

## Technical Compliance Matrix -Armored Driver's Cabin (Flat type-RHD)

Tender Ref: 6300034481

Tech. Specs of Armored Driver's Cabin (Flat type-RHD) for BEML HMV 8x8

Doc No. BEML/GAT/R&D DEFENCE /MGS/A-CAB/003, Rev 01 Dt: 25.04.2020



Sl no.	Description	Supplier Response	
	<p><b>GENERAL DESCRIPTION:</b>                      Armored Cabin is required for sustaining the blast pressures upto STANAG Level 1.                      This cabin will be integrated on BEML High Mobility Vehicle 8x8. The requirement of the cabin includes Right Hand Drive, Co-Driver and 2 crew members. The windshields used on the cabin must be blast proof to STANAG Level I standard. The Cabin structure is made out of tubular square and rectangle tubes to resists the blast pressure, dynamic loads. The Armored plates are welded over the structure to form a cabin.                      The vehicle has four axle rows with constant drive of all axles. When overcoming difficult terrain you can use a system which enables, during the driving, to alter (according to terrain character) the tyre inflation pressures.                      The unique conception of a four-axle vehicle with a central back-bone tube and independently sprung half-axles and air-cooled engine allows driving in the rough terrains and various climatic zones; with a temperature ranging from – 40 °C up to + 55 °C.</p>		
1	<p>The vehicle body consists of:                      – Cabin for driver, Co Driver, 2 nos. emergency seats and 2 berth type seats ,one over the other behind Driver &amp; Co driver seat.                      – Vehicle platform body</p> <p>To the front frame there is attached an all-metal two-door tilting cabin for driver and crew. In the cabin roof there is a tilting rectangular hatch / manhole. The cabin is locked in the driving position by a system of levers controlled from the LH side of the vehicle. The tipping of the cabin (after unlocking) is done with the help of a hydraulic cylinder and hand pump located on the LH side behind the driver's cabin. The driver and co-driver's seats are adjustable. There are two emergency seats for two persons and this seat is fitted with lap belts. Cabin should be provided with HVAC (Heating ventilation air conditioning system) and vaporization vents on the FRP dash boards. On the instrument panel, firmly connected to the cabin front wall, there are check instruments and elements serving for the vehicle control.</p>		
2	<p><b>SCOPE OF WORK:</b>                      Development of Armored Driver's cabin for BEML High Mobility Vehicle 8x8, Fabrication, Pre-treatment, CED dip paint &amp; top coat, Furnishing of cabin aggregates with BEML supplied Free issue materials, Interior ABS Trims, Installation and internal testing.</p>		
3	<p><b>CABIN STRUCTURE:</b>                      The cabin shall have all driving controls on right hand side, made from hollow structural steel with Tubes and Hat cross section, drop down cab type with two doors and on front wind shield partitioned in the centre. Driver cabin should be equipped with Armored glass for the following places:                      a) Driver Cabin Front Windshield ( LH and RH)                      b) Driver / Co Driver Door Fixed Window glass - single piece each</p> <p>Front structure, Side structure LH &amp; RH &amp; Roof structure of the cabin should be provided with provision for cladding the outer surface with armored steel sheets so as to withstand blast pressure upto STANAG Level 1. Supplier has to obtain confirmation from BEML finalizing the technical details of armored steel plates to be used on the cabin shell for cladding. Strengthened cabin to withstand blast pressure &amp; Temperature of exhaust gases from Muzzle of BARREL.                      Cabin structure should be covered with armored sheet of 6 mm* (approx) on all surfaces (Front, rear, side wall, top, doors). Cabin floor structure and engine tunnel should be covered using Galvanized carbon steel with extra deep draw of cold rolled /hot rolled sheets of 3 mm (approx) thick.                      The cabin is sealed against entry of dust and is to be waterproof, with shower test, as per IS:11865-2006.                      The cabin should be tested to withstand 1000 hours salt spray life as per ASTM: B117                      Drivers Cabin should be provided with 2 doors for the entry and egress of following members                      A. Driver                      B. Co Driver                      Each Door should be equipped with major items having following features                      • Armoured glass</p>		

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	<ul style="list-style-type: none"> <li>• Suitable door locking mechanism as per CMVR requirements</li> <li>• Handles on the door for Firm Holding</li> <li>• Door Hinges as per CMVR requirements</li> <li>• Suitable sealing on the door panel to prevent water ingress, dust ingress</li> <li>• Inner surface of the door to be provided with ABS trims and suitable sound / vibration damping materials.</li> </ul> <p>The corner fastenings of the front glass are protected with strips against possible damage due to branches of trees. The cabin is sealed against entry of dust and water. There are two hinged sun visor screens on top of the front glass for screening against sunlight. There is a manhole in the roof which could be closed. The lid of the manhole is held against a spring stop in the open position and clamped by a bolt in the closed position.</p>			
4	<p><b>CABIN MOUNTING:</b></p> <p>a) Mounting of the swing cabin onto the frame is done using sleeves in the front and prismatic rubber at the rear. Clamping of the cabin in the running condition is done by a control mechanism from the left side.</p> <p>b) The cab lock release mechanism has to be of mechanical linkages arrangement (Tie-rod &amp; Lever to secure the Cabin). Hydraulic system for tilting mechanism of the cabin and Cabin mountings with lock arrangement to be provided.</p>			
5	<p><b>CABIN INTERIORS:</b></p> <p>a) FRP Dash board - Supplier to manufacture FRP dash board with HVAC vents Supplier to make the necessary cut-outs in FRP dash board to mount the accessories. BEML will provide reference 3D Model of dashboard during design stage.</p> <p>b) Engine tunnel profile and dimensions of the existing arrangement is to be provided as given in fig shown below. Detailed rear cutout for engine profile as shown in Dwg No: 459 CA 02022.</p> <p>c) The tunnel bottom is to be covered with thermal insulation of 40 mm thick placed between external &amp; internal panels. The stowage provision to be provided below sleeper berth.</p> <p>d) The Gear Shift Lever (GSL) - (BEML Free issue item) is to be mounted on the engine tunnel.</p> <p>e) The cut out to be made for GSL on engine tunnel as shown in Dwg No: 459 CA 02022</p> <p>f) High &amp; low speed gear pre selector (BEML Free issue item) switch should be fitted on the dashboard suitable cut out and mounting arrangement to be provided by supplier.</p> <p>g) The parking brake and controls (BEML Free issue item) for drive selection has to be placed on the tunnel (driver side) as shown in fig below: suitable cut out and mounting arrangement to be provided by supplier.</p> <p>h) Individual switches (BEML Free issue item) have to be provided in dashboard for drive selection as shown in fig below. suitable cut out and mounting arrangement to be provided by supplier.</p> <p>i) The sleeper berth with minimum cushion, one over the other behind driver &amp; co -driver to be provided. Positioning of berths will be finalized by BEML &amp; supplier in the detail design stage.</p> <p>j) HVAC system requirement : The cabin should be capable of reducing the temperature by at least 15°C from the ambient temperature of 40-45°C and increasing by at least 15°C from the ambient temperature 0-15°C up to a minimum period of three hours.</p> <p>k) Integrated pedal unit with pendant type to be provided by supplier as per CMVR norms</p> <p>l) Supplier to provide Wind screen washer tank (5 ltrs capacity) , which shall be mounted on the LH side floor panel (near co-driver leg room).</p> <p>m) Provision to be made for storing of first aid box, fire extinguisher bottle inside the cabin</p> <p><b>Front Cowl:</b></p> <p>n) Covering front bonnet cover with Meshing cut for cooling air of engine.</p> <p>o) Mechanical linkage with release handle above accelerator pedal shall be provided for bonnet / hood release mechanism.</p> <p>p) Oil heating equipment (BEML Free issue material) ,supplier to provide mounting provision.</p> <p>q) Hinged front cowl to be provided with mechanical stay to facilitate working on the front mounted equipments.</p> <p><b>Roof hatch:</b></p> <p>s) The roof hatch has to be of rectangular in shape placed above co-driver seat : (Shape can be finalized during detailed design)</p> <p>t) Tubular Structure with cladding sheets to be provided.</p>			

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	u) Hard board with 6mm thick / ABS trims to be provided.			
	v) Roof hatch to be provided with spring loaded pull type lock for closed condition			
	w) A handle to be provided for roof hatch open & close operation.			
	<b>Driver's Seat:</b> The driver's seat (BEML Free issue Material) is of adjustable according to the driver's requirement and is adjustable in forward - r. Supplier to provide suitable mounting provision in the cabin to assemble Driver & Co -driver seat. Two seater crew seats (BEML Free issue Material) with leather upholstery with safety belts are to be fitted over engine cover. Supplier to make the mounting provisions for assembling crew seats.			
7	<b>CABIN FITMENTS &amp; ACCESSORIES:</b>			
	<b>LH/RH Side Fitments:</b>			
	a) Rigid type handles shall be provided on "A" & "B" pillars for ingress driver & crew members, meeting the CMVR requirements.			
	b) A suitable insulation shall be added between outer skin & interior ABS trim.			
	<b>Bulk head &amp; Front Panel Fitments:</b>			
	c) Engine idle speed and engine shut off lever (BEML Free issue material) has to be fitted on the dashboard. Supplier to make suitable cutout & mounting arrangement.			
	d) The steering column assy (BEML Free issue material) - Supplier to make suitable cutout & mounting arrangement.			
	e) The column is to be fitted with a steering wheel (BEML Free issue material) of diameter 500 mm.			
	f) Single Lever combination switches(BEML Free issue material) to be used as shown in fig below:			
	g) Two numbers of windshield wipers with two speed controls & linkages shall be provided to suit armour glass.			
	h) Two handles to be provided on cabin front end for windshield cleaning.			
	i) Engine oil temperature dependent heater (BEML Free issue material) to be used -Mounting provision to be provided by supplier.			
	<b>Roof Fitments:</b>			
	j) A search light (BEML Free issue material) has to be fitted on the roof of cabin -supplier to provide mounting provision.			
	k) Two beacon lamps (BEML Free issue material)with metal guards to be provided diagonally at RH front corner & LH rear corner. supplier to provide mounting provision			
	l) Two handles are to be provided inside the cabin on the roof for use by the crew members seated on the Co Driver seat.			
	m) Bracket to be provided for air intake mounting - BEML will provide the requisite details during manufacturing stage.			
n) Stopper (rubber & strip) to be provide to lock hatch during fully open condition.				
o) LMG Gun Mount provision to be provided on top of roof near the hatch- Reference drawing will be shared by BEML during fabrication.				
8	<b>Other Fitments:</b>			
	a) Roof lighting (BEML Free issue material) to be placed on top of right door. Supplier to provide mounting provisions.			
	b) LH & RH direction indicators (BEML Free issue material), two on the sides and two on the front hinged cowl to be provided meeting CMVR norms			
	c) Control Unit with knobs (BEML Free issue material), for the operation of centralized tyre inflation system (CTIS) should be provided on the panel to LH side of Driver, for the inflation/deflation of tyres from the driver cabin.- Supplier to make suitable cutout & mounting arrangement			
	d) Adjustable rear view mirrors to be provided on both sides.			
	e) Control Unit with knobs for the operation / engagement of Axle differential lock and Inter-axle Differential Lock (BEML Free issue material)to be provided on the panel to LH side of Driver. Supplier to make suitable cutout & mounting arrangement.			
	f) Exhaust Brake engagement lever (BEML Free issue material)should be provided near the driver's seat. Supplier to make suitable cutout & mounting arrangement			
	g) Electric horn, Head lamp with leveller, side direction indicators, Wide angle & proximity mirror (BEML Free issue material) etc., should be fitted. Supplier to make suitable cutout & mounting arrangement.			
<b>CABIN INSULATION:</b>				

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9	The floor of the cabin is plain and made of steel plate with internal anti-vibration isolation, and rubber matting. External surface of the floor is also provided with anti-vibration coating. Holes for draining of any water that may enter are provided on the front part of the floor along with rubber plugs for closing the same.			
	Parts of the floor of the driver's cab form the cover for the engine. On the outer surface of the cover away from the engine thermal and sound insulation is stuck—on, in the front portion and is held in position by punched plate.			
	The floor mats are of 3 piece construction to be provided with 10 mm thick insulation. Rexin to be used with paste to fix the floor mat on the tunnel surface. Also, rubber sheets with anti skid surface have to be pasted in emergency seat leg room.			
10	<b><u>DIMENSIONS OF CABIN:</u></b>			
	a) Main dimensions and weight for cabin are indicated below for ref.			
	Length : 2410 mm			
	Width :2400mm			
	Height :1800mm			
	Weight :1650 ± 5% kg			
	<b><u>b) PAINT DETAILS:</u></b>			
	Pre treatment CED painting and top coat painting as per CSN 5450 KHAKI.			
	Colour Type: AKRYL LV EM 020 - SYMPO, Minimum thickness 55 microns.			
	<b><u>c) SHOWER TEST:</u></b>			
Shower test for Cabin to be conducted as per IS: 11865-2006.				
<b><u>d) PACKING &amp; FORWARDING:</u></b>				
The cabin assy. shall be packed to withstand transit damages.				
<b><u>e) CAUTION ON STORAGE:</u></b>				
Cabins must be stored in covered areas or alternatively by tarpaulin covers on the product. In the storage area, there must not be any large storage of acids or other harmful materials which cause corrosion.				
11	<b><u>ACCEPTANCE CRITERIA:</u></b>			
	The stage inspection & acceptance of Cabin assembly will be carried out in two stages as per mutually agreed ATP as indicated below:			
	a) Stage inspection: Cabin structure will be inspected as per the approved drawing. Welding checks, Inspection measuring fixtures and DPT Test report to be submitted.			
	b) BEML team will participate and witness the Factory Acceptance Test (FAT) at Supplier premises, before dispatch.			
	c) Cabin will be integrated on 8x8 truck chassis at BEML premises. The inspection checks & performance evaluation by road trials will be carried out.			
d) Developed Driver's Cabin will be checked by jointly by BEML Team as per Provisional Acceptance Test Plan Doc No. BEML/GAT/RD/MGS/A-CAB/ATP/003 ,Rev 01 dt: 25.04.2020. During inspection if any failure occurs, supplier should carry out Rectifications / Modifications to address the failure and meet the technical requirements.				
12	<b><u>WARRANTY:</u></b>			
	The supplier shall be responsible for any defect or failure of components of cabin due to defective design, material or workmanship for a period of 24 months from the date of acceptance of the cabin.			
	The repair and/or replacement of failed components and equipment and installation of repaired/replaced components/equipment shall be taken by the supplier on his own charge at the site.			
	The supplier shall bear custom duty, freight charges and all other expenses involved in collection of defective components and equipment from the Site, and transportation to the manufacturer's works in India and its return to site after repairs.			
Further, should any design modification be required to any components or equipment as a consequence of failure analysis, the period of 24 months shall recommence from the date when the modified part is commissioned into service and modification shall be carried out free of charge.				

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	The supplier shall carry out all replacement and repairs under the warranty promptly and satisfactorily on notification of the defect by BEML.			
	<b>SCOPE OF SUPPLY:</b>			
	a) Supplier has to quote for			
	1. Furnished cabin (with BEML supplied FIM & supplier sourced accessories ) <b>with</b> armored sheets.			
	2. Furnished cabin (with BEML supplied FIM & supplier sourced accessories ) <b>without</b> armored sheets.			
	b) On receipt of PO, Supplier has to acknowledge and come out with an action plan for execution of the work involved with timeline.			
	c) BEML will provide the conceptual design of Cabin structure in 3D model format in STEP / IGES with GA drawing in AUTOCAD / PDF format.			
	d) BEML will provide most of the accessories as free issue material (FIM).However there are some accessories ,which supplier needs to be procured. These accessories should meet CMVR norms / test report / test approval certificate /Conformity of Production (CoP) ,and before procurement BEML approval should be taken. The details of BEML supplied FIM & supplier sourced accessories are listed in work scope matrix <b>APPENDIX - E of PTS</b>			
	e) Supplier has to provide work status report covering the development aspects, manufacturing activities on monthly basis.			
	f) Firm has to execute detailed design (finalizing design of front structure, rear structure, side structure, cabin floor structure, roof structure) based on the conceptual model in 3D CAD in neutral format provided by BEML.At the end of the design, Firm has to provide finalized.			
13	<ul style="list-style-type: none"> <li>• General arrangement drawings with details of Cabin structure with BOM</li> <li>• General arrangement drawings with details of Cabin structure with BOM</li> <li>• Details of hollow / square / rectangular structural steel tubes with cladding of armored sheet to be used on the Cabin welded structure</li> </ul>			
	g) BEML will review the drawings and provide feedbacks & clearance for manufacturing.			
	h) Supplier has to integrate the Cabin aggregates on the cabin structure and will be responsible for functional demonstration of cabin functionality.			
	i) One no. Driver's Cabin (with interior seating, accessories etc) will be installed on BEML HMV 8x8 vehicle. Functionality to be demonstrated.			
	(a) Accelerator linkages with - Brake & Clutch integral pedal unit.			
	(b) HVAC and its controls, routings			
	(c) Interior Trims (ABS)			
	(d) Roof Hatch			
	(e) Laminated Glass ( Type, Contour)			
	8. BEML will review the drawings and provide feedbacks & clearance for manufacturing.			
14	<b>PROJECT SCHEDULE:</b>			
	The delivery of cabin should complete within SIX months from the date of release of PO.			
	<b>PROJECT DELIVERABLES FROM SUPPLIER:</b>			
	a) Cabin assembly, qty as indicated in the SO.			
	b) Inspection & testing of cabin to be carryout at supplier premises.			
15	c) Reports of the Factory Acceptance Test (FAT) and check sheets to be provided along with the supply.			
	d) Material Certification and amoured glass documents to be provided along with the supply.			
	e) COC for HVAC system.			
	f) One set of soft copy and hard copy of all above documents to be provided.			