CONTENTS *(Contd.)*

CHAPTER - II

SECTION - 1

UNIVERSAL ELECTRONIC TIME FUZE M85 P13 T3

FUZE UNIVERSAL TIME, M85 P13 T3

INTRODUCTION

1. Fuze M 85 P 13 T3 for carrier projectile was developed by M/s ECIL Hyderabad in collaboration with M/s FUCHS, SOUTH AFRICA. Indigenisation of the fuze will be completed in different phases. Fuze M 85 P 13 T 3 is a universal electronic time fuze, applicable to arty gun system as indicated below :-

*	M 85 P 13 T1	-	105 mm
*	M 85 P 13 T2	-	130 mm
*	M 85 P 13 T3	-	155 mm.

GENERAL :-

2. The fuze is an electronic microprocessor time delay type with point detonating 'backup. Fuze functioning time is inductively settable by means of setter M15A2.

DESCRIPTION

Plate 'M'

3. It consists of the following major components :-

(*a*) Nose Cone

(*b*) Impact Sensor

(*c*) RF Antenna

(*d*) Signal Processor Electronic

(*e*) Reserve Battery

(*f*) Electric Detonator M 519

(*g*) Safety and Arming Device

4. The electronic head is housed in a plastic nose cone and contains a radio frequency (RF) telemetry Section. The telemetry RF oscillator can only be encabled by means of a special setter for testing purpose. The programming and timing electronic assembled mainly in surface mount device technology on printed circuit board and ceramic (thick film) hybrid. A deformation impact switch is also contained in the electronic head and the entire electronic head is filled with semi ridged poly - urethane foam.

5. The reserve battery is housed below the electronic head. It is activated by the combined forces of acceleration and spin. The electronic circuit for firing the electronic detonator as well as the detonator it self is contained in the lower part of the reserve battery assembly.

6. **Fuze body assembly** :- The electronic head and reserve battery assembly is mounted into the upper part of the fuze body and held in place with locking ring. The projectile interface thread is integral with the fuze body.

7. The safety and arming devices (SAD) is screwed into the lower part of the fuze body assembly. It provides the main mechanical safety and requires two independent actions for arming. SAD shutter houses a combined lead azide / tetryl Relay 1 and Relay 2 comprising tetryl is housed in the SAD below the shutter. SAD clockwork mechanism lock the shutter in the safe position for the duration of mechanical safety distance. The bottom of the SAD is sealed with a booster assembly lid.

SAFETY

8. Fuze has following safeties

(*a*) The fuze will be safe to transport, handle and dispose off after a 12 m drop.

(*b*) The fuze will be armed mechanically after a minimum distance of 39 metres from the muzzle.

(*c*) Triggering of the electronic detonator is inhibited for a minimum 600 m after launch.

(*d*) Time functioning of fuze cannot be set shorter than 3 secs after launch.

PERFORMANCE CHARACTERISTICS

9. **Setting** :- The fuze is settable for time function from 3 to 199.9 sec in 0.1 sec increment by means of the M15A2 induction setter.

10. **Memory Retention** :- The fuze will remain its set memory for the shelf life 15 years.

11. **Time Function** :-The fuze will initiate the ejection charge at the set time, after launch. The timing accuracy is set time plus or minus 0.05 sec.

12. **Point Detonating Action** :- In case of time failure or when the flight time is less than the set time, the fuze will function on the point detonating action. The point detonating super quick (PDSQ) action of the fuze is activated when it impacts a target surface at an angle between 10 and 90° and minimum remaining velocity of at least 180 m/s.

ENVIRONMENT

13. Transport & storage: The fuze in its unpacked stage, will be unaffected by exposure to any combination or sequence of the following condition.

(*a*) Temperature –20° to +70° C.

(*b*) Transport vibration to MIL STD-331 Test 119 Procedure 2.

(*c*) Temperature & Humidity cycle to MIL-STD-331 Test 105.1 for 28 days with temperature – 20° to +70° C.

14. The fuze shall withstand the following combination of condition :-

(*a*) Temperature – 20 to + 60 degrees C

(*b*) Axial acceleration – 1500 to 20000 g

(*c*) Maximum angular acceleration – 4,00,000 rad / S

(*d*) Spin rate – 2700 to 25,000 rpm.

(*e*) Max muzzle velocity 950 m/s.

STORAGE & SHELF LIFE

15. The fuze in its original sealed packaging and stored between temperature limits of – 20 degree C to + 70 degree C with a maximum relative humidity of 90 % will have a shelf life of at least 15 years.

RELIABILITY

16. **Time Function**

At least 95 % of the fuze will operate within the time accuracy as per specn.

17. **Trajectory burst**

In the time mode trajectory bursts between launch and set time minus 2 sec time shall be less than 1 in 100.

MASS

18. Total mass of filled fuze 830 ± 25 g.

19. Total explosive mass 620 mg

.SPECIAL REQUIREMENTS :-

20. The fuze contains explosive and must be handled carefully.

21. The fuze nose is vulnerable to damage when exposed to rough handling *e.g.* drop on the nose and impact with sharp object etc. Once visually damaged in any way a fuze shall be considered unsafe for use.

IDENTIFICATION Plate 'M1'

22 **MARKING**

All the marking on the fuze are in signal red with the following information :-

(*a*) Identification of fuze *viz.* Fuze nose proximity M85 P13 T3

(*b*) The filled and empty lot marking, filler monogram and year of manufacture and filling which is located on the reverse side of the fuze.

PACKAGING AND MARKING

23. **INNER PACKAGING AND MARKING** Plate 'N'

Each fuze is individually packed in a plastic container. The label on lid of the plastic container provides information of the lot number, manufacturer's monogram and year of filling. A label marked 'EXPLOSIVE' is secured to the side of the plastic container.

24. **OUTER PACKAGING AND MARKING** (20 fuzes in a box) Plate 'P'

20 cylindrical containers are packed in a plastic box. Label showing Qty, Nomenclature of Fuze, Explosive category, Net explosive weight and Gross weight are pasted on a box.

TRANSPORTABILITY

25. The fuze in its original sealed package is transportable by road, rail or sea.

MAINTAINABILITY

26. No maintenance is required when stored in individual packaging under the relevant condition.

INSPECTION BEFORE FIRING

27. Following to be ensured before firing :-

(*a*) Screw thread is clean and free from grit.

(*b*) The nose cap is secured and not damaged.

(*c*) The fuze is correctly set as ordered (SQ or Delay).

RESTRICTION

28. The fuze has the following restrictions :-

(*a*) If the nose cap is damaged or dented do not fire the fuze.

(*b*) If the fuze is to be set on 'Delay' the sealant must be removed from the set screw to prevent the set screw from returning to the SQ setting,

(*c*) During heavy rain or hail storm the fuze is to be set on delay.