

**CIA/PS/FZ/97/11**  
(Based on ARDE/Proof Schedule/FZ/ME)

**SCHEDULE OF PROOF AND SENTENCING CRITERIA**

1. **Store** : FUZE TIME AND PERCUSSION DA No. 213P MK5(M-3)- EMPTY.
2. **Lot Size** : 2052 + Proof samples required for Empty and Filled proof.
3. **Proof Samples** :

Sl. No.	Proof	No of Samples	
		Advance Samples/ First Lot/	Subsequent Lots
(a)	High Service Pressure	50	32
(b)	Low Service Pressure	50	08
(c)	Absence of Premature Proof	60	05
(d)	Percussion Proof	05	05* *(Every tenth lot, i.e., lot No 1, 10, 20, 30,.....,)
	Total	165	45+5*

4. **Proof Establishment**: Central Proof Establishment, Itarsi.
5. **Equipment**: 81mm Mortar E1.
6. **Instrument**: Drello for Time Recording.
7. **Proof Stock**:

Sl. No.	Component	Drg. No.
(a)	Mortar Bomb 81mm Flash 2A	ITV 47 GF
(b)	Cartridge 81mm Mortar filled	IRW 107 GF
(c)	Cartridge, 81mm Mortar, Augmenting filled	IRW 111 GF

8. **Proof Condition:**

For focusing of the Drello, Fuze Ex-Proof stock shall be fired prior to commencement of proof.

9. **Conduct of Proof:**(a) **Time proof : High Service Pressure (HSP).**

- (i) Samples size : Advance sample/First Lot - 50 Nos.  
Subsequent Lot - 32 Nos.
- (ii) Fuze setting : 34.0 Sec.
- (iii) Charge : X (Ten).
- (iv) QE : As convenient.
- (v) Observations : (i) Time to burst by Drello for round No 1 to 15 or minimum 11 round for CMT/SD calculation.  
(ii) Premature, Blind, Ground Burst or any other defects.  
(iii) Fuze temperature before firing.

(vi) **Calculation of CMT & SD :**(aa) **Temperature correction:**

Temperature correction shall be made as follows:-

**Add** 0.0036 seconds for each 1° C drop in fuze temperature below 15.5 ° C (at which fuze has been calibrated).

**Deduct** 0.0036 seconds for each 1° C rise in temperature above 15.5 ° C (at which fuze has been calibrated).

## (ab) SD, Cumulative CMT &amp; Cumulative SD shall be calculated as follows:-

$$SD = \sqrt{\frac{\sum(\bar{x}-x)^2}{n-1}}$$

Where,

n = No. of samples after elimination of Wild Round if any.

$\bar{x}$  = CMT &

x = Reading of individual round after applying Temp correction.

$$\text{Cumulative CMT} = \frac{(n_1 \times \text{CMT}_1) + (n_2 \times \text{CMT}_2)}{n_1 + n_2}$$

and

$$\text{Cumulative SD} = \sqrt{\frac{\text{SD}_1^2(n_1-1) + \text{SD}_2^2(n_2-1)}{(n_1+n_2-2)}}$$

Where,

CMT1 = CMT of 1<sup>st</sup> proof.

CMT2 = CMT of Re-proof (with single sample size).

n1 = No of samples taken for calculation of CMT & SD in 1<sup>st</sup> proof.

n2 = No of samples taken for calculation of CMT & SD in Re-proof.

SD1 = Standard deviation of 1<sup>st</sup> proof &

SD2 = Standard deviation of Re-proof (with single sample size).

(vii) **Classification of Defects:**

**Variables** : CMT & SD beyond specification limit.

**Attribute :**

aa) Critical defects : Premature.

ab) Major defects : Wild Round, Ground Burst and Blind.

ac) Minor defects : Nil.

(viii) **Sentencing Criteria:**

**Variable defects:**

Lot	Proof	CMT	SD
Advance samples/ First lot	First Proof	34.0 ± 0.23sec	0.363 sec max
	Reproof	34.0 ± 0.23sec (Cumulative)	0.363 sec max (Cumulative)
Subsequent lots	First Proof	34.0 ± 0.3sec	0.3 sec max
	Reproof	34.0 ± 0.3sec (Cumulative)	0.3 sec max (Cumulative)

**Attribute defects:**

(aa) **Critical defect** : On occurrence of a Premature, the lot shall be rejected.

(ab) **Major defects** :

Sampling plan - Double sampling plan for Normal Inspection AQL- 4%.

Lot	Proof	Sample size	Cumulative Sample size	Acceptance Criteria	
				Accept	Reject
Advance samples/ First lot	First Proof	50	50	3	7
	Reproof	50	100	8	9
Subsequent lots	First Proof	32	32	2	5
	Reproof	32	64	6	7

**Note:**

1. In case of any one or more of the following conditions, lot shall be reproofed when it fails to pass the acceptance criteria of first proof:

- (a) CMT or SD are not within specified limit.
- (b) CMT & SD are not within specified limit.
- (c) Attribute defects are not within specified limit.

2. Whenever a lot is reproofed, it shall be reproofed for all conditions viz. Variable & Attribute).

3. Wild rounds are omitted in calculation of CMT and SD. A round shall be considered as a Wild round if its timings (after temp. correction) is outside the following limits:-

(a) For Adv./First three lots - "34.0 ± 0.7"sec.

(b) For subsequent lots (4<sup>th</sup> lot onwards) - \*\* "CMT±0.7" or "CMT±4s" sec, whichever is smaller (where 's' is the average Standard Deviation of passed 20 lots or available for more than three lots of the same supplier).

\*\*CMT is the Corrected Mean Time of the lot under proof.

4. During First proof and Reproof of Adv. Samples/First lot and subsequent lots, the timings of round Sl. Nos. 1 to 13 shall be initially considered for CMT & SD calculation. The following procedure shall be adopted to calculate CMT & SD:-

- (a) Calculate CMT & SD based on the recorded 13 readings.
- (b) If there is/are any Wild round(s), calculate CMT & SD by ignoring simultaneously the Wild rounds deviated the most as defined earlier.
- (c) Take readings max. up to 15<sup>th</sup> readings only, for Adv. Sample/First lot or subsequent lot until we get 11 minimum readings to calculate CMT & SD.

5. The Wild rounds shall be considered as major attribute defect and all the Wild rounds should be removed at a time in calculation of CMT & SD. The lot shall be serviceable if the cumulative CMT/SD and other defects are within limits.

6. If there is any NR or Erratic Timing by Drello, the Proof Range shall record observation with regard to the functioning of fuze i.e. Air burst, Ground burst, or Blind. Additional rounds shall only be fired where it is not possible to make such an observation so that 32 observations are available for sentencing the lots for major defects.

7. Observations of all 32 rounds in a series shall be considered for defects like GB and Blind. For Wild round, first 15 readings shall only be considered.

8. Five additional fuzes shall be supplied along with Proof samples to Proof Range to meet the above eventuality.

9. A Premature is defined as a fuze which functions at a recorded time of flight of less than 3.5 seconds or the range of burst is less than 650 meters. In case of any doubt, the recorded Range shall be the deciding factor.

**(b) Time proof : Low Service Pressure (LSP)**

- (i) Samples size : Advance sample/First Lot - 50 Nos.  
Subsequent Lot - 08 Nos.
- (ii) Fuze setting : 19.4 Sec.
- (iii) Charge : 2 (Two).
- (iii) QE : 63° or As convenient.
- (v) Observation required : (i) Time to burst by Drello for information only.  
(ii) Premature, Blind, Ground Burst or any other defects.  
(iii) Fuze temperature before firing.  
(iv) Mechanism number of each fuze to be recorded against its proof results.

**(vi) Classification of Defects:**

- (aa) Critical defects - Premature.  
 (ab) Major defects - Ground Burst and Blind.  
 (ac) Minor defects - Nil.

**(vii) Sentencing Criteria:**

- (aa) **Critical defect** : On occurrence of a Premature, the lot shall be rejected.

**(ab) Major defects :**

Sampling plan- Double sampling plan for Normal Inspection  
 AQL - 4%.

Lot	Proof	Sample size	Cumulative Sample size	Acceptance Criteria	
				Accept	Reject
Advance samples/ First lot	First proof	50	50	3	7
	Reproof	50	100	8	9
Subsequent lots	First proof	08	08	0	2
	Reproof	08	16	1	2

**Note:**

- The timings shall be recorded for information only and shall not be considered for sentencing of lot. However, a record of CMT and SD shall be maintained.
- A Premature is defined as a fuze which functions at a recorded time of flight of less than 3.5 seconds or the range of burst is less than 650 meters. In case of any doubt, the recorded Range shall be the deciding factor.

**(c) Absence of Premature proof :**

- (i) Samples size : Advance sample/First Lot - 60 Nos.  
 Subsequent Lot - 05 Nos.
- (ii) Fuze setting : 7 sec.
- (iii) Charge : 8 (Eight) (Bomb and fuzes to be conditioned at +50 °C for 8 hours).

- (iv) QE : 49°
- (v) Observation required : (i) Time to Burst by Drello for information only and Range in metres.  
(ii) Premature, Blind, Ground Burst or any other defects.  
(iii) Mechanism number of each fuze to be recorded against its proof results.

(vi) **Classification of Defects:**

- (aa) Critical defects - Premature.  
(ab) Major defects - Ground Burst, Blind.  
(ac) Minor defects - Nil.

(vii) **Sentencing Criteria :**

- (aa) **Critical defect** : On occurrence of a Premature, the lot shall be rejected.

(ab) **Major defects**

Sampling plan- Double sampling plan for Normal Inspection  
AQL - 4%.

Lot	Proof	Sample size	Cumulative Sample size	Acceptance Criteria	
				Accept	Reject
Advance samples/ First lot	First proof	60	60	4	7
	Reproof	60	120	10	11
Subsequent lots	First proof	05	05	0	2
	Reproof	05	10	1	2

**Note:**

- The timings shall be recorded for information only and shall not be considered for sentencing of lot.
- A Premature is defined as a fuze which functions at a recorded time of flight of less than 3.5 seconds or the range of burst is less than 650 meters. In case of any doubt, the recorded Range shall be the deciding factor.

**(d) Percussion Proof**

- (i) Samples size : Advance sample/First Lot - 05 Nos.  
Subsequent Lot - 05 Nos.\*  
\*(Every tenth lot, i.e., lot No 1, 10, 20, 30,....., ).
- (ii) Fuze setting : Safe.
- (iii) Charge : 2 (Two).
- (iv) QE : As convenient for Observation to ensure square hit.
- (v) Target : Ground(excluding marshy/water logged area).
- (vi) Observation required : (i) Premature, Blind or any other defects.  
(ii) Mechanism number of each fuze to be recorded against its proof results.

**(vii) Classification of Defects:**

- (aa) Critical defects - Premature.
- (ab) Major defects - Nil.
- (ac) Minor defects - Blind or any other defects.

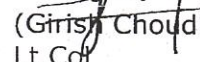
**(viii) Sentencing Criteria:**

- (aa) **Critical defect** : On occurrence of Premature, the lot shall be rejected.
- (ab) **Minor defects** : These defects shall be recorded for information only and shall not be taken into consideration for sentencing.

**Note:**

A Premature is defined as a fuze which functions at a recorded time of flight of less than 3.5 seconds or the range of burst is less than 650 meters. In case of any doubt, the recorded Range shall be the deciding factor.

DATED : 12 July 2014

  
(Girish Choudhry)  
Lt Col  
Dy Controller  
for CONTROLLER

correct copy of the approved proof schedule of this date

  
**SS YADAV**  
Dy. Asstt. Controller  
For Controller

dt: 22/11/2019