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JAPANESE AMMUNITION

C.I. AMM. TECHNICAL REPORT

No. 40

GROUND FLARES (SIGNAL) WITH PULL TYPE FRICTION IGNITION



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JUNE 1945.

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G E N E R A L

The use of ground flares by the Japanese has not previously been reported. During the later part of last year some samples of ground flares were received from time to time in a mutilated condition and extremely wet. Attempts had been made to fire them before they were sent to Kirkee and the filling in some had partially burnt. Four flares altogether were received for examination purposes. This Report is, therefore, restricted and it is not possible to give certain important details e.g. time of burning, delay, effectiveness of illumination and colour of flares etc. So far as is known the four flares were found in the Burma Theatre.

2. Analysis of portions of the composition of the different flares indicated that there were three different colours- red, white (illuminating) and green. So far as can be translated the instructions on the label, round the body of the flares, support this and also indicate that the flares are used for signal purposes. The instructions also refer to the visibility range of the flares by day and by night and again, so far as can be translated, the red and green flares are stated to be visible from 3,000 metres by day and 8,000 metres by night. One flare in which the characters have been cleaned up etc. is being forwarded for proper translation to General Headquarters, India, G.S.Branch Military Intelligence Directorate. A supplementary Report will be published if this provides any further useful details.

D E S C R I P T I O N

3. The details of construction, general assembly and appearance will be clear from the Plate at end of this Report.

4. The general construction and method of assembly of all flares appears to be the same as that shown in the Plate. The nature of composition, of course, differs and this means that different sizes of stars are used, which is compensated for by different sizes of cardboard distance pieces.

Flare Body

5. The flare container is a plain cylinder measuring approx. 1.9-in. in diameter and 3.6-in. long. It is made up from good quality white rolled paper and is robust in construction. The mouth and base are closed by the case being turned over on to cardboard closing discs, similar to the method used in closing the mouth of a shot gun cartridge. These discs have perforations as shown in the Plate; at the base two small holes to release pressure when the fuze is burning, and at the mouth different numbers of holes to release pressure when the flare composition is burning. It will be noticed, in the case of the green flare, that there are four perforations in the mouth and in the case of the red, nine. These are thought to be

arranged in this form to facilitate night identification by feel.

6. The flare composition is a moulded pellet pressed to shape with a central channel to take the fuze of the igniter assembly. At the ignition end the priming composition (see chemical analysis below) is lightly pressed over the face of the pellet to ensure uniform ignition. The composition used in the different colours of flares is detailed in the chemical analysis below. The pellet is positioned in the flare container by a centrally perforated cardboard disc which is supported by prismatic cardboard distance pieces over which are two cardboard discs to close the base of the container. The two closing discs have a small central perforation through which passes the "pull wire" of the friction igniter assembly. During transport and handling the loop end of the friction wire fits snugly in the recessed base of the flare.

Igniter Assembly

7. This consists of a brass tube holding a $2\frac{1}{4}$ -in. length of white safety fuze for about three-quarters of the length of the fuze and a small inner brass tube holding the friction mechanism. The construction of this friction mechanism will be clear from the enlarged details. Note how safety is effected in the case of a light accidental pull by locking the inner end of the friction wire round the mouth of the small brass tube. The hole in the small brass tube allows the release of gas when the friction igniter is functioned and four equi-spaced holes in the large brass tube allow escape of gas when the fuze is burning. As mentioned earlier there are two holes in the base closing disc to allow release of gas to the atmosphere.

Action.

8. The action will be obvious from the construction of the flare. So far as can be seen from the instructions on the flare in Japanese character, it is held in the right hand of the user well away from the body and the forefinger of the left-hand is passed through the wire loop and pulled. The flare is then thrown about 5 to 6 yards.

9. The time of delay is not known but from our experience of Japanese safety fuze which appears to be identical with the safety fuze used in this flare, $2\frac{1}{4}$ -in. of fuze would give an approximate time of delay of 6-Secs.

M A R K I N G

10. A $\frac{1}{4}$ -in. wide colour band of the same colour as the flare is painted round the mouth of the flare as shown in the Plate. In addition, as explained above, variations in the position and number of holes in the mouth probably indicate the colour of the flare at night time. Unfortunately the flare with white composition was so mutilated that the discs in the mouth were beyond identification.

CHEMICAL ANALYSIS

(Chief Inspector of Military Explosives, Kirkee)

11. Pull type friction igniter.

Friction Composition:

Potassium Chlorate, Antimony Sulphide and Charcoal.

Safety fuze:

Gun powder consisting of
Sulphur, Potassium nitrate
and Charcoal.

12. Priming Composition.

Barium Chlorate monohydrated, Barium nitrate,
Sulphur, Charcoal and Shellac.

In all the above ^{cases} samples were too small for quantitative estimation.

13. Flare Composition.

Red -	Sulphur	16.2%
	Potassium perchlorate	60.3%
	Strontium Carbonate	23.5%
White -	Sulphur	11.6%
	Wax	8.0%
	Potassium nitrate	46.3%
	Antimony Sulphide	7.3%
	Aluminium Powder	26.5%
	Grit (Impurities)	0.3%
Green -	Barium Chlorate (monohydrated)	53.8%
	Barium Nitrate	36.6%
	Shellac	9.6%
	(Almost retained on 40 B.S.S. mesh sieve)	

A P P R E C I A T I O N

(Economic, development and manufacture aspects)

14. This is a simple ground flare using the friction method of ignition which appears to be a favourite with the Japanese.

SUMMARY OF DATA

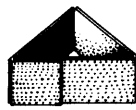
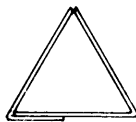
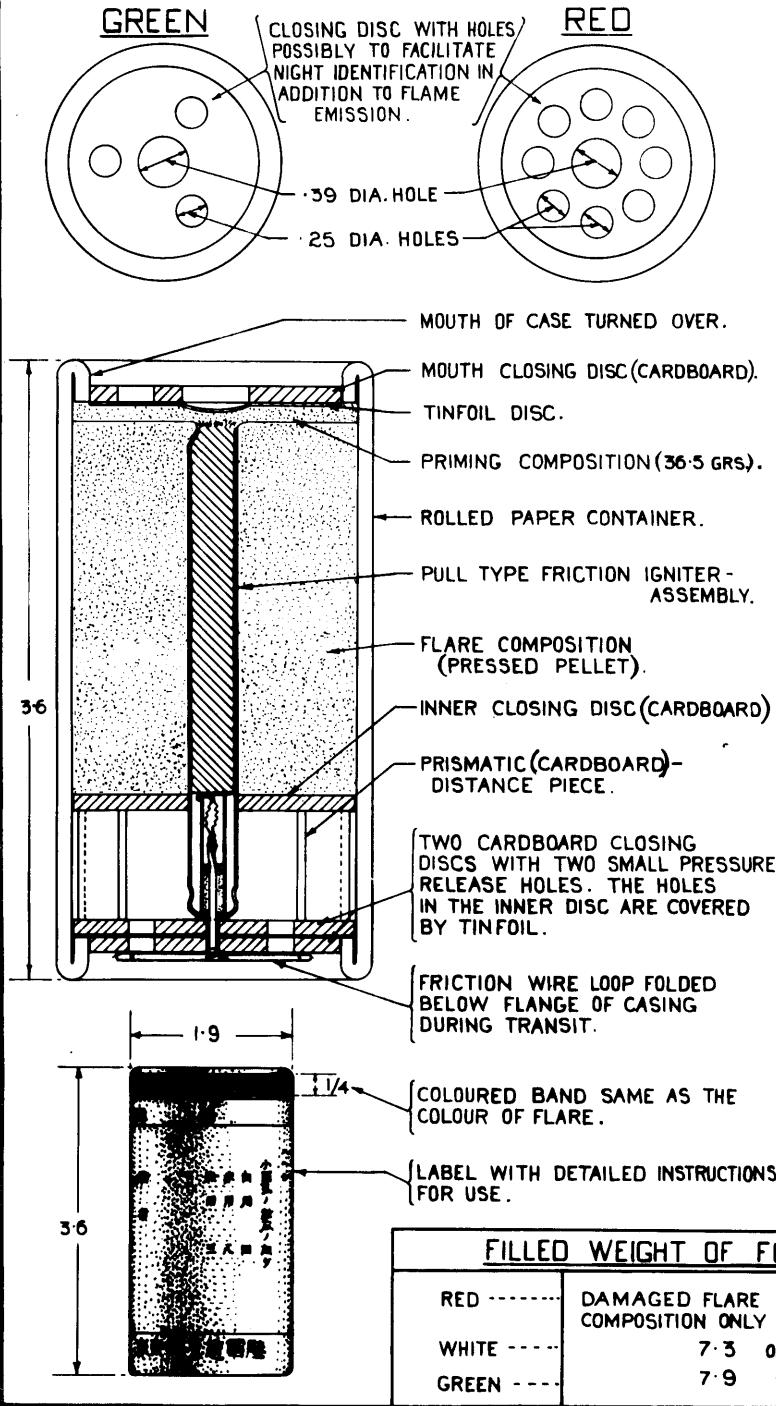
15. Flare.

Length overall	3.65-ins.
Maximum Diameter	1.87-ins.
Weight (filled)	
Red	Could not be estimated.
White	7.3-ozs.
Green	7.9 ozs.
Weight of priming composition	36.5 grains
Weight of flare composition	
Red	Could not be estimated.
White	5.9-ozs.
Green	6.1-ozs.

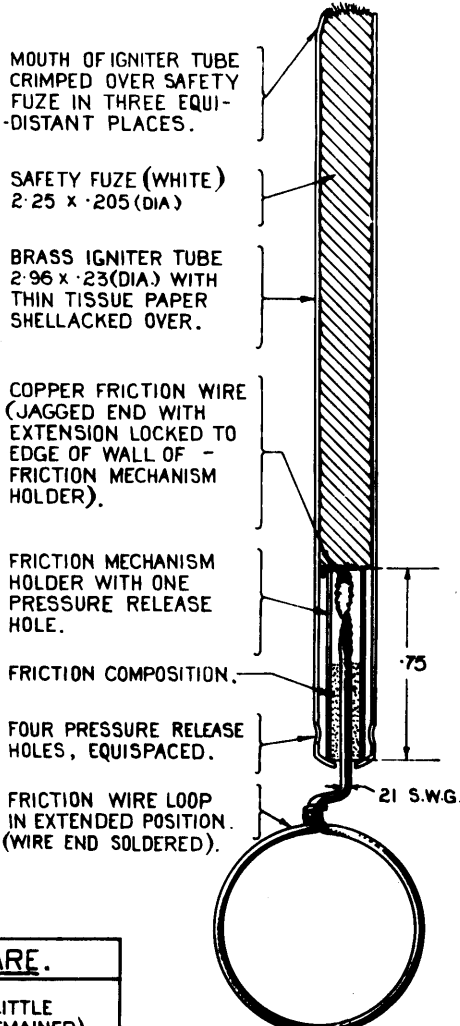
16. Igniter Assembly.

Length Overall (with friction loop)	4.0-ins.
Max. Diameter	0.23-ins.
Weight of friction composition	1.1 grains.
Safety Fuze - Colour - White; Length - 2.25. Dia. 0.205.	

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PRISMATIC CARDBOARD DISTANCE PIECE. (TYPICAL)



PULL TYPE FRICTION-IGNITER ASSEMBLY.

FILLED WEIGHT OF FLARE.	
RED -----	DAMAGED FLARE (LITTLE COMPOSITION ONLY REMAINED).
WHITE -----	7.3 ozs.
GREEN -----	7.9 "

COLOUR OF COMPOSITION.	FLARE COMPOSITION.	WT. OF FLARE COMPO.
RED -----	SULPHUR, POTASSIUM PERCHLORATE, STRONTIUM CARBONATE.	-
WHITE -----	SULPHUR, WAX, POTASSIUM NITRATE, ANTIMONY SULPHIDE, ALUMINIUM POWDER, GRIT (IMPURITIES).	5.9 ozs.
GREEN -----	BARIUM CHLORATE (MONOHYDRATED) BARIUM NITRATE, SHELLAC.	6.1 "

JAPANESE GROUND FLARES (SIGNAL).
(WITH PULL TYPE FRICTION IGNITION.)

DIMENSIONS IN INCHES.

C.I. AMM. 3/1120
KIRKEE. MAY 1946