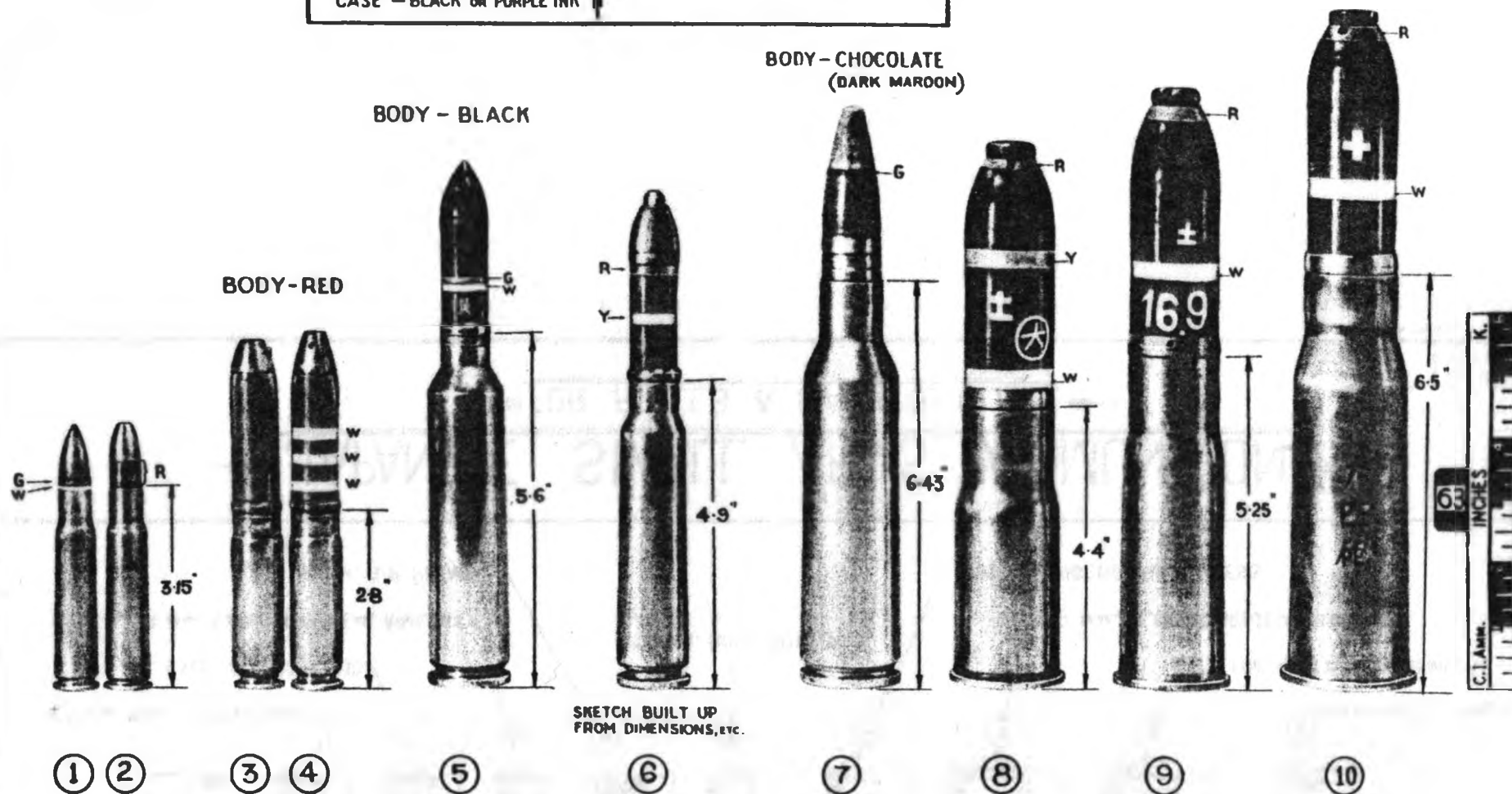
FOR RIFLES & MACHINE-GUNS.

C.I.Amm. S/986
KIRKEE JAN '45

RESTRICTED

STENCILLING
ON
SHELL - WHITE
CASE - BLACK or PURPLE INK

KEY TO COLOUR BANDS
R - RED Y - YELLOW
G - GREEN W - WHITE



JAPANESE AMMUNITION
COMPARATIVE CHART
for
12.7MM, 20MM, 25MM. & 37MM AMMUNITION.

C.I. AMM. S/1033
KURKEE MARCH '45

PLATE D

KEY TO PHOTOGRAPH OPPOSITE

(Details given refer to actual rounds shown in photograph)

Serial No.	Calibre MM.	Type of Shell.	Type of Weapon.	Complete Round.			Shell / Bullet.			Propellant.	
				Length	Weight		Length	Weight		Weight	Nature.
				Ins.	Lbs.	Ozs.	Ins.	Lbs.	Ozs.	Ozs.	
1	12.7	A. P./Tracer.	(a) 12.7-mm. Type 1, A.C. Cannon. (b) 12.7-mm. Type '89 A/C. Cannon.	4.21	...	2.92	1.75	...	1.25	0.29	Graphited tubular N. C. with diphenylamine.
2	12.7	H. E./Incendiary.	Do.	4.21	...	2.95	2	...	1.35	0.29	Graphited tubular N. C. and N. G. with carbanite.
3	20	H. E. /Tracer (Self-destroying).	20-mm. Type '90 A/C. Cannon.	5.5	...	6.8	3.1	...	...	0.46	Graphited tubular N. C. with diphenylamine.
4	20	H. E./Tracer.	Do.	5.65	...	6.8	3.25	...	4.49	0.46	Do.
5	20	A. P./Tracer.	20-mm. Type '98 A.A. A.T. machine gun.	8.4	...	15.57	3.16	...	5.55	1.03	Graphited tubular N. C. with D. N. T. and diphenylamine.
6	20	H. E./Incendiary.	20-mm. Type '97 A.T. machine gun, and its modification as an A/C. Cannon.	7.36	...	10.6	3.4	...	4.48	1.2	Graphited tubular N. C. with D. N. T. and diphenylamine.
7	25	H. E.	25-mm. Type '06 Naval A.A./A.T. gun.	9.2	1	8.27	4.54	...	8.85	3.7	Graphited tubular N. C. with D. N. T. and diphenylamine.
8	37	H. E. (nose fused).	Type Taisho 11 Infantry Gun.	8.6	1	15	5.17	1	5.0	1.85	Loosely loaded flakes of graphited N. C. with diphenylamine.
9	37	H. E. (nose fused).	Type '94 tank mounted gun.	9.46	2	2	5.17	1	6.2	2.7	Rectangular flakes of graphited N. C. and diphenylamine.
10	37	H. E. (nose fused).	Type '94 A.T. gun.	10.71	2	7.2	5.17	1	5.2	4.3	Unitubular grains of graphited N. C. and N. G. with carbanite. Contained in a silk bag. G. P. igniter.

Notes.—1. Round 6 has not been examined at Kirkee and the sketch shown has been built up from dimensions reported, and included for the sake of completeness and visual comparison.

2. The three 37-mm. rounds have been included for the same reason but are also fully dealt with in Section E under gun ammunition.

INTERCHANGEABILITY CHART

JAPANESE.	BRITISH.	AMERICAN.	GERMAN.	ITALIAN.	RUSSIAN.
6.5-mm. Semi-Rimless ...	...	...	...	6.5-mm. Rimless NOT inter- changeable.	...
7.7-mm. Semi-Rimless ...	...	...	...	...	...
Rimless ...	...	...	...	...	...
Rimmed ...	308-in. fully inter- changeable.	...	...	7.7-mm. Rimmed fully inter- changeable.	...
7.92-mm. Rimless (7.9×57) ...	7.92 BESA fully interchangeable.	...	7.9 SERVICE (1898) fully interchangeable.	...	...
8-mm. Semi-Rimless ...	...	...	...	...	...
9-mm. Rimmed ...	Interchangeable with 380-in. pistol ammunition, but see para. 13 of Text.	...	...	...	...
12.7-mm. Semi-Rimless ...	...	...	...	12.7-mm. fully interchangeable.	...
20-mm. Rimless ...	Japanese use four distinct types of 20-mm. cartridges, none of which is interchangeable with British or American, and also, so far as is known, none is interchangeable with any German, Italian or Russian 20-mm. cartridges.				
*25-mm. Rimless ...	...	...	...	...	...
30-mm. Rimless ...	...	...	30-mm. Rimless NOT inter- changeable.	...	...

* It is believed that under German control a similar, if not identical round was being manufactured by the French.

Brief Summary, for quick reference, of Weapons and Ammunition

6.5-mm. Semi-rimless Ammunition

Rifles :—

- (1) 6.5-mm. Meiji 38 (1905) Short
- (2) 6.5-mm. Meiji 38 (1905) Long (Arisaka)
- (3) 6.5-mm. Meiji 44 (1911) Cavalry Carbine
- (4) 6.5-mm. Snipers rifle, Type '97 (1937)

Light Machine Guns :—

- (5) 6.5-mm. Taisho 11 (1922) Nambu
- (6) 6.5-mm. Type '91 (1931) for Tank use
- (7) 6.5-mm. Type '96 (1936)

Heavy (Medium) Machine Guns :—

- (8) 6.5-mm. Type Taisho 3 (1914)

Serial No.	Type of Cartridge.	Markings.	Approximate length of :—			Approximate weight of Bullet/Shell fuzed (Grs.)	Notes.
			Complete Round. (Ins.)	Case (Ins.)	Bullet/Shell (Ins.)		
1	Ball.	Pink band at junction of bullet and case.	2.99	1.99	1.28	138	V Pointed bullet, flat base. Cupro-nickel or gilding metal envelope with lead alloy core. Propellant charge about 80 grains of square flaked N.C. M. V. about 2300 f. s. The cap is secured in the case by three punch stabs.
2	Tracer.	...	...	...	...	...	No details available.
3	Training (Snubnose)	...	2.12	1.99	0.23	24	For training purposes. Propellant charge only 6.2 grs. Snubnose bullet; gilding metal envelope with lead core and felt wad underneath bullet.
4	Guard.	Overlapping brown and black bands at junction of bullet and case.	2.99	1.99	1.28	55	Ball round bullet without the lead core. The lead is melted out of envelope and round reassembled. Possibly for guard use. Details are vague and the rounds are probably only a local improvisation.
5	Bullethead Blank.	Pink coloured bullet.	2.99	1.99	1.21	3.95	V Pink paper bullet similar to ball but has rounded nose. Probably used similar to our service L MK 7 bulleted blank.
6	Rifle Grenade.	...	2.97	1.99	1.29	5	V The bullet is of the same shape and size as the ball bullet but is made of solid wood.
7	Blank.	Cartridge case mouth closed by crimping.	1.93	1.93	...	...	V This is similar to our service L MK 5 blank cartridge.

7.7-mm. Rimless Ammunition.*Rifles**

(i) 7.7-mm. Type '99.

Machine Guns.

(ii) 7.7-mm. Type '97 Standard for tank use (Bren Type).

(iii) 7.7-mm. Type '99 L. M. G.

7.7-mm. Semi-rimless Ammunition.**Aircraft Machine Guns.**

(i) 7.7-mm. Type '89 free and fixed.

Heavy (Medium) Machine Gun.

(ii) 7.7-mm. Type '92 (Juki).

Serial No.	Type of Cartridge.	Markings.	Approximate length of:—			Approximate weight of Bullet/Shell fused (Grs.)	Notes.
			Complete round. (Ins.)	Case. (Ins.)	Bullet/Shell. (Ins.)		
7.7-mm. RIMLESS							
1	Ball	... Pink band at junction of bullet and case.	3.14	2.27	1.27	181	V Pointed bullet, flat based. Gilding metal envelope with lead alloy core. Cap secured by ringing in.
2	A. P.	... Black band at junction of bullet and case.	3.14	2.27	...	...	Streamlined base; chromium steel core in brass envelope.
3	Tracer	... Green band at junction of bullet and case.	3.14	2.27	...	...	Cupro-nickel envelope, flat base. Tracing composition in copper tube.
4	Rifle Grenade	... Nil. ...	3.14	2.27	1.17	5	V Solid wooden bullet, unpainted.
7.7-mm. SEMI-RIMLESS							
5	Ball	... Pink band at junction of bullet and case.	3.14	2.27	1.89	203	V Pointed bullet; flat base, gilding metal envelope, with lead alloy core.
6	A. P.	... (a) Black band at junction of bullet and case. (b) Black band as above, tip of bullet painted violet. (c) Black band as above, tip of bullet painted red. (d) Annulus lacquered black.	3.14	2.27	1.45	162	V Pointed bullet; flat base, brass envelope with hardened steel core.

Serial No.	Type of Cartridge.	Markings.	Approximate length of:—			Approximate weight of Bullet/Shell fuzed (Grs.)	Notes.
			Complete round. (Ins.)	Case. (Ins.)	Bullet/Shell. (Ins.)		
7	7.7-mm. SEMI-RIM-LESS—contd. Tracer	Green band at junction of bullet and case.	3.14	2.27	1.49	155	V Pointed bullet; flat base, cupro-nickel envelope with lead alloy point. Tracing composition in copper tube.
8	Incendiary	(a) Pink band at junction of bullet and case. (b) Pink band as above, and tip of bullet painted red. (c) Pink band as above, and tip of bullet painted violet.	3.13	2.27	1.49	162	V Pointed bullet, flat base, cupro-nickel envelope, with white phosphorus filling in the tip and closed by a lead cored cupro-nickel fluted plug. Envelope has a fuzible lead plug. Somewhat similar bullet to the British Service B, Mk. 4 Incendiary.
9	Explosive	Dark purple band at junction of bullet and case. The nose of the bullet may have a purple spot painted on the flat top.	3.08	2.27	1.49	162	V Truncated tip, flat base, gilding metal envelope, the nose of which is filled with P. E. T. N., R. D. X. and wax. Behind this is a copper or brass cone filled with similar explosive. The bullet is closed by a lead plug. On impact the cone sets forward to initiate the filling.

* The 7.7-mm. Rimless ammunition can be fired from Type '92 (Juki) H. M. G.

7.7-mm. Rimmed Ammunition.Aircraft Machine Guns:—

- (1) 7.7-mm. Type '92 (Lewis Type).
 (2) 7.7-mm. Type '97 (Vickers Type).

These weapons, suitably adapted are also used in a ground role.

7.92-mm. Rimless Ammunition.Aircraft Machine Guns:—

- (1) 7.92-mm. Type '98.
 (2) 7.92-mm. Type '00 (Twin Gun).
 (3) 7.92-mm. Type '01.

8-mm. Semi-Rimless Ammunition.Pistols:—

- (1) 8 round semi automatic Nambu pistol.
 (2) 8 round semi automatic pistol Type Taisho 14.
 (3) 6 round semi automatic pistol Type '94.

Machine Carbine (Solothurn)
 Type '00.

9-mm. Rimmed Ammunition.Revolvers:—

- 9-mm. 6 round pistol revolver
 Type Meiji 26.

Serial No.	Type of Cartridge.	Markings.	Approximate length of:—			Approximate weight of Bullet/Shell fuzed (Grs.)	Notes.
			Complete Round (Ins.)	Case (Ins.)	Bullet/Shell (Ins.)		
7.7-MM. RIMMED							
1	Ball	Annulus lacquered black	3.02	2.21	1.28	173.6	V Pointed bullet, flat base, cupro-nickel envelope with lead alloy core and aluminium tip.
2	A. P.	Annulus lacquered white	3.07	2.21	1.4	173.6	V Pointed bullet, flat base, cupro-nickel envelope with steel core and lead jacket.
3	Incendiary	Annulus lacquered green	3.05	2.21	1.4	133.2	V See Notes for 7.7-mm. semi-rimless incendiary round.
4	Tracer	Annulus lacquered pink	3.05	2.21	1.4	130.4	V Pointed bullet, flat base, cupro-nickel envelope with lead point and tracing composition in copper tube.
5	Explosive	Annulus lacquered purple	3	2.21	1.32	...	Similar to 7.7-mm. semi-rimless explosive cartridge.

Serial No.	Type of Cartridge.	Markings.	Approximate length of:—			Approximate weight of Bullet/Shell fused (Grs.)	Notes.
			Complete Round (Ins.)	Case (Ins.)	Bullet/Shell (Ins.)		
6	7.92-MM. RIMLESS Ball	Pink band at junction of bullet and case. Some cartridges were found with base markings.	3.15	2.21	1.43	180	V Pointed bullet, streamlined base, gilding metal envelope, with lead alloy core. Cartridges with base markings are believed to be of German manufacture. Cap secured by 3 stabs or in some cases by pressing in. Propellant about 46 grains of N.C. flakes.
7	A. P.	Black band at junction of bullet and case.	3.16	2.21	1.45	182	V Pointed bullet, streamlined base, gilding metal envelope with steel core in lead jacket.
8	Incendiary	(a) Pink band at junction of bullet and case. (b) Bullet completely black; has base markings. Annulus lacquered black. (c) Pink band at junction of bullet and case and violet tip. (d) Same as above but with light blue tip.	3.15 3.15	2.21 2.21	1.45 1.38	182 182	V Pointed bullet, streamlined base. cupro nickel or gilding metal envelope filled to half the length from the tip with white phosphorus. Fusible lead plug in wall of envelope, which gives smoke trace. Sometimes called incendiary/tracer. Item (b) is of German manufacture. Similar to British Service B Mk 4. In addition to types (a), (b), (c) and (d), some rounds examined at Kirkee had the bullet tip painted dark blue, with a pink band at junction of bullet and case.
9	8-MM. SEMI-RIMLESS Ball	No markings	2.25	.840	.59	102	V Round nose bullet, flat base, cupro-nickel envelope with lead core. Cap secured by pressing in.
10	9-MM. RIMMED Ball	No markings	1.19	.85	.632	150	V Lead alloy bullet, (unjacketed) rounded at nose, flat based. Cartridge case rimmed and mouth coned on bullet. Cap pressed in.

12.7-mm. Semi-Rimless Ammunition.Aircraft Cannons:—

(1) 12.7-mm. Type '01.

(2) 12.7-mm. Type '89.

13-mm. Rimless Ammunition.Heavy Machine Guns:—

(1) 13-mm. Single or twin mount Type '92, for A.A. and A.T. use.

(2) 13-mm. Single or twin mount Type '93, for A.A. and A.T. use.

Serial No.	Type of Cartridge.	Markings.	Approximate length of:—			Approximate weight of Bullet/Shell fuzed	NOTES.
			Complete round (Ins.)	Case. (Ins.)	Bullet/Shell. (Ins.)		
1	12.7-MM. SEMI-RIMLESS. A.P.	Tip painted black	4.5	3.18	2.27	1.35	V Pointed bullet, streamlined base. Gilding metal envelope with lead tip and hardened steel core. Cartridge of Italian manufacture.
		(a) Green and white bands at junction of bullet and case. (b) Blank band only	4.21 4.21	3.18 3.18	1.75 1.75	1.25 1.25	V Pointed bullet, streamlined base. Gilding metal or brass envelope with steel core and lead tip. Steel core recessed to contain tracing composition which is contained in a copper tube closed by a brass washer. Japanese manufacture. (a) gives a white trace and (b) gives a red trace.
3	H.E./Incendiary	(a) Shell painted red. Has base markings. Letter 'J' stamped on the fuze body.	4.21	3.18	2	1.35	V The round is of Italian manufacture, with a direct action nose fuze. Striker held safe by centrifugal segments kept in position by spring. Nose truncated. Shell filling P. E. T. N. and Incendiary composition.
		(b) Shell painted blue. Other details as above.	4.21	3.18	2	1.3	V Italian manufacture. Shell filled P. E. T. N. and incendiary composition. Fitted with fuze as above.
		(c) White band at junction of bullet and case.	4.15	3.18	1.88	1.21	Japanese manufacture. Shell as above but filled with R. D. N. and a different type of incendiary composition. Fuze is similar but of slightly different design.

Serial No.	Type of Cartridge.	Markings.	Approximate length of:—			Approximate weight of Bullet/Shell fuzed (Ozs.)	NOTES.
			Complete round. (Ins.)	Case. (Ins.)	Bullet/Shell. (Ins.)		
4	12.7-MM. SEMI-RIMLESS — <i>contd.</i> H.E./Incendiary (Fuzeless)	Dark purple band at junction of bullet and case.	4.15	3.18	2	1.16	V Fuzeless shell. Truncated nose portion secured to body by screwthreads. In nose is filling of P.E.T.N./R.D.X. behind which is a hollow brass cone containing the same filling. Below this is a perforated diaphragm closing the body of the shell which is filled with an incendiary/flash composition.
5	13-MM. RIMLESS Ball	Annulus lacquered black	5.36	3.9	2.42	1.82	In some reports this ammunition and the equipment is referred to as 13.2-mm. The propellant consists of graphited tubular N.C. weighing 231 grains. Cap is secured by ring punching. No details of shell are yet available.
6	Tracer	Annulus lacquered red.	5.36	3.9	2.42	1.7	
7	A.P.	Annulus lacquered white	5.36	3.9	2.42	1.8	
8	A.P./Tracer	...	...	...	...	...	
9	H.E.	...	...	...	...	...	
10	Incendiary	...	...	...	...	...	
11	Practice	...	...	...	...	...	

Type '99 A/c Cannon

Serial No.	Type of Cartridge	Markings.	Approximate Length.			Weight of Bullet/Shell fuze (Ozs.)	Notes.
			Complete Round (Ins.)	Case (Ins.)	Bullet/Shell with fuze (Ins.)		
1	H.E.	(a) Shell painted dark brown.	5·65	2·8	3·25	4·4	V (a) Percussion type fuze having a centrifugal fork holding the striker, (long type). The H.E. filling consists of 157 grains of P.E.T.N./T.N.T. (40 : 60). (b) Fuze as for above, but <i>gaine is slightly longer</i> . The shell is identical to that of the H.E. round painted dark brown, but the cavity of (b) is tapering slightly whereas in (a) it is almost cylindrical.
		(b) Shell painted orange yellow.	5·65	2·8	2·25	4·4	
2	H.E. Tracer.	(a) Shell painted red with one white band.	5·50	2·8	3·1	4·5	V (a) Fuze as for the H.E. round but shorter in length. The shell has two compartments, the upper holding the H.E. filling (87·4 grains of pento lite) and the lower, tracer composition. V (b) Percussion fuze, rotary type, other detail, same as (a).
		(b) Shell painted red with three white bands.	5·65	2·8	3·25	4·49	
3	H.E. Incendiary.	(a) Shell painted greenish yellow.	5·65	2·8	3·25	...	(a) Percussion fuze, rotary type.
		(b) As above but with one white band.	5·65	2·8	3·25	4·53	(b) Percussion fuze, rotary type. Shell similar to that for item 1 (a) but has lesser quantity of H.E. filling. Incendiary composition consists of white phosphorus and is contained in an aluminium capsule surrounded by a small quantity of pyrotechnic composition.
		(c) As above, but with two white bands.	5·62	2·8	3·25	4·46	V (c) Strikerless percussion fuze. Shell identical with 3 (b).
		(d) As above, but with three white bands.	5·68	2·8	3·25	4·44	V (d) Percussion fuze, rotary type. Shell similar to 3 (b).

Serial No.	Type of Cartridge.	Markings.	Approximate Length.			Weight of Bullet/Shell fuze	Notes.
			Complete Round (Ins.)	Case (Ins.)	Bullet/Shell with fuze (Ins.)		
4	H.E. Tracer, Self-destroying.	Shell painted red.	5.5	2.8	3.1	...	The shell is fuze as for item 2 (a), and has a self-destroying charge, consisting of G.P. pellets, housed in the H.E. filling.
5	A.P.	Shell painted black.	5.6	2.6	...	...	Usual A.P. design—pointed nose.
6	Bag burster tracer.	Shell painted red.	5.6	2.8	...	...	The projectile has a long hollow cavity for tracer composition above which is a priming charge. Blunt nose.
7	Training, ball round.	Shell painted black.	5.6	2.8	...	...	Hollow steel projectile of the same weight and shape as the fuze ones. Hollow cavity closed by a metal plug.

NOTE—The coloured band, shell and fuze combinations reported above are as found during critical examinations at this Inspectorate. It does not necessarily follow that this exact combination is to be expected in every case. The intention of the coloured band markings is not fully understood; they may refer to the use intended for the round, or the filling, or a combination of fuze and filling.

20-mm. Rimless Ammunition (4.9" case).20-mm. Rimless Ammunition (5.6" case).25-mm. Rimless Ammunition.

20-mm. Type '97 A.T./M.G.
(sometimes termed A. T. Rifle).
And its modification as an aircraft cannon.

20-mm. Type '98 A.A./A.T. Machine Gun.

25-mm. Type '96 Naval A.A./A.T. Gun.

Serial No.	Type of Cartridge.	Markings.	Approximate length of:—			Approximate weight of Bullet/Shell fuze (Ozs.)	NOTES.
			Complete round. (Ins.)	Case (Ins.)	Bullet/Shell (Ins.)		
1	20-MM. RIMLESS (4.9-IN CASE) H. E. Incendiary	... Shell painted black with a yellow band in the middle and red band on the shoulder.	7.36	4.9	3.4	4.48	The shell is reported to be fitted with a D. A. type nose fuze having a centrifugal bolt and shutter. The lower half of the projectile is filled with incendiary composition (barium nitrate etc.) while the upper half is filled with R. D. X. The propellant charge is 556 grains of graphited N. C.
2	20-MM. RIMLESS (5.6-IN CASE) H. E. Tracer	... Shell painted black with red and yellow band on shoulder and white band over driving band.	8.56	5.6	3.2	4.54	Shell fuze as above, H. E. filling consists of R. D. X. Has a tracer cavity in the base closed by a perforated base plate. The propellant charge consists of 910 grains of graphited N. C.
3	H. E. Tracer (Self Destroying).	Shell painted black with red band on shoulder and green and yellow band above driving band.	8.2	5.6	3.23	4.7	V The fuze for this shell has only a centrifugal bolt supporting the striker. The shell has two compartments. The bottom compartment filled with tracer composition and top one H. E. filling. The partition has a recess to hold a self-destroying detonator.
4	H. E. Incendiary	... Painted black and a red band above driving band.	8.34	5.6	3.32	3.85	No fuze. Fitted with a screwed nose piece similar in shape to a fuze. The whole cavity in the projectile filled with H. E. filling and nose piece with incendiary composition.

Serial No.	Type of Cartridge.	Markings.	Approximate length of:—			Approximate weight of Bullet/Shell fused (Ozs.)	NOTES.
			Complete round (Ins.)	Case (Ins.)	Bullet/Shell (Ins.)		
5	20-MM. RIMLESS (5-6-IN CASE)— <i>contd.</i> A. P. Tracer	Shell painted black with green and white band above driving band.	8.35	5.6	3.16	5.5	V Pointed shell. Has a small cavity in the rear holding the tracer composition. Cavity closed by a perforated steel screwed plug.
6	Practice	Nil.	8.31	5.6	3.4	.2	V Wooden bullet, unpainted.
7	25-MM. RIMLESS H. E.	Shell painted dark maroon with 0.16" green band at the mouth.	9.2	6.43	4.54	8.85	V Nose fuze, D. A. type; having centrifugal bolt and shutter. The shell is streamlined at the base and has two driving bands. H. E. filling consists of 257 grains of T. N. T./Aluminium.
8	H. E./Tracer	(a) Shell painted orange with a 0.16" green band at the mouth. (b) As above, but the colour of the body is nearer red than orange.	9.2 "	6.43 "	4.35 "	8.59 "	V Shell body and fuze, same as item (7) above. The shell has two compartments, upper filled with 145 grains of T. N. T./Aluminium and the lower with 135.83 grains of tracing and priming composition.
9	H. E./Tracer (Self Destroying).	Shell painted red (believed to have a green band).	9.2	6.43	4.3	...	Fuze same as item (7) above. The shell in construction resembles H. E./Tracer having orange coloured body. This has a self-destroying element consisting of gun powder pellets.
10	H. E./Incendiary	Shell body painted green.	9.2	6.43	4.5	...	Fuze same as item (7) above. Shell in construction is similar to the H. E. shell. Has 87.9 grains of H. E. filling (T. N. T./Aluminium) and 208 grains of incendiary composition which is white phosphorus.

NOTE—Projectiles for 20-mm. Rimless ammunition for Type '97 A. T. M. G. and 20-mm. Ammunition for Type '98 A. A./A. T. M. G. appear to be fully interchangeable. Cartridges of course are not interchangeable.

20-mm. Rimless (3·7-in case)**Type Ho 5, 20-mm. A.C. Cannon (Browning Mechanism)**

Serial No.	Type of Cartridge.	Markings.	Approximate Length.			Weight of Bullet/Shell fuzed. (Ozs.)	Notes.
			Complete round (Ins.)	Case (Ins.)	Bullet/Shell with fuze (Ins.)		
1	A. P. Tracer.	A. P. Shot painted black. Green band on body.	5·8	3·7	2·48	4·18	Solid steel shot with a tracer cavity filled with a red tracing composition, topped with the usual priming composition, which consists of:— Barium peroxide, Magnesium powder, Iron, Aluminium oxides and wax, The Tracer composition consists of:— Aluminium powder, Strontium nitrate, Magnesium powder and wax, and is covered by a blue silk disc. This is held in position by a screwed perforated steel plug.
2	" "	A. P. Shot painted black, White and green bands on body.	5·8	3·7	2·48	4·16	The projectile is the same as above, but has white tracer. Priming composition consists of:— Barium peroxide, Potassium nitrate, magnesium powder and wax, and the tracer composition consists of:— Potassium nitrate, Aluminium powder, Magnesium powder and wax.
3	H. E. Incendiary.	Shell painted black with a screwed brass nose piece resembling a fuze.	5·8	3·7	2·55	2·91	Shell consists of a steel body with a solid base, containing incendiary composition. A hollow brass nose piece screws into the nose of the shell. Externally the nose piece resembles a fuze, but is actually hollow and filled with R. D. X. and P. E. T. N. The incendiary filling in the shell body consists of:— Barium nitrate, Aluminium Powder, Magnesium Powder and wax.

NOTE.—The propellant charge in all the three cases is the same; about 300 grains of graphited cords of N. C. with diphenylamine and D. N. T. as stabiliser.

THIS LEAFLET MUST NOT
FALL INTO ENEMY HANDS

D. OF A. (INDIA)

JAPANESE AMMUNITION LEAFLETS

SECTION B.

LEAFLET B 9.

JAPANESE PISTOL AND MACHINE CARBINE AMMUNITION.

GENERAL.

Although reports have mentioned calibres of 7-mm., 7.62-mm. etc. for pistols and machine carbines only two calibres of ammunition are believed to be standard and in general use in Japanese revolvers, S.L. pistols and machine carbines. Both these cartridges have been examined at Kirkee and this Leaflet is intended to give a detailed description of them.

- (a) A semi-rimless 8-mm. Cartridge for use in S.L. (semi-automatic) pistols and machine carbines.
- (b) A 9-mm. rimmed cartridge for use in pistol revolvers.

2. Before describing these cartridges it will be useful to mention briefly the various weapons in which they are used.

3. The 8-mm. (Nambu) semi-rimless cartridge is used in :—

(a) 8-mm. S.L. (semi-automatic) pistol, Nambu Type :—

This is named after its designer, Colonel Kijiro Nambu. Although it resembles the German Luger pistol it is of Japanese origin and the mechanism is different. This was formerly the standard pistol of the Japanese Army but was superseded by the 14th Year Type (Taisho 14) (1926). The Nambu pistol weighs about 2-lbs. and has an eight round box magazine in butt grip. The muzzle velocity is of the order of 950 f. s.

(b) 8-mm. S.L. (semi-automatic) Pistol Type Taisho 14, (1926) :—

This weapon supersedes the Nambu type pistol and although in appearance it resembles the German Luger its mechanism follows the lines of the German Mauser and the Italian Glisenti military semi-automatic pistols. It weighs about 2.2-lbs. and has an eight round box magazine in the butt grip. The muzzle velocity is the same as for the Nambu type pistol.

(c) 8-mm. S.L. (semi-automatic) Pistol, Type '94 (1934) :—

This is a latest design of Japanese pistol and is much lighter than previous designs weighing only 23 3/4-ozs. with the magazine empty, and 26-ozs. with the magazine filled. The barrel is slightly shorter and for this reason the Muzzle Velocity is slightly less, of the order of 900 f. s. The box type magazine in the butt grip holds six rounds.

(d) 8-mm. Machine Carbine Type '00 or 100 (1940) :—

This is a light blow back air-cooled automatic carbine, which appears to be issued in two types. One type has a one piece stock and fore-end while the other has a folding stock for use by paratroops. The latter is provided with a light bipod similar to that used on the Finnish Suomi carbine. The muzzle velocity is reported to be of the order of 1100 f. s.

4. The 9-mm. cartridge is a very old type and so far as is known is used only in the 9-mm. pistol revolver Type Meiji 26 (1893). This weapon is a copy of the old American .45 Schofield Smith and Wessen revolver and in appearance is very much like the British Service (Webley revolver) having the same type of top breakdown frame, extraction, ejection, and double action trigger mechanism. The weapon is, however, very crude compared to the British Service No. 1 or No. 2 pistols, and in pistols examined here there was no positive method of aligning or locking cylinder at time of firing. The weight of the revolver is 2½-lbs. and the cylinder accommodates 6 rounds. The muzzle velocity is reported to be of the order of 520 f. s.

DESCRIPTION.**8-mm. (NAMBU) SEMI-RIMLESS CARTRIDGE.**

5. This cartridge with its bottle-necked semi-rimless case of an unusual design is not used by any other country. It resembles generally the 7.65-mm. (.30-in.) Luger cartridge, but is considerably larger with a slightly heavier bullet. The general appearance of this cartridge and the details of construction are given in the Plate. The round follows orthodox practice, the case being made of solid drawn cartridge brass with a semi-rimless base. At the mouth the case is necked down more than is usual with cartridges of this nature, this giving it a bottle neck appearance. The percussion cap is of brass and is a Berdan type secured in the case by pressing in. No base or other markings are used.

The bullet is full jacketed with a lead alloy core and a cupronickel envelope, the weight being 100 grains. The propellant charge consists of about 4.6 grains of small pillow-shaped N.C. grains which fill the case to capacity. These are of two distinct colours, one being ash coloured and the other pale yellow. Details of this propellant are given under Summary of Data below. The velocity of this cartridge is of the order of 1000 f.s. in a short barrelled pistol and up to nearly 1100 in the longer barrelled machine carbine.

9-mm. RIMMED CARTRIDGE.

6. This cartridge is very similar to the .38-in. Smith and Wessen revolver cartridge, but the case is approximately .1-in. longer. Its manufacture follows orthodox practice, a solid drawn case with a Berdan type percussion cap made of brass, which is secured in the case by pressing in. It has a solid lead unjacketed bullet weighing 150 grs. with a propellant charge of about 3 grains of a smaller greenish grey pillow-shaped N.C. powder, which fills the case up to about one-third capacity. The bullet is seated in the case over a mill-board cup shaped wad. The general construction of this cartridge will be clear from the Plate. No base or other markings are used.

PACKING.

7. 8-mm. No details of packing are available at present.

8. 9-mm. Fifty rounds are packed in a cardboard carton measuring 4-ins. x 2-ins. x 1½-ins. A white paper label printed in black is pasted on the carton to indicate the type of revolver, nature and quantity of contents. The inspection mark is in the centre of the label. Details of this carton are shown in the Plate.

IDENTIFICATION.

9. The 8-mm. and 9-mm. rounds are readily identified by their sizes and appearances shown clearly in the Plate.

SUMMARY OF DATA.

10.

Complete round

Length overall
Weight

8-mm.

1.24-ins.
159-grs.

9-mm.

1.19-ins.
203-grs.

Bullet.

Type

Jacketed ball ; lead alloy
core in cupronickel
envelope.

Unjacketed ball ; lead alloy
bullet.

Length
Diameter
Weight

0.59-ins.
0.32-ins.
100-grs.

0.632-ins.
0.354-ins.
150-grs.

Cartridge Case.

Type
Material
Length
Diameter over rim
Weight

Semi-rimless
Solid drawn brass
0.84-ins.
0.413-ins.
52-grs.

Rimmed
Solid drawn brass
0.85-ins.
0.43-ins.
50-grs.

Propellant.

Weight
Composition

8-mm.

4.63-grs.
N.C. 95.2 %
Diphenyl-
lamine 4.8%
0.05-in. x 0.05-in.
x 0.04 in.

9-mm.

2.9-grs.
N.C. 96%
Diphenyl-
lamine 4%
0.07-in. x 0.07-in.
x 0.03 in.

Percussion Cap.

Type

Berdan

Berdan (similar to British
S.A.A. Cartridge)

Material
Diameter
Weight cap filled
Weight of cap composition

Brass
0.179-in.
1.69-grs.
0.12 grs.

Brass
0.19-in.
1.67-grs.
0.5-grs.

HANDLING AND TRANSPORT.

(Of Ammunition by Ordnance)

11. No special points. Treat as for similar British types.

EXPLOSION/FIRE RISK

8-mm. .. 5½-ozs.)
9-mm. .. 3½-oz.)

per 1000
rounds.

GROUP CLASSIFICATION

.. VI, Category X.

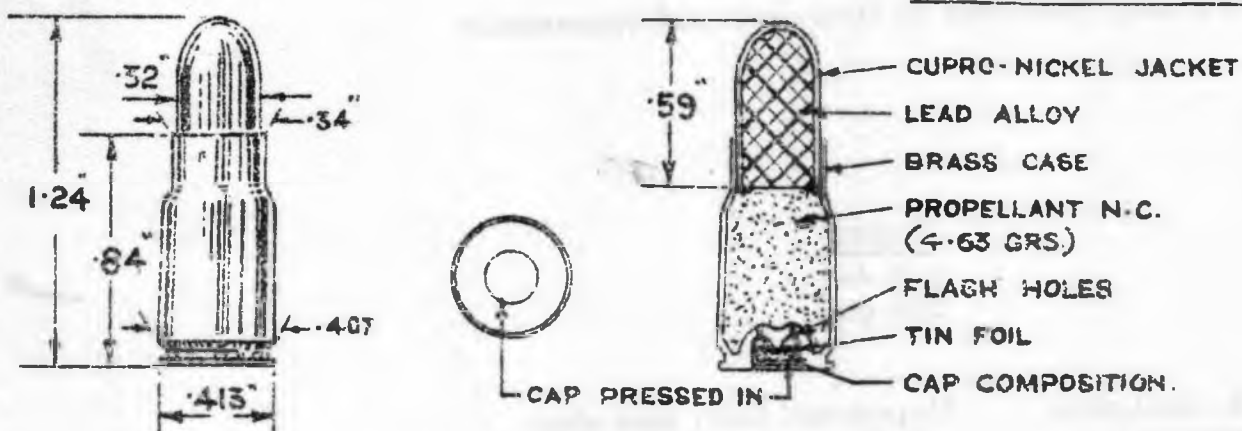
CLASSIFICATION FOR SEA TRANSPORT

.. O.A.S.

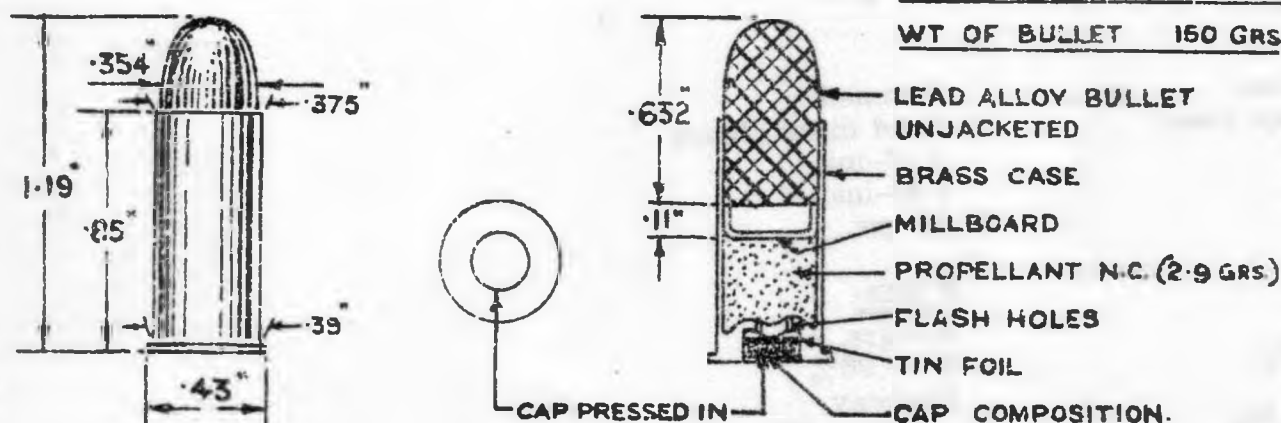
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WT. OF COMPLETE ROUND 189 GRS.

WT OF BULLET 100 GRS.



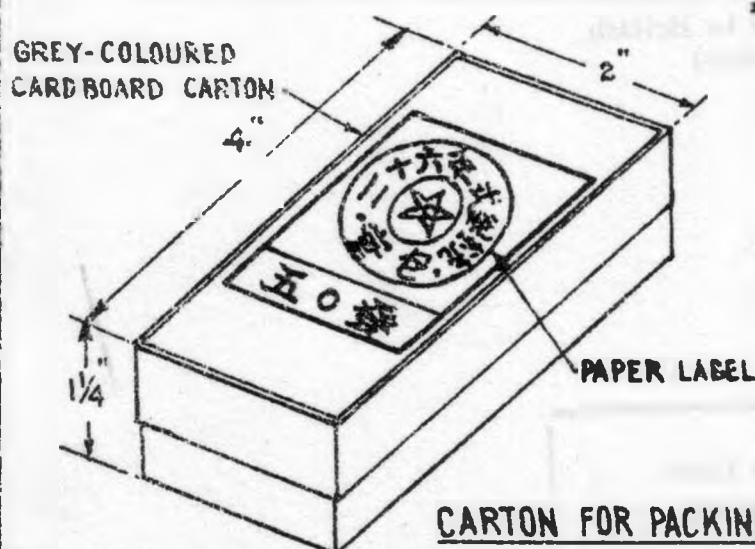
CARTRIDGE, S. A., BALL 8 MM. NAMBU SEMI-RIMLESS.



WT. OF COMPLETE ROUND 203 GRS.

WT OF BULLET 150 GRS.

CARTRIDGE, S. A., BALL, (S & W TYPE) 9 MM. RIMMED.



二十六年式拳銃弾

26 YEAR TYPE PISTOL

實包

BALL AMMUNITION

五〇發

50 ROUNDS



INSPECTION MARK, TOKYO ARSENAL.

CARTON FOR PACKING 50 ROUNDS, 9 MM. BALL CARTRIDGES.

PISTOL & MACHINE CARBINE AMMUNITION.

C.I.AMM. 5/1224
KIRKEE, AUG. 45

**THIS LEAFLET MUST NOT
FALL INTO ENEMY HANDS**

D. OF A. (INDIA)

SECTION B

JAPANESE AMMUNITION LEAFLETS

LEAFLET B 11

AMMUNITION FOR 13-mm. TYPE 2 AND 13.2-mm. TYPE 3 MACHINE GUNS

The following American Report* with slight alterations to suit printing facilities is reproduced.

*M. E. I. U. No. R 137,
dated 22-3-45.
Received in Kirkee
on 28-4-45.

When actual ammunition is received, a more detailed J. A. L. will be issued if necessary. None of this ammunition has been received at Kirkee and so far as is known this calibre has not yet been used in the Burma theatre.

"Ammunition for two types of 13 mm. Naval machine guns was recovered on Clark Field, Luzon. One type of ammunition is exactly 13 mm. and is an entirely new type. The other is 13.2 mm. and similar to known ammunition for the Type 93 A.A. gun. The 13 mm. is labelled for a Type 2, the 13.2 mm. for a Type 3 gun. There is documentary evidence of a Type 2 flexible and a Type 3 fixed aircraft machine gun. Neither have yet been recovered.

AMMUNITION FOR TYPE 2 GUN (13 mm.)

Documentary data on this gun is as follows:—

Muzzle Velocity	... 2640 ft/sec.
Rate of fire	... 900 rds/min.
Weight	... 37.6 lbs.

The ammunition recovered is tracer, H.E.—tracer, and incendiary. The last two rounds are fuzed; the tracer has a dummy fuze.

Projectiles

1. All projectiles are fixed in the cases by three crimps at the cannellure, the junction is coated with a clear lacquer. Exterior dimensions are the same. Each has a smooth rotating band with a forward slope. The ogive starts at the bourrelet and is completed by the fuze.

(a) TRACER PROJECTILE

This projectile has a dummy hollow fuze and an empty forward cavity. The base cavity is filled with yellow tracer compound. Burning time is 4-1/2 seconds.

(b) H. E.-TRACER PROJECTILE

This projectile has a fuze and gaine. Below the gaine the forward cavity is filled with pentolite. The base cavity contains yellow tracer.

(c) INCENDIARY PROJECTILE

The entire explosive cavity below the gaine is filled with a canister containing cast white phosphorus. This is similar in shape to the cannister used in the 25 mm. incendiary round. The gaine presumably is sufficient to crack the case and cannister thus igniting the phosphorus.

PROJECTILE DATA

Overall length without fuze	... 1.583 ins.
Diameter at bourrelet	512 „
Diameter of body	512 „
Diameter of rotating band lip	535 „
Wall thickness of body	094 „
Distance from bourrelet to nose	402 „
Distance from band to base	394 „
Width of band	197 „
Weight of projectile empty:—	
Tracer	... 419.8 grains.
H. E. Tracer	... 379.6 „
Incendiary	... 375.0 „
Weight of fillings:—	
Tracer, tracer charge	... 12.4 „
H. E. Tracer, H. E. Charge	... 23.1 „
Incendiary, incendiary charge	... 38.6 „
Threads of fuze pocket:—	
Per inch	... 32 U. S. std.
Outside diameter of threads	346 ins.
length of threaded portion	283 „

Case and Propellant

2. The case is brass of the reduced rim type similar to the Type 99, 20 mm. ammunition. The primer is identical to the primer used in that case. (Usual Berdan Type S. A. A. Cap.). The propellant is graphited fine cylindrical grains of smokeless powder. Analysis was not available.

CASE DATA

Weight of case	... 492.2 grains.
Weight of propellant	... 114.2 „
Length overall	... 2.480 ins.
Length of neck	472 „
Length of body	... 1.772 „
Length of base	236 „
Exterior diameter of neck	343 „
Exterior diameter of upper shoulder	441 „
Exterior diameter of lower shoulder	709 „
Exterior diameter of extractor groove	551 „
Exterior diameter of base	673 „

Fuze

3. The fuze is an air column type. It is made in one piece of brass. The gaine is a light alloy and threads into the fuze with a right hand thread. It contains a primer over a lead azide core imbedded in PETN. On impact the nose crushes the closing disc compressing the air in the column and producing enough heat and pressure to detonate the primer.

FUZE DATA

Weight of fuze complete	... 61.7 grains.
Weight of gaine complete	... 12.4 „
Weight of explosive	... 6.2 „

Color and Markings

4. The projectiles follow the color code of the Type 99 20 mm. aircraft ammunition without the system of white bands. The tracer round is red, the H. E.—tracer red with a 5.0 mm. brown band immediately forward of rotating band, and the incendiary round yellow. The dummy fuze in the tracer is red too. The fuzes are unpainted except for the closing disc which is red. There are no markings on the fuze, projectile, or case. The primers are sealed with black lacquer in all rounds, but this is without significance as to type of round.

AMMUNITION FOR THE TYPE 3 GUN (13.2 mm.)

According to documents this is a fixed A. C. M. G. representing a modification of U. S.-M2.50 calibre Browning A. C. M. G. statistics are:—

Muzzle velocity	... 2,600 ft/sec.
Rate of fire	... 800 rds/min.

The ammunition appears to be the same design as the ammunition for the type 93 A. A. gun. The rounds recovered are tracer-ball, A. P., and H. E. I. All are fuzeless. The A. P. and tracer-ball projectile appear identical with the projectiles for the Type 93 gun.

Projectiles

1. The projectiles are of the copper-jacketed type. They have a long ogive, a relatively shallow single cannellure and a boat-tailed base. The case is secured by three short crimps.

(a) TRACER-BALL

This projectile has a mild-steel core drilled at the base for the tracer. The tracer cavity is not filled flush with the base. It has an 8-second orange tracer.

(b) A. P.

This consists of a hardened steel core with a specially hardened point and a lead cap.

(c) H. E. I.

This round has a slightly flattened tip. Immediately aft of this is a charge of PETN. A copper section separates this from an incendiary charge of dark grey metallic powder. The base has a core of mild steel filled with lead.

PROJECTILE DATA:

Overall length:—

Tracer-ball	... 2.441 inches.
A. P.	... 2.284 „
H. E. I.	... 2.441 „
Maximum diameter	520 „
Distance from maximum diameter to base	422 „
Weight of projectile empty:—	
Tracer-ball	... 691.4 grains.
A. P.	... 799.4 „
H. E. I.	... 683.7 „

Weight of fillings:—

Tracer	...	3.09 grains.
H. E. I.:—		
PETN	...	10.8 „
Incendiary mixture	...	24.7 „

Case and Propellant

2. The case is rimless brass. The primer is the same as that used in the 13 mm. case. The propellant consists of small graphited cylindrical grains, larger than the 13 mm. propellant.

CASE DATA

Weight of case	...	814.9 grains.
Weight of propellant	...	200.6 „
Length overall	...	3.898 ins.
Length of neck	...	.787 „
Length of body	...	2.855 „
Length of base	...	.256 „
Exterior diameter of neck	...	.571 „
Exterior diameter of upper shoulder	...	.729 „
Exterior diameter of lower shoulder	...	.887 „
Exterior diameter of extractor groove	...	.669 „
Exterior diameter of base	...	.795 „

Color and Markings

3. The only color marking is the color of the lacquer used to seal the primer. The regular aircraft ammunition code is used.

Tracer-ball	...	Red (designated tracer by the Japanese).
A. P.	...	White.
H. E. I.	...	Yellow (designated incendiary by the Japanese).

There are no other markings''.

NOTE BY C. I. AMN., KIRKEE

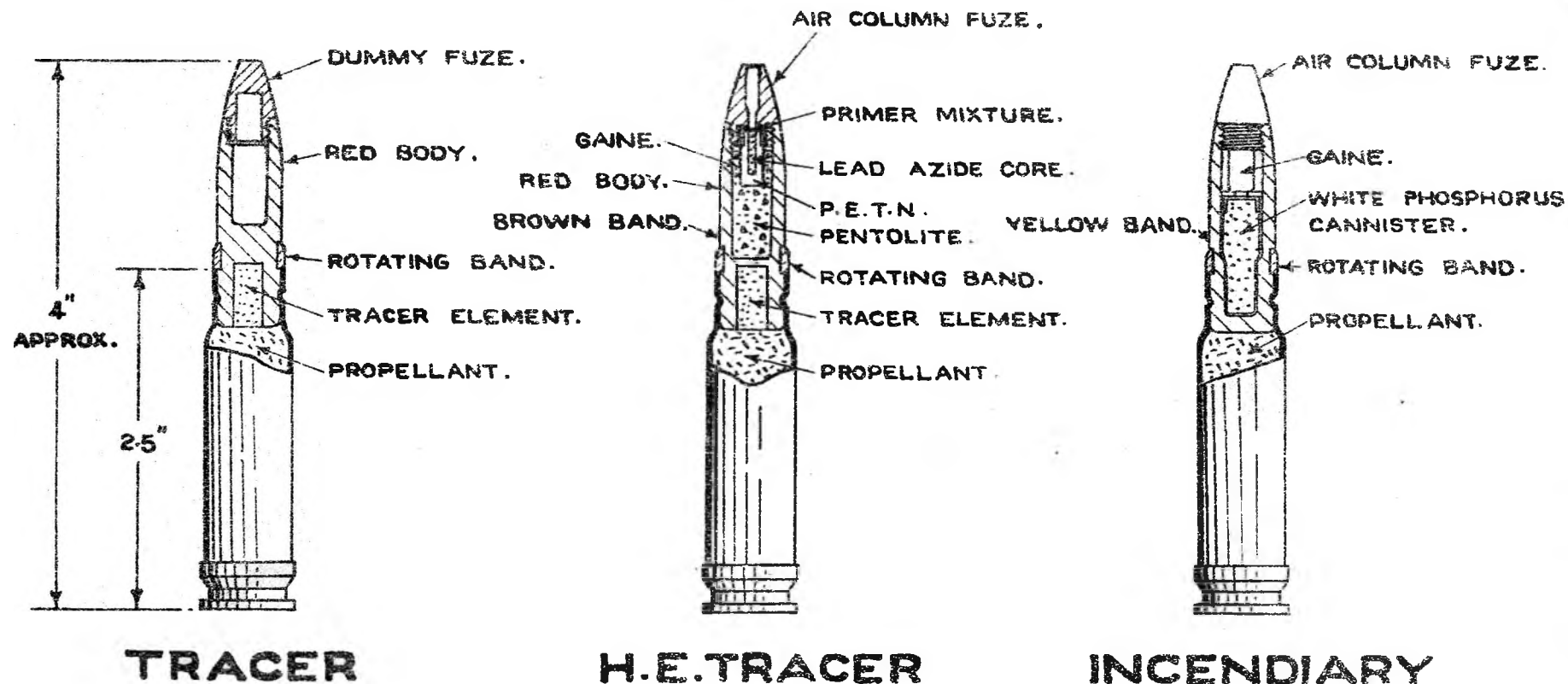
This report clarifies the position considerably in regard to 13-mm. and 13.2-mm. ammunition, see J. A. L. B. 1, para. 16 and sheet 4 of Summary. It seems clear now:—

(a) That the Type '93 A.A./A.T. gun and its ammunition is known as 13.2-mm., similar 13.2-mm. ammunition described in the report above being used in the Type 3 Machine Gun.

(b) An entirely different size of cartridge being used in the Type 2 A. C. Machine Gun and known as 13-mm. This is a new type of ammunition with a belted cartridge, of which we have had no definite information previously.

(c) That the type 3 Gun may be an improved version of the Type '93 A.A./A.T. Gun designed to take the same 13.2-mm. ammunition, while the Type 2 Gun is a new design, taking entirely different ammunition, for use as an aircraft cannon.

RESTRICTED.



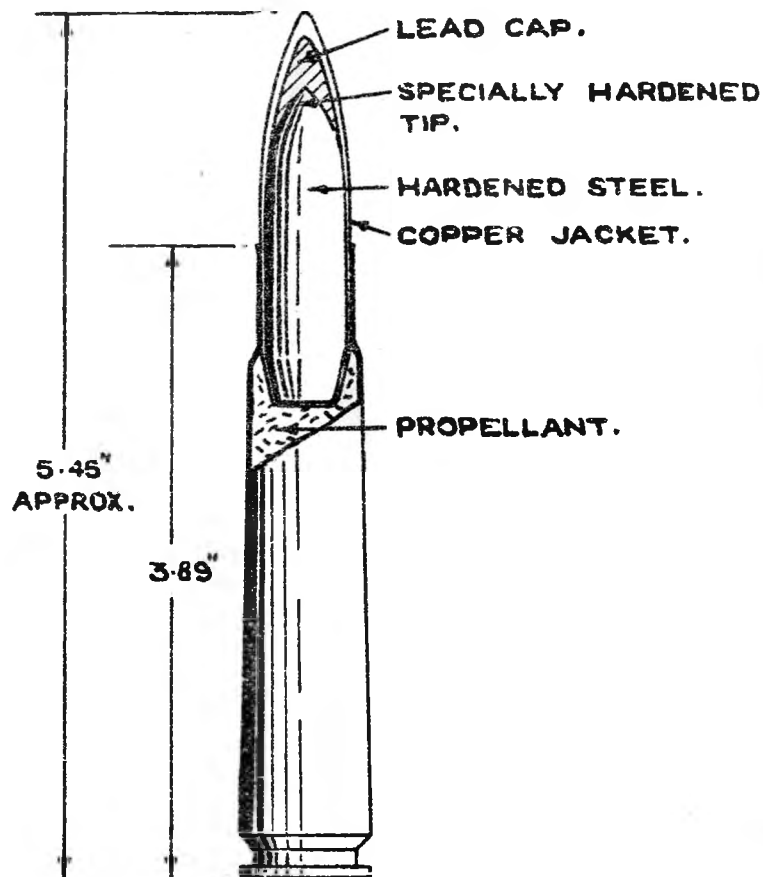
13 M.M. AMMUNITION
FOR
TYPE '2 AIRCRAFT MACHINE GUN

C.I. AMN. 3/1128
KIRKKE JUNE '48

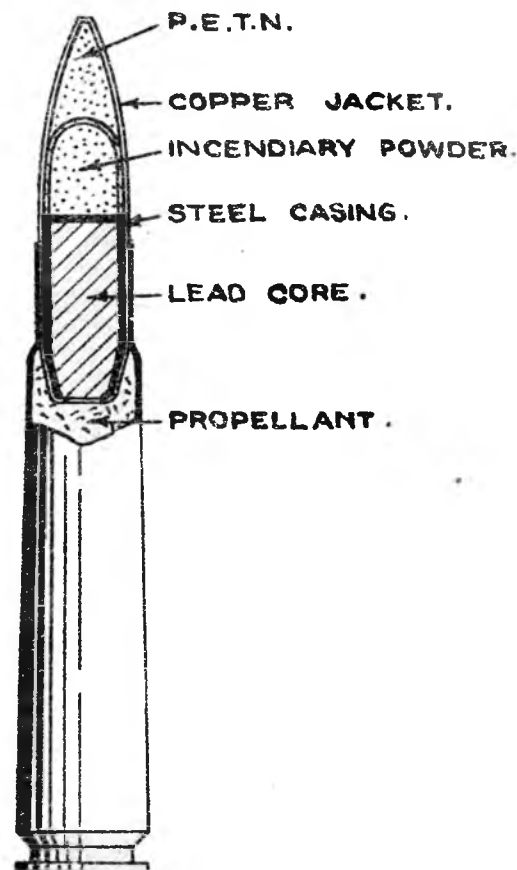
G.P.Z.P. 000NH, 1945.

PLATE A

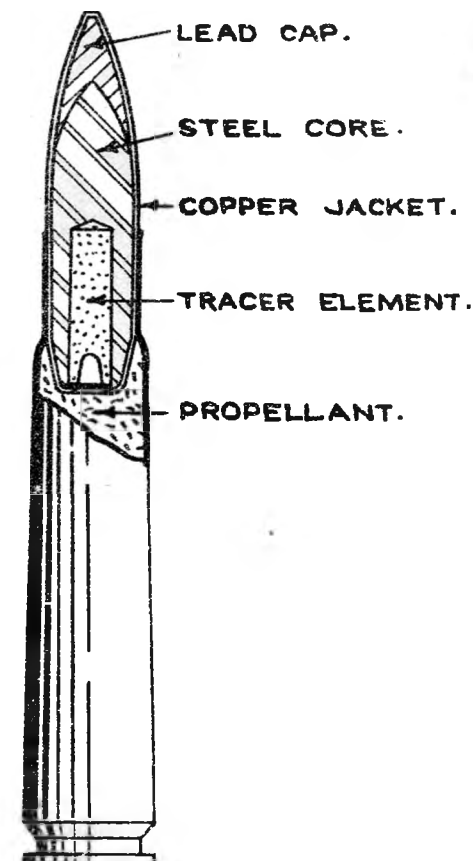
RESTRICTED.



A.P.



H.E. Inc.



TRACER-BALL

13.2 M.M. AMMUNITION FOR TYPE '3 MACHINE GUN

THIS AMMUNITION APPEARS IDENTICAL WITH THAT USED IN THE TYPE '93 A.A./A.T. MACHINE GUN.

C.I. AMN. S/1129
KIRKEE JUNE '45

**THIS LEAFLET MUST NOT
FALL INTO ENEMY HANDS**

D. OF A. (INDIA)

SECTION B

JAPANESE AMMUNITION LEAFLETS

LEAFLET B12

**AIRCRAFT CANNON CARTRIDGES, 12·7-mm. SEMI-RIMLESS
FOR
AIRCRAFT CANNONS BROWNING TYPE**

GENERAL

It was originally intended that 12·7-mm. ammunition should be described in two separate Leaflets in view of the large variety of cartridges used. It is now thought that it is more convenient to collate all the available information in one Leaflet for ease of reference. This Leaflet is, therefore, allotted serial number B12. Leaflet B13 will be issued, if necessary, when information on any other types of 12·7-mm. cartridges is available.

2. So far as is known there are two 12·7-mm. weapons used in Japanese aircraft:—

(a) Type '01 Aircraft Cannon.

(b) Type '89 Aircraft Cannon.

Both these weapons are of the Browning Type and take the same ammunition with different natures of shell, etc.

3. Japanese 12·7-mm. ammunition is practically identical with Italian 12·7-mm. ammunition and at one time considerable quantities appear to have been obtained from the Italian Government. This is clear from the fact that much of the ammunition captured had Italian markings: the stamping "B. P. D." on the base indicates that the cartridges were made by the Italian firm of Bombini Parodi Delfino. Dates of manufacture examined were 1937, 1938 and 1939. Much of the ammunition captured was, however, of Japanese manufacture and following their usual custom with Small Arm Ammunition no base markings were used.

4. It will be seen from Plate A that 12·7-mm. ammunition of Japanese manufacture can be distinguished from similar ammunition of Italian manufacture by the colour markings on the shell, and the presence of Japanese characters on the fuze. In addition it will be seen from Plate B that the Italian cartridge case has usually a copper cap which is a push fit in the case and has the usual base markings. The Japanese manufactured case, however, has usually a brass cap ringed in and no base markings.

Note.—For convenience, a distinction has been made here between a bullet and a shell. The shell is fuze and has a H. E. or Incendiary filling while the bullet is without a fuze, i. e. closed at the tip.

DESCRIPTION

5. A photograph of eight different rounds examined at Kirkee is given at Plate A and a detailed description of each round will be given later. As the cartridge case is common to all rounds it will be convenient to describe it here and leave the description of each type of shell or bullet until later in the report.

6. A drawing of a typical cartridge case is given in Plate B. It will be noticed that the cartridge case is semi-rimless, the anvil being formed integral with the case. The body of the case tapers uniformly towards the mouth for a distance of approximately $2\frac{1}{2}$ inches. It is then sharply necked down to a suitable diameter to accept the shell or bullet. The neck of the case is crimped on to the body of the shell or bullet in three places and the mouth is usually turned over to fit into the serrated cannellure in the shell. The Italian method of fixing the bullet or shell is similar to that of the Japanese.

7. All cartridge cases examined were made of brass.

8. The propellant found in all rounds was usually either graphited N. C. and N. G., with carbamite as a stabiliser, for Italian manufacture or graphited N. C. only with diphenylamine as a stabiliser for Japanese manufacture. In some rounds of Japanese manufacture examined late in 1944 the propellant was N. C. with D. N. T., and diphenylamine as a stabiliser.

All rounds of Japanese manufacture had a piece of decoppering foil above the propellant charge, which consisted of either pure tin or lead-tin foil. The decoppering foil was not found in rounds of Italian manufacture examined here.

The caps of cartridges examined were found to hold a charge varying from .8-gr. to 1.3-grs. of a composition similar to British "A" mixture, i. e. mercury fulminate, potassium chlorate and antimony sulphide.

9. **Armour Piercing (Round No. 1 Plate A).**—The only purely A. P. Cartridge examined was of Italian origin. This bullet can be distinguished by its black tip and brass or gilding metal envelope. Its make up is somewhat similar to the .5-in. Browning A. P. bullet, i.e. gilding metal envelope (or steel, coated with gilding metal), lead tip and hardened steel core. For details see Plate B. A fired round only, with separate bullet was examined. The length of the complete round appeared to be 4.5-ins. but this seems excessive in view of the length of other rounds being consistently about 4.2-ins.

10. **Armour Piercing Tracer (Round No. 2 in Plate A).**—This has the typical Japanese mouth marking of thin green and white bands, with the tip of the bullet painted pink. It gives a whitish trace turning to red when fired. The tracer composition consists of Aluminium, Magnesium, Strontium Nitrate, Strontium Peroxide and wax, and the priming composition consists of Aluminium, Magnesium, Barium Peroxide and wax.

11. **Armour Piercing Tracer (Round No. 3 in Plate A).**—This also has the typical Japanese mouth markings of thin green and white bands but has no coloured tip. The tracer composition used is believed to give a white or light green trace as opposed to the red trace of Round No. 2 above. The tracer composition consists of Barium Peroxide, Barium Nitrate, Potassium Nitrate, Aluminium and Magnesium, and the priming composition consists of Barium Peroxide and Magnesium.

12. **Armour Piercing Tracer (Round No. 4 in Plate A).**—This round also has the typical Japanese mouth marking but one black band only is used. It is understood that this gives a longer burning bright red trace. The tracer composition consists of Strontium Nitrate, Strontium Peroxide, Magnesium, Aluminium and waxy matter.

Note.—It will be seen that there are three natures of A.P. tracer rounds all of which are of Japanese manufacture, the only difference being in the nature of the tracing composition used.

13. **High Explosive/Incendiary (Rounds Nos. 5 and 6 in Plate A).**—These rounds are fitted with a fuze shell having a filling of high explosive and incendiary composition. The rounds are of Italian manufacture and have distinctive Italian markings, i.e. body painted red or blue. The fuzes also are of Italian manufacture and can be easily identified by the letter 'J' stamped on the body and also by the slightly longer fuze used. The cartridge case is stamped with the letters "B.P.D." (Bombini Parodi Delfino) followed by a date (year only) which in the samples examined was either 1937, 1938 or 1939. Full details of the method of filling of the shell are given in Plate B while the fuze used is the Type 'B' shown in Plate C and fully described below. The fillings in both shell are generally identical and the reason for the difference in the body colour is not known. The top filling is P. E. T. N. and wax, while the bottom incendiary filling consists of T. N. T./wax Aluminium, Potassium Chlorate and Potassium Perchlorate.

14. **High Explosive/Incendiary (Round No. 7 in Plate A).**—This round is of Japanese manufacture with the typical Japanese mouth marking of a white band. The fuze is stamped with Japanese markings and unlike the Italian fuze is not fitted with a gaine. This is described as Type 'A' fuze in Plate C. Full details of the shell are given in Plate B. The top filling is R. D. X. and wax, while the bottom incendiary filling consists of Aluminium, Magnesium, Barium Nitrate and wax.

15. **High Explosive/Incendiary (Round No. 8 in Plate A).**—See also Plate B. The method of manufacture of this shell is peculiar to the Japanese; a similar shell or bullet is found in 7.7-mm. calibre. It is thought that the round may be intended more for observation purposes than for its high explosive or incendiary effect. The round can readily be distinguished by the truncated tip of the bullet and the purple band at the junction of the bullet and case. Similar markings are used on the round in the 7.7-mm. calibre. The filling in the upper half of the shell, in both the inner and outer liner is R. D. X., P. E. T. N. and wax, while the bottom filling of the shell is an incendiary composition consisting of Aluminium, Magnesium, Barium Nitrate and wax.

FUZES

16. There are two types of fuzes used; one type which is peculiar to cartridges of Japanese manufacture, is for convenience described as Type 'A' and the other found on cartridges of Italian manufacture is described as Type 'B'. Details of both fuzes are given in Plate C.

TYPE 'A' FUZE (Japanese Manufacture)

17. This is of Japanese manufacture and has Japanese characters indicating date of manufacture and maker stamped on the body of the fuze. All samples examined were manufactured in Tokyo Arsenal and the dates ranged from December 1941 to October 1943.

18. The general construction of the fuze can be seen from Plate C. It consists of a brass body in two parts, the lower portion (7) being securely coned over the upper portion (3). The steel striker (4) is operated by a small aluminium push rod (2), and the nose of the fuze is closed by a brass disc (1) which is secured by the turning over of the nose of the fuze. The head of the striker (4) has a circular ridge which seats in a circular groove formed in two brass centrifugal segments (5). These segments are retained in position round the striker by a steel spring (6). The lower portion of the fuze body (7) is screwthreaded externally to screw into the mouth of the shell and internally to take a brass detonator holder (8). This holder is fitted with a small detonator holding approximately .92-gr. of fulminate of mercury composition. The detonator shell is made of copper and the mouth is closed by a flanged copper disc. The detonator is held in position in the holder by the mouth of the latter being turned over.

19. **Action.**—On firing, the steel striker (4) sets back, the circular ridge bearing hard into the circular grooves in the segments (5), preventing any tendency for them to move outwards under centrifugal force. When acceleration ceases the centrifugal segments (5) tend to move outwards and, owing to the inclined surfaces of the circular ridge in the striker (4) and the groove in the segments (5), the striker is caused to move slightly forward towards the nose and this is further assisted by creep action. The push rod has sufficient longitudinal movement to allow this. The segments are then free to move outwards against the weak pressure of the spring. The fuze is now armed and on impact the striker is forced into the detonator.

TYPE 'B' FUZE (Italian Manufacture)

20. This is of Italian manufacture and all samples examined had the letter 'J' stamped on the body of the fuze.

21. The general construction of this fuze can be seen from Plate C. It consists of a brass body (2), a brass striker (3), two aluminium centrifugal segments (4), copper alloy spring retaining segments (5) and a brass adapter (6) to take the brass gaine (9). The body of the fuze, unlike the Japanese fuze, is in one piece, the nose of the fuze being closed by a brass disc (1) which is held in position by the mouth being turned over. The fuze is threaded internally to take an adapter, the latter being screw-threaded externally to screw into the shell and internally to take the gaine. The main filling in the gaine is P. E. T. N. above which is pressed a layer of fulminate of mercury. On top of this is pressed a layer of fulminate of mercury composition to act as the initiator on being pricked by the sharp point of the striker. This composition is probably similar to British 'A' mixture, although complete analysis has not been possible.

22. **Action.**—The action is identical with that of Type 'A' fuze. It may be noticed, however as a matter of interest that the slot to allow the segments to move outwards is, in the case of Type 'A' fuze, in the upper half of the fuze body while in the Type 'B' fuze it is actually in the adapter.

IDENTIFICATION

23. It will be easy to identify the rounds from the photograph in Plate A. The 12.7-mm. (.5-in.) Japanese or Italian round is somewhat similar in appearance to the British .5-in. Vickers round except that—

(a) The Vickers .5-in. cartridge case is rimless while the Japanese is semi-rimless.

(b) The Vickers round is fitted only with a ball and A. P. bullet while the Japanese or Italian round has fuze shell as well as bullets.

The Japanese or Italian 12.7-mm. cartridge can readily be identified from the American .5-in. Browning cartridge as follows:—

(a) The American cartridge case is about 3/4-in. longer.

(b) In the .5-in. Browning no shell are used but bullets only, similar to the .5-in. Vickers.

SUMMARY OF DATA

24. Round No. 1

Overall length of complete round	... Believed about 4.5-ins.
Length of case	... 3.18-ins.
Length of bullet	... 2.27-ins.
Weight of bullet	... 590-grs.
Weight of propellant	... Not known.

Rounds Nos. 2, 3 and 4

Overall length of complete round	... 4.21-ins.
Length of case	... 3.18-ins.
Length of bullet	... 1.75-ins.
Weight of bullet	... 548-grs.
Weight of propellant	... 127-grs.

Rounds Nos. 5 and 6

Overall length of complete round	... 4.21-ins.
Length of case	... 3.18-ins.
Length of shell fuze	... 2-ins.
Weight of shell fuze	... 570-grs.
Weight of propellant	... 127-grs.

Round No. 7

Overall length of complete round	... 4.15-ins.
Length of case	... 3.18-ins.
Length of shell fuze	... 1.88-ins.
Weight of shell fuze	... 533-grs.
Weight of propellant	... 127-grs.

Round No. 8

Overall length of complete round	... 4.15-ins.
Length of case	... 3.18-ins.
Length of shell	... 2-ins.
Weight of shell	... 508-grs.
Weight of propellant	... 132-grs.

Fuze Type 'A' (Japanese)

Overall length	675-in.
Fuze threads diameter	4-in. L. H. T., 32 T. P. I.
Weight of filled fuze	... 133-grs.

Fuze Type 'B' (Italian)

Overall length	... 1.1-ins.
Fuze threads diameter	390-in. L. H. T., 32 T. P. I.
Weight of filled fuze	... 183-grs.
Diameter of gaine body	275-in.
Threads of gaine body	... R. H. T.

HANDLING AND TRANSPORT

(Of captured ammunition by Ordnance)

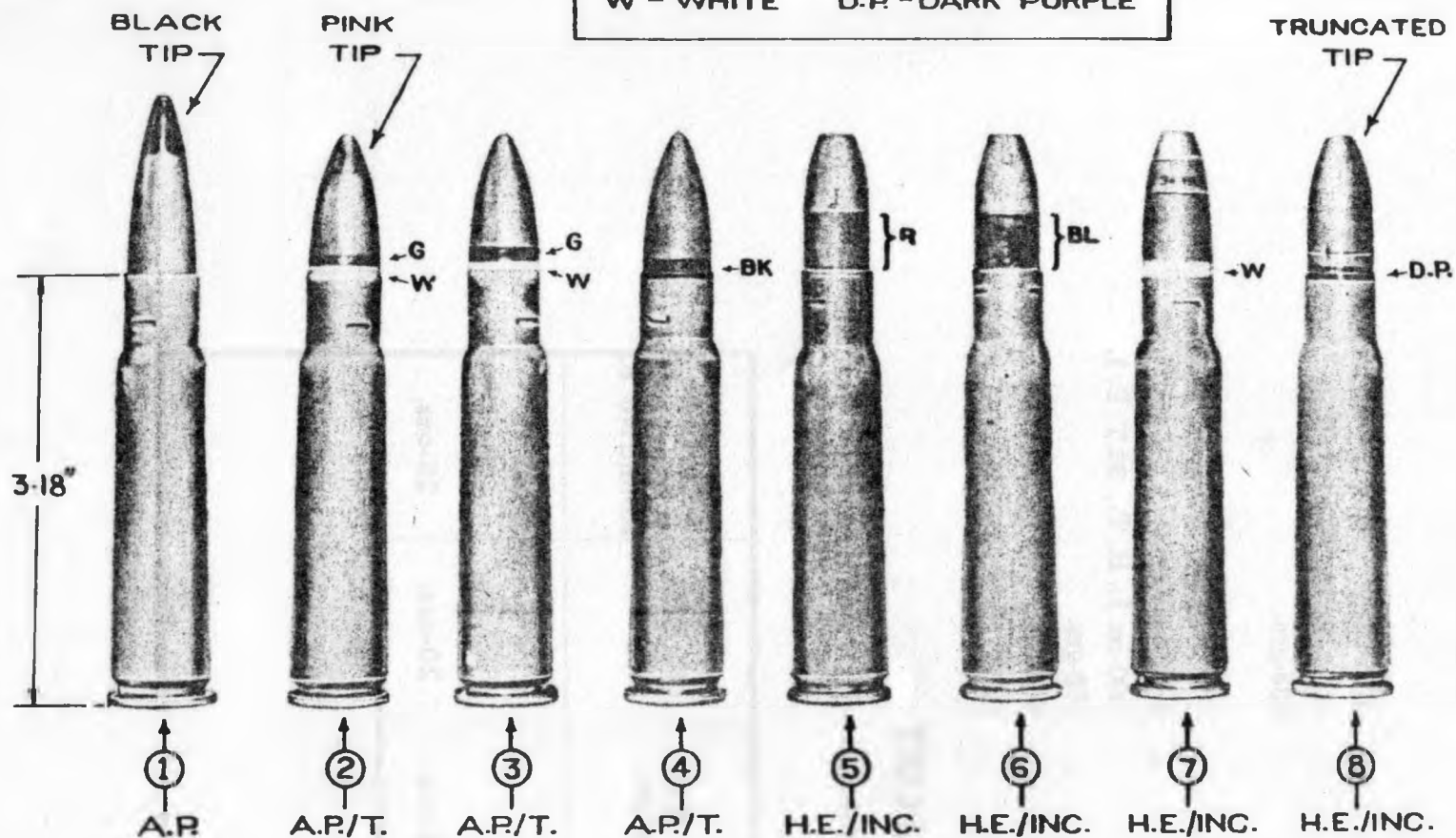
25. See J. A. L. Bl para. 20.

	A. P./T.	H. E./I. Italian	H. E./I. Jap.	H. E./I. Jap. Round No. 8.
EXPLOSION/FIRE RISK per 100 rounds (approx.)	... 17-ozs.	20-ozs.	20-ozs.	25-ozs.
GROUP CLASSIFICATION	... VI Category X.			
CLASSIFICATION FOR SEA TRANSPORT	... O. A. S. (C)			

KEY TO COLOUR BANDS

R - RED
G - GREEN
W - WHITE

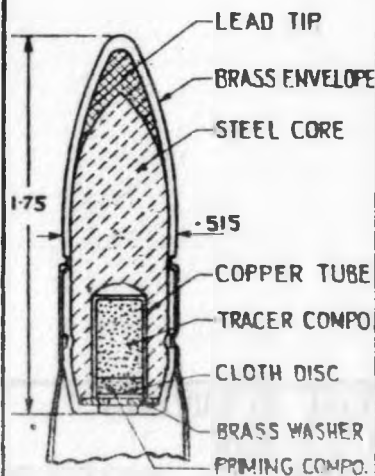
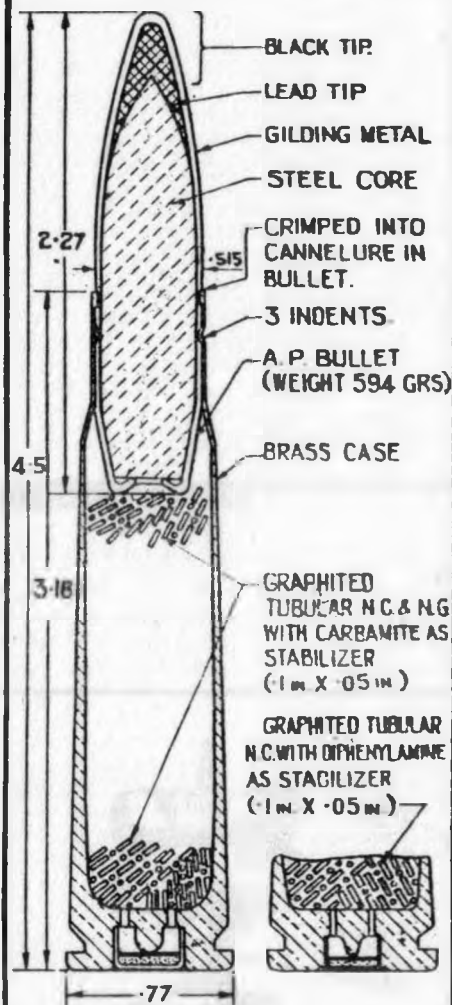
BL - BLUE
BK - BLACK
D.P. - DARK PURPLE



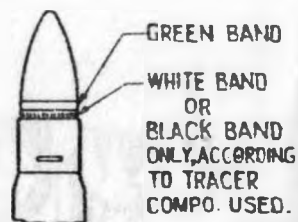
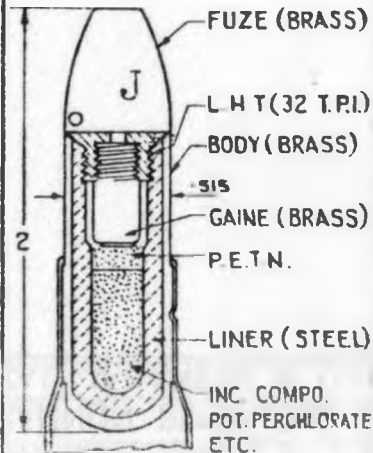
JAPANESE A.C. CANNON CARTRIDGES 12.7 M.M.
SEMI - RIMLESS
FOR A.C. CANNON (BROWNING TYPE)
COMPARATIVE PHOTOGRAPH.

C.I. AMM 5/1115
KIRKEE MAY '45

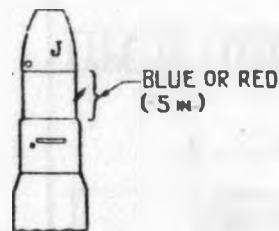
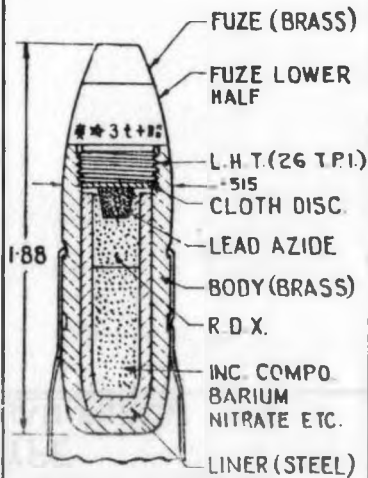
G.P.Z.P. POONA, 1945.



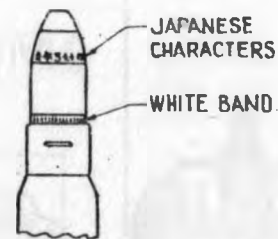
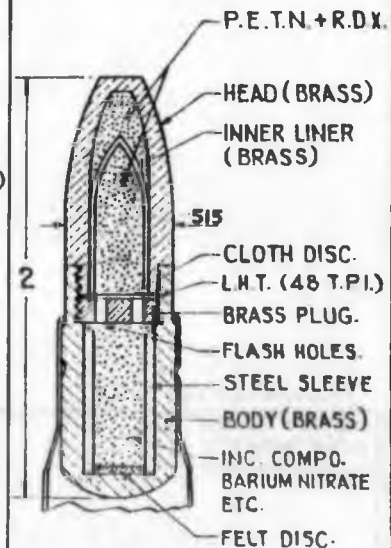
MARKING : —

**A.P. TRACER (JAPANESE)**

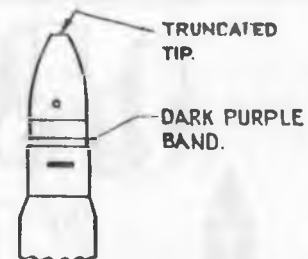
MARKING : —

**H.E. INC. (ITALIAN)**

MARKING : —

**H.E. INC. (JAPANESE)**

MARKING : —

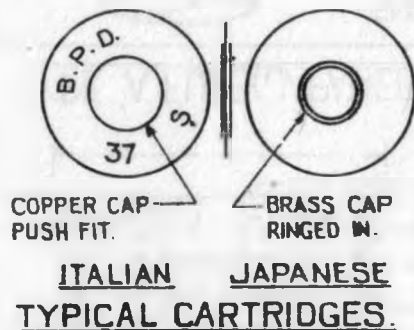
**H.E. INC. (JAPANESE)**

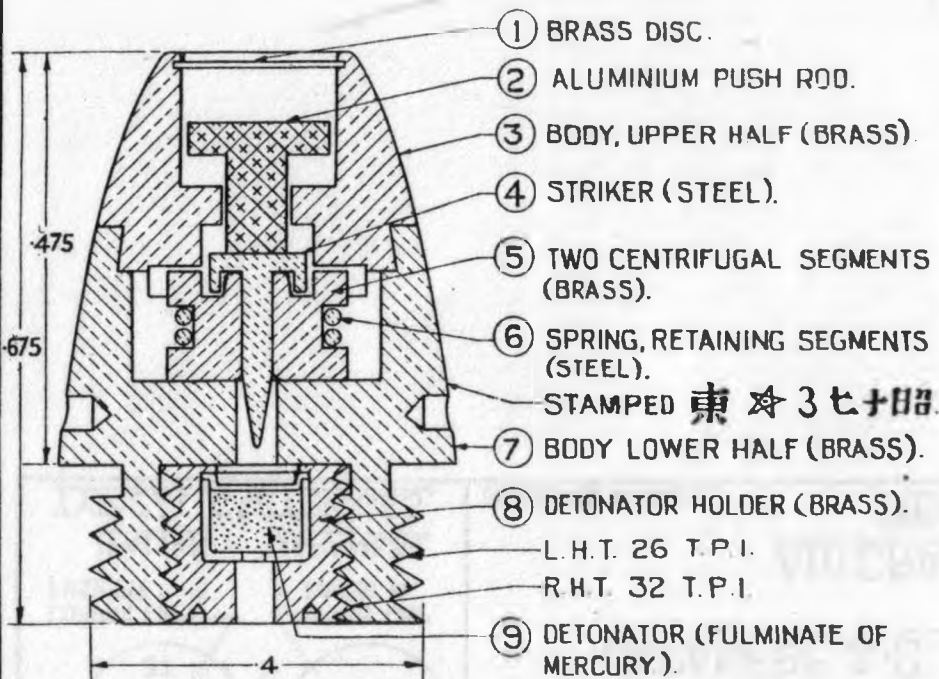
WEIGHT OF SHELL	548 GRS.	570 GRS.	533 GRS.	508 GRS.
PROPELLANT	127 GRS. N.C.	127 GRS. N.C. & N.G.	127 GRS. N.C.	132 GRS. N.C.

JAPANESE A.C. CANNON CARTRIDGES 12.7 MM. (SEMI-RIMLESS)

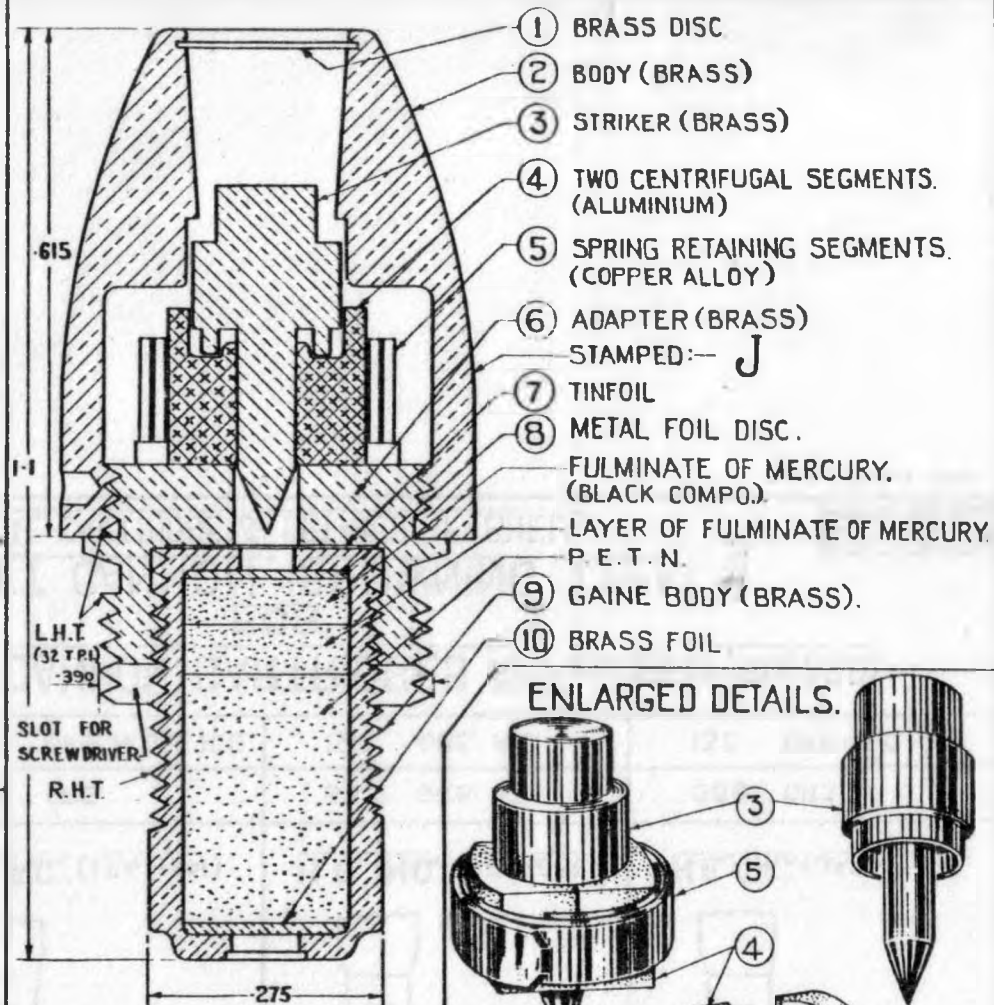
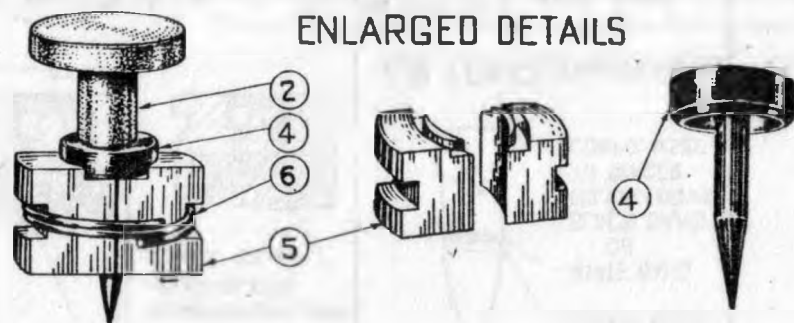
FOR AIRCRAFT CANNON (BROWNING TYPE). TYPICAL CARTRIDGE & DETAILS OF SHELL.

DIMENSIONS IN INCHES.

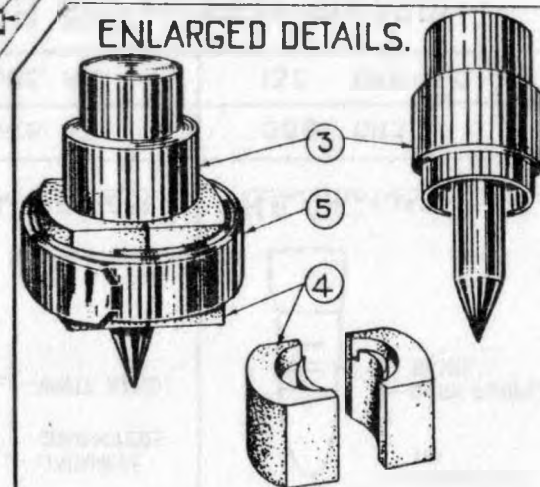
C.I. AMN. 5/1205
KIRKEE, AUG. 1945



TYPE A FUZE (JAPANESE)



TYPE B FUZE (ITALIAN)



FUZES, PERCUSSION. D. A.

FOR

JAPANESE A.C. CANNON CARTRIDGES 12.7 MM. (SEMI-RIMLESS).

FOR A.C. CANNON BROWNING TYPE

(DETAILS OF TYPICAL JAPANESE & ITALIAN FUZES)

DIMENSIONS IN INCHES.

C.I. Amn. S/1206
KIRKEE, AUG. 1945

G.P.Z.F. POONA 1945

THIS LEAFLET MUST NOT
FALL INTO ENEMY HANDS

D. OF A. (INDIA)

JAPANESE AMMUNITION LEAFLETS

SECTION B

LEAFLET B 15

CARTRIDGES, S.A., 20-MM. — GENERAL NOTES

GENERAL

There are a number of Japanese 20-mm. ammunition and it is essential to appreciate the various equipments in this calibre in order to identify the ammunition with the appropriate gun.

2. So far four different weapons in the 20-mm. calibre are known, each chambered for different types of cartridges. The largest cartridge is used for the Type '98 A. A./A. T. machine gun, the length of the case being 5.6-ins. The next largest is for the Type '97 A. T. machine gun which, when suitably modified, is reported to be used also as an aircraft cannon; the length of this cartridge case is 4.9-ins. The next cartridge in size is that for the Type Ho 5-20-mm. (Browning mechanism) fixed aircraft cannon; the size of cartridge case is 3.7 ins. The smallest cartridge is used in the Type '99 A. C. cannon and more recent weapons similarly chambered; the length of the cartridge case is 2.8-ins. This latter weapon appears to be widely used and samples of practically all types of ammunition for it were captured in Assam and Burma. This machine gun is reported to be also used in a ground role for A. A./A. T. purposes and as a heavy M. G. in an infantry support role.

American reports refer to two designs of this weapon, which they call:—

- (a) Type '99 Mk. 1 A. C. Cannon.
- (b) Type '99 Mk. 2 A. C. Cannon.

The ammunition for both these types is identical except that the cartridge case for the latter is larger (length-3.9").

The Japanese Army is also known to be using the German Mauser 151/20 A. C. Cannon which uses a cartridge case 3.18" long.

To assist in the identification of each type a photograph of typical cartridges is given at Plate 'A'.

CARTRIDGE CASES

3. These are all solid drawn brass cases of the rimless S. A. A. type and vary considerably in size. The cases for the Type '99 and '98 guns are heavily necked whereas those for the Type '99 and Ho 5 A. C. cannon have very short necks and rounded shoulders.

PRIMERS/CAP.

4. The cartridges for the Type '98 and Ho 5 use push-in primers of the "G" & "H" Types respectively—described in J. A. L. E 2 (a)—whereas those for the Type '97 and '99 use caps of the Berdan type as commonly used in small arms cartridges.

INTERCHANGEABILITY

5. The four types of Japanese 20-mm. cartridges are not interchangeable with British, American, or, so far as is known, with German, Italian or Russian 20-mm. cartridges. Moreover, none of these cartridges can be interchanged with other Japanese cartridges of the same calibre, on account of the very different chambering of the guns. However, the projectiles for ammunition for the Type '97 & '98 guns do appear to be fully interchangeable and it is presumed that the same applies to the projectiles for the two marks of Type '99 cannon reported by the U. S. Army.

FUZES

6. The nose fuzes used in 20-mm. ammunition may be classified into three main types according to the equipment with which they are used and each of these types may be subdivided into a number of varieties:—

<u>Types '97 and '98</u>	<u>Type '99 A.C. Cannon</u>	<u>Type Ho 5 A.C. Cannon</u>
16-mm. F.H.	14-mm. F.H.	16-mm. F.H.
(A) Type '93 (Small) as used in 37-mm. ammunition.	(C) One piece body with centrifugal fork and detent.	*(G) Reported to be identical with Type '100 (Small) (B) but made of aluminium alloy.
(B) Similar to (A) above but with no shutter—believed to be Type '100 (Small).	(D) Similar to (C) but shorter and fitted with modified striker.	(H) Reported to be similar to (F) but with parallel sided cavity.
	(E) Rotor type with centrifugal bolts.	(J) Two piece strikerless type with no separate gainc.
	(F) • One piece strikerless fuze with tapered cavity.	

*NOTE:—A modification of this fuze exists in which the centrifugal bolt hole is closed by a staked plug instead of a screwed plug.

These fuzes have been classified in this way since they have actually been found, or are reported to have been found, associated with their respective equipments. Although Fuzes A and B are not interchangeable, there is no reason to suppose that some at least of the other fuzes with a 16-mm. fuze hole gauge are not fully interchangeable ; for instance Fuzes B and G are identical except that they are made of different material.

Drawings showing the details of construction of all these fuzes are given in Plates B and C.

FUZE, PERCUSSION, D.A., TYPE '93 (SMALL)-A

7. This is the same fuze as that used in 37-mm. ammunition and it has been fully described in J.A.L. E4. This fuze is reported to be fitted to the H.E./T shell for the Type '98 gun but it certainly will not fit the H.E./T shell with self-destroying element examined here.

FUZE, PERCUSSION. D.A.,-BELIEVED, TYPE 100 (SMALL)-B

8. This is similar to A above but the fuze body is made in one piece and no shutter is incorporated.

The brass fuze body is screw-threaded externally (R.H.T.) to screw into the shell body and internally (L.H.T.) to take the gaine. A longitudinal recess formed in the body houses the hammer and striker and is closed by a brass disc. A second recess at right angles to the former contains the centrifugal bolt and spring. The brass gaine is threaded internally at the top to take the detonator holder and is filled with P.E.T.N. into which is embedded a lead azide pellet.

9. **Safety Devices.** The striker is held off the detonator by a centrifugal bolt which is held under the striker head by a spring.

ACTION

10. The action is very simple and will be clear from the drawing.

FUZE, PERCUSSION, D. A. (CENTRIFUGAL FORK TYPE)-C

11. This fuze consists of three main components :—

- (i) Brass body, which houses the striker, centrifugal fork, detent and detent spring.
- (ii) Brass striker guide, which screws into the body (L. H. T.).
- (iii) Brass gaine also screwed into the body (L. H. T.).

The striker is positioned in the body by the centrifugal fork and the striker guide. The body is closed at the top by a brass disc which is secured by turning over the body wall.

12. Safety Devices

- (a) **Centrifugal Fork** :—Prevents downward movement of the striker until centrifugal force is sufficient to withdraw the fork.
- (b) **Detent** :—Prevents outward movement of the fork until after set-back.

ACTION

13. This again is a simple fuze and the action will be clear from the drawing. The centrifugal fork is thrown clear of the projectile after which the striker is kept off the detonator by creep alone.

FUZE, PERCUSSION, D A. (14-mm. F.H.)-D

14. This is very similar to Fuze C above except that it is shorter and incorporates a modified striker.

FUZE, PERCUSSION, D.A. (ROTOR TYPE)-E

15. This fuze is of the same design as that for the Swiss made Oerlikon used by Germany in which arming is carried out by means of a rotor. It consists essentially of the following parts :—

- (i) The Head which contains the hammer and which is closed by a brass disc.
- (ii) The Body which houses the rotor and the spring-loaded centrifugal bolts.
- (iii) The Rotor which is bored centrally to take the needle; this hole narrows at the centre so that the needle can move only in one direction. There are also four recesses two of which are used to engage the bolt; the other two are for balance.
- (iv) The Gaine which screws into the body (L.H.T.).

16. Safety Devices. Before firing the rotor is locked by the two spring-loaded bolts in such a position that the needle is not in alignment with the detonator nor at right angles to the axis.

ACTION

17. On firing, the centrifugal bolts set back and continue to hold the rotor in the unarmed position but when the rotational velocity reaches a definite figure the two bolts are withdrawn by centrifugal force, leaving the rotor free to rotate. This it does since its mass tends to be concentrated at two points on the periphery at 90° to the needle hole and these two points tend to move away from the axis of rotation under centrifugal force. The rotor will therefore rotate until the needle hole is aligned along the axis of rotation of the shell; this brings the needle over the detonator, so that the hammer can drive it inwards on impact. During flight the needle is kept off the detonator by creep alone.

FUZE, PERCUSSION, D. A. (STRIKERLESS TYPE)-F

18. The method of construction of this will be clear from the drawing at Plate C. It has no safety or arming devices and is comparable with the corresponding British fuzes (Nos. 253 and 254). It has a short gaine which screws into the body.

FUZE, PERCUSSION, D. A.-G

19. This fuze is reported to be identical with Fuze B, except that it is manufactured in aluminium alloy. A variation is also reported to exist in which the centrifugal bolt hole is closed by a staked plug in place of a screwed one. (This fuze is not shown in the Plates,)

FUZE, PERCUSSION, D. A. (STRIKERLESS TYPE)—H

20. This is similar to Fuze F but the central cavity has parallel sides and a large gaine screws into the body. The body is made in one piece.

FUZE, PERCUSSION (STRIKERLESS TYPE)—J

21. In this type the body is made in two pieces, the upper half housing the detonator, the lower half the booster. There is no separate gaine.

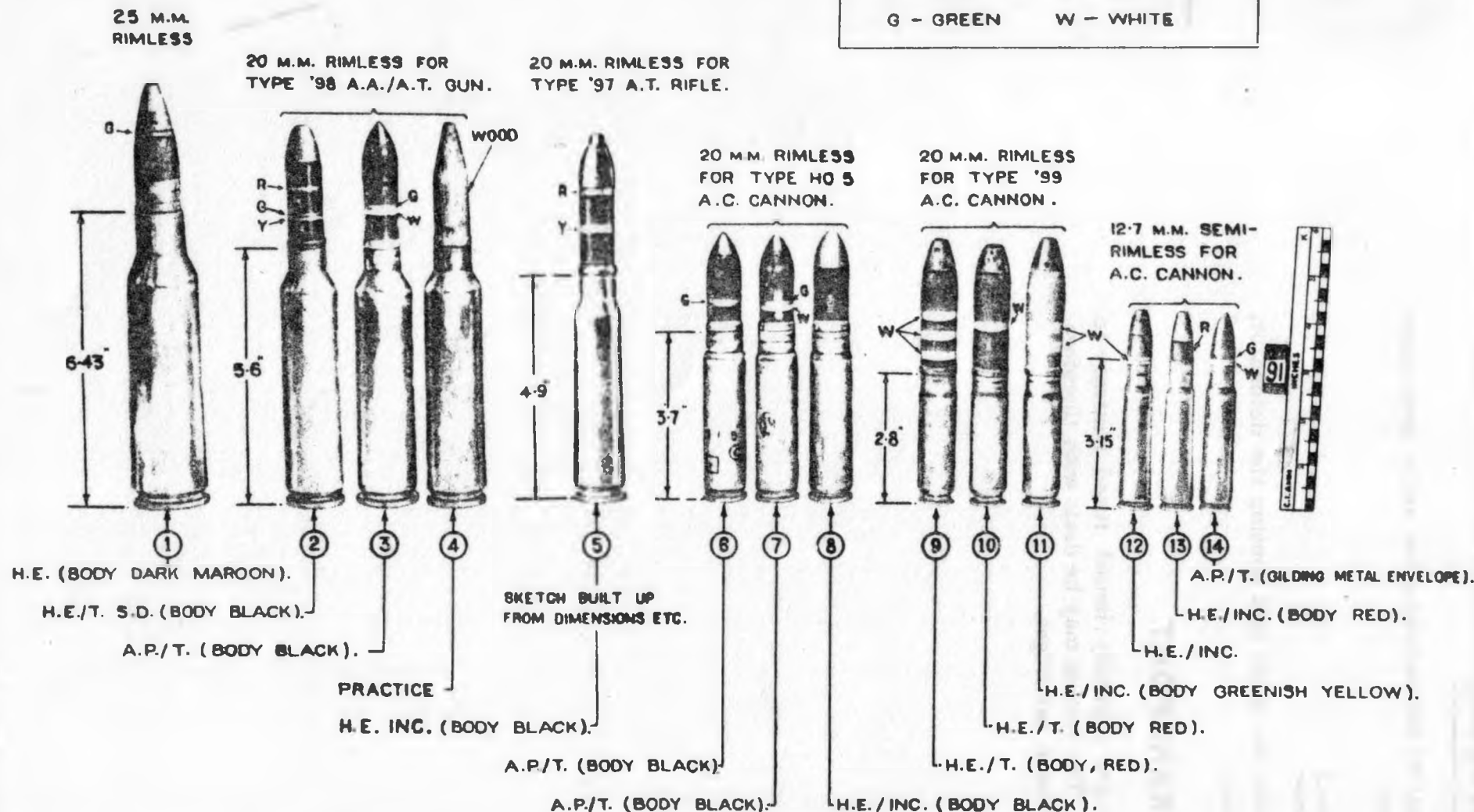
HANDLING AND TRANSPORT

22. See J. A. L. B1. Shell in 20-mm. calibre are normally issued fuzed contrary to standard practice for ammunition of greater calibre. The rounds may be dealt with therefore, in the same way as British Hispano, Oerlikon and Polsten cartridges.

RESTRICTED.

KEY TO COLOUR BANDS.

R - RED Y - YELLOW
G - GREEN W - WHITE

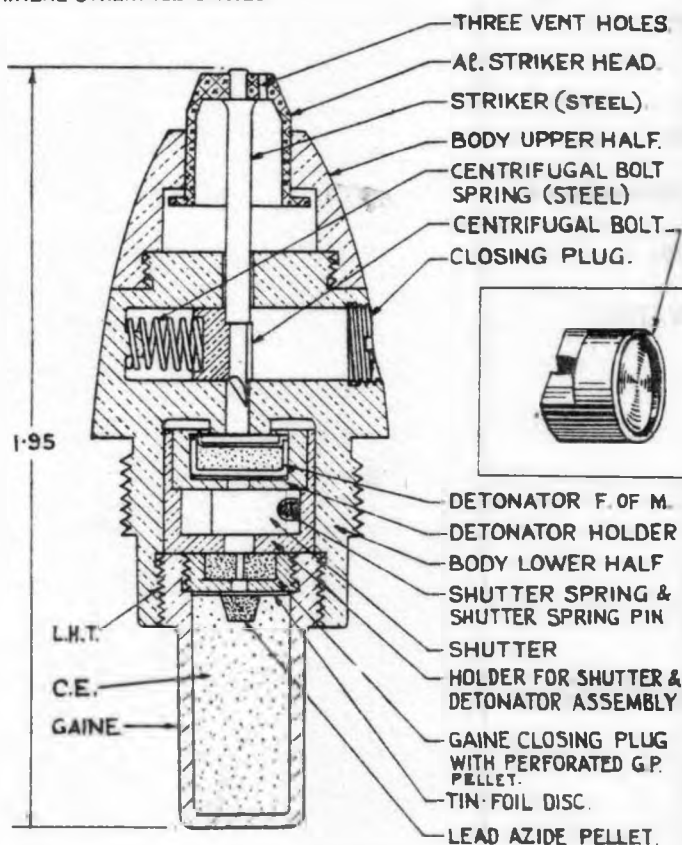


JAPANESE AMMUNITION COMPARATIVE CHART FOR 25 M.M., 20 M.M. & 12.7 M.M.

C.I. AMM. 9/1114
KIRKEE, MAY, '45

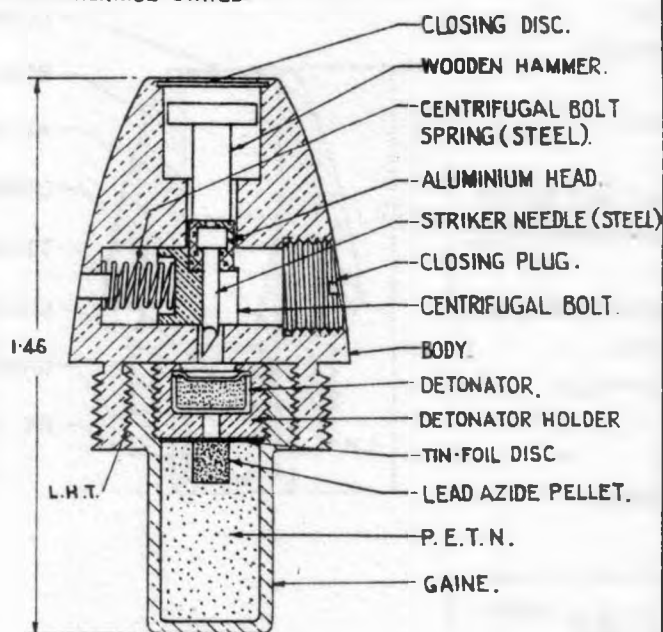
G.P.S.P. POONA. 1345.

FUZE MADE OF BRASS EXCEPT WHERE OTHERWISE STATED.



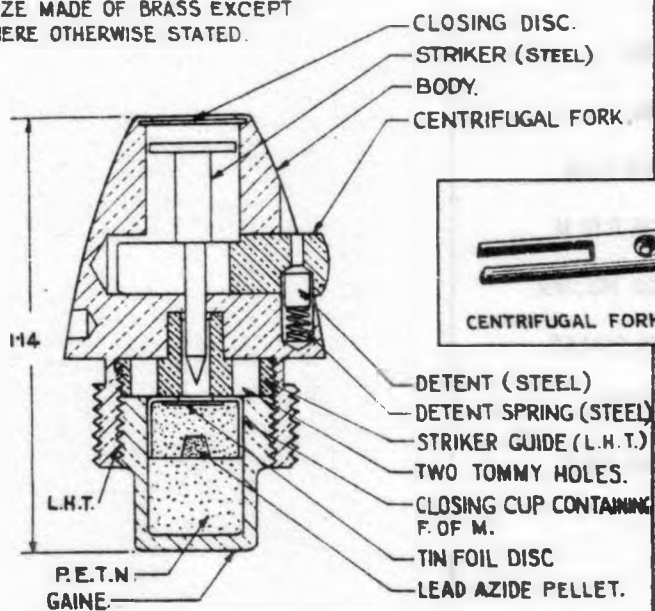
(A) FUZE, PERCUSSION, D.A.
TYPE '93 (SMALL)

FUZE MADE OF BRASS EXCEPT WHERE OTHERWISE STATED.



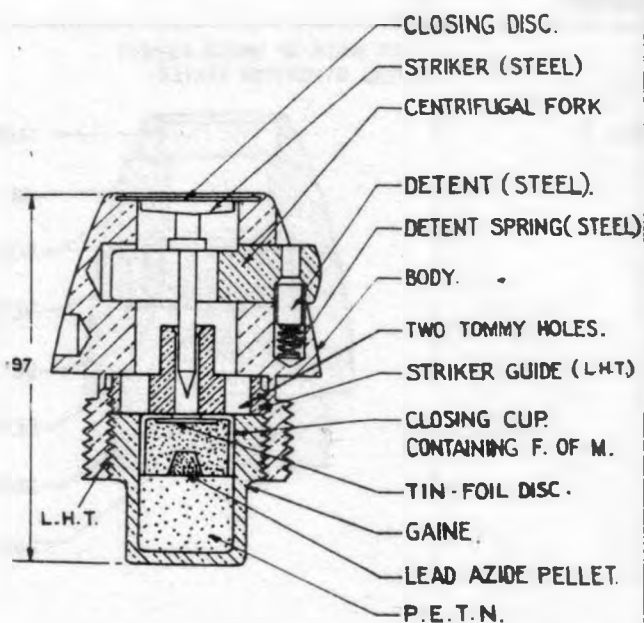
(B) FUZE, PERCUSSION, D.A.
BELIEVED, TYPE 100 (SMALL)

FUZE MADE OF BRASS EXCEPT WHERE OTHERWISE STATED.



(C) FUZE, PERCUSSION, D.A.
(CENTRIFUGAL FORK TYPE)

FUZE MADE OF BRASS EXCEPT WHERE OTHERWISE STATED.

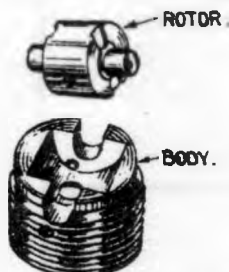
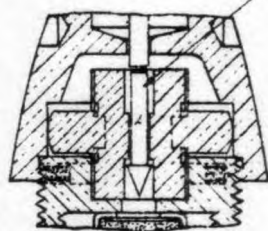
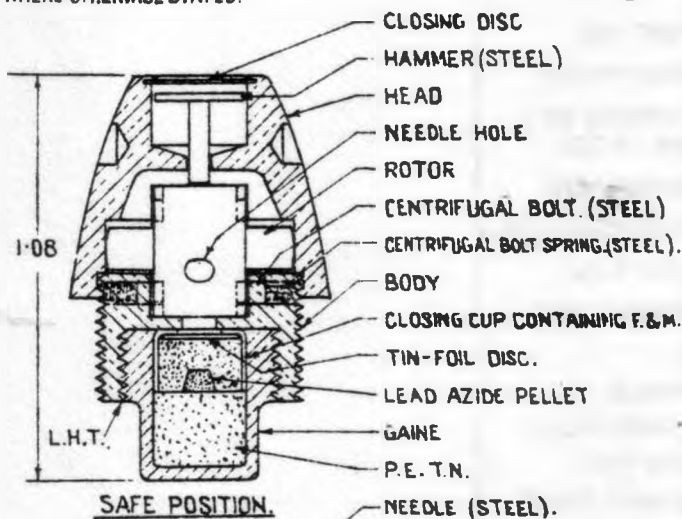


(D) FUZE, PERCUSSION, D.A.
(14 mm. F.H.)

FUZES, NOSE, PERCUSSION, D. A. FOR JAPANESE 20mm. AMMUNITION.

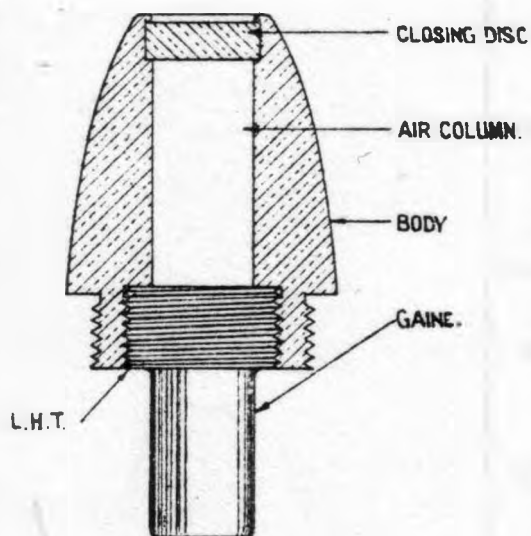
FUZE MADE OF BRASS EXCEPT WHERE OTHERWISE STATED.

(V)



(E) FUZE, PERCUSSION, D.A. (ROTOR TYPE).

FUZE MADE OF BRASS EXCEPT WHERE OTHERWISE STATED.

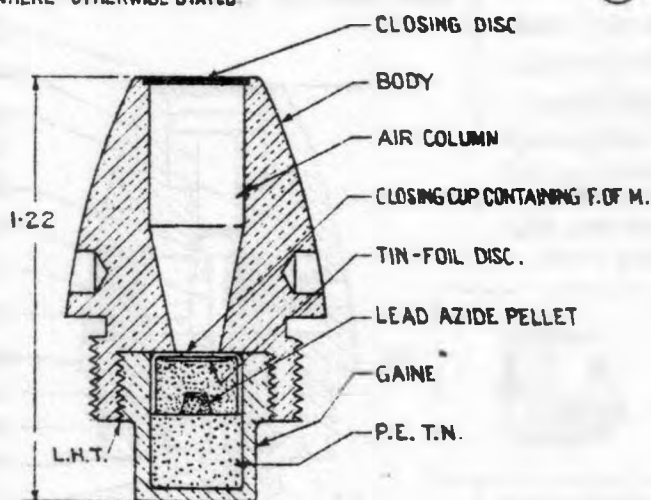


FUZE, PERCUSSION, D.A. (STRIKERLESS TYPE.)

(H)

FUZE MADE OF BRASS EXCEPT WHERE OTHERWISE STATED.

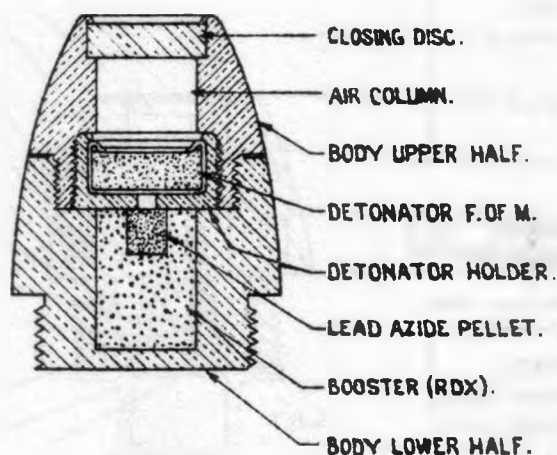
(V)



FUZE, PERCUSSION, D.A. (STRIKERLESS TYPE).

(F)

FUZE MADE OF BRASS EXCEPT WHERE OTHERWISE STATED.



FUZE, PERCUSSION, D.A. (STRIKERLESS TYPE.).

(J)

FUZES, NOSE, PERCUSSION, D. A.

FOR
JAPANESE 20mm AMMUNITION.

THIS LEAFLET MUST NOT
FALL INTO ENEMY HANDS

D. OF A. (INDIA)
JAPANESE AMMUNITION LEAFLETS

SECTION B
LEAFLET B 16

CARTRIDGES, S.A., 20-mm.
FOR
TYPE '97 A.T. MACHINE GUN.

GENERAL

The Type '97 A.T. Machine Gun is a gas operated, air cooled, automatic weapon and is usually fired in the prone position from the shoulder; it can be carried into positions inaccessible to other anti-tank weapons.

2. Apart from A.P. and A.P./T. rounds, H.E./I. (fuzed), H.E./I. (fuzeless), H.E./T. and H.E./T. self destroying rounds also exist for this weapon but the only one examined at Kirkee is the H.E./I. No details are available on the other types and therefore they are not included in this Leaflet. Although this machine gun is reported to be a single purpose weapon (A.T.), the existence of various types of H.E. round suggests that it is also used against thin-skinned vehicles.

In this Leaflet it is proposed to discuss the H.E./I. (fuzed) round only.

DESCRIPTION

3. The Plate A gives details of the complete round whereas Plate B shows its external appearance and method of packing.

4. Cartridge Case. The case is of brass and is similar in design to that for the 20-mm. Type '98 gun, though of smaller dimensions. It is secured on to the projectile by three long crimps. The length is 4.9-in.

5. Propellant. The charge weighs 1.34 ozs. and consists of tubular grains of graphited N. C.

A sheet of lead tin foil, 2.1" x 1 7" x .002" in size is included as a decoppering agent.

6. Primer. The primer used is the type 'H' which has already been described in J.A.L. E2 (a).

7. Shell H.E./Incendiary. The shell body is machined from steel bar and is drilled from the nose to hold 92 grains of an incendiary composition above which are 49 grains of H.E. The incendiary composition consists of Barium nitrate, Aluminium, Magnesium and Wax and the H. E. of R D.X. and Wax.

8. Fuze. The fuze used is the Type '93 small (type 'A') described in J.A.L. B15.

PACKING

9. The rounds examined at Kirkee, were received packed, each round in a cardboard container, a photograph of which is included at Plate B

IDENTIFICATION

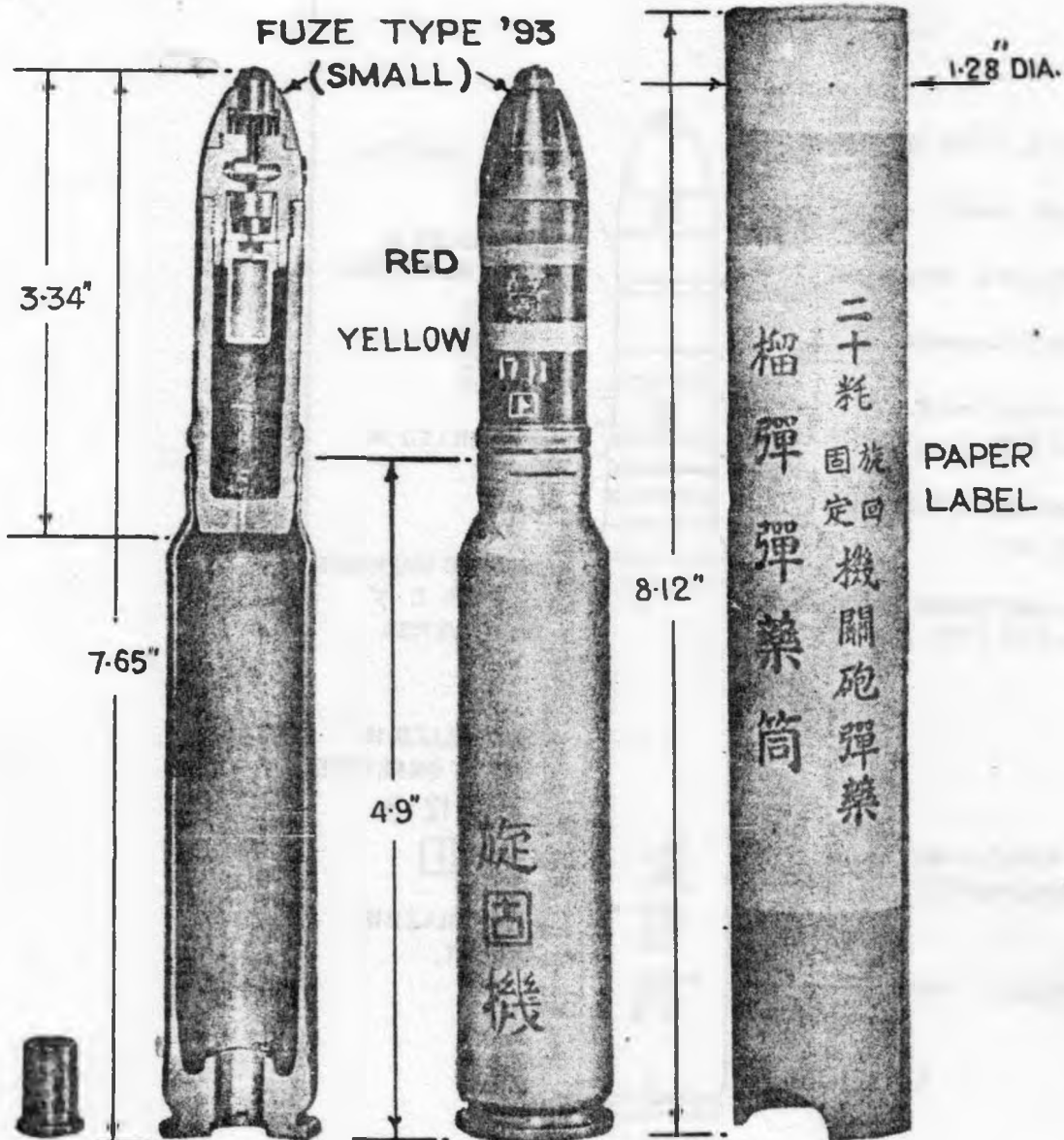
10. This shell is painted black with a yellow band around the middle of the body and a red band immediately below the shoulder. Note the length of the cartridge case which is 4.9 inches. A label in Japanese characters attached to the cardboard container indicates the calibre and type of ammunition.

HANDLING AND TRANSPORT

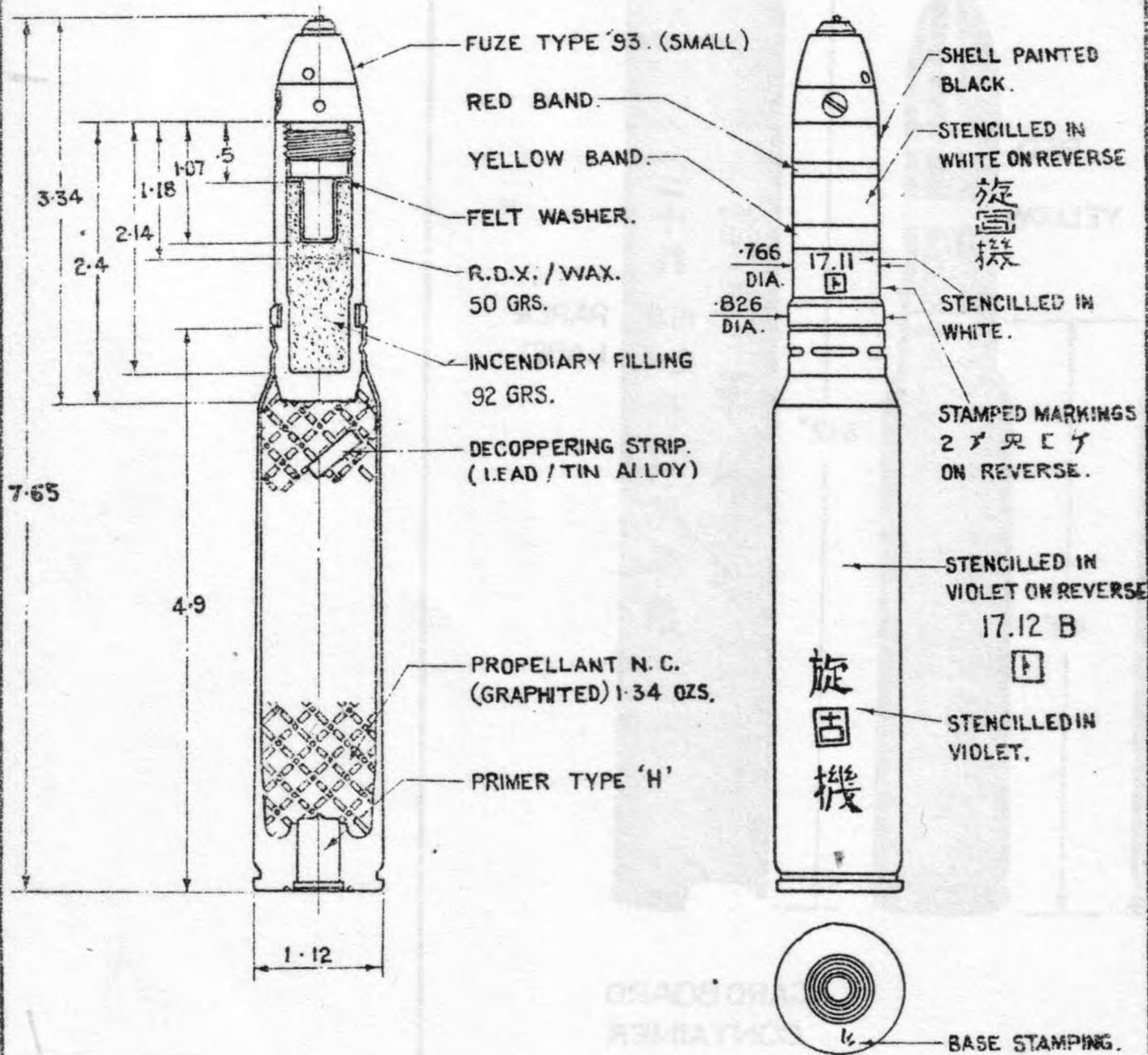
(Of captured ammunition by Ordnance)

11. See J.A.L. B1 and B15.

EXPLOSION/FIRE RISK	..	3.6 oz. (for 12 rds.)
GROUP CLASSIFICATION	..	VI, Category Z.
CLASSIFICATION FOR SEA TRANSPORT	..	O. A. S. (c)



JAPANESE
CARTRIDGE S. A. 20 MM. H.E./I.
FOR
TYPE '97 A./T. MACHINE GUN.



COMPLETE WT. 10.2 OZS.

DIMENSIONS IN
INCHES.

JAPANESE
CARTRIDGE S.A. 20MM. H.E/I
FOR
TYPE '97 A/T MACHINE GUN.

C.I. AMN. 5/1476.
KIRKEE, JUNE 46

Restricted

THIS LEAFLET MUST NOT
FALL INTO ENEMY HANDS

D. OF A. (INDIA)
JAPANESE AMMUNITION LEAFLETS

SECTION B
LEAFLET B 17

CARTRIDGES, S.A., 20-MM., FOR JAPANESE TYPE '98 A.A./A.T. GUN

GENERAL

The Type '98 A.A./A.T. gun is an all purpose, gas operated, air-cooled, automatic weapon which is usually fired on a tripod but which is also mounted on wooden wheels for mobility. It has proved effective against low flying aircraft but may also be used as an A.T. weapon or as a heavy machine gun.

2. This weapon uses the largest cartridge case of all the 20-mm. types and consequently a large propellant charge can be loaded and a high muzzle velocity obtained. It is reported that the muzzle velocity is 2720 ft./sec. and that this gives a maximum ground range of 5450 yds. and a ceiling of 12,000 feet.

3. So far, five types of projectile are known to be used in the equipment and these are shown together with a typical complete round in the drawing at the end of this Leaflet; three of these projectiles have actually been examined here and these are indicated on the drawing by a "V". A chart summarising all the data for these rounds is also included at the end of this Leaflet.

DESCRIPTION

4. Cartridge Case. This is a solid drawn brass case of the rimless S.A.A. type recessed at the base to take a push-in type 'H' primer described in J.A.L. E. 2 (a). A lip formed in the cartridge head is turned over to secure the primer, already a very tight fit, in position. The case is heavily necked and is crimped into a cannellure and this secures the projectile to the case.

5. Propellant. The cartridge case is loosely filled with graphited tubular grains of propellant which consist of N.C. stabilized with diphenylamine and D.N.T. A sheet of lead/tin foil is included as a decoppering agent.

PROJECTILES

6. H.E./Tracer. The shell body is machined from steel bar and the method of filling follows normal practice for such rounds. A type 'A' fuze (See J.A.L. B. 15) screws into the nose. The base is closed with a screwed plug which has a central hole to allow the propellant gases to ignite the tracing composition.

7. **H.E./T. Self-Destroying.** The method of construction of this shell is generally similar to that of the H.E./T. shell but the central portion is drilled to take the self-destroying element; this consists of a brass tube filled with mealed G.P. which connects the two compartments. The shell is fuze with a fuze Type "B" (See J A.L. B. 15). The shell actually examined here had a main filling of gunpower and bore a marking in Japanese characters meaning "Practice". These shell then are obviously used for practice purposes but it is probable that they are merely a modification of a service design normally filled with H. E., especially as a fuze with a detonating gaine was fitted to the specimen examined. This means that shell, identical in external appearance with the practice round except in the stencilling, may be encountered with an H. E. filling.

8. **H.E./I.** This is made in two pieces; the head, containing the H.E. filling, screws into the body which contains the incendiary composition. There is no fuze, the H.E. filling being sufficiently sensitive to detonate on impact.

9. **A.P./T.** This is a hardened steel bullet recessed at the base to take the tracing and priming compositions and closed with a screwed plug.

10. **Practice.** This is a wooden bullet fitted with a driving band, and is used as bulleted blank.

PACKING

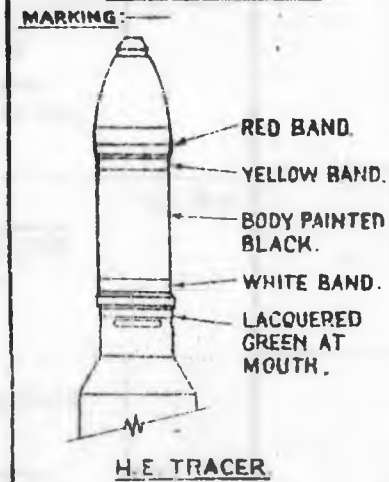
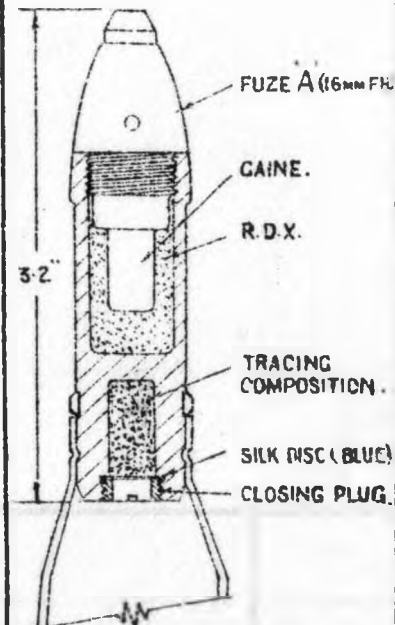
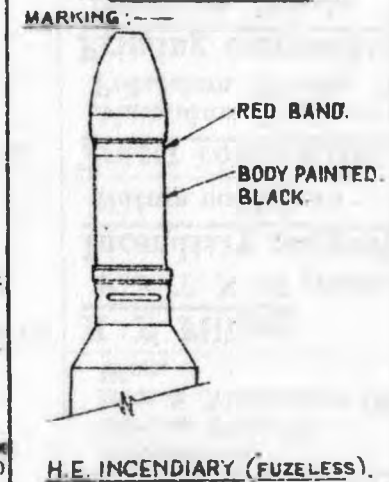
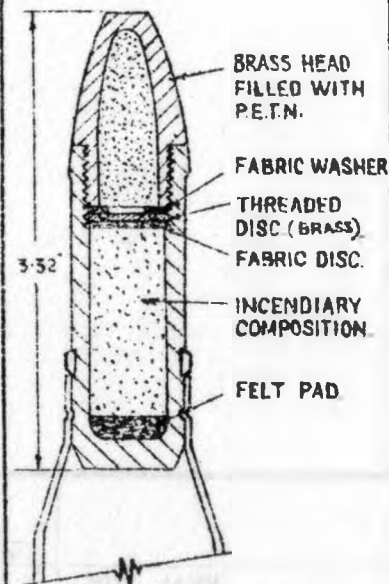
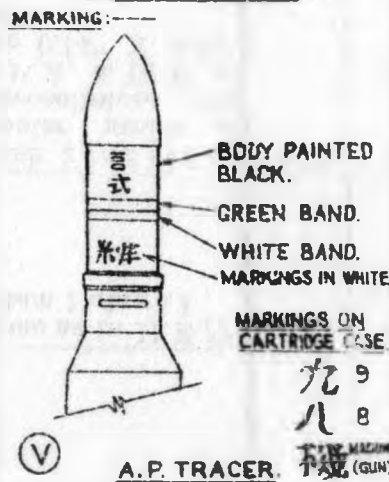
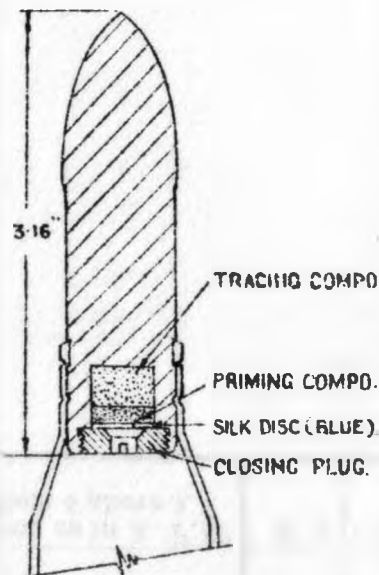
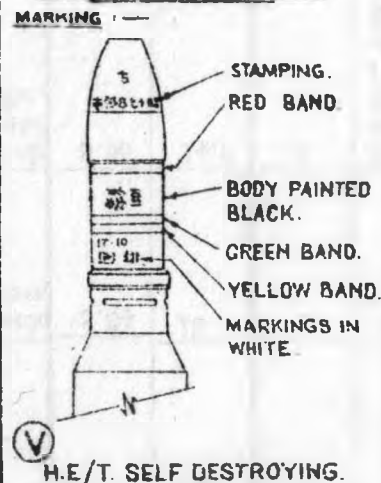
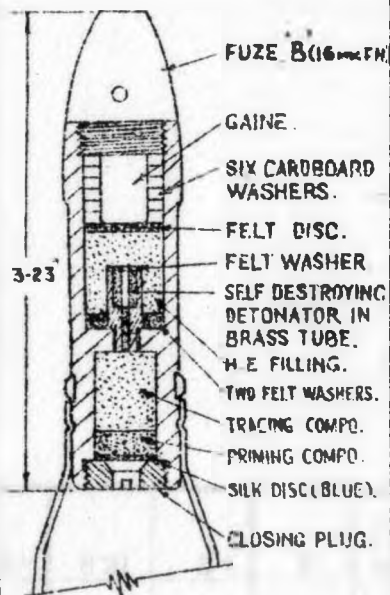
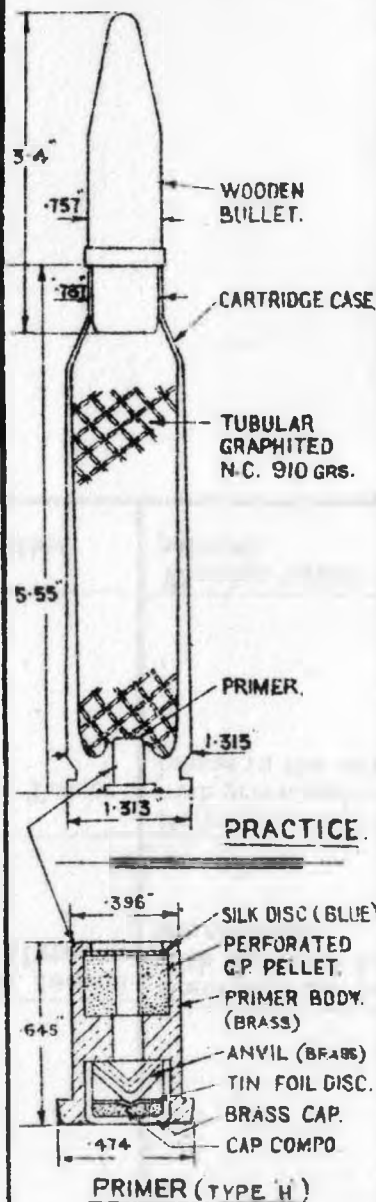
11. No details of bulk packing are known, but the round received in Kirkee was packed in a cylindrical cardboard carton, closed at one end and having a hollow wooden cylinder inside the closed end to receive the shell. Two labels were pasted on the carton giving the type of round, gun in which fired and the date and place of manufacture.

HANDLING AND TRANSPORT

(Of captured ammunition by Ordnance)

12. See J.A.Ls. B. 1 and B. 15.

	H.E./T.	H.E./T/SD	H.E./I	A P./T	Practice
EXPLOSION/FIRE RISK	1½ oz.	1½ oz.	1½ oz.	1-oz.	1-oz.
GROUP CLASSIFICATION	VI, Z	VI, Z	VI, Z	VI, X	VI, X
CLASSIFICATION FOR SEA TRANSPORT	O. A. S. (C)				



NOTES

- 1) ALL THREADS ARE R.H.T EXCEPT WHERE OTHERWISE STATED.
- 2) ALL SHELL & COMPONENTS MADE OF STEEL AND CARTRIDGE CASE MADE OF BRASS EXCEPT WHERE OTHERWISE STATED.

JAPANESE 20mm. RIMLESS AMMUNITION.

TYPE '98 A.A. A.T. MACHINE GUN.

TYPICAL CARTRIDGE & DETAILS OF SHELL FILLING.

RESTRICTED.**CARTRIDGES S. A. 20-MM. TYPE '98 A. A./A T. MACHINE GUN.**

Serial No.	Type of Cartridge	Markings.	Complete Round		Propellant		Shell (Fuzed)/Bullet.			Fuze.
			Length (Ins.)	Weight (ozs)	Weight (ozs.)	Nature.	Length (Ins.)	Weight filled (ozs.)	Filling.	
1	H.E. Tracer	Shell body painted black with red band on shoulder, yellow band below shoulder and white band above driving band.	8.5	14	2	Cylindrical grains of graphited Nitro-cellulose with D.N. T. and D.P.A. size, 0.11" length 0.058" diameter.	3.2	4.5	<u>H. E. filling</u> R. D. X.-65 grs. <u>Tracer Composition.</u> Strontium Nitrate, Magnesium, Aluminium and wax. <u>Priming Composition</u> Barium peroxide, Magnesium and wax. } 34 grs.	"A" 16-mm. F. H. believed Type '93 (small).
2	V H.E. Tracer self-destroying.	Shell body painted black with red band on shoulder, green and white bands in the middle.	8.2	14.8	2	Believed to be the same as in A. P. T. (Item 4 below).	3.23	4.7	<u>H. E. filling.</u> G. P. See para 7, Page 2 <u>Self-destroying element</u> Mealed gunpowder. <u>Tracer composition.</u> Same as Serial 1. <u>Priming composition.</u> Magnesium, Barium Peroxide, Iron & Aluminium (traces), Wax. } 74 grs.	"B" 16-mm. F. H. believed Type '100 (small)
3	H.E. Incendiary (fuzeless)	Shell painted black with red band below the shoulder.	8.34	13	2	Same as in H.E./T. (Item 1 above)	3.32	3.85	<u>H. E. Filling.</u> P. E. T. N.-67 grains. <u>Incendiary composition</u> Nature not known ... 136 grs.	...
4	V A.P. Tracer	Bullet painted black with green and white bands in the middle.	8.35	14.6	2	Black graphited tubular grains of Nitrocellulose with D. P. A. & D. N. T. size 0.14" X 0.65" X 0.01".	3.16	5.5	<u>Tracer composition.</u> Aluminium, Magnesium and Potassium Nitrate, Wax. <u>Priming composition.</u> Potassium Nitrate, Barium peroxide Magnesium powder, and Wax. } 33 grs.	...
5	V Practice	Wooden bullet unpainted.	8.31	9.4	2	Same as in A. P./T. (Item 4 above).	3.4	0.2		

THIS LEAFLET MUST NOT
FALL INTO ENEMY HANDS

D. OF A. (INDIA)

JAPANESE AMMUNITION LEAFLETS

SECTION B

LEAFLET B 18

**CARTRIDGES S. A., 20-MM.
FOR
TYPE '99 AIRCRAFT CANNON**

GENERAL

Of all the types of 20-mm. equipment, the Type '99 A. C. Cannons were the most extensively used in the Burma campaign and large quantities of ammunition were captured. The 20-mm. aircraft cannon is reported to be used in the majority of Japanese planes, both as fixed guns in fighter planes and as flexible guns in bombing planes.

2. Four versions of this cannon are known to exist namely :—

- (i) Fixed A.C. Cannon Mk. I.
- (ii) Fixed A.C. Cannon Mk. II.
- (iii) Flexible A.C. Cannon Mk. I, and
- (iv) Flexible A.C. Cannon Mk. II

These cannons have often been converted to ground weapons and used in defensive positions. In some instances they have been found on well constructed mounts with A.A. or A.T. sights attached: in others they were on poorly constructed, hastily improvised tripods and were not equipped with sights.

3. The following data, taken from reports, will be useful :—

	Fixed A.C. Cannon Mk. I	Flexible A.C. Cannon Mk. I	Fixed A.C. Cannon Mk. II	Flexible A.C. Cannon Mk. II
Length of barrel	32 $\frac{1}{4}$ -ins.	30-ins.	30-ins.	30-ins.
Muzzle Velocity	1960 f. s.	1930 f. s.	2437 f. s.	2800 f. s.
Effective Range	550 yds.	—	600-700-yds.	300-yds.
Operation	Gas	Blow-back	Gas	Gas
Rifling	9 grooves	9 grooves	9 grooves	9 grooves

4. It should be noted that the ammunition for the different marks of these cannons is not interchangeable as the size of the cartridge cases differs; the cartridge case for Mk. I cannons is 2.8-in. long as against 3.9-in. for the one used in Mk. II. So far as is known the projectiles can be fired from any of these weapons.

5. A chart giving the summarised details of all the known types of ammunition is included in this Leaflet; those items marked with a 'V' have been critically examined at Kirkee and the details given are correct; details of other types, which are taken from reports are given for the sake of completeness.

DESCRIPTION

6. The drawings at Plates A and B show the general appearance and details of construction of all the known types. Only typical rounds have been included in the Plates, and except for the colour markings and slight differences in internal dimensions etc., they are representative of the particular type.

CARTRIDGE

7. A drawing of a typical cartridge case is shown in Plate A. The case is made of brass with a rimless base, the anvil being formed integral with the case. It has a very short neck and is secured on to the projectile by three long or six short crimps.

Dimensions are given in Plate A. The internal walls are well finished with brass coloured lacquer or varnish.

As stated above, another type of cartridge case (Mk. II) is known to be used, which is similar in construction but of larger dimensions. The length of case is 3.9-in. No sample of this type of case has been received at Kirkee.

8. Percussion cap—The cap is of brass, of the Berdan type, and is pressed into the case. The caps of the rounds-examined here were found to hold a charge varying from 1.3 grs. to 1.9 grs. of a composition similar to British 'A' mixture e. g. mercury fulminate, potassium chlorate and antimony sulphide.

9. Propellant—The propellant is loose in the case and consists of N.C. powder; full details are given in the chart at the end of this Leaflet.

No decoppering foil was found in the rounds examined here.

PROJECTILES

10. H. E. (dark brown body)—The shell body is machined from a steel bar and is drilled out from the nose to hold the H.E. filling. The inside walls are well finished with black lacquer or varnish. Below the driving band is a cannellure for the attachment of the cartridge case. The filling consists of about 160 grs. of Pentolite (40:60) having a recess in the top for the fuze gaine.

11. H.E. Tracer (red body with 1 white band)—The shell body follows the usual H.E./T construction. Dimensions are shown in Plate A. At the base of the tracer cavity is a push-fit steel sleeve holding a priming composition and closed by a thin brass disc secured in place by the wall of the sleeve being spun over.

Details of fillings are given in the chart.

12. H. E. Tracer Self-Destroying (Red body with 3 white bands)—The construction of this shell is identical to that of H.E. tracer shell (Para 11 above) with the difference that it holds a self destroying element, which consists of a black charge (presumably gunpowder) housed in the central partition and connected by black powder pellets to the H. E. filling.

It is important to note that the gaine of the fuze (Type 'D') used in this shell, is reported to hold black powder charge pellets in the gaine filling (P.E.T.N.) also.

13. H.E. Incendiary (greenish yellow with 2 white bands)—The shell is very similar to the H.E. shell (Para 10) except for the internal cavity which tapers towards the base.

It holds an H.E. filling (T.N.T.) in the lower portion above which is an aluminium capsule containing white phosphorus. Above and surrounding this capsule is a pyrotechnic mixture consisting chiefly of H.C. powder ; for details see chart.

14. Armour Piercing (black body)—This is a normal A.P. bullet and can be distinguished by its black colour and solid steel body with a pointed nose. None of these have been examined at Kirkee.

15. Armour Piercing Incendiary (white body)—This has a soft copper nose cap 0.016-in. thick, extending 7/16-in. from the tip of the bullet. The incendiary cavity is drilled from the base and is threaded internally to take the steel closing plug.

The filling is reported to be a green and silver coloured powder ; full details are not available.

16. Bag Burster Tracer (red body)—This round is reported (being the last one loaded into the magazine) to be the first round fired from the cannon to break the tape cap over the muzzle. The bullet can be distinguished by its red colour and blunt nose. The tracer cavity which is drilled from the base is closed by a thin brass disc, secured to the base of the bullet by being spun over. Details of the tracer composition are not known.

17. Training Round (black body)—According to information available, the bullet is of the same weight and shape as the fuze rounds. It has the appearance of typical training ammunition where weight and shape of the projectile is important and it is desired to eliminate explosive damage to the target.

FUZES

18. The fuzes used with the various rounds are shown in the fuze column in the charts at the end of this Leaflet and have been already described in J.A.L. B 15.

IDENTIFICATION

19. See Plate A, J.A.L. B 15. These cartridges can be identified from other types of 20-mm. ammunition by the length of the cartridge case which is almost equal to that of the fuze shell. Note the elaborate system of colour bands, and the many varieties of shell in existence.

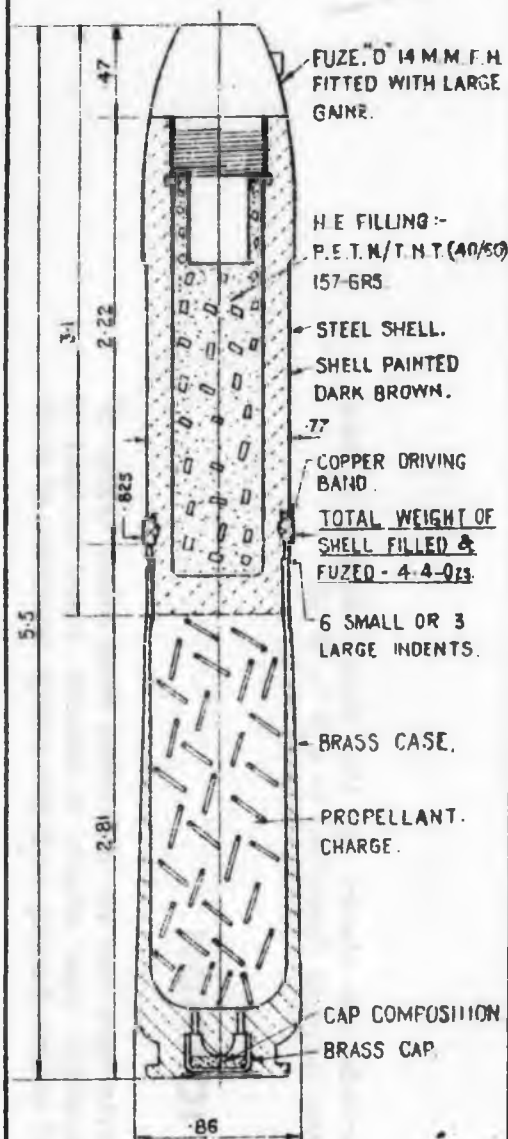
The ammunition used in the Mk. II cannons is known to have a longer cartridge case but up to date no samples have been received here.

HANDLING AND TRANSPORT

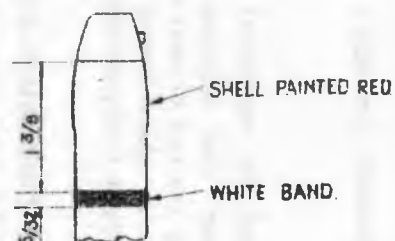
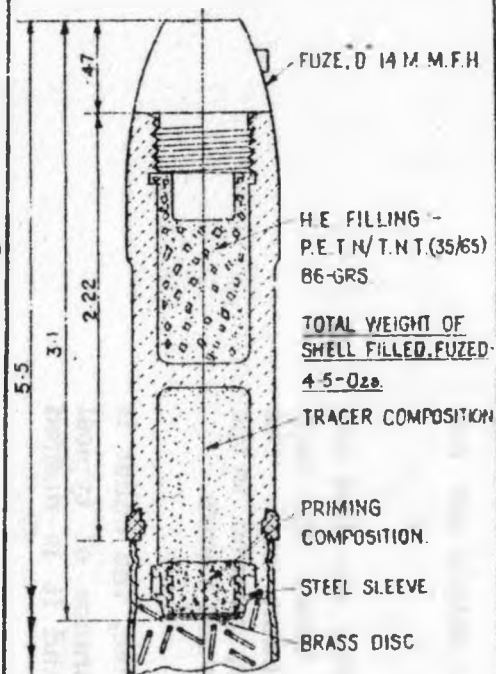
(Of captured ammunition by Ordnance)

20. See J.A.L. B1 Para. 20.

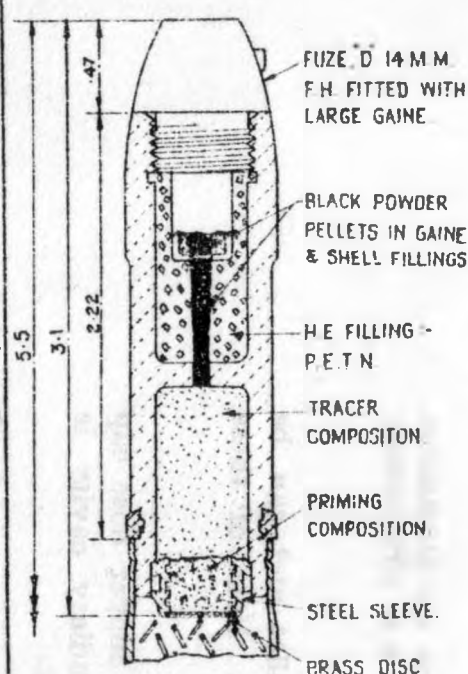
	H E.	H.E./T.	H.E./T. S.D.	H.E./I.	A.P.	A.P./I	B.B.T.	Training
EXPLOSION/FIRE RISK. (Per 100 Rds.)	3-lbs.	4-lbs.	3½-lbs.	3¼-lbs.	1½-lbs.	2½-lbs.	2¼-lbs.	1½-lbs.
GROUP CLASSIFICA- TION.	VI, Y	VI, Z	VI, Z	XII, Y	VI, Y	XII, Y	VI, Z	VI, Y
CLASSIFICATION FOR SEA TRANS- PORT	O. A. S. (c)							



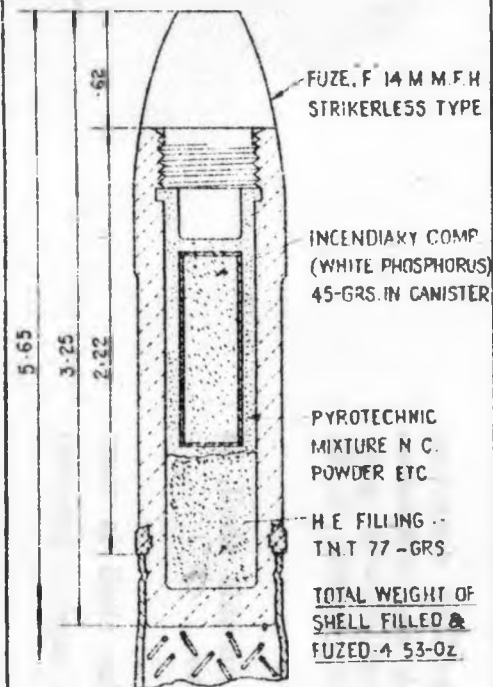
H.E. ROUND
WITH
TYPICAL CASE.



H.E. TRACER



H.E. TRACER
SELF DESTROYING



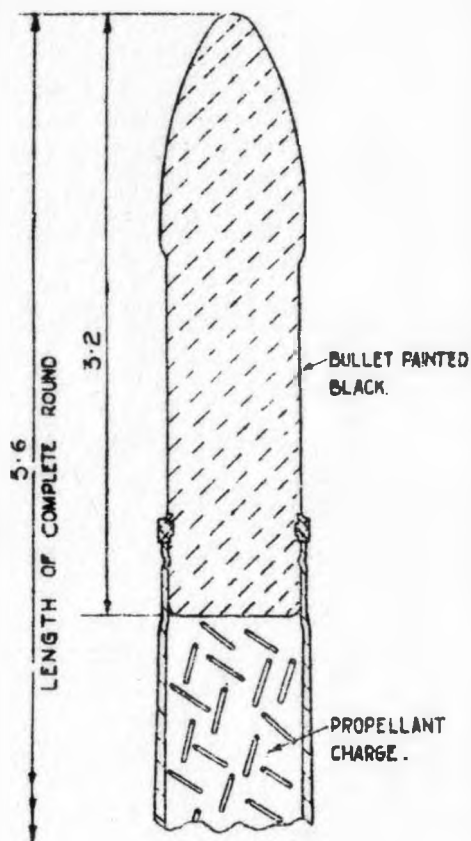
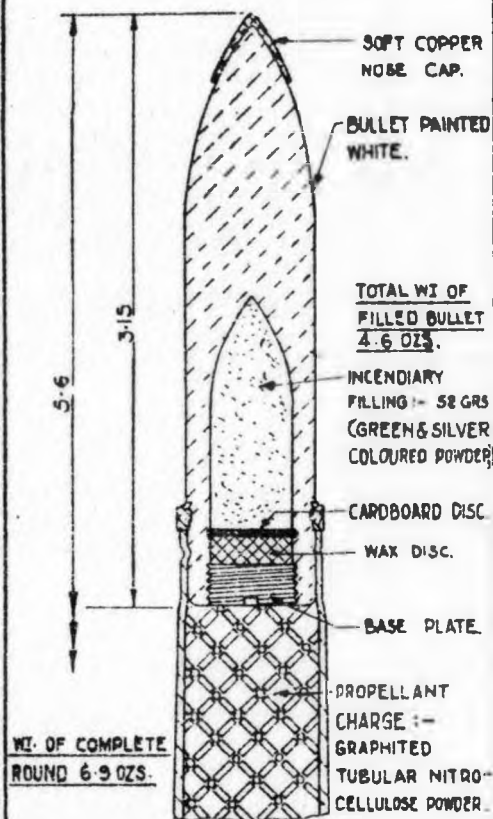
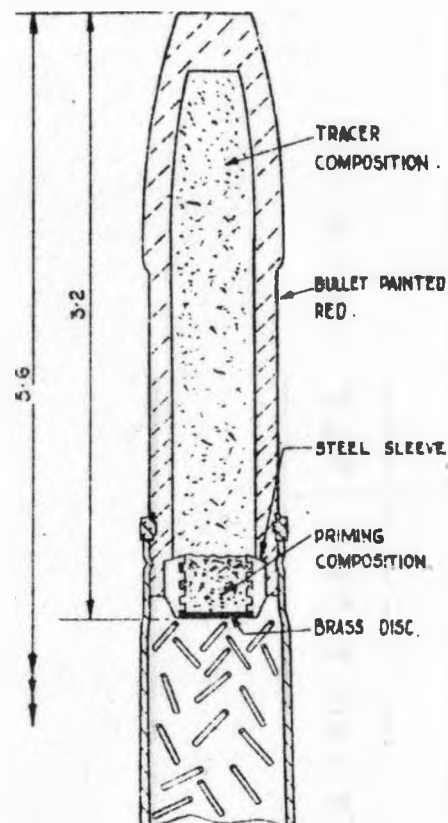
H.E. INCENDIARY

JAPANESE 20-M.M. RIMLESS AMMUNITION
 FOR
 TYPE '99 AIRCRAFT CANNON.
 TYPICAL CARTRIDGE & DETAILS OF SHELL

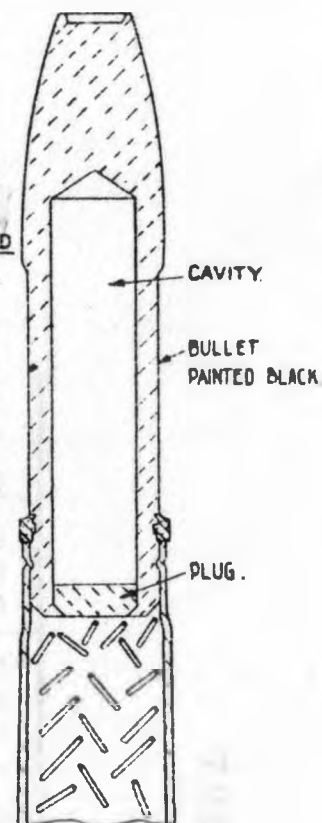
DIMENSIONS IN INCHES

C.I. AMN S/1403
 KIRKEE, FEB. 46.

G.P.Z.P. Poona. 1946

A.P.A.P. INCENDIARYBAG BURSTER TRACER

REPORTED TO
BE OF THE
SAME SIZE
& WT. AS FUZED
PROJECTILES.

TRAINING.

JAPANESE 20 M.M. RIMLESS AMMUNITION
FOR
TYPE '99 AIRCRAFT CANNON.
DETAILS OF SHELL.

DIMENSIONS IN INCHES

C-1AMN 3/1404
KIRKEE, FEB. 46

D.P. Z.F. POONA. 1946.

Serial No.	Type of Cartridge	Markings	Complete Round		Propellant		Shell (Fuzed)/Bullet			Fuze
			Length (Ins.)	Weight (Ozs.)	Weight (Ozs.)	Nature	Length (Ins.)	Weight filled (Ozs.)	Filling	
1	High Explosive	a) Shell painted dark brown.	5.5	6.8	..	..	3.25	4.4	<u>H. E. Filling.</u> P.E.T.N./T.N.T. (40/60) — 157 grs.	"D" 14-mm F.H., fitted with large gaine
		b) Shell painted orange yellow	5.5	6.8	..	..	3.25	4.4	Details not available	Same as in (a) above
2	High Explosive Tracer	V a) Shell painted red with one white band	5.5	6.9	..	..	3.1	4.5	<u>H. E. Filling.</u> P.E.T.N./T.N.T. (35/65) — 86 grs. <u>Tracer Composition.</u> Strontium Peroxide, Magnesium, Aluminium & Iron oxides. <u>Priming Composition.</u> Strontium Peroxide, Barium Peroxide, Magnesium, Aluminium & Iron.	"D" 14-mm. F.H.

Serial No.	Type of Cartridge	Markings	Complete Round		Propellant		Shell (Fuzed)/Bullet			Fuze	
			Length (Ins.)	Weight (Ozs.)	Weight (Ozs.)	Nature	Length (Ins.)	Weight filled (Ozs.)	Filling		
	High Explosive Tracer	b) Shell painted red with two white bands	5.65	6.9	0.47	Graphited chopped tubular nitrocellulose powder	3.26	4.5	<u>H. E. Filling.</u> P.E.T.N./T.N.T. (50/50) — 92 grs. <u>Tracer Composition.</u> Strontium Peroxide, Strontium Chloride, Magnesium Metal, Zinc Metal & Wax. <u>Priming Composition</u> Barium Peroxide, Magnesium Metal.	85 Grs	"C" 14-mm. F.H.
		V c) Shell painted red with three white bands	5.65	6.8	.46	Graphited chopped tubular nitrocellulose powder	3.25	4.4	<u>H. E. Filling</u> P.E.T.N./T.N.T. (15/85) — 92.6 grs. <u>Tracer Composition.</u> Strontium Peroxide, Magnesium, Iron & Aluminium oxides, <u>Priming Composition</u> Strontium Peroxide, Barium Peroxide Aluminium, Iron, Wax.	85 Grs.	

Serial No	Type of Cartridge	Markings	Complete Round.		Propellant.		Shell (Fuzed)/Bullet			Fuze
			Length (Ins.)	Weight (ozs.)	Weight (ozs.)	Nature	Length. (Ins.)	Weight filled (ozs.)	Filling	
3	H.E.Tracer, self-des- troying.	Shell painted red.	5.5	—	—	—	3.1	—	<u>H. E. Filling.</u> P. E. T. N. <u>Tracer Composition</u> Barium carbonate, Magnesium, Strontium Chlorate, Iron, Manganese. <u>Self-destroying Com- position.</u> Gun powder.	"D" 14-mm. F. H. The gaine fitted in this fuze is reported to hold black powder pellets in the gaine filling.
4	H.E. Incendiary.	(a) Shell painted yellow.	5.5	—	—	—	3.25	—	<u>H. E. Filling.</u> T. N. T. - 37 grs. <u>Incendiary Composition</u> White phosphorus. Below H.E. Filling are 7 lead shots.	"D" 14-mm. F.H.
		(b) Shell painted greenish yellow.	5.5	—	—	—	3.25	—	<u>H. E. Filling</u> T.N.T. - 77 grs. <u>Incendiary Composition</u> White Phosphorus - 45 grs. <u>Pyrotechnic mixture</u> N. C., Sodium nitrate, Iron, Magnesium and Zinc.	"D" 14-mm. F. H.
		(c) Shell painted greenish yellow with one white band.	5.65	6.9	—	—	3.25	4.5	Fillings reported to be similar to 'b' above.	"F" 14-mm. F.H. Strikerless type.

Serial No.	Type of Cartridge	Markings	Complete Round		Propellant		Shell (Fuzed)/Bullet			Fuze
			Length (Ins.)	Weight (ozs.)	Weight (ozs.)	Nature	Length (Ins.)	Weight filled (ozs.)	Filling	
		V (d) Shell painted greenish yellow with two white bands.	5.65	6.9	.47	Graphited tubular powder, 0.1"x0.03" x0.01" N.C. D.P.A., D.N.T.	3.25	4.4	<u>H. E. Filling.</u> T.N.T. (m.p. 80°C) - 52 grains. <u>Incendiary Composition</u> White phosphorus. <u>Pyrotechnic mixture</u> Iron, Aluminium, Graphite and Propellant N.C. Powder with D.P.A.	"F" 14-mm. F. H., Strikerless type
		V (e) Shell painted greenish yellow with three white bands.	5.65	6.9	.47	Same as in "d" above.	3.25	4.4	<u>H. E. Filling.</u> T.N.T. (m.p. 81°C) - 55 grains. <u>Incendiary Composition</u> Same as 'd' above. - 45 grains. <u>Pyrotechnic mixture</u> Same as 'd' above. - 15 grains.	"E" 14-mm. F.H., Rotor type.
5	Armour Piercing.	Bullet painted black.	5.6	—	—	—	3.2	—	—	—
6	Armour Piercing Incendiary	Bullet painted white (A soft copper cap fitted on the nose).	5.6	6.9	—	Same as in 2 (b)	3.15	4.6	<u>Incendiary filling</u> Green & silver coloured } 52 grains; Powder: details } not available.	—
7	Bag Burster Tracer.	Bullet painted red (a blunt nose).	5.6	—	—	—	3.2	—	Filling details not known.	—
8	Training round.	Bullet painted black.	—	—	—	—	Reported to be of the same weight and shape as of fuzed projectiles.		—	—

Restricted

THIS LEAFLET MUST NOT
FALL INTO ENEMY HANDS

D. OF A. (INDIA)

JAPANESE AMMUNITION LEAFLETS

SECTION B
LEAFLET B 19

CARTRIDGES, S.A., 20-mm., FOR Ho 5 A/C. CANNON.

GENERAL

The Ho 5 A/C Cannon is a scaled up version of the ordinary Japanese 12.7-mm. A./C. Cannon and in design and construction represents an immense improvement over the previous 20-mm. A. M. Gs. It is recoil-operated, belt-fed, air-cooled machine gun and it is mounted either in the wing or in a power operated turret. It is fired electrically by remote control and works on the Browning principle.

2. The cyclic rate of fire of this gun is as high as 950 r. p. m. Muzzle velocities of 2300 f. s. with A. P. ammunition and 2430 f. s. with H. E. ammunition are obtained. It has a penetration performance of 7/8-in. homogeneous plate at 20° at 200 yards, and 1/2-in. at 20° at 850 yards. The effective range is believed to be 600 yards. The maximum weight lifting capacity of the belt, which is of the disintegrating metal link type, is 62-lbs.

3. So far as is known, four types of ammunition are believed to be used in this equipment and these are shown in the drawing at Plate A. Only three of these projectiles have actually been examined at Kirkee and these are indicated on the drawing by a 'V'. A chart summarising all the data available on these rounds is also included at the end of this Leaflet.

DESCRIPTION

CARTRIDGE CASE

4. The case is of brass of the rimless S. A. A. type with a slight taper towards the neck and is 3.7-ins. long. A primer Type G, described in J. A. L. E. 2 (b), is pressed into the base of the case. The case is slightly necked and is secured to the projectile by 3 long or 6 short indents.

PROPELLANT

5. In the cartridges examined at Kirkee the propellant charge consisted of graphited tubular grains of N. C. stabilised with D. P. A. and D. N. T., a small piece of lead/tinfoil being incorporated as a decoppering material. Other rounds, not examined here, are reported to use an N. C. propellant containing a small quantity of N. G. For details see chart at end of Leaflet.

PROJECTILES

6. A. P. /Tracer. This is a solid steel shot recessed at the base to take the tracing and priming compositions and closed by a perforated screwed plug. The projectile is painted black with one green band round the middle and gives a red trace when fired.

Another A. P./T. round similar to the above has been examined at Kirkee. The only difference is in the tracing composition, and this is believed to give a greenish white trace. The projectile is painted black with a green and white band on the body.

7. **H. E./I. Fuzeless.** This round is somewhat similar to the Japanese 12.7-mm. H. E./I. shell described in para. 15 of J. A. L. B. 12. The shell consists of a steel body containing an incendiary composition of aluminium, barium nitrate and magnesium. A hollow brass nose piece screws into the nose of the shell body; externally this resembles a fuze, but is actually hollow and is filled with R. D. X. and P. E. T. N. On impact the nose crushes, detonating the H. E. filling and igniting the incendiary composition.

8. **H. E./ Incendiary.** Shells with two different colour markings may be found, but they are essentially the same. The shell body may be painted black without any colour bands, or black overall with yellow band in the middle and red band just below the fuze. The former takes the one piece strikerless fuze designated Type H in para. 6 of J. A. L. B. 15. The shell with the colour bands take the Type G fuze which is reported to be identical with the Type 100 (small) fuze, except that the body is made of aluminium alloy.

9. **H. E. Incendiary.** Same as above but the body is painted silver-grey without any colour bands. Fuze Type J, a two-piece strikerless type without any separate gaine, is used.

10. **Practice.** This is a practice shell of exact shape and dimensions as the H. E. Incendiary shell when fuzed. It has no filling and is closed at the base by a screwed plug. This round is often referred to as an empty cartridge.

IDENTIFICATION

11. The comparative photograph in J. A. L. B. 15 will be useful in distinguishing ammunition for the 20-mm. Ho 5 from other rounds of the same calibre. Note the length of the cartridge case which is 3.7-ins.

12. A different colour scheme is used in this ammunition. The marking on these projectiles indicates a tendency for the Army to abandon its elaborate system of colour bands, and rely on the difference in external appearance to identify the projectiles. In almost all cases, colour bands are used only where no external difference exists.

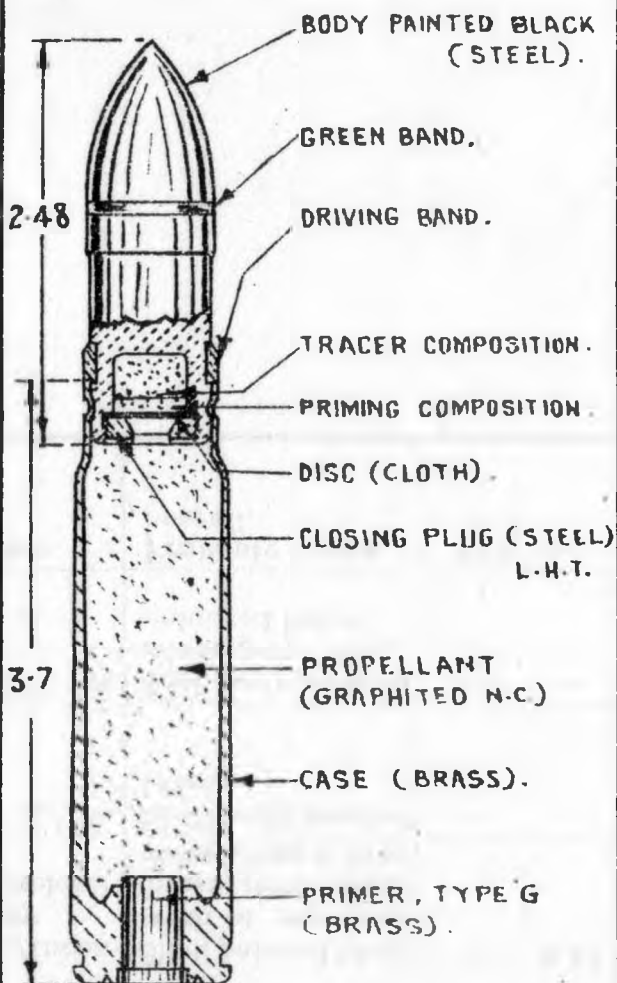
HANDLING AND TRANSPORT

(Of captured ammunition by Ordnance)

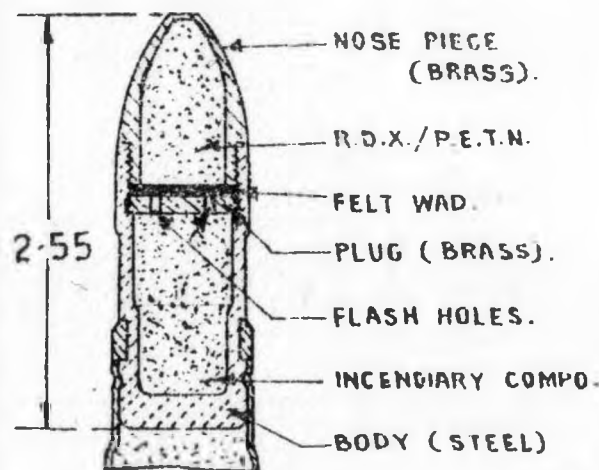
13. See J.A.Ls. B. 1 and B. 15.

	H.E./T.	H.E./I. Fuzeless	H. E./I.	Practice
EXPLOSION/FIRE RISK (Per rd.)	$\frac{1}{2}$ oz.	$\frac{3}{4}$ oz	$\frac{2}{3}$ oz	$\frac{1}{3}$ oz.
GROUP CLASSIFICATION	VI Cat. X	VI Cat. Z	VI Cat. Z	VI Cat. X
CLASSIFICATION FOR SEA TRANSPORT	O. A. S. (C)	O. A. S. (C)	O. A. S. (C)	O. A. S. (C)

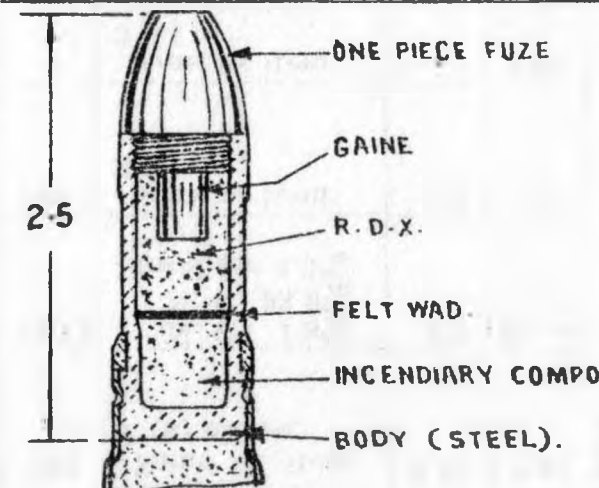
RESTRICTED



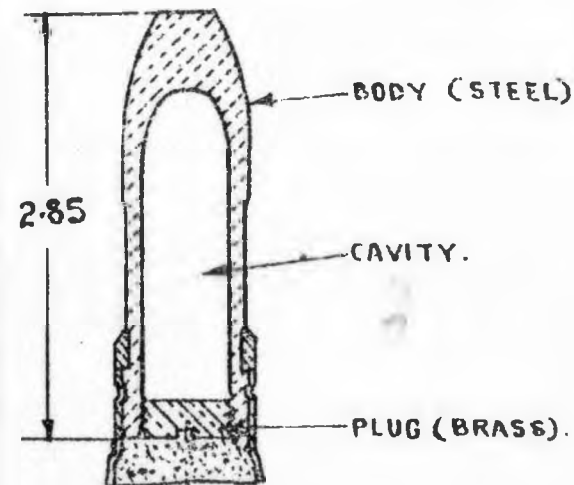
A.P. TRACER. (V)



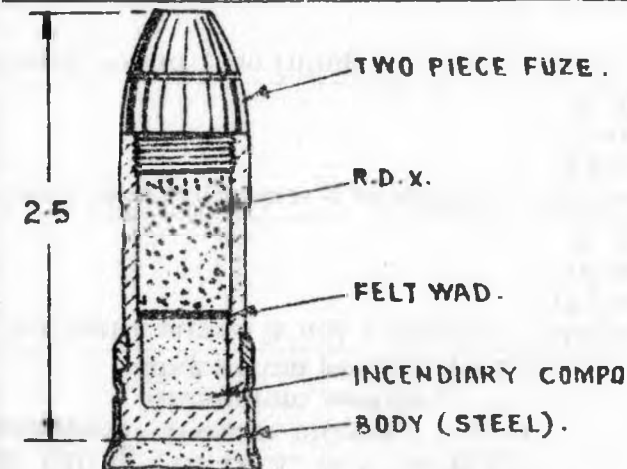
H.E. INCENDIARY (FUZELESS). (V)



H.E. INCENDIARY.



PRACTICE.



H.E. INCENDIARY.

— JAPANESE CARTRIDGES, S. A., 20 MM. —
— FOR —
— TYPE HO 5 A C. CANNON. —

DIMENSIONS IN INCHES.

C.I. AMN. 5/1326
KIRKEE, NOV. 45

G.P.F. POONA, 1945.

CARTRIDGES, S.A., 20-mm. FOR Ho. 5. A. C. CANNON

Serial No.	Type of Cartridge	Markings	COMPLETE ROUND		PROPELLANT		SHELL (Fuzed) / BULLET			Fuze
			Length	Weight	Weight	Nature	Length	Filled	Filling	
			ins.	ozs.	grs.		ins.	ozs.		
1.	V (a) A.P./ Tracer	Bullet painted black, green band on body.	5.8	8.28	305	Black graphited grains of N. C. + Graphite + Volatile 93.0% D. P. A. 1.0% D. N. T. 6.0%	2.48	4.18	Tracer composition :— Aluminium Powder, Strontium nitrate, Magnesium powder and wax. Priming Composition :— Barium Nitrate, Magnesium powder, Iron & aluminium oxides and wax, Colour of trace red.	—
	V (b) A.P./ Tracer	Bullet painted black, white and green bands on body.	5.8	8.16	294	Same as item 1 (a) above.	2.48	4.16	Tracer composition :— Aluminium Powder, Potassium nitrate, Magnesium powder, Barium peroxide and wax. Priming composition :— Potassium nitrate, Magnesium powder, Barium peroxide and wax.	—
2.	V H. E./Incendiary (Fuzeless)	Shell painted black with a screwed brass nose piece resembling a fuze.	5.8	6.94	292	Same as item 1 (a) above.	2.55	2.91	H E filling—R. D. X. & P. E. T N. Incendiary—Barium nitrate, Aluminium powder, Magnesium powder & wax	—
3.	(a) H.E./Inc.	Shell body painted black.	—	—	330.2	N. G. 1.8% N. C. 93.9% Stabiliser 4.3%	2.5	About 2.3	Chemical analysis is not available	Strikerless (1 piece) 16-mm F. H.
	(b) H.E./Inc.	Shell body painted silver grey. No coloured bands.	—	—	330.2	Same as item 3 (a)	2.5	2.5	Chemical analysis is not available	Strikerless (2 piece) 16-mm F. H.
4.	Practice	Probably black overall.	2.35	—	—	Same as item 3 (a)	—	2.85	Empty round (no filling)	—

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JAPANESE AMMUNITION LEAFLETS

SECTION B

LEAFLET B. 21

CARTRIDGES, S.A., A.A./A.T., 25-mm. ('98-in.)

GENERAL

This ammunition is used in a multiple barrelled full automatic high angle gun which is primarily for Naval A.A. use. The gun is known as the 25-mm. A.A./A.T. gun Type '96, Model 2. Its muzzle velocity is reported to be 2978 f.s. with a maximum horizontal range of 5470 yds. and a vertical range of 12000 ft. A.P. Ammunition, in view of the high velocity of the weapon, should be very effective against lightly armoured tanks, vehicles and vessels.

2. The ammunition follows orthodox S.A.A. design as used in the British Service for the larger calibres. In the form of case, depth of bullet seating, etc. it conforms generally to our 15-mm. BESA cartridge. The standard of workmanship and finish of samples examined at Kirkee is high and comparable with British standards.

3. The following types of ammunition for this gun have been reported:—

(a) **H.E./Tracer Shell, fuzed.**—The body of the shell is painted a red or orange colour with or without a green band just below the fuze.

(b) **H.E. fuzed.**—The body of the shell is painted a chocolate or dark maroon colour down to the driving band, with a green band just below the fuze.

(c) **H.E./Tracer with self-destroying element.**—The body of the shell is painted a red colour, with or without a green band just below the fuze.

(d) **H.E./Incendiary, fuzed.**—The body of the shell is painted a green colour.

(e) **A.P./Tracer.**—Shell body is painted a smoky blue colour with or without a white tip or it may be painted black overall as described in para. 20 below.

4. Of the above ammunition only two natures have been examined at Kirkee, i.e. Para. 3 (a) and (b). A detailed description of these is given below, which may be taken generally as typical of 25-mm. ammunition.

DESCRIPTION—CARTRIDGE

5. Details of the Cartridge are clearly shown in Plates A and B. External appearance is shown in Plate C. It is a solid drawn brass case of the rimless S.A.A. type. The case is heavily necked and attached to the shell body by squeezing or rolling the neck round the rear driving band with the mouth of the case coned tightly at the rear of the forward driving band. Typical markings on the base of the case are reproduced in the Plates.

Dimensions of the cases are given in the Plates. The cubic capacity for ballistic purposes is 129 c. cs. The internal walls of the case were lacquered or varnished with a heat resisting black finish. Although those examined were brass cases it is known that steel cases are also used.

Propellant

6. The propellant is loose in the case, similar to an S.A.A. cartridge. The charge consisted of 3.7-ozs. of a graphited tubular N.C. powder with D.N.T. and diphenylamine. No decoppering material was found.

Primer

7. This is made of brass throughout and the details are clearly shown in Plate D. It is of the "push in" type and is firmly fixed in the cartridge case. The cap is of the loose anvil Boxer type. See also J.A.L. E. 2.

FUZE (Type 1)

8. Details of construction and dimensions of the fuze are shown in Plate D. The assembly sequence of components is shown in Plate C. It should be noted that in this Plate the centrifugal bolt (13) is described incorrectly as a detent.

9. For convenience of description the fuze may be divided into seven main components:—

- (i) Nose portion of the body (18), which is made of brass and houses the striker (17).
- (ii) Main body portion (16) made of brass. This is threaded externally at the upper end (R.H.T.) to take the nose portion, while the lower half is threaded externally (R.H.T.) to screw into the shell. It is also threaded internally (L.H.T.) to take the gaine (5) which secures in position the holder for the detonator and shutter assembly (8).
- (iii) Striker (17), which comprises the head made of duralumin and a steel needle, parkerised finish.
- (iv) The centrifugal bolt (13), and steel spring (14).
- (v) Holder (8) made of white metal or plated brass, which houses the detonator and safety shutter (11).
- (vi) Gaine (5) made of light alloy.
- (vii) Brass booster plug (7), which boosts the flash from the detonator and initiates the gaine.

Safety Devices

10. (a) A centrifugal bolt (13) which under pressure of the spring locks the striker (17) and prevents it from impinging on the detonator during handling and transport, and in the bore of the gun during acceleration.

(b) A solid safety shutter (11) which masks the flash hole in the fuze diaphragm until the shutter is opened by centrifugal force on deceleration after firing.

Action

11. On firing the striker (17) sets back on to the centrifugal bolt (13) which also sets back on to its seating in the fuze. This prevents the bolt (13) from opening under the action of centrifugal force and retains the striker locked. Similarly the safety shutter sets back and continues to mask the flash hole in case of any failure such as might occur in the centrifugal locking device. On deceleration the centrifugal bolt flies out against the pressure of its spring thus releasing the striker. At the same time the shutter opens exposing the flash channel. The striker is now free to be driven by impact on to the detonator.

12. The striker is extremely light and presumably creep action is sufficient to retain it from the detonator. No spring is used and fuze must be very sensitive.

SHELL

H.E./Tracer (Orange coloured body)

13. Details of construction and dimensions of the shell are shown in Plate A. External appearance of the shell is shown in Plate C.

14. The shell body is machined from steel bar and is streamlined, the angle of taper being approximately 10°. It follows usual small arm H E/T. construction. The dimensions of both cavities are given in Plate A. Internal walls have a black lacquer or varnish finish. The two driving bands are made of a copper alloy both having about the same degree of hardness. The steel washer closing the tracer cavity is secured in by the base of the shell being spun over.

15. The filling consists of three prepressed blocks of T.N.T./Aluminium (60-40), the total weight of the three pellets being 145 grains. The charge weight percentage is approximately 3.85% for this H.E./T. shell against 6.65% for the H.E. shell, see para. 17 below.

16. The tracer cavity contains 135 grains of priming and tracing composition.

H. E. Shell (dark maroon coloured body)

17. Details of construction and dimensions of the shell are shown in Plate B. External appearance of the shell is shown in Plate C.

18. The shell body is generally similar in construction to the shell described in para. 13 above. The following are the main differences:—

- (i) The body is longer by nearly .2-in.
- (ii) The H. E. shell has no tracer cavity; it is drilled out from the nose to its full length to take an H. E. filling.
- (iii) The weight of the H. E. filling is 257 grains against the 145 grains of the H.E./T. shell.

RECENT REPORTS

19. American information of October 1944 (G. H. Q. (J) M. I. D., Periodical Technical Summary No. 36 of March 1945) indicates that the fuze described in para. 8 above is known to the Japanese as the Type (or Model) 1. The report refers to a new modified fuze, designated Model 4 by the Japanese, which has been recovered at Hollandia. There are several differences between this fuze and the Model 1 fuze described above. The lower portion of the fuze body housing the detonator and shutter in its holder (8) has been eliminated shortening the body by about .2-in. The overall length of this fuze including gaine is 1.71-in. against 1.98-in. for the Model 1. The percussion cap is a brass inverted cup located in the top of the gaine body and held there with sealing compound. A lead azide pellet is embedded in the C. E. filling of the gaine directly below the percussion cap. Other changes include a more pointed nose and a longer striker with a smaller head. The only safety feature is the centrifugal bolt which operates in exactly the same fashion as in the Model 1 described above, freeing the striker when the projectile rotates in flight. Model 4 fuzes recovered had both steel and brass nose caps and both steel and aluminium gaines. The weight of the fuze complete including aluminium gaine is 1.36 ozs. The Model 4 fuze fits in a smaller cavity, and hence the amount of explosive in the new rounds has increased. The filling of the shell is reported to consist of a cast T. N. T./ Aluminium powder mixture. None of the shell had green bands painted around the nose, and there were no manufacturing dates stamped on the cartridge cases.

20. The report also describes a new A. P. round. This is a solid shot projectile with a sharp ogival nose fitting into the standard cartridge case. The driving band is one wide copper band, with a groove round the middle into which the neck of the cartridge case is crimped. All other known 25-mm. shell have two separate driving bands as described in para. 14 above. A cavity drilled in the base of the shot contains an inert filling (Kieselguhr) in its forward portion and behind that the tracer composition. The projectile was black in colour and the nose had been tipped in white, with a white band painted in front of the driving band. The rounds were manufactured in May 1943 at the Kure Naval Arsenal. This shell is listed in a captured document as an A. P. shell, although the metal is softer than that generally used in small calibre A. P. rounds. The overall length of the shell is 3.98-ins. and the total weight is 10-ozs. The burning time of the tracer is reported to be 18 seconds.

21. A 25-mm. round has been reported in which the shell body is painted orange with a red ring on the base of the case round the primer. The shell is filled with two C. E. pellets and a screw-in tracer element.

22. Tracer composition in 25-mm. shell is reported to be of two natures, one gives an orange trace and the other a red trace. There is nothing in the external appearance of the shell to distinguish between the two types. This is probably recognised by the Japanese from markings on the packages in Japanese characters.

According to the above report the shell with orange coloured tracer is known to the Japanese as "Ordinary tracer, Modification 1 and 2" while the red is "Ordinary tracer Model 2".

PACKING

23. According to meagre information available forty rounds, without fuzes, are packed in a wooden box fitted with a plated steel liner. The dimensions of the wooden box are $19" \times 11\frac{1}{4}" \times 9\frac{3}{8}"$. The box is held together by screws and nails and the lid is hinged with catches permitting easy opening. Rope handles are provided. The steel liner has no tear handle but a small hole is provided for the insertion of a tool to facilitate opening. Corrugated paper cushions the rounds at the nose and base. Fuzes are packed separately but no details are available.

HANDLING AND TRANSPORT

(Of captured ammunition by Ordnance).

24. The rounds may be dealt with in the same manner as equivalent British types of 20-mm. Hispano, Oerlikon and Polsten cartridges. Blind shell should be destroyed in situ if possible or else moved with great care to a suitable site for destruction. The drawings of the fuze will show that it is quite possible for the striker of a blind shell to be sticking in the detonator and any slight movement may be sufficient to cause detonation. See also para. 20 of J. A. L. B. 1.

EXPLOSION/FIRE RISK

... For all types of H. E. fuze shell, assume $2\frac{1}{2}$ -ozs. per round.

GROUP CLASSIFICATION

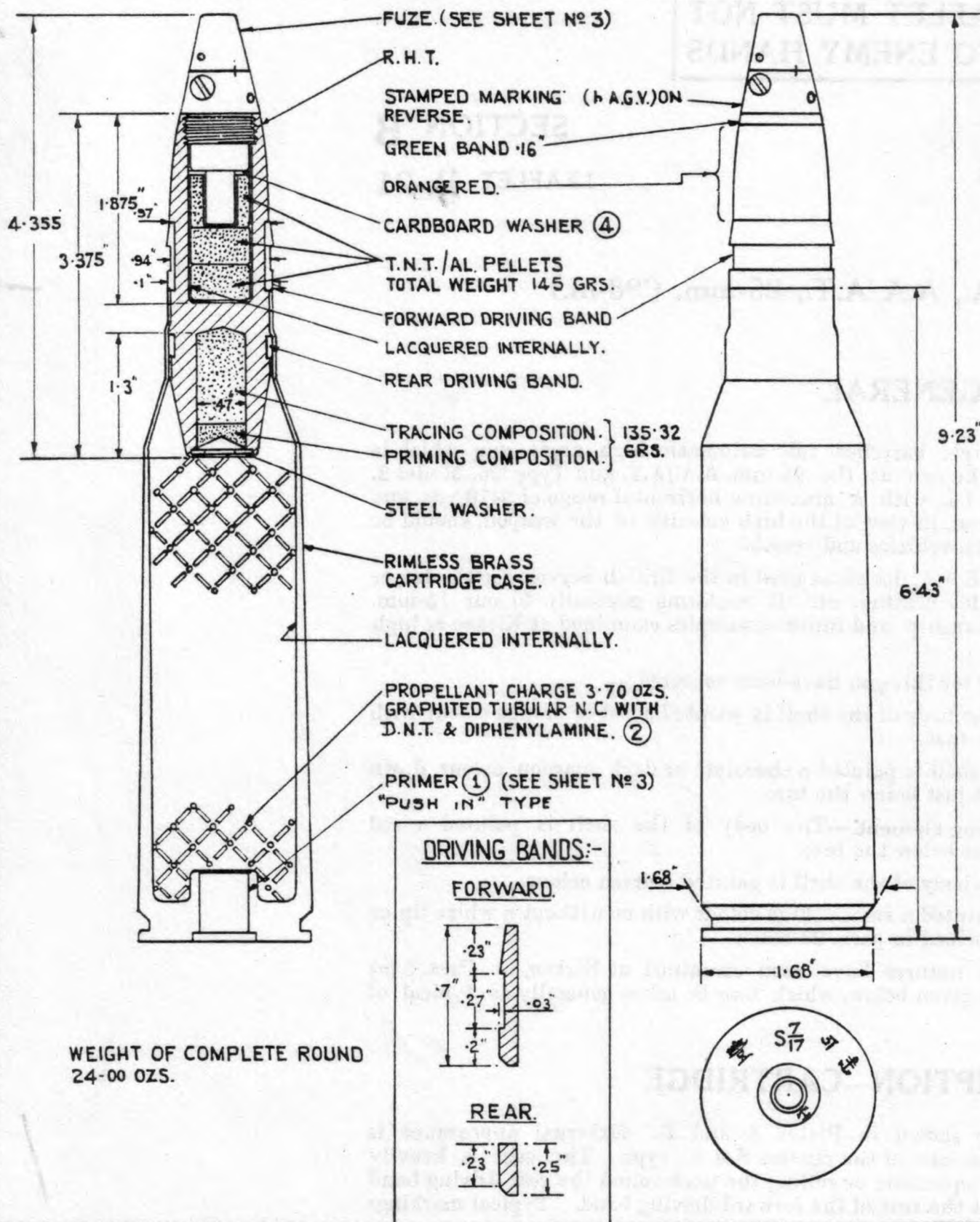
... (a) H. E.—Group VI Category Y.
(b) H. E./T.—Group VI Category Y.
(c) H. E./I.—Group VI Category Y.

CLASSIFICATION FOR SEA TRANSPORT

... O. A. S. (C).

C. I. Amn.,
Kirkce.

First Issue,
1st June 1945.

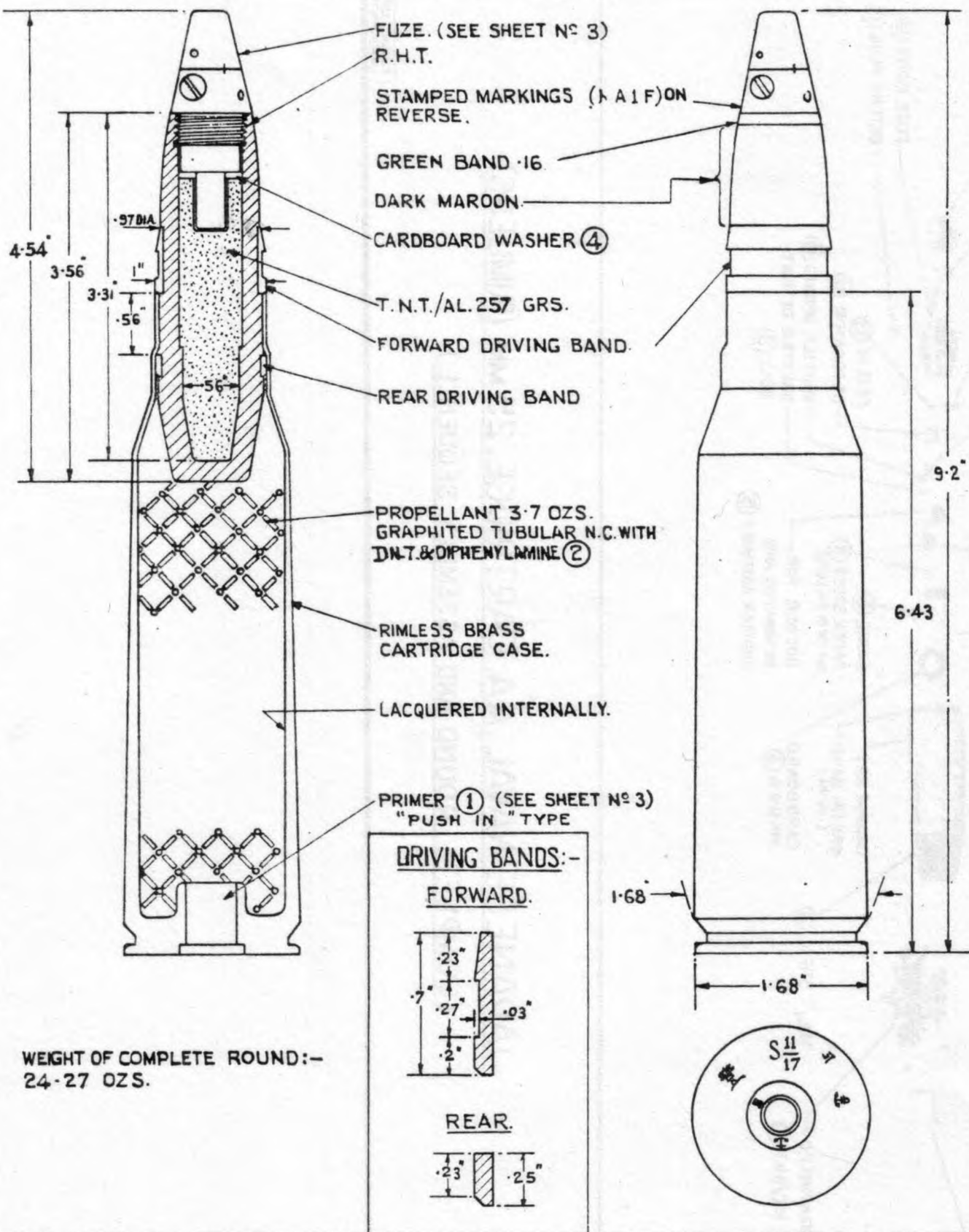


RESTRICTED.

JAPANESE NAVAL A.A. CARTRIDGE 25 MM. (RIMLESS)
WITH H.E. TRACER SHELL
(ORANGE BODY)

SHEET 2 OF 3 SHEETS

C.I. AMM. S/931.
KIRKEE. NOV. 1944.



RESTRICTED.

JAPANESE NAVAL A.A. CARTRIDGE 25 MM. (RIMLESS)

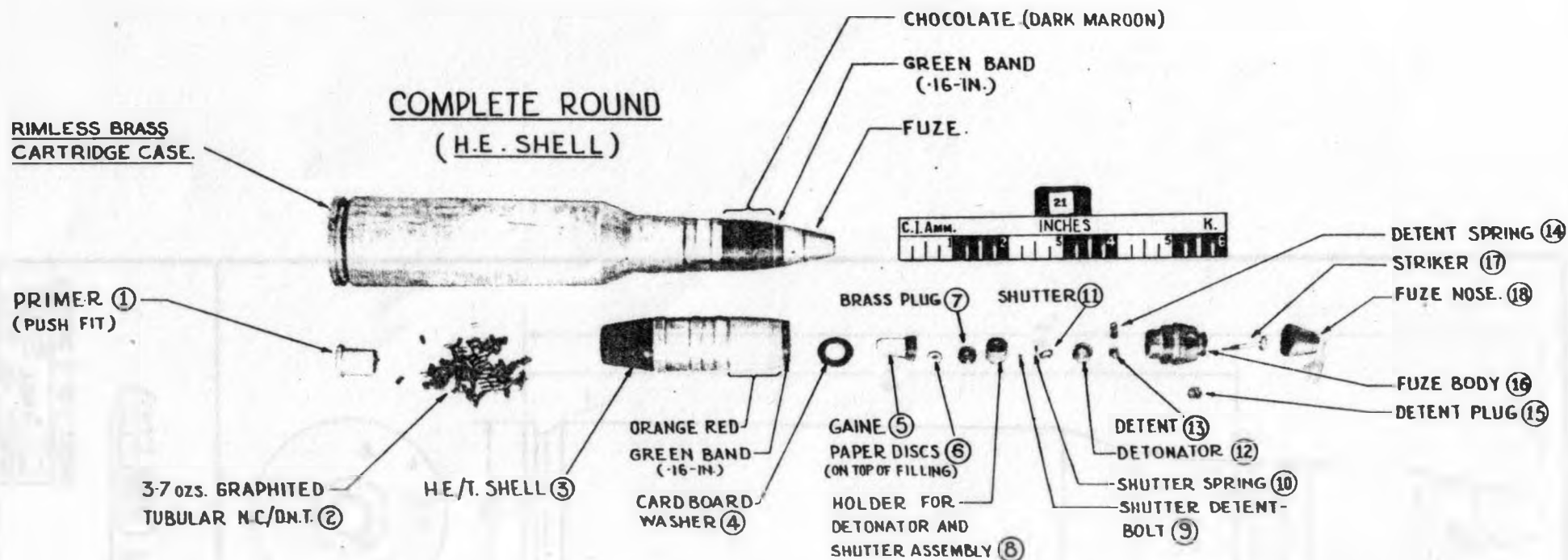
WITH H. E. SHELL

(DARK MAROON BODY.)

SHEET 1 OF 3 SHEETS.

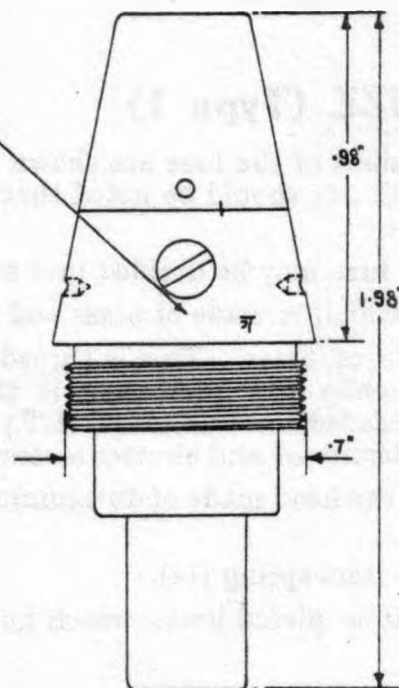
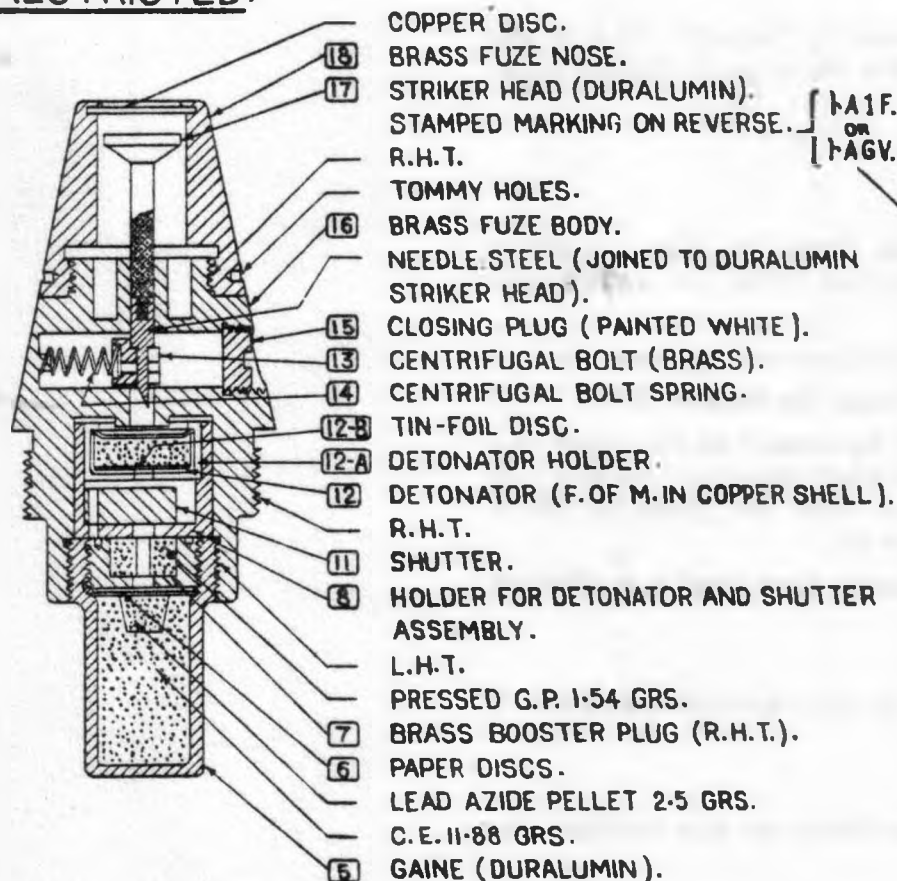
C.I.AMM. S/931
KIRKEE. NOV. 1944

RESTRICTED

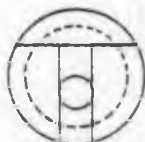


JAPANESE NAVAL A.A. CARTRIDGE, 25 MM. (RIMLESS)
(COMPLETE ROUND AND ASSEMBLY SEQUENCE)

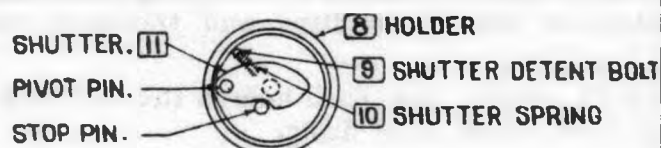
RESTRICTED.



WEIGHT OF FUZE COMPLETE WITH GAINE 1.48 oz.



CENTRIFUGAL BOLT. 13

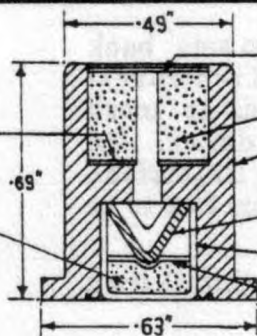


SHUTTER ASSEMBLY IN HOLDER.

PAPER DISC

CAP COMPOSITION

POTASSIUM CHLORATE
 ANTIMONY SULPHIDE } 1-74 GRS.
 MERCURY FULMINATE



PRIMER. 11

"PUSH IN" TYPE

LACQUERED PAPER DISC.

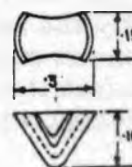
PRESSED G.P. PELLET...11 GRS.

BRASS BODY.

ANVIL (BRASS)

BRASS CAP (15.43 GRS. FILLED)

TIN FOIL DISC.



ANVIL.

D.A. FUZE & "PUSH-IN" TYPE PRIMER
FOR

JAPANESE NAVAL A.A. CARTRIDGES 25 MM. (RIMLESS)

SHEET 3 OF 3 SHEETS

C.I. AMM. S/931
 KIRKEE. NOV. 1944.

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D. OF A. (INDIA)

JAPANESE AMMUNITION LEAFLETS

SECTION B
LEAFLET B 21(a)

CARTRIDGES, S. A., 25-mm.,
FOR
TYPE '96 A.A./A.T. GUN.

GENERAL

A number of types of ammunition is known to exist in the 25-mm. calibre and these include shell of eight different colour markings, four types of shell design and an A.P. shot. Two of these designs have already been discussed in J.A.L. B 21; another two designs will be dealt with in this Leaflet. For reference purposes the following arbitrary types have been allotted :—

Type 'A' design :—See sketch of H.E./T shell in Plate A of J.A.L. B21.

Type 'B' design :—See sketch of H.E. shell in Plate B of J.A.L. B21.

Type 'C' design :—See sketch of H.E./T shell (long body) in Plate A of this Leaflet.

Type 'D' design :—See sketch of H.E./T/S.D. shell (short body) in Plate A of this Leaflet.

The tabular chart at the end of this Leaflet shows all colour markings and relevant projectile data. A reference to the sketches in conjunction with this chart should be of value in appreciating Japanese colour marking, method of filling, shell design etc.

2. Plate B includes external views of the A.P./T round and H.E./I round painted green. Sectioned views of these rounds are not available and it is proposed to augment the sketches by a short description of these items.

DESCRIPTION

A.P./T. Round

3. Additional information is now available on the A.P./T round which confirms the statement made in para. 20 of J.A.L. B21. A sketch of this round is given in Plate B. The A.P. shot has only one driving band, as compared to the H.E. shell which have a forward driving band also. Another noteworthy point is the use of a steel primer (Type A, see J.A.L. E2); Australian Munitions Supply Laboratories Report No. 147 states that the steel primer in the A.P./T. round is a retrograde step as severe corrosion has occurred in all rounds examined and is a further move to conserve copper. An inert filling of Kieselguhr is loaded into the cavity to shift the centre of gravity of the shot slightly to the rear and this may have been introduced as a result of ballistic trials.

The cartridge case and propellant are the same as for the H.E. and H.E./T rounds discussed in Leaflet B 21.

H.E./I Round (Painted Green)

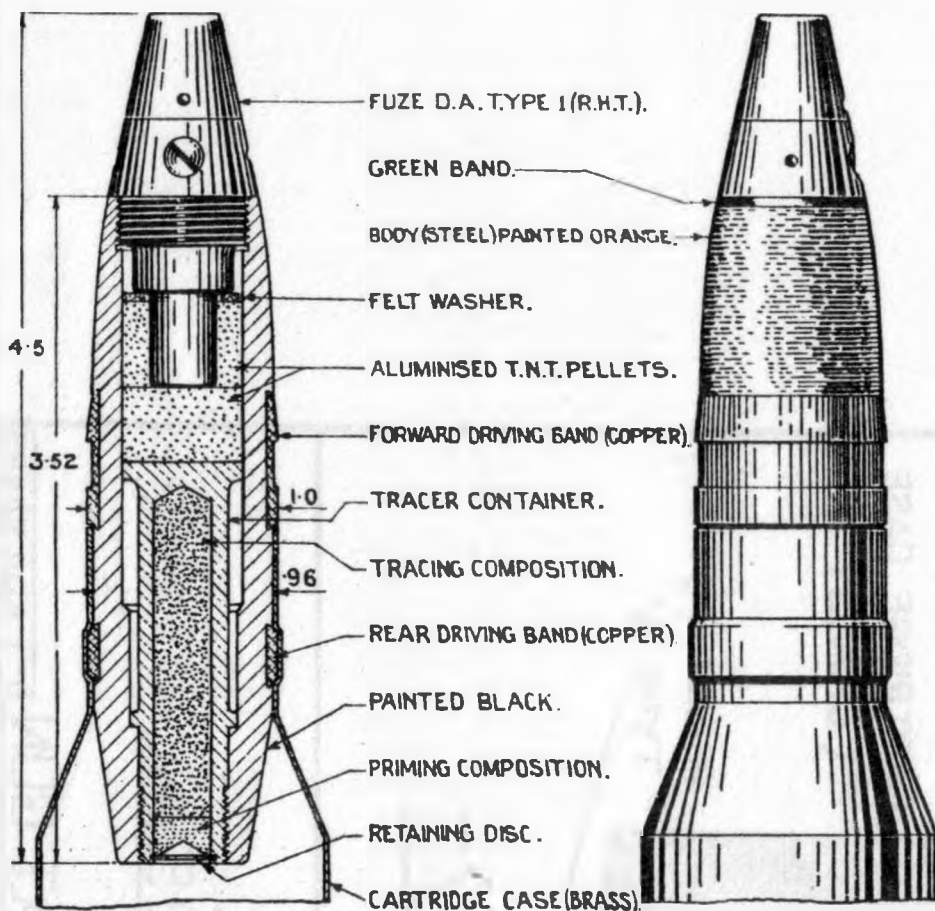
4. A sketch of this round is included in Plate B. The shell is made to type 'B' design, but the filling consists of a cannister of white phosphorus below a block of aluminized T.N.T. The cannister is made of steel and has a tinned steel cap soldered to the body. It is 1.75" long and fits the internal contour of the shell; its filled weight is 215 grains and the weight of W.P. is 130 grains.

M.S.L. Report No. 146 states that the cartridge case is similar to the normal case, but the particular round examined had a steel case. The steel case may be found with any other shell and represents a change-over due to shortage of copper in Japan. The case is phosphate-blackened and covered with a clear lacquer as an anti-corrosion measure.

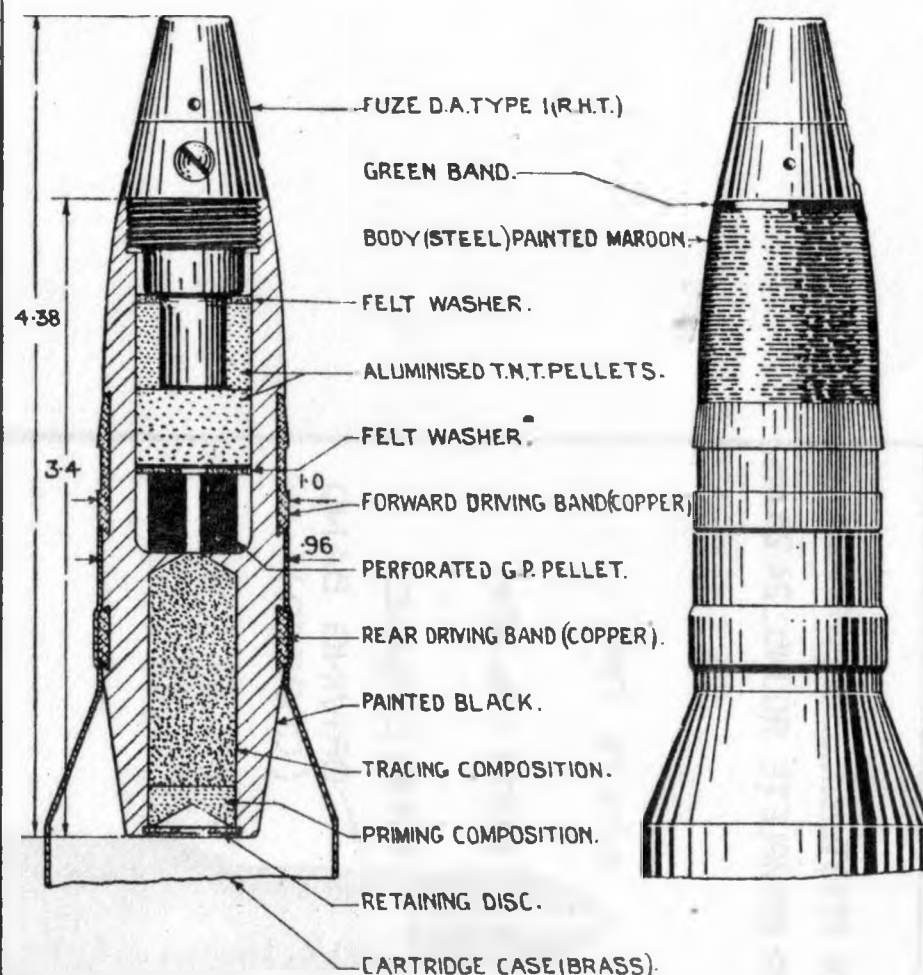
NOTE :—For fuze details, packing, handling and transport etc. see J.A.L. B 21.

COLOUR MARKINGS AND PROJECTILE DATA

Colour	Nature	Shell Body Type	Filling	Colour of Trace
Maroon	H.E.	B	TNT or Tetryl	—
Maroon with 3-mm. green band at nose	H.E.	B	Aluminized TNT	—
Brown	H.E.	B	Aluminized TNT	—
Green	H.E./I	B	Aluminized TNT and cannister of white phosphorus	—
Orange (1)	H.E./T	C	TNT or C.E. (2 pressed blocks)	Red
(2)	H.E./T	A	TNT or C.E. (3 pressed blocks)	Red
Orange with 3-mm. green band at mouth of shell	H.E./T	A	Aluminized TNT	White
Blood Red (1)	H.E./T	A	Aluminized TNT	White
(2)	H.E./T/ S.D.	D	Aluminized TNT and a gunpowder pellet	White
Blood Red with 3-mm. green band at nose	H.E./T	A	Aluminized TNT	White
Black with white tip and white band above driving band	A.P./T	—	Kieselguhr	White



H.E. TRACER.
(LONG BODY).



H.E. TRACER. SELF-DESTROYING.
(SHORT BODY).

JAPANESE CARTRIDGE S.A. 25 MM.
FOR TYPE 96 NAVAL A.A./A.T. GUN.

DIMENSIONS IN INCHES.

