Annexure-I

SEA WATER ACTIVATED HIGH ENDURANCE BATTERY

1. **Performance Requirements and product characteristics**

(a). **Electrical output:**

1	Average Power Output	28KW
2	Average Current	175A (Approx.)
3	Voltage on load (avg)	170V
4	Endurance	10 minutes
5	Flow rate of sea Water	28 ltrs/minute ±2%
6	Temperature of sea water	20±2 Dec.C
7	Battery activation time	< 3.5 seconds
8	Weight	30±0.5Kg

(b). **General Characteristics:**

(i) Dry Storage Life: 05 years from the date of manufacture

(ii) Storage temperature: Minus 10 Deg C to plus 50 Deg C when kept in the sealed container

(iii) Electrolyte: The battery shall be capable of operating in sea water.

(iv) Load: The load resistance for discharge purposes shall be 0.85 Ω ±.0.02Ω.

2. **Static Discharge Test(SDT)**: One battery will be subjected to static discharge test to verify the performance of the battery as per specifications

3. **Environmental Tests:**

(a) Vibration:

Battery, when assembled in a control and battery section or in an equivalent fixture, shall be vibrated according to following schedule in each of the test axes as under: -

Ser:	Frequency Range (in HZ)	Amplitude (in mm)	Duration (in min)	Remarks
(i)	10-30	1.524±10%	60	The frequency shall be continuously varied between each of the limits given, at a uniform rate over a 3 to 5minutes period for the duration of the test.
(ii)	31-60	3g±10%	60	
(iii)	61-100	3g±10%	60	

(b) Shock: Battery, when assembled in a control and battery section or in an equivalent test fixture, shall be subjected to 3 shock pulses in each of the three axes, along the two directions (total of 18 shock pulses). The shock pulse will be as follows: -

(i) 60 g ± 5 g peak amplitude of 8-10 m sec. duration and with a pulse shape approximating a one half sine wave along the longitudinal axis.

(ii) 40 g ± 3 g peak amplitude of 8-10 m sec. duration along the other two orthogonal axes.

(c) Temperature Cycling: Battery packaged and packed in hermetically sealed container, shall be placed in a test chamber. The test chamber temperature shall then be raised to ±50°c and held for a period of 16hrs. During the following 16 hrs, the temperature must drop to -10°c and held for a period of 8 hrs. The test item shall be removed from the chamber and from the container and discharged as specified.

4. **Simulated Sea Trials (SST) / Sea Firing Trials**. The supplier is to undertake Simulated Sea Trial (SST) / Sea firing trial on one battery. The battery would be assembled to the weapon and SST/ sea firing trial is to be conducted to meet the performance requirement.

5. **10 Cell Battery Test**: 10 Cell Battery Test to be conducted for acceptance of Production Battery for assembly & integration and trials.

6. **Finished Battery Dimensional Checks**:

Sl. No	Description	Specification Value (mm)
1	Overall height (Excluding terminals)	225.0 +0.5 -0.3
2	Outer Dia (Check with 311.0+0.2, -0.0 Ring gauge)	Ø 310.0 +/-0.5
3	C.D. between terminals	a) 60.0 +/- 0.2 b) 30.0 +/- 0.1
4	Dia over the ribs (check with 312.6 + 0.0, -0.3 Ring gauge)	Ø 313.0 +/- 0.4
5	Hole Dia A (2 Nos)	Shall accept tube of size Ø 17.0 +/- 0.2
6	C.D. between Dia 17.0 holes	276.0 +/- 0.8
7	Hole Dia B (4 Nos)	Shall accept dia 10.0 mm rods freely
8	C.D. between Dia 10.0 holes	268.0 +/- 0.2
9	C.D. between Dia 10.0 holes	115.0 +/- 0.2
10	C.D. between Dia 10.0 and 17.0 holes.	57.5 +/- 0.1

11	Terminal length (from top of the battery in the loaded condition)	64.0 +/- 1.0
12	Check for the provision of name plate sticker with Batch No., Type SWA 010/1 etc.	Visual Check
13	Battery Weight (in Kgs)	30 +/- 0.5 as per drawings
14	Insulation Resistance between terminals using 500 V DC Megger a) Positive & Negative } b) Positive & Tapping } c) Negative & Tapping }	> 5 M Ohms

7. **Usage of Requirement**:

(a) 01 Battery to be subjected to SDT & ET's (Vibration, Shock, Temperature Cycling)

(b) 01 Battery to be subjected to Simulated Sea Trails(SST).

(c) 01 Battery to be delivered for Assembly & Integration and Trails