Proof Schedule No. CQA(A)/PS/GA/192 (Prov)(R)
Based on drg 3-026892 Index 4K40

SCHEDULE OF PROOF AND SENTENCING OF COMBUSTIBLE CASE WITH PROPELLANT (SCC FILLED) FOR 125MM TK GUN AMN

1. **STORE** : Semi Combustible Cartg (Filled) for 125mm TK Gun amn

2. **TYPE OF PROOF** : Functioning , Safety & Ballistic Performance.

3. **LOT SIZE** :
   (a) Pilot lot : 200
   (b) Subsequent lot : 2000 + PS

4. **PROOF SAMPLES** :

   (a) **Pilot lot** : 24 (functioning & safety) +
   10 (Completeness of combustion).

   (b) **Subsequent lot** : 10 Nos

   (c) **Periodic test for Completeness of Combustion** : 10 Nos (As per Drg 3-026892 Tb-5 & OST B84-867-82)

4.1 Manufacturing for first time or after introduction of design/ technological modification or break in production and resumption after an interval of more than 1 year, the first lot manufactured is a pilot lot and will be subjected to testing as per para 4(a).

4.2 **FUNCTIONOING, SAFETY & BALLISTIC PROOF (24 Nos): (PILOT LOT)**
For conducting the proof as per para 4(a) : 12 rounds in service packages (4 rds each for temp condition as per para 8.1 (a)) will be subjected to jolt test as pr specn JSG 0102 for 1 hr at ambient temp. After jolt test if any one of the following defects is observed the lot will be rejected without carrying out proof.

(aa) Separation of metallic base from combustible case.
(bb) Separation of ram cover & cover from case body.
(cc) Crack on combustible case body.

4.2.1 Samples from above if found satisfactory in jolt test will be subjected to proof as per para 8.1(a).

4.3 **COMPLETENESS OF COMBUSTION (10 Nos) : (PILOT/ SUBSEQUENT LOT)**

This test is carried out on pilot lot and also on OT lot on quarterly basis (Minimum one lot out of 15 lots). The test will be carried out as per details given in specn. OST B84-867-82.

4.3.1 Samples are to be transported over a paved / rough road upto 1000 km at 35 to 45 Kmph and subsequently subjected to loading and unloading 10 times from and on to the truck or Jolting as per CNT HO 3661-61/Mode IV for 1 hour (specn OST B84-1855-80 refers)

4.3.2 After completing above, the following defect will be checked.

(aa) Separation of metallic base from combustible case.
(bb) Separation of ram cover & cover from case body.
(cc) Crack on combustible case body.

If any one defect is observed the samples will not be permitted for further processing/test.

4.3.3 If samples after carrying out above test are found satisfactory, then these will be kept in

(a) Humidity chamber at 95-98% RH AT temp 20-25°C for 15 days. Further samples will be proved 5 Nos with HEAT at +27°C and 5 Nos with HE at +50°C.

OR

(b) Thermostatting chamber at a temperature of 48°C ± 1.5°C for 5 days. After 5 days the charges to be taken out and kept in the closed condition at 18 to 25°C for 24 hrs. After 24 hrs the charges should be taken out of the container or humidity chamber, wiped dry, weighed and kept in an individual container in thermally insulated wooden cases. These conditioned charges will be fired 5 Nos with HE and 5 Nos with HEAT shells.

4.3.4 Following defects during firing, not permitted: -

(a) Flame or back blast behind breech face.

(b) Leakage of propellant gases through gun breech block.

(c) Presence of cold (not burning and not smouldering) debris / pieces of cartridge body and charge elements, exceeding 50 mg per piece in chamber, bore or behind breech face (FC & metallic base) as per OST B84-867-82.

(d) Presence of burning / smouldering pieces of combustible case in bore, chamber or behind breech face (FC & metallic base).

4.3.5 A board of officers will be constituted by resident SQAE(A) with reps from SQAE(A), filling factory and rep from CQA(ME) to over-see the above test. The team is required to submit a detailed consolidated report to CQA(A) for further action as per OST B84-867-82.

4.3.6 The periodic test at para 4(c) for completeness of combustion is to serve as a process control check and in case failure as per para 4.3.4 occurs during the test, the manufacturer with reps of SQAE (A) will carry out investigation and decide on the necessity of a re-test. In case failure occurs in re-test also, the manufacturer will suspend further production and issue a statement to the user, regarding the serviceability of the lots already issued.

5.0 **PROOF SAMPLES INDENTIFICATION:** In addition to the normal service marking, samples will be marked with proof samples No. 1P, 2P, 3P.... etc.

6.0 **PROOF ESTABLISHMENT:** CPE ITARSI

7.0 **METHOD OF FILLING :**

7.1 Proof samples will be selected at random from SCC lot filled and assembled as per drg. 3-026892 Index 4 ✕ 40.

7.2 SCC lot shall be filled and assembled using single lot or accepted components of metallic base, combustible cartg & its components, primer GUV-7 and propellant. If primer GUV-7 and combustible cartg & its components are not available in matching qty in accordance with the SCC lot size due to reasons beyond control, the deficient qty will be made up from another accepted lot with the prior concurrence of the Quality Assurance Officer.

7.3 The filled SCC lot shall consist of component lots/batch not exceeding the following limit.

Lot Size	Metallic base	Primer GUV-7	Combustible cartg & its components	Propellant
2000 + PS	1	2	2	1 each type

8.0 **METHOD OF PROOF FOR FUNCTIONOING, SAFETY & BALLISTIC PERFORMANCE :**

8.1 **Sample size** :

(a) **Pilot lot** : 24 for ballistic performance (8 Rds each at -40°C, at +27°C and +50°C) and 10 Nos for completeness of combustion proof (5 Nos with HEAT at +27°C and 5 Nos with HE at +50°C). For detail procedure for conduct of completeness of combustion proof refer para 4.3.

The SCC shall be conditioned for minimum 48 hrs at the respective temperature prior to firing.

(b) **Subsequent lot** : 10 (5 rounds each at +27°C & +50°C) + 10 Nos for completeness of combustion test (one in every 15 lots)

The SCC shall be conditioned for minimum 48 hrs at the respective temperature prior to firing.

8.2 **PROJECTILE** :

(a) **For SCC conditioned at +27°C for 48 hrs**
Shell 125mm HE1A filled (Under proof) with Fuze B429E set instantaneous 'cap on'

Incase shell 125 mm HE1A (Filled) (under proof) are not available for combination proof then shell 125 mm HE1A filled inert will be used.

(b) **For SCC conditioned at +50°C for 48 hrs**
Shell 125mm HE1A filled inert as per specn OST B84-877-74 with Fuze B429E inert or PRF.

Note :

Every 10th lot will be proved with shell 125 mm HEAT filled inert with Fuze B-15 dummy for both the temp condition i.e. +27°C and +50°C.

For remaining lots projectile as mentioned above will be used.

8.3 **GUN**: 125mm TK GUN D81 mounted on Tank T-72M or Ajay. Barrel with wear up to ~~2.6 mm~~ at 850 mm from breech end.

8.4 **TARGET**: Open ground.

~~< 1.5 mm i.e. bore diameter upto 126.50 mm~~

< 1.7mm i.e. bore diameter upto 126.70 mm

8.5 **QE**: Suitable to proof office to facilitate velocity recording.

8.6 **MODE OF FIRING**: Auto loading and electro-mechanical mode **(both electrical and percussion mode should be operative)**

9.0 **CONDUCT OF PROOF:**

9.1 Proof samples received shall be visually examined for defect like cracks, damages, looseness of combustible case and cover, deformation etc. Any defect or abnormality noticed will be brought to the notice of SQAO, manufacturer and CQA (A) and proof will be carried out only after clearance from CQA (A).

9.2 Two CCD cameras are to be placed at a suitable position for observing / recording of smouldering/ burnings / flame / unburnt debris / pieces in Fighting Compartment.

9.3 Duck cloth of appropriate size required to be spread in the fighting compartment to collect the unburnt debris and for observation of burnt hole / mark due to burning / smouldering debris / particles.

9.4 The video camera is to be placed at a suitable distance for observing / recording of smouldering / burning flame / debris / pieces in the air or touching the ground at ME.

9.5 Above observations through the instruments are to be supplemented by visual observations of debris falling into the fighting compartment without jeopardizing the normal safety precautions. The debris / smouldering pieces and other cold recovered remnants be weighed and preserved with proper identification. The same will be forwarded to CQA (A) for necessary action.

9.6 The firing will be carried out in single rounds and each series will be completed within 30 minutes, maintaining uniform interval between rounds.

10.0 **OBSERVATIONS REQUIRED**

(a) MV of each round.

(b) Barrel bore dia. at 850mm from BE before and after firing.

(c) Met. Data and charge temp.

(d) Observations regarding presence of unburnt debris of combustible case and other cold remainders in chamber / Bore / fighting compartment to include observation on duck cloth and in metallic

base will be recorded after every round. (Wt of unburnt debris / cold remainders recovered also to be recorded.)

(e) Observations of flame or back blast in the fighting compartment after each round is fired.

(f) Presence of burning or smouldering pieces of combustible case in chamber and behind breech face alongwith the observation of hole mark / burnt mark on duck cloth after each round is fired.

(g) Burning or smouldering debris or unburnt debris of combustible Case at Muzzle end of the gun after each round.

(h) Misfire.

(i) Leakage of gases through primer threads.

(j) Jamming of metallic base.

(k) Hard extraction of metallic base.

(l) Soot stain on outer surface of metallic base up to flange.

(m) Leakage of propellant gases through breech block.

(n) Any other defect.

11.0 GENERAL PERFORMANCE REQUIRED

11.1 The SCC must function correctly without exhibiting the defect stated in para 12. Muzzle velocity recorded at +27°C should be within specified limits.

11.2 The specified Muzzle velocity at +27°C for HE & HEAT projectile are as under: -

125 mm HE1A - 852 ± 10 m/s
125 mm HEAT - 907 ± 10 m/s

12.0 CLASSIFICATION OF DEFECTS

12.1 CRITICAL DEFECT

(a) Misfire

(b) Jamming of metallic base

(c) Presence of cold (not burning and not smouldering) debris / pieces of cartridge body and charge elements, exceeding 50 mg per piece in chamber, bore or behind breech face (FC & metallic base) as per OST B84-867-82.

If the debris observed are more than 50 mg per piece then concerned factory in association with resident SQAO will carry out investigation and submit a report to CQA(A) indicating the reason for this defect. CQA(A) will analyse the result in consultation with CQA(ME) and decide further course of action.

(d) Flame or back blast behind breech face.

(e) Leakage of propellant gases through breech block/obturation failure.

(f) Presence of burning / smouldering pieces of combustible case in bore, chamber or behind breech face (FC & metallic base).

If flying debris getting extinguished in air, then it is not to be treated as defect as long as no burnt mark/hole is made on the duck cloth.

12.2 **MAJOR DEFECT :**

(a) MV not within specified limit as per para 11.2

(b) Hard extraction of metallic base.

(c) Cracks, splits of metallic base.

(d) Soot stains on OD or outer surface of flange.

12.3 **MINOR DEFECT**

(a) Cold debris in chamber, bore, or behind breech face (FC and extracted metallic base), not exceeding 50 mg.

(b) Soot stains on outer surface of base up to inner surface of flange.

(c) Burning /smouldering pieces of CCC at Muzzle End.

12.4 Defective samples alongwith recovered debris, if any will be preserved with identification for further investigation.

13.0 **SENTENCEING CRITERIA**

13.1 Lot which satisfies functioning & safety and ballistic performance as per para 11 will be accepted. Muzzle velocity recorded at -40°C and +50°C for Pilot lot is for information only.

13.2 **Critical defect** : Lot will be rejected even for a single critical defect.

13.3 **Major defect** :

LOT	PROOF LEVEL	SAMPLES SIZE	COM. SAMPLE SIZE	ACC	REJ
Pilot lot (AQL 4%)	First	8	8	0	2
	Second	8	16	1	2
Subsequent lot (AQL 6.5%)	First	5	5	0	2
	Second	5	10	1	2

13.4 **Minor defect** will be recorded for information and taking corrective action by the manufacturer.

13.5 For completeness of combustion test actions as per para 4.3 will be followed and evaluation of results will be done as per guidelines given in specn. OST B84-867-82.

14.0 SENTENCING AUTHORITY

14.1 **Pilot Lot** : CQA(A) Khadki.

14.2 **Subsequent lot** : CPE Itarsi or Concerned SQAO.

15.0 **EQUIPMENT AND COMPONENTS TO BE PROVIDED BY THE PROOF ESTT FOR FIRING EACH SAMPLE.**

	EQUIPMENT	QUANTITY
15.1 **GUN**	125mm TK Gun D-81 (Article 2A46) mounted on tank T-72 or Ajay.	As required
15.2 **AMN**	Shell 125mm HE1A filled (Under proof) with Fuze B429E set instantaneous 'cap on'	1
	OR	
	Shell 125mm HE1A filled inert as per specn OST B84-877-74 with Fuze B429E inert or PRF.	
	OR	
	shell 125 mm HEAT filled inert with Fuze B-15 dummy	

16.0 **INSTRUMENTATION**

Sr. No.	Item	Qty
1.	Humidity chamber (95 to 98% Rh)	1 (to hold 10 SCC's)
2.	Conditioning chamber	As required
3.	CCD camera	2
4.	Video camera	1
5.	TV set	3
6.	Muzzle velocity measuring instrument	1
7.	Weighting m/c to measure wt. Of debris (LC 1mg)	As required
8.	Duck cloth variety No. 4 as per spec IS-1422-1983 or IND/TC/0202(b) 'Specification for Duck', cotton 340g/sq m (10 oz)	As required

17.0 **DOCUMENTATION** :

17.1 Recording of observation and sentence should be made on approved form attached as Annexure. Any abnormalities observed also be recorded in the proof report. Observation of SCC before firing is also to be recorded.

18.0 SAFETY PRECAUTIONS

18.1 Normal safety precautions as applicable to the Proof Estt will be observed.

19.0 For any matter not covered by this proof schedule, AHSP shall be consulted for clarification.

APPROVED

Date: 15 Dec 07

(K J SARVAIYA)
Lt Col
Dy Controller

Encl.

Certified correct copy of the proof schedule at this date.

BS SABHERWAL
Dy. Asstt. Controller
For Controller

Date : 12 Aug 2016
Kirkee, Pune-3

for Controller

ANNEXTURE-I

PROOF REPORT

1. Store : Semi combustible cartg case (Filled)
2. Lot No. :
3. Dt of proof : Functioning, Safety & ballistic performance
4. Equipment details:
5. Amn details :
6. Met. Data :
7. Test result :
8. Test result :
9. Observations :

Sr. No.	Dt of firing	SCC lot No. U/P	HE /HEAT shell lot No. used	Conditioning temp/ MV m/s	Observation of burning debris flame		Wt of unburnt debris noticed in			Duck cloth observation
					BE	ME	Bore	Chamber	FC	

SENTENCE

DATE:

For CPE ITARSI