

ACCEPTANCE TEST PLAN
of
Armored Driver's Cabin
(Flat type-RHD) for BEML
High Mobility Vehicle 8x8
-MGS Project



BEML LTD

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1. INTRODUCTION

SCOPE:

This document defines the various checkpoints / acceptance criteria of Armored Driver's Cabin (RHD) development for BEML High Mobility Vehicle 8x8 and after integration of CABIN on BEML HMV 8x8. Based on the performance, the quality plan may be modified and updated from time to time improvement in the quality of the final product offered to the customer.

2. TECHNICAL SPECIFICATION OF CABIN (RHD):

The technical specifications & scope of supply for the CABIN are brought out in **Procurement Technical specification of Armoured Driver's Cabin (RHD) for BEML High Mobility Vehicle 8x8- Doc no: BEML/GAT/R&D /DEFENCE/MGS/A-CAB/003 Dt: 25.04.2020**

The brief specifications are shown below for reference:

Main Dimensional Data & Weight Of Cabin	
Length	2140 mm
Width	2400 mm
Height	1800 mm
Weight of outfitted cabin	1650 kg $\pm 5\%$
Overall Dimensions With Cabin Mounted On Chassis	
Overall width	2500 mm
Overall height (over cabin hatch)	3000 ± 30 mm

3. DRAWINGS

The key dimensional details of cabin are provided in Technical specification of Armoured Driver's Cabin (RHD) document. (Ref Dwg 459 CA 02014)

4. ACCEPTANCE STAGES FOR CABIN (RHD):

1. Design & drawing should be vetted by BEML Team as per IS 9435:2004 before development of proto type. Design clearance will be carried out in the following stages

- a) Design

- i. Conceptual Layout design of shell structure of cabin
- ii. Detailed design of shell structure of cabin
- iii. Detailed specification freezing of Bought out items
- iv. Integration of Bought out items on Cabin Structure and synchronization of the respective functionalities

Note: Supplier shall submit the technical specifications, 3D model & drawings in hard & soft format for all the above stages for approval by BEML.

- b) Manufacturing & Inspection in the following stages

- i. Cabin tubular structure fabrication
- ii. B/O item integration and functionality check
- iii. Cabin will be integrated on 8x8 truck chassis at BEML premises.
- iv. BEML team & Inspection agency will participate and witness the Factory Acceptance Test (FAT) at Supplier premises, before dispatch.
- v. The inspection checks & performance evaluation by road trials will be carried out along with the Inspection agency.

4.1 VISUAL INSPECTION:

1 CABIN SL.NO. _____

2 CABIN TYPE & MODEL _____

3 AC UNIT SL. NO. _____

4 Outfitted cabin is checked for:

- a. Functioning of doors, handles, locks, HVAC and all other electrical accessories.
- b. Completeness and proper fitment of all components in CAB
- c. Assembly.
- d. Tightening of fasteners.
- e. Defects in construction, sharp corners / edges if any.
- f. Moisture, dust & distortion.
- g. Corrosion of metal parts.
- h. Any form of deterioration of material and finishing's.
- i. Mechanical imperfection.
- j. Preservative coating & welding joints.
- k. Should be complete, no missing and loose items are allowed
- l. Inspection "OK" sticker on cabin.
- m. All dummy holes to be covered with proper plugs.
- n. Proper dummy plug for all hoses and pipe free ends.
- o. Lubrication for moving part like hinges, check arm etc.
- p. Operating Instruction sticker if required.
- q. Check list for items to be supplied in loose as per scope of supply.

4.2 STATIC CHECK: 100%

SL. NO.	DESCRIPTION OF CHECKS	OBSERVATIONS	REMARKS
I. STATIC CHECKS:100 %			
1.	CABIN (Inside)		
a)	Ignition box/ Steering lock i) Ignition key operation in 03 positions ii) Ignition On/Off iii) Functioning of Steering Lock		
b)	Cabin Doors i) Functioning of Lock/ Unlock from outside ii) Functioning of Lock/ Unlock from inside iii) Fitment of door handles		
c)	Driver/Co-Driver Seat i) Forward/Backward adjustment ii) Raising/lowering iii) Back rest inclination adjustment iv) Safety belt for Driver & Co- driver		
d)	Bonnet i) Functioning of Lock/ Unlock		
e)	Horn i) Functioning		
f)	Sun visors (02 Nos.)		

	i) Fitment ii) Free movement of sun visors		
g)	Steering Wheel i) Position (8-20) ii) Steering wheel play (10-40 mm.) Max.18 Deg. With engine operating iii) No. of Steering wheel turns – $5 \frac{2}{3}$	- mm - Deg. - turns.	
h)	Wind Shield Wiper i) Functioning ii) Position of wiper blade ii) Sprinkler functioning/ jet spray adjustment		
i)	Manhole i) Cover fitment ii) Functioning of Lock/ Unlock		
j)	Fitment/ Functioning of Instrument Panel Board Meters i) Tachometer / Eng. Hrs. meter ii) Double Air Pressure Gauge of Brake iii) Oil pressure gauge iv) Fuel gauge with reserve indicator v) Tyre pressure gauge vi) Voltmeter		
k)	Fitment/ Functioning of Instrument Panel Switches i) Winch lamp switch ii) Engine stop button iii) Convoy light switch iv) Winch Control Knob vi Head lamp change over switch vi) Hazard lamp switch vii) Tortoise/ Rabbit mode switch viii) Exhaust brake switch ix) Fan switch x) Electric fuel delivery pump switch xi) Fog lamp switch xii) Dome light switch xiii) Rotary illumination switch (03 steps)		
l)	Functioning of Instrument Panel Signal Lamps i) Engine Overheating (red) ii) Electronic Cooling malfunctioning (red) iii) Engine preheating (yellow) iv) 65 % system air pressure (red) v) 90 % system air pressure (red) vi) Fog lamp (green) vii) Winch signal lamp (yellow) viii) Turn signal (green) ix) Trailer turn signal (green)		
	x) Charging indicator (red) xi) High beam (blue)		

	xii) IAD lock (green) xiii) AD lock (green) xiv) Cabin lock (red) xv) Beacon lamp (yellow) xvi) Electric delivery pump (white) xvii) Hazard lamp (red) xviii) PTO engagement indicator (if applicable)		
m)	Ventilators/Cabin Heaters i) Functioning of 03 speeds fan ii) Functioning of Dependent heater (oil) iii) Functioning of Independent heater (fuel) iv) Functioning of Independent heater LCD		
n)	Map reading lamp		
o)	Accelerator Pedal i) Free play ii) Free movement of pedal		
p)	Gear Shift Lever i) Fitment ii) Fouling iii) Condition and locking of rubber boot		
q)	Clutch Pedal i) Free play (4-11mm) ii) Free movement of pedal	- mm	
r)	Brake Pedal i) Free play (4-11mm) ii) Free movement of pedal	- mm	
s)	Exhaust Brake i) Functioning ii) Releasing (800-900 RPM)		
t)	Parking Brake i) Functioning in 03 positions		
u)	Fitment/ functioning of Misc. accessories i) NBC filter (01 No.) ii) Gun mounting clips iii) Instruction stickers (Tyre inf./def, AD/IAD etc.) iv) Electric Wiring diagram v) Fire extinguisher mounting bracket vi) Sprinkler tank vii) Radio socket viii) Blind Spot Mirrors ix) Brackets for mounting Convoy Flag Posts		

	x) Stainless Steel Drinking Water Tank (85 ltrs)		
v)	Other snags - Visual and general defects which is not specified in the check list		
2.	CABIN (Outside)		
a)	Electrical lamps i) Front double parking lamp ii) Upper head lamp (dim/ dip/ straight beam/ passer) iii) Lower head lamp (dim/ dip/ straight beam/ passer) iv) Fog lamps v) Contour lamps vi) LH/ RH side indicator lamps vii) Hazard indicator lamps viii) Beacon lamps ix) Search lamp x) Rear double parking lamp xi Tail lamps xii) Brake lamps xiii) Reverse lamp xiv) Winch lamp		
b)	Bonnet i) Locking/ seating		
c)	Fuses		
d)	Cabin Lifting/ Lowering i) Locking/ unlocking of securing hook ii) Cabin lifting/ lowering function iii) Oil leakage from lift pump iv) Oil Leakage from lift cylinder v) Fitment/ correction of instruction sticker		
e)	Air Intake Hood i) Fitment and seating		
f)	Other snags - Visual and general defects which is not specified in the check list		
3.	Miscellaneous Fitments		
a)			
4.	Details of Measuring Instruments Used:		
	Description of Instruments	Sl. No. of Instrument	Calibrated upto
a)			



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Doc No. BEML/GAT/RD/MGS/A-CAB/ATP/003
Revision No. 0
Date: 25.04.2020

	Commencement time :-	Hrs	
	Concluding time :-	Hrs.	
	Total Time Taken :-	Hrs	
	Date:		(Signature)
			Name:
		Vendor rep.	
		BEML rep.	
		CQA (BEML) rep.	

4.3 DIMENSIONAL CHECKS

The key dimensions of the Cabin will be checked as per IS 9435:2004 & recorded as per format given below

Sl. No	Parameter	Specified (mm)	Observed
1	Over all length	2140	
2	Over all width	2400	
3	Height (over cabin hatch)	3000	
4	Height over beacons	3100	

4.4 WEIGHT MEASUREMENT

The weight measurement of the cabin will checked as per IS: 11825:1986

Sl. No	Parameter	Specified (IN Kg)	Observed
1			

4.5 QA CHECK ROAD TRIAL (50 KM) 100% (Before Integration)

SL.NO	PARAMETER	OBSERVATIONS
a.	Initial Kilometer reading	
b.	Final Kilometer reading	
c.	Initial hour meter reading	
d.	Final hour meter reading	

SL. NO	DESCRIPTION OF CHECKS	OBSERVATIONS	REMARKS
II. ROAD TRIAL CHECKS:100 %			
1.	HIGHWAY TRIALS (40 KMS)		
a)	Steering i) Steering position ii) Steering effort (IS 11948:1999)		
b)	Accelerator pedal i) Free play ii) Free movement of pedal		
c)	Clutch Pedal i) Free play (4-11mm) ii) Free movement of pedal	- mm	
d)	Brake Pedal	- mm	
e)	Horn (IS 15796:2008) i) Functioning		
f)	Fitment/ Functioning of Instrument Panel Board Meters i) Speedometer (IS 11827:2008) ii) Odometer (IS 11850:1998)		
j)	Other snags - Visual and general defects which is not specified in the check list		
2.	CROSS COUNTRY TRIALS (10 KMS)		
a)	Service Brake (IS 11852:2001) i) Brake stopping distance at 32 km/hr. With load – 13 m max. Without load – 10 m max.	- meter	

	ii) Brake pedal operation iii) Steady stopping of CABIN without dragging		
b)	Parking Brake i) Effectiveness of parking brake at 20° gradient		
c)	Inter axle differential & Differential lock i) Functioning of inter axle differential lock when some of the wheels (front or rear) are skidding ii) Functioning of axle differential lock when wheels of one side of CABIN are skidding		
e)	Turning Circle Diameter on steering pad (IS 12222:1987) i) Turning circle diameter on turning extreme left and right hand side ii) Fouling of first axle tyre with leaf spring (shall not foul)	Left ---- meter Right ---- meter	L
h)	Other snags - Visual and general defects which is not specified in the check list		
3.	POST ROAD TRIAL CHECKS Functioning of all switches, linkages & controls will be checked as per clause 4.5 above after completion of road trials.		

4.	Details of Measuring Instruments Used:		
Sl No	Description of Instruments	Sl. No. of Instrument	Calibrated upto
1			
	Commencement time: - Hrs. Concluding time : - Hrs. Total time taken : - Hrs. Date:		
	<div style="text-align: right;"> (Signature) Vendor rep. BEML rep. CQA (BEML) rep. </div>		

4.6 DIMENSIONAL CHECKS (AFTER INTEGRATION)

Sl. No	Parameter	Specified	Observed
1			

4.7 WEIGHT MEASUREMENT (AFTER INTEGRATION)

Sl. No	Parameter	Specified (In Kg)	Observed
1			

4.8 QA CHECK ROAD TRIAL (AFTER INTEGRATION)

SL. NO.	DESCRIPTION OF CHECKS	OBSERVATIONS	REMARKS
II. ROAD TRIAL CHECKS:100 % (AFTER INTEGRATION)			
1.	HIGHWAY TRIALS (20 KMS)		
a)	Steering i) Steering position ii) Steering effort		
b)	Accelerator pedal i) Free play ii) Free movement of pedal		
c)	Clutch Pedal i) Free play (4-11mm) ii) Free movement of pedal	- mm	
d)	Brake Pedal	- mm	
e)	Horn i) Functioning		
f)	Fitment/ Functioning of Instrument Panel Board Meters i) Speedometer ii) Odometer		
g)	Gear Box & Transfer case performance i) Smooth Up-shifting of gears (1L-1H-2L-2H-3L-3H-4L-4H-5L-5H) ii) Smooth Down-shifting of gears (5H-5L-4H-4L-3H-3L-2F-2L-1H-1L) iii) Shifting of reverse gear iv) Max speed in top gear (82 km/ hr) v) Functioning of high & low gear vi) Running in tortoise & rabbit mode vii) Check for any abnormality in functioning of gear box and transfer case	- Km/hr	
i)	Exhaust Brake i) Functioning ii) Releasing (800-900 RPM)	- Rpm	
j)	Other snags - Visual and general defects which is not specified in the check list		

2.	CROSS COUNTRY TRIALS (05 KMS)		
a)	Service Brake i) Brake stopping distance at 32 km/ hr. With load – 13 m max. Without load – 10 m max. ii) Brake pedal operation iii) Steady stopping of CABIN without dragging	- meter	
b)	Parking Brake i) Effectiveness of parking brake at 20° gradient		
c)	Inter axle differential & Differential lock i) Functioning of inter axle differential lock when some of the wheels (front or rear) are skidding		
	ii) Functioning of axle differential lock when wheels of one side of CABIN are skidding		
d)	Turning Circle Diameter on steering pad i) Turning circle diameter on turning extreme left and right hand side ii) Fouling of first axle tyre with leaf spring (shall not foul)	Left ---- meter Right ---- meter	L
e)	Other snags - Visual and general defects which is not specified in the check list		
3.	POST ROAD TRIAL CHECKS Functioning of all switches, linkages & controls will be checked as per clause 4.8 above after completion of road trials.		

4.	Details of Measuring Instruments Used :		
S No.	Description of Instruments	Sl. No. of Instrument	Calibrated upto
	Commencement time :- Hrs Concluding time :- Hrs. Total time taken :- Hrs Date: (Signature) Vendor rep. BEML rep. CQA (BEML) rep.		

4.9 QA CHECK OF LOOSE ITEMS SUPPLIED WITH CABIN:

4.10 VERIFICATION OF DOCUMENTS / CERTIFICATES:

4.11 VERIFICATION OF TECHNICAL LITERATURE SUPPLIED ALONG WITH CABIN (Hard copy & Soft copy in CDs form) (As per PO)

- i) Operators/Drivers Manual
- ii) Workshop Manual
- iv) ISPL
- vi) MRLS
- vii) Service Booklet
- viii) SMT list

4.12 QA CHECK FINAL

SL. NO.	DESCRIPTION OF CHECKS	OBSERVATIONS	REMARKS
III. FINAL CHECKS:100 %			
1.	Check that observations made during static checks have been attended.		
2.	Check that observations made during road trial checks have been attended.		
3.	The following to be checked at final stage:-		
a)	Electrical lamps i) Front double parking lamp ii) Upper head lamp (dim/ dip/ straight beam/ passer) iii) Lower head lamp (dim/ dip/ straight beam/ passer) iv) Fog lamps vi) Contour lamps vi) LH/ RH side indicator lamps vii) Hazard indicator lamps viii) Beacon lamps ix) Search lamp x) Rear double parking lamp xi) Tail lamps xii) Brake lamps xiii) Reverse lamp xiv) Winch lamp		
b)	Final painting and workmanship i) Check for general workmanship ii) Check for final painting iii) Check thickness of paint a) Cabin(inside) – 40 microns Min b) Cabin(outside) - 55 microns Min IV) Scratch test of paint	. - Microns - Microns	
c)	Instruction and caution stickers (C) i) Cab lifting pump ii) Tyre inf./def, AD/IAD iii) Air cleaner	.	
d)	Other snags :- Visual and general defects which is not specified in the check list		

4.	Details of Measuring Instruments Used:		
	Description of Instruments	Sl. No. of Instrument	Calibrated upto
	Commencement time :- Hrs Concluding time :- Hrs. Total time taken :- Hrs		
	Date: _____ (Signature) _____ Vendor rep. _____ BEML rep. _____ CQA (BEML) rep. _____		

5 QUALIFICATION TEST:

CABIN (RHD) of BEML HIGH MOBILITY VEHICLE 8 x 8 has to undergo all qualification tests. Proto cabin or Qty 01 No. of BEML HIGH MOBILITY VEHICLE 8 x 8 with integration of CABIN shall undergo test track trials at BEML premises in presence of Inspection agency. Any improvements / modifications/ failures identified by the Quality team have to be incorporated by the vendor immediately.

6 QUALITY, COMPLETENESS AND RELIABILITY

The workmanship of the cabin must be in accordance with the Production drawings, technological process and their technical Conditions.

6.1 Welds must satisfy the following requirements:

- The beads of the welds must be symmetrical and deposited in one direction.
- The weld must have full penetration to the basic material.
- There should be not patches, regions of over runs and unfilled

craters with cracks.

d) Finishing of the weld must be continuous.

e) There should not be any cracks at the root of the welds.

6.2 Riveted parts must not be either damaged or deformed during riveting. Riveted joints must be done as per CSN standards and as specified in the production drawings. Parts joined by riveting must not be movable. The finished head of rivet must not be split.

6.3 Durability, trouble free function and life must correspond to that of the CABIN.

7. LIST OF ACCESSORIES AND TOOLS:

List of tools & accessories supplied along with cabin (RHD) shall be recorded as per the below table:

SI No	PART NO.	DESCRIPTION	QTY/EQPT.
1			
2			

8. REPORTS TO BE SUBMITTED ALONG WITH CABIN

- 1) Overall & critical dimensions report for cabin
- 2) Type approval certificate copies for components
- 3) Shower test report
- 4) Toque list for trims items fitment
- 5) Functional verification of various electrical systems with simulated test rigs
- 6) Assembly instruction for interface.
