

**NOTICE FOR INVITING EXPRESSION OF INTEREST (EOI)**  
**FOR INDIGENOUS DEVELOPMENT OF NI-CD BATTERIES FOR SUBMAINES.**

REF NO. : MDL/ INDG/SUBMARINE/2020/02  
DATE OF ISSUE : Sept 10, 2020  
DATE OF EOI CLOSING : October, 09, 2020 at 14.00 hrs.  
ITEM DESCRIPTION : Indigenous Development of Ni-Cd Cells for 28Vdc Back up battery Box.

**1 Mazagon Dock Shipbuilders Limited** invites 'Expression of Interest (EOI)' from reputed Indian manufacturers for Indigenous design, development & manufacturing of Ni-Cd batteries, Test & trials at factory or at designated labs & Successful trials on board Submarine. A brief technical specification of Nickel Cadmium cells is enclosed with this EOI at Enclosure I

**2 Pre-qualification criteria**

The interested manufacturer must fulfil the following minimum pre-qualification criteria and shall necessarily submit the relevant documents to support the claim. Lack of documentary proof is liable for rejection of offer.

- (1) The bidder shall be an Indian Registered Manufacturer with own development & production facilities in India. The bidder shall provide
  - i. Company Profile and valid shop & establishment registration certificate.
  - ii. Audited / certified balance sheet, P/L statement for past 3 years and valid solvency certificate / Banker's opinion issued by Nationalized / Reputed International / Scheduled bank.
  - iii. Details of manufacturing facilities with list of equipment, Professional strengths, production process backed by quality assurance, in house testing facility if any.
- (2) The bidder has to submit proof of Indigenously developed/manufactured and supply of Ni-Cd battery to Indian or International ships / warships / submarine / shipyard / industries.
- (3) It is desirable to have minimum 60% components / input material used for development of item is sourced in India.
- (4) Any other documents considered relevant but not listed here.
- (5) Traders/Agents/Dealers/foreign Suppliers/consultant shall not be considered.


**3** Based upon above information and documentary evidence, factory visit of firms will be undertaken for ascertaining capacity and capability to undertake indigenous development of required item / equipment. The development of the item by selected firms will be undertaken following approved commercial procedures of MDL on limited tender basis for prototype development. Post successful development of prototype the supplier will be informed to manufacture & supply additional NI-Cd cells with quantities as per requirement.

4 Timely submission of offer is responsibility of the Suppliers and no reasons / excuses in this regard will be entertained by MDL. MDL reserves the right to: (i) Accept or reject EOIs submitted by the Suppliers. (ii) Cancel the process at any time without any liability and assigning any reason thereof.

5 **Inspection:** The item / equipment that are to be developed / indigenised are to be jointly inspected by MDL and Indian Navy (IN) as per pre-approved QAP. Any test that are to be carried out in laboratory should be done from NABL accredited laboratory duly witnessed by IN & MDL rep.

6 **Submission of EOI.**

- (a) **Issue of EOI Document.** The EOI can be downloaded from MDL's website 'www.mazdock.com' with link to "Make in India."
- (b) **Submission of EOI.** EOI bids are to be submitted in sealed envelope prior to closing date & time. Suppliers shall ensure timely submission of their interest well in advance, in order to avoid the difficulties. The bids are to be submitted in person or by registered post clearly indicating "**BID FOR EOI for Ni-Cd Batteries**" on top of envelope. Bids received after closing date & time will be not considered for evaluation.
- (c) In case of any queries, the bidder can contact Mr. G.A. Jadav, DGM (Indg.) at his mobile # (+91) 9004863140 or e-mail: [gjadav@mazdock.com](mailto:gjadav@mazdock.com).
- (d) Bids shall be submitted directly to Indigenisation Department, 3rd Floor, New Service Block, North Yard, Mazagon Dock Shipbuilders Limited, Dock Yard Road, Mumbai, 400 010, on Tel. Nos. 23762707. Timely submission of the bid is responsibility of the Suppliers and no reasons / excuses in this regard will be entertained by MDL.

  
Yours faithfully,

For MAZAGON DOCK SHIPBUILDERS LIMITED,

कप्तान रमेश बाबू (निवृत्त)  
CAPT. RAMESH BABU (RETD)  
महा प्रबंधक (स्वदेशीकरण एवं सी.एस.आर)  
GENERAL MANAGER (INDIGENISATION & CSR)  
माझगांव डॉक शिपबिल्डर्स लिमिटेड  
MAZAGON DOCK SHIPBUILDERS LIMITED  
मुंबई - ४०० ०१०.  
Mumbai - 400 010.

**Enclosures with EOI:**

- (i) Technical Bid

# Enclosure: I

## 1. PREFACE

Nickel Cadmium batteries are integrated part of 28Vdc Emergency Battery Charger Assembly (BCA). The purpose of this unit is to ascertain electrical power supply to vital installation in case emergency due to power failure.

## 2. BATTERY CHARACTERISTICS

The battery will have the following characteristics:

- (a) Nickel-Cadmium battery type.
- (b) Battery autonomy: The battery must provide a secure supply with a voltage that ranges between 22 V and 24 V for 30 minutes (2.4 V/element at the start of the discharge) during the loss of the 115V/60 Hz supply.
- (c) Number of battery elements: 10.
- (d) 2 cells per element.
- (e) Nominal voltage: 2.4 V per element
- (f) Final voltage: 2.2 V per element
- (g) 158 A in 30 minutes
- (h) Capacity in a ratio of 5 h: 238 Ah
- (i) Dimensions of a Battery element:  
406 mm (height) x 241 mm (width) x 195 mm (depth)
- (j) Weight of a Battery element: 30,5 kg
- (k) Corrosion – protected terminals / connectors.

## 3. SYSTEM DESCRIPTION

The Ni-Cd batteries are fitted in battery box which is integral part of Battery Charger Assembly and getting charged across the output of battery charger. The battery charger provides a high quality output of 27V (float) or 28.5 V (Boost) at 24A, which is produced from 115V 3 $\phi$  50/60Hz supply.

The Battery Box is built into a custom built steel enclosure, 813mm x 485mm x 1032mm overall dimensions, which is designed for top mounting. The enclosure is suitable for direct mounting for shock levels up to 15g. Protection level is to IP33.

Access for maintenance and repair is via the top panel, which can be removed. This will give access to the batteries and battery sense PCB.

The maximum expected power consumption during the charge is 950 W during the charge for each BCA. The maximum expected heating are 250 W during the charge for each BCA.

## 4. SPECIFIC REQUIREMENT

The 28Vdc back up battery should capable enough to withstand with the underneath characteristics of end users and charger.

1. The maximum voltage drops between consumers and battery charger assembly must not be higher than 2.4 Volts, taking into account the voltage drop in the electronic components of circuits. (i.e diode etc)

2. In case of excessive battery discharge decreasing its voltage to zero volts, the used material must not be damaged.
3. Under abnormal conditions of battery charger failure, the voltage must be maintained between 30 and 32 volts during 2 hours.
4. Consumer supply is not provided by the 28Vdc back up when there is normal power supply.
5. The output voltage of charger must be around 27 volts, inside a range between 20 and 32 volts with the following conditions:
  - (a) Maintenance charge: The floating voltage of different battery elements is of 27 V (1.36V/element) in normal situation with 115 V/60 Hz power supply.
  - (b) Fast charge of battery elements with a charge voltage of 28.5 V (1.43 V/element) produced automatically after a battery discharge.
  - (c) After a complete discharge, the time needed for charging the battery from 0 to 90% of its capacity is about 20 hours.
  - (d) Peak to peak ripple lower than 2.5 V.
  - (e) Alarm corresponding to hydrogen concentration higher than 1%, impedance unbalance in battery cell, over temperature and over voltage, provoke the automatic disconnection of the battery charger. On resuming adequate hydrogen values the battery charger restart is carried out automatically.

#### 5. ENVIRONMENT CONDITIONS

CONDITIONS	NORMAL ENVIRONMENT	ABNORMAL ENVIRONMENT
Exterior air temperature	-10°C to +40°C	-30°C to +70°C
Conditions in the areas	Propulsion compartment	Propulsion compartment
Temperature	10°C to 55 °C	5°C to 60°C
Humidity	30% to 80%	10% to 100%
Internal pressure	800 mbar ≤ P ≤ 1200 mbar ΔP/Δt ≤ 100 mbar /min.	700 mbar ≤ P ≤ 1300 mbar ΔP / Δt ≤ 300 mbar/min
Composition of the atmosphere	Partial oxygen pressure (absolute pressure) 170 mbar ≤ P(O <sub>2</sub> ) ≤ 230 mbar	Partial oxygen pressure (absolute pressure) 170 mbar ≤ P(O <sub>2</sub> ) ≤ 250 mbar
Roll	± 30° in a period of 10 seconds	± 45° Period of 10 seconds
Pitch	± 10° Pseudoperiod 1 minute	± 15° Pseudoperiod of 1 minute
Heel (for 10 minutes)	± 18°	± 45°
Trim (for 10 minutes)	± 30°	± 45°
Vibrations (50,000 h)	From 0.1 Hz to 1 Hz: amplitude 10 mm From 1 Hz to 50 Hz: acceleration 40 mg Vibrations applied to equipment attachment points	From 0.1 Hz to 1 Hz: amplitude 25 mm From 1 Hz to 5 Hz: acceleration 0.1 g From 5 Hz to 22 Hz: amplitude 1 mm From 22 Hz to 50 Hz: acceleration 2 g Vibrations applied to the fixing points of the material
Magnetic induction.	Earth's magnetic field B < 1.5 × 10 <sup>-4</sup> T	Earth's magnetic field: B < 1.5·10 <sup>-4</sup> T

		During a demagnetisation treatment: $B < 15 \cdot 10^{-4} \text{ T}$
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**6 Battery Structure**

One Battery Element



Ten Battery Elements



Note: The photograph is for representational purpose only.

Battery Arrangement in Battery Box

