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JAPANESE AMMUNITION

C.I. AMN. TECHNICAL REPORT

No. 50

AMMUNITION FOR 88-MM. TYPE '99 A. A. GUN

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REPORT NO. 50

NOVEMBER 1945.

AMMUNITION

FOR

88-mm. TYPE '99 A.A. GUN

G E N E R A L

It is only recently that full information on this equipment has been received. General Headquarters, India, Military Intelligence Directorate, Periodical Technical Summary No. 37 of April 1945, refers to this gun as follows:-

" The gun is mobile for Army use and is being manufactured for the Navy. It is believed to be in action on the Japanese homeland. One P.W. stated that a belt feed loading mechanism had been developed to raise the rate of fire of the equipment to 25 r.p.m.

Final confirmation of the existence of this equipment was the capture, on Saipan, of 88-mm. Type '100 long pointed H.E. shell with Type '100 mechanical time and percussion fuzes. Parts of these fuzes have been found in the wings and fuselage of Allied aircraft on two occasions after raids over Japan. "

2. Recently, however, these guns with H.E. ammunition have been captured in Burma and it is now possible to give details in this Report. According to characters stamped on the piece the gun is designated by the Japanese as Type '99 (1939), 8-cm. A.A. gun. Barrel and shell dimensions, however, definitely point to it being 88-mm. calibre.

3. Two types of round are known to be in use with this gun and although only one type (the H.E. A.A. round) has been examined at Kirkee, a brief description of the other (drill round) is included in this Report.

H.E. SHELL TYPE '100.

4. This is the standard ammunition for the weapon and is an orthodox round; it is generally similar in appearance to the H.E. round for the 75-mm. Type '88 Field/A.A. gun, but all shell examined here took the Type '100 (mechanical) T. & P. fuze. It is fully described in this Report.

DRILL ROUND.

5. One complete round was recovered in the Rangoon Area of Burma during May 1945. It is assumed to be used by the gun detachments for practice in the operations of loading, firing and ejecting with the Type '99, 88-mm. gun.

The cartridge case is identical to that used for

the H.E. round; the one difference is that in place of a cap in the base of the primer there is a lead plug for the firing pin to strike on firing.

A smooth, tapered wooden projectile is crimped into the case in place of the regular projectile for this round. It has a length of 13 1/2-ins. from the case to the tip of the projectile. A 3 1/2-in. protective copper cover fitted around the nose is held in place by three nails.

SHELL, H.E., A.A., TYPE '100

D E S C R I P T I O N

CARTRIDGE CASE.

6. Details of this are clearly shown in the drawing at Plate B and the general appearance in the photograph at Plate A. The case is of brass, 22 1/2-ins. in length. It is slightly necked at the mouth end and is attached to the shell by indenting into two cannelures in the shell; the mouth is also coned into the groove below the lower driving band. The primer hole in the base is similar to that in the brass case for 75-mm. Type '88 Field/A.A. gun (see Technical Report No.29) having a diameter of 27-mm. (1.07-ins.) and a vent diameter of 0.31-ins. The approximate cubic capacity for ballistic purposes is 207-cub. ins.

7. The stencilling on the cartridge case, see Plate A, is in purple ink and the 19.1 refers to date of filling (January 1944). The 'A' is not understood but it may have some connection with the lot number; it has not been possible to identify the other marking following the 'A'. The stamped markings on the base indicate the year and place of manufacture (July 1941 at Osaka).

PROPELLANT AND IGNITER.

8. The arrangement of the charge in the cartridge case can be seen in the drawing at Plate B. The charge is made up in two portions each consisting of tubes of graphited double base propellant, having a total weight of 5-lbs. 4 1/2-ozs.; the sticks are tied together with silk threads. The ballistic size is about 0.125-in. The lower portion contains sticks 13 3/8-ins. long and weighs 4-lbs.; the upper portion is made up from sticks 4 1/2-ins. long and weighs 1-lb. 4 1/2-ozs. The bottom of the lower portion is enclosed in a cloth bag to which is stitched the igniter. A lead tinfoil decoppering strip is inserted at the top of the charge.

The gunpowder in the igniter bag weighs 10 drams and is roughly G.20.

PRIMER.

9. The primer used is the Type E which has already been described in C.I.Amn. T.R. No.31 of February 1945.

SHELL.

10. The general appearance will be clear from the

photograph in Plate A and the details from the drawing in Plate B. The shell body is of forged steel construction and is streamlined, the streamline angle being about 10° . It follows the same general construction as the 75-mm. H.E. A.A. shell Type '90 (see Tech. Rep. 29) but with some differences. In this case, the shell is not fitted with a centring band but it has two cannelures below the lower driving band for attachment of the cartridge case. The two driving bands are made of a copper alloy, both having about the same degree of hardness (110 V.P.N.). The cavity has parallel walls but tapers slightly towards the head; the fuze hole is screw-threaded internally (52-mm. fuze hole diameter) to take the exploder container and fuze, below which is a ledge on which rests the screwed exploder container.

The weight of the shell body is 15-lbs. 12 1/2-ozs., the total weight filled and fuzed being 20-lbs. 2-ozs.

11. The steel exploder container is of standard Japanese construction; two key holes are cut in the lip for insertion and removal.

12. The shell body, according to stamped markings, was manufactured in December 1943 and filled in January 1944.

FILLING.

13. The shell examined here were found filled with 1-lb. 15 1/2-ozs. of cast T.N.T. Grade I or Trinitrophenetole. The latter bore Japanese characters, stencilled in white, above the upper driving band, meaning Trinitrophenetole.

The filling in the exploder container consists of three pellets of R.D.X./Wax, enclosed in a paper tube, the top pellet being perforated to take the gaine magazine. The use of picric acid, found in some exploder containers is of interest. Details of these fillings are given in Chemical Analysis below.

GAINES.

14. The gaine is the same as used in the H.E. A.A. shell Type '90 for 75-mm. Type '88 Field/A.A. gun (see Technical Report No.29, paras. 13 to 17). As stated in Supplement 'B' to Technical Report No.29, in some gaine the magazine holder (11) was again found with a C.E. stemming. The dead weight required to cause the set-back ferrule to ride over the retaining ferrule is about 95-lbs.

FUZE.

15. As mentioned above, the shell are fitted with Mechanical, Time and Percussion Fuzes, Type '100. This fuze will be fully described in a later T.R., which is now nearing completion.

P A C K I N G

16. Two plugged rounds, with two fuzes each in tinned plate cylinders, are packed in a roughly made packing case.

Magazine filling (11)

27.4-grs. of C.E. (M.P.129°0)

APPRECIATION

(Economic, manufacture and development aspects)

23. The round and its components show a good standard of workmanship which appears to be generally up to British standards. The general design is quite conventional and the only special feature is the use of R.D.X. exploders.

The ammunition is generally comparable with that for the Q.F. 3.7-in. gun, although it is considered that the performance of the Japanese gun is not quite so good as that of the 3.7-in. The muzzle velocities in the two equipments are about the same (2600 f.s.) but the Japanese shell is lighter and has presumably a lower service ceiling.

This is the first round examined at Kirkee which is fitted with a mechanical time fuze, all previous rounds (including those for A.A. guns) having been fitted with combustion fuzes. This is a naval equipment which has been adopted by the Army and it is known that other naval rounds are fitted with mechanical fuzes, although these have not previously been encountered in land service ammunition.

SUMMARY OF DATA24. Complete Round

Length plugged	31 5/8-ins.
Length fuze	35 5/8-ins.
Weight plugged	33 lbs.

Cartridge Case

Length	22 1/2-ins.
Diameter over rim	4.42-ins.
Diameter under rim	4.82-ins.

Propellant and Igniter

Lower portion	4-lbs. of dark green double base propellant (tubular), size 13 3/8-ins. X 3/16-in. X 1/16-in. internal diameter.
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Upper portion	1-lb. 4 1/2-ozs. of dark green double base propellant (tubular), size 4 1/2-ins. X 3/16-in. X 1/16-in. internal diameter.
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Decoppering strip	398-grs. of lead tin foil, size 32.5-ins. X 2.875-ins. X 0.003-in.
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Igniter	10-drams of gunpowder roughly size G.20.
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Primer

Type	"E"
Length	0.78-in.
Diameter over rim	1.28-ins.
Weight filled	2.4-ozs.
Magazine filling	62-grs. of pressed G.P.(G.20)

Cap composition

A composition of:-
Mercury Fulminate,
Antimony Sulphide, and
Potassium Chlorate.

Shell (without plug)

Type	H.E., A.A., Type '100, stream-lined.
Length	11.875-ins.
Diameter over bourrelet	3.443-ins.
Diameter over body	3.425-ins.
Diameter over upper driving band	3.55-ins.
Diameter over lower) driving band)	Minimum 3.549-ins.
Weight of shell body	Maximum 3.594-ins.
Weight of shell) filled and fuze)	15-lbs. 12 1/2-ozs.
Exploder pellets:-	20-lbs. 2-ozs.
Bottom pellet	297.8-grs.) of R.D.X./Wax
Middle pellet	200-grs.) or Picric Acid.
Top pellet	86.4-grs.)

Gaine

Length overall	1.87-ins.
Weight filled	6.4-ozs.
Force required to push ferrule over stirrup spring	88-lbs. to 99-lbs.

Fuze

Type	Mechanical, Time & Percussion
Length	4 7/8-ins. (Type '100
Weight filled	1-lb. 2.3-ozs.
Magazine filling	G.P.

Packing

Material	Soft white wood.
Contents	2 complete rounds (plugged), 2 fuzes, each in tinned plate cylinder.

Internal dimensions:-

Length	38 5/8-ins.
Breadth	11 1/2-ins.
Height	6-ins.

Stowage dimensions:-

Length	42-ins.
Breadth	14 1/2-ins.
Height	8 3/4-ins.
Weight of box empty	31 1/2-lbs.
Weight of box filled	99 1/2-lbs.
Marking	Stencilling reads:- "99 Type 8-cm.A.A.(gun), 100 (Type) A.A. pointed (shell), two pieces (rounds) with fuzes. Box unpainted.

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FUZED T.&P. TYPE 100 (MECHANICAL)

KEY TO COLOUR BANDS

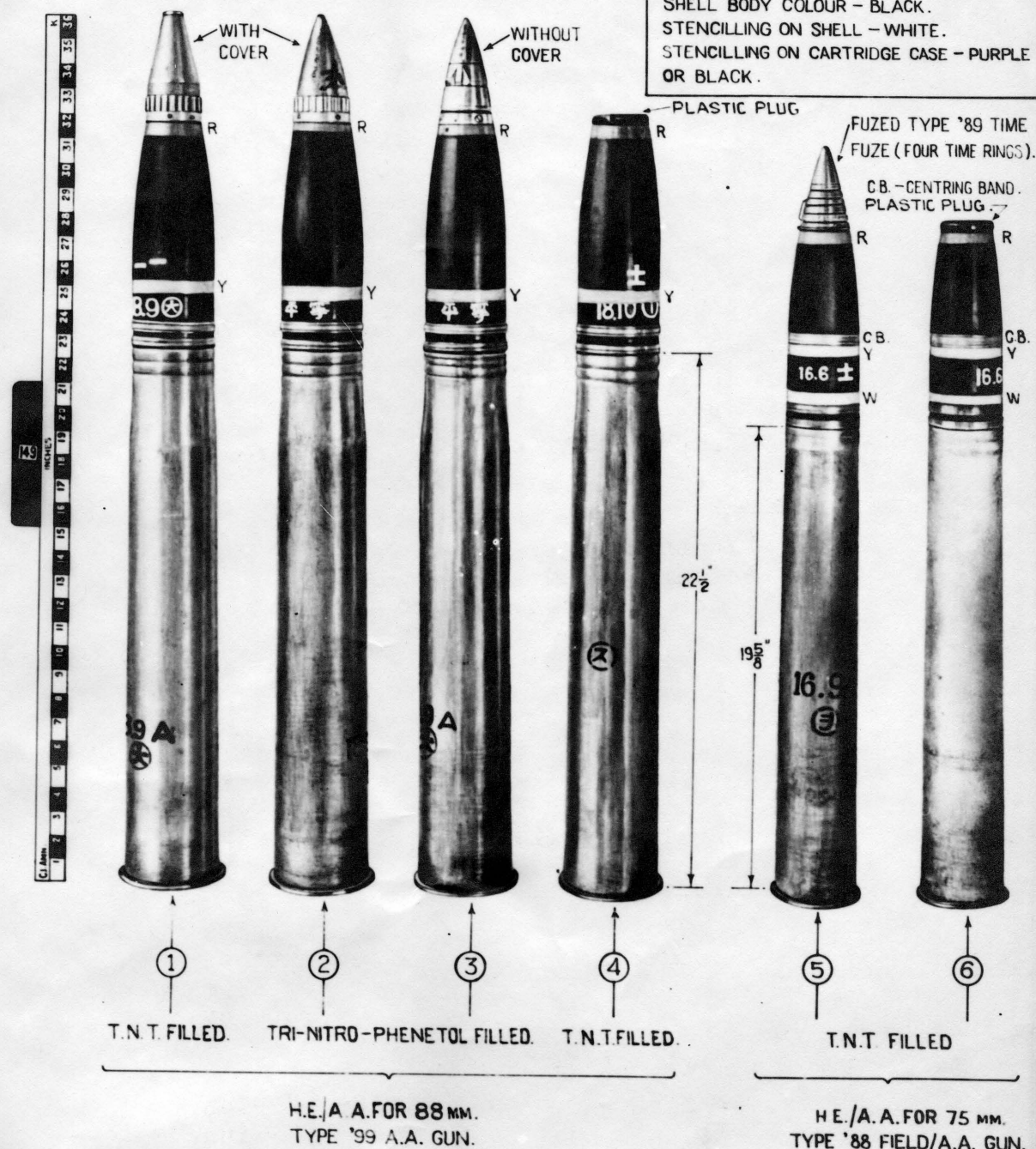
R - RED. W - WHITE

Y - YELLOW

SHELL BODY COLOUR - BLACK.

STENCILLING ON SHELL - WHITE.

STENCILLING ON CARTRIDGE CASE - PURPLE OR BLACK.

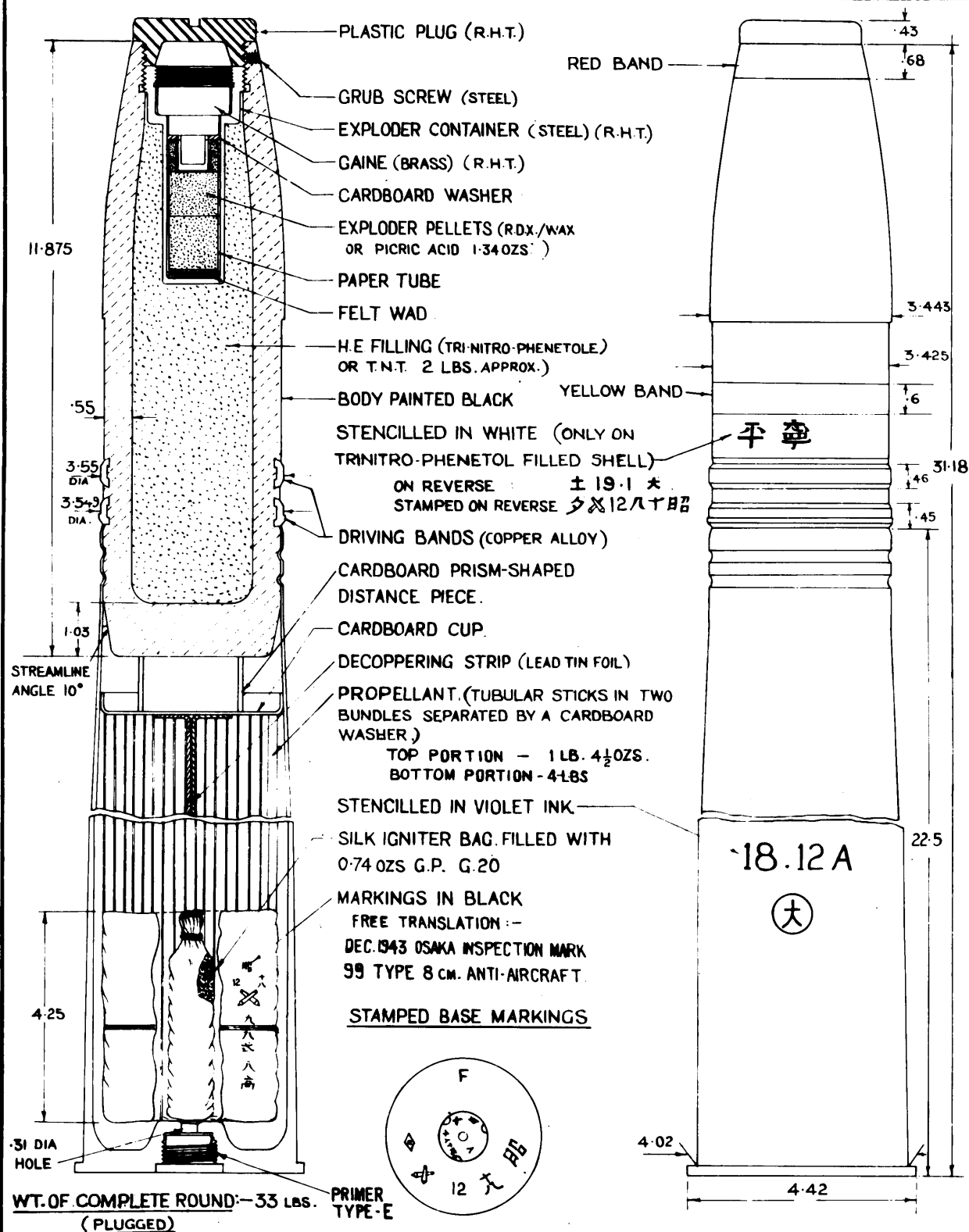


JAPANESE GUN AMMUNITION

FOR

88 MM. TYPE '99 A.A. GUN & 75 MM. TYPE '88 FIELD/A.A. GUN.

COMPARATIVE PHOTOGRAPH



H.E. A.A. SHELL, TYPE 100

FOR

JAPANESE, 88 MM. A/A. GUN TYPE '99.

(INTERNAL DETAILS & DIMENSIONS)

DIMENSIONS IN INCHES

C.I. AMN. S/1248
KIRKKE, SEPT. '45

RESTRICTED.

STENCILLED MARKINGS
ON THE SIDES:—

信管共 九九式八高一〇〇高 九九式八高
 KYU KAN SHIN
 WITH FUZE
 SEN KO REI REI ICHI KO HACHI SHIKI KU KU
 POINTED A/A 100 A/A 8 TYPE 9 9
 (TYPE OF SHELL) (CM OR 88 MM) (GUN)

KK
 固
 KO NI
 PIECES 2

HEAVY GRADE PAPER
COATED WITH PITCH
COMPOSITION

TINNED PLATE
 CYLINDER CONTAINING
 TYPE 100 (MECHANICAL)
 T & P. FUZE.

WOOD SHAVINGS
 ROPE HANDLE.

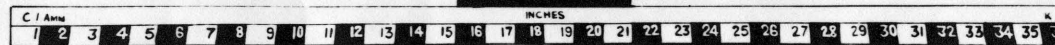
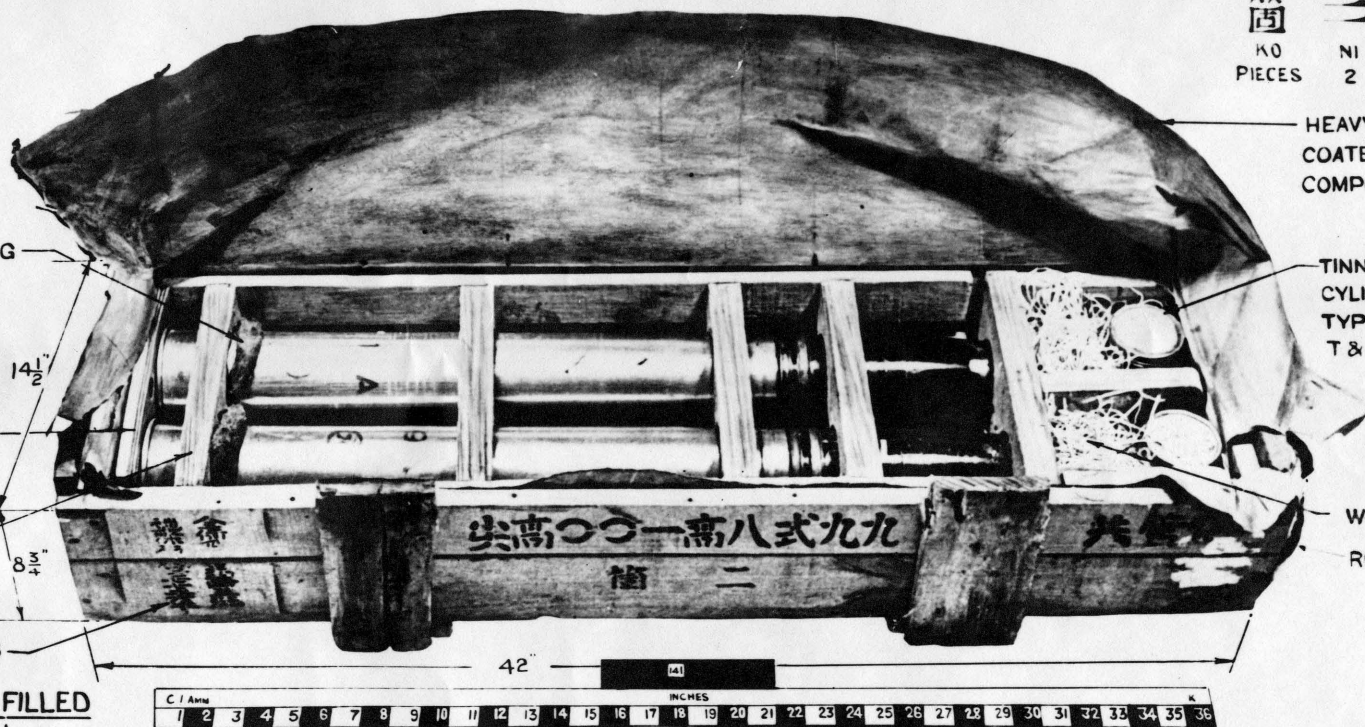
FELT PADDING

WOODEN &
 CARDBOARD
 PACKING
 PIECES

WOODEN
 PACKING
 FRAME

WT MARKINGS

WEIGHT OF FILLED
 BOX :- 99½ LBS.



H.E. A A SHELL TYPE 100
 — FOR —
JAPANESE 88 MM. A/A GUN TYPE '99
METHOD OF PACKING

CI AMN S/1246
 KIRKEE SEPT '43

PLATE C