

**BRAZILIAN NAVY
BRAZILIAN NAVAL COMMISSION IN EUROPE**

CONTRACT 70100/2025-006/00
CONTRACT ENTERED BETWEEN THE
BRAZILIAN NAVY, REPRESENTED BY THE
BRAZILIAN NAVAL COMMISSION IN EUROPE
(BNCE) AND HBL ENGINEERING LIMITED
FOR THE PROVISION OF SUBMARINE
BATTERY CELLS AND ACCESSORIES.

This Contract is made on the 27 of August 2025 in this city of London, England, at the headquarters of the Brazilian Naval Commission in Europe, with complete observance of existing legal provisions, Captain RODRIGO BARREIROS LEAL, President of the Brazilian Naval Commission in Europe, being present as representative of the Brazilian Navy, hereinafter referred to as the Navy and or BNCE, and Mr ROBERT HERRITTY, representative duly accredited of HBL Engineering Limited, hereinafter referred to as the Contractor. This contract was not preceded by Public Tender, in accordance with waiver TJDL nº 02/2025, NUP: 63007.000435/2025-71, as per clauses and conditions set out below.

CLAUSE ONE - OBJECT OF THE CONTRACT

1.1 - The object of this Contract is the provision of a set of battery cells and a set of accessories for battery cells, in the quantities defined in Subclause 1.2, to meet the needs of the Submarine "Tupi", in accordance with the conditions and requirements established in the Annex A - Terms of Reference and in its Appendix - Purchase Specification.

1.2 - The object of this contract:

ITEM	DESCRIPTION	SUPPLY UNITY	QUANTITY
a)	Lead-acid battery cells designed with positive tubular plates and negative plates with CSM technology	UN	123
b)	Acid level indicator for 31DD16 cell without temperature sensor and with gasket	UN	354
c)	Acid level indicator for 31DD16 cell with temperature sensor and with gasket	UN	20
d)	Maintenance plug for 31DD16 cell with gasket	UN	374
e)	Ventilation plug explosion proof for 31DD16 cell	UN	364
f)	Small ventilation plug explosion proof for 31DD16 cell	UN	10

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g)	Distributors (manifolds) with six (6) nipples each for air agitation (individual supply)	UN	90
h)	Spare parts, accessories, instruments, special tools and onboard mounting accessories according to Subclause 6.1.2 of Purchase Specification	UN	as Subclause 6.1.2 of Purchase Specification
i)	Documentation according to Subclause 6.1.1 of Purchase Specification	UN	as Subclause 6.1.1 of Purchase Specification
j)	Training and technical support according to Subclause 6.2 of Purchase Specification	UN	as Subclause 6.2 of Purchase Specification

a) One hundred twenty-three (123) lead-acid battery cells designed with positive tubular plates and negative plates with CSM technology, which will be installed on the "Tupi" Submarine. The cells are to be divided into the following groups:

(i) One hundred twenty (120) lead-acid battery cells with all the individual components and accessories necessary for the correct operation on board including acid level indicator, maintenance plug with nipple to connect to the agitation system, ventilation plug explosion proof, insulation measuring probe and connectors (bus bars). The acid level indicator for six (6) of these cells shall also have temperature sensor assembled;

(ii) One (01) cell for FAT;

(iii) Two (02) spare cells;

b) Three hundred fifty-four (354) acid level indicator for 31DD16 cell (already purchased by BN) without temperature sensor and with gasket;

c) Twenty (20) acid level indicator for 31DD16 cell (already purchased by BN) with temperature sensor and with gasket;

d) Three hundred seventy-four (374) maintenance plug for 31DD16 cell (already purchased by BN) with gasket;

e) Three hundred sixty-four (364) ventilation plug explosion proof for 31DD16 cell (already purchased by BN);

f) Ten (10) small ventilation plug explosion proof for 31DD16 cell (already purchased by BN);

g) Ninety (90) distributors (manifolds) with six (6) nipples each for air agitation (individual supply);

h) Spare parts, accessories, instruments, special tools and onboard mounting accessories according to Subclause 6.1.2 of Purchase Specification;

i) Documentation according to Subclause 6.1.1 of Purchase Specification;

j) Training and technical support according to Subclause 6.2 of Purchase Specification.

1.3 - The following documents will form an integral part of the Contract, regardless of transcript:

Annex A - Terms of Reference;

Annex B - Quotation HBL/BRAZIL/209/25072024/R6, dated 14th June of 2025, from HBL Engineering Ltd; and

Annex C - Drafts of Term of Provisional and Definitive Receipt.

1.4 - In the event of dispute, ambiguity or conflict between the terms of this Contract and that of the annexes, the terms of this Contract will prevail.

CLAUSE TWO - DURATION OF THE CONTRACT

2.1 - This Contract shall become effective on the day of the fulfilment of the following conditions:

- a) The signature of this Contract by both the Navy and the Contractor;
- b) Issuance of the End User Certificate by the Navy;
- c) Issuance of the Export Licence, a copy of the Export Licence must be sent to the Navy as soon as it is issued.

2.2 - The day the last of the above conditions has been fulfilled shall be referred to as the Effective Date of the Contract.

2.3 - In the event that the above-mentioned conditions, referred to in Subclause 2.1 have not been fulfilled within 120 (one hundred and twenty) days from the date of the fulfilment of the first thereof, either party may, by notice in writing, cancel this contract and neither party shall be under any liability to the other due to the fact that the contract shall not have become effective.

2.4 - The period of execution and effectiveness of this Contract shall begin upon the fulfilment of Subclause 2.1, and shall remain in force until all obligations therein are satisfactorily fulfilled, including the successful conclusion of all services and warranties required. The date limit for completion of all services and warranties shall be within one (01) year of effective Date of the Contract.

CLAUSE THREE - EXECUTION AND MANAGEMENT

3.1 - The procedures for the execution, assessment and acceptance of the object of the contract, are set out in Annex A - Terms of Reference and its Appendix.

3.2 - The Contractor will deliver the goods, and documents, CIP Rio de Janeiro Airport/Seaport, in accordance with Incoterms 2020, in 1 (one) batch as per Physical and Financial Schedule (PFS) stated in Clause 6.1. Early delivery is acceptable with the agreement of the Navy.

3.3 - The shipment of the goods will only be allowed upon acceptance of the results of the tests required in the Annex A - Terms of Reference and its Appendix, and after presentation of a scanned version of the documents required in Subclause 3.4.

3.4 - The Contractor will advise BNCE, at least 30 (thirty) days prior to the delivery, that the object of the contract is ready for shipment, in order to allow BNCE to prepare the "pre-advice of delivery" for the Depot Authorities of the Navy, by sending to the BNCE:

a) Invoice and Packing List, both stating:

total value for Customs purposes;
product specification details, such as description, NSN and PN, net weight of each product (in the case of products sold in a box, specify the net weight of each product and the quantity contained in each box), unit and total prices and currency;
product case number (in case of more than one case, specify the number of cases and which product/PN are in each case), gross weight of each volume, net weight of each product (number of products in each case);
number and type of packing (such as wood, metal, etc.);
country of origin/manufacturer/seller, delivery costs and any other applicable cost;
name and address of the exporter (full address including country);
name and address of the importer (as per consignee and case markings);
If applicable: NEQ, hazard symbol and storage compatibility.

b) Factory Acceptance Test/Warranty Certificate;

c) Manufacturer's Certificate/Certificate of Conformity with the number of the batch, date of manufacture, validity of the item, serial numbers, if applicable;

d) Phytosanitary Certificate, issued in accordance with International Standards for Phytosanitary Measures, if applicable;

e) Dangerous Goods Declaration/Certificate and Material Safety Data Sheet, if applicable;

f) Draft of Bill of Lading/Air Way Bill (for each shipment, if applicable), marked freight prepaid and including the freight value, to the order of:

Markings to read:

Consignee Address:

COMANDO DA MARINHA
CENTRO DE DISTRIB. E OPER. ADUAN. DA MARINHA
Recinto Aduaneiro 7.93.35.012
CNPJ: 00.394.502/0382-06

Case Markings:

COMANDO DA MARINHA
CENTRO DE DISTRIB. E OPER. ADUAN. DA MARINHA
AV. BRASIL 10500 - OLARIA - RIO DE JANEIRO - RJ - BRASIL
CEP 21012-350
OMS: 91530 (SUBMARINO TUPI) / OMD: 41000 (AMRJ)
CONTRATO: 70100/2025-006/00
NCM: To be advised by the company prior to shipment.

g) Copy of Insurance Certificate in the amount of 110% of the goods being shipped.

3.4.1 - The goods to be supplied shall be suitably packed for sea or air freight, in accordance with the Contractor's best commercial practice, and all packing materials utilized shall be deemed to be property of the Navy.

3.4.2 - If the object of this contract is delivered in wooden boxes the Contractor will provide a Phytosanitary Certificate issued according to the International Standards for Phytosanitary Regulation is required. All materials utilized shall be deemed to be property of the Navy.

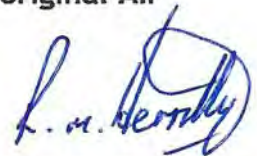
3.4.3 - The Contractor is not allowed to consolidate the goods of the Navy.

3.5 - The Contractor will advise the BNCE of the shipment forecast detailing pre-booking Aircraft, Shipping Line, Airport/Port of Loading, Estimated Time of Departure (ETD) and Estimated Time of Arrival (ETA) Rio de Janeiro.

3.6 - Immediately after the shipment, the Contractor must send to BNCE:

a) 3/3 (3 out of 3) original of the Bill of Ladings (B/L) and/or one original Air Way Bill (AWB), detailing the following;

- Consignee address;
- Case markings;
- Name of the Shipping Line Agent in Rio de Janeiro;
- Freight value and marked *freight prepaid*; and
- Phytosanitary Stamp, confirming that any wooden material, has been treated in accordance with International Standards for Phytosanitary Measures, if applicable.
- "Notify: COMANDO DA MARINHA, CENTRO DE DISTRIB. E OPER. ADUAN. DA MARINHA, AV. BRASIL, 10.500 - OLARIA - RIO DE JANEIRO - RJ - BRASIL, CEP 21012-350, a/c Divisão de Tráfego de Carga I, Tel: 0 55 21 2101 0567/0556, email: cdam-importa@marinha.mil.br".



b) One original Insurance Certificate, in the amount of 110% of the goods being shipped, in order to be forwarded to the Depot Authorities of the Navy in Brazil for the release of the goods through the Brazilian Customs.



3.7 - If the Contractor fails to forward to BNCE, the correct documentation, within 3 (three) working days from shipment date, delaying the arrival of the documentation for clearance to the Depot Authorities of the Navy in Brazil and the Brazilian Customs authorities request payment of storage charges to the Navy, the value of those charges will be deducted from the payments due to the Contractor. Those charges will be invoiced to the Contractor if payments are no longer due.



3.8 - Any other discrepancies in the documentation, such as weight in the packing list that do not tally with the one declared in the AWB/BL, or incorrect number of the container seal, or incorrect markings, or any other discrepancy that would incur in delays in the release of the goods through Customs and therefore causing charges to be applied to the Brazilian Navy by the Airport Authorities, those charges will also be deducted from the payments due to the Contractor and, if no payment is due, the Contractor will be invoiced for those charges.



3.9 - Due to the restrictions imposed by the Brazilian Customs Authorities for the clearance of this type of goods, under no circumstances, goods are to be delivered to Rio de Janeiro via express couriers, such as DHL, UPS, SKYnet, FEDEX, SEDEX, TNT and alike.

3.10 - Demurrage and Free Time: if by sea freight, 15 (twenty-one) days free time of demurrage after discharge in Rio de Janeiro.

CLAUSE FOUR - SUBCONTRACTING

4.1 - Full subcontracting of the object will not be allowed.

4.1.1 - In any case of subcontracting, the Contractor remains fully liable for the perfect compliance with the agreement and responsible for supervising and coordinating the subcontractor's activities, as well as liable, in relation to the Navy, for the strict fulfilment of the contractual obligations concerning the object of the subcontracting.

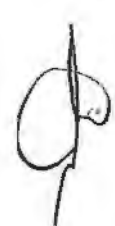
4.2 - Subcontracting is only allowed with the previous approval of the Navy.

4.3 - In case of subcontracting of part of the object in Brazil, the goods will be delivered at the following address: Arsenal de Marinha do Rio de Janeiro - AMRJ, Praça Barão de Ladário, s/nº - Ilha das Cobras - Centro. Post Code 20091-000 - Rio de Janeiro/RJ - Brazil.

CLAUSE FIVE - PRICE



5.1 - The total contract price, which includes all costs relating to the service to be provided and the equipment to be supplied CIP Rio de Janeiro Seaport, in accordance with Incoterms 2020, is firm and fixed for the whole duration of the contract in the amount of Nine hundred thirty seven thousand, eight hundred twenty nine US dollars and eighty tree cents (US\$ 937.829,83) and comprises all costs, including packing and delivery.



CLAUSE SIX - PAYMENT



6.1 - The total contract price, for amount of US\$ 937.829,83 (Nine hundred thirty seven thousand, eight hundred twenty nine US dollars and eighty tree cents), will be paid as per Physical and Financial Schedule (PFS) below:



Event	Description	Scheduled Date	%	Price
1	Signature of the Contract.	D ₀	-	-
2	Effective Date of the Contract.	D	-	-
3	Delivery of proof of completion of the preparation of the production line for manufacturing.	D + 5 days	5	U\$ 46.891,49
4	Delivery of orders for all materials required for manufacturing.	D + 10 days	15	U\$ 140.674,46
5	Delivery of Technical Documentation as per subclause 6.1.1 of the Appendix Purchase Specification.	D + 15 days	5	U\$ 46.891,49
6	Delivery of Logistic Support Documentation as per subclause 6.1.1 of the Appendix Purchase Specification.	D + 30 days	5	U\$ 46.891,49
7	Delivery of Quality Assurance Documentation as per subclause 6.1.1 of the Appendix Purchase Specification.	D + 45 days	10	U\$ 93.782,98
8	Delivery of Shipping Documentation as per clause 3.4 and 3.6 of this contract.	D + 240 days	30	U\$ 281.348,94
9	Delivery and arrival of the equipment CIP Rio de Janeiro Seaport, INCOTERMS 2020, with all components and parts.	D + 280 days	20	U\$ 187.566,00
10	Signature of the Term of Provisional Receipt (TRP) by the Navy at the conclusion of the training and the tests at the end of the activation of battery cells.	D + 320 days	5	U\$ 46.891,49
11	Signature of the Term of Definitive Receipt (TRD) by the Navy.	D + 340 days	5	U\$ 46.891,49
	TOTAL		100	U\$ 937.829,83

6.1.1 - Event 3 Delivery of proof of completion of the preparation of the production line for manufacturing, 5% (five per cent) of the total contract price, against the presentation of the original invoice (stating the contract number, event it refers to, amount for payment and total amount of the contract) and proof of completion of the preparation of the production line for manufacturing.

6.1.2 - Event 4 Delivery of orders for all materials required for manufacturing, 15% (fifteen per cent) of the total contract price, against the presentation of the original invoice (stating the contract number, event it refers to, amount for payment and total amount of the contract) and the order of all materials required for manufacturing.

6.1.3 - Event 5 Delivery of Technical Documentation, 5% (five per cent) of the total contract price, against the presentation of the original invoice (stating the contract number, event it refers to, amount for payment and total amount of the contract)

and the delivery of Technical Documentation as per subclause 6.1.1 of the Appendix Purchase Specification.

6.1.4 - Event 6 Delivery of Logistic Support Documentation, 5% (five per cent) of the total contract price, against the presentation of the original invoice (stating the contract number, event it refers to, amount for payment and total amount of the contract) and the delivery of Logistic Support Documentation as per subclause 6.1.1 of the Appendix Purchase Specification.

6.1.5 - Event 7 Delivery of Quality Assurance Documentation, 10% (ten per cent) of the total contract price, against the presentation of the original invoice (stating the contract number, event it refers to, amount for payment and total amount of the contract) and the delivery of Quality Assurance Documentation as per subclause 6.1.1 of the Appendix Purchase Specification.

6.1.6 - Event 8 Delivery of Shipping Documentation, 30% (thirty per cent) of the total contract price, against the presentation of the original invoice (stating the contract number, event it refers to, amount for payment and total amount of the contract) and all original Shipping Documents, listed in Clauses 3.4 and 3.6.

6.1.7 - Event 9 Delivery and arrival of the equipment CIP Rio de Janeiro Seaport, INCOTERMS 2020, with all components and parts, 20% (twenty per cent) of the total contract price, against the presentation of the original invoice (stating the contract number, event it refers to, amount for payment and total amount of the contract) and after cargo clearance.

6.1.8 - Event 10 Signature of the Term of Provisional Receipt (TRP), 5% (five per cent) of the total contract price, against the presentation of the original invoice (stating the contract number, event it refers to, amount for payment and total amount of the contract) and signed Term of Provisional Receipt (TRP), issued by the NAVY at the conclusion of the training and the tests at the end of the activation of battery cells.

6.1.9 - Event 11 Signature of the Term of Definitive Receipt (TRD), 5% (five per cent) of the total contract price, against the presentation of the original invoice (stating the contract number, event it refers to, amount for payment and total amount of the contract) and signed Term of Definitive Receipt (TRD), issued by the NAVY.

6.2 - Payment will be made by bank transfer, within 30 days of receipt of the original Invoice, upon successful completion of the respective event and the approval of the appropriate Navy's representative.

6.3 - If there is an error in the presentation of the Invoice, or any other relevant document, or even a circumstance that prevents the settlement of the expense, such as, pending financial obligation, resulting from an imposed penalty or fault, the payment will be put on hold until the Contractor provides the BNCE with the corrective measures. In this case, the payment period will resume after the situation has been corrected and settled between the parties.

6.4 - Bank details for payment purposes:

Company Name as per the Account: HBL ENGINEERING LIMITED

Bank: STATE BANK OF INDIA

CORPORATE CLIENTS GROUP BRANCH

ROAD NO.12, BANJARA HILLS,

HYDERABAD - 500034

Account: 10284056261

BIC (Swift Code): SB IN IN BB 659

CLAUSE SEVEN - PRICE ADJUSTMENT

7.1 - Prices are valid from the date of the proposal.

7.2 - Prices are fixed during the whole duration of the contract.

7.3 - Readjustment for monetary correction purposes arising from the variation of price indices that reflect the costs of the performance of the service will be determined between the parties, if applicable.

7.3.1 - The readjustment mentioned in item 7.3 will be carried out by an official internal document issued by the Brazilian Navy.

7.4 - The need for readjustment must be proven and accepted by the contracting party.

CLAUSE EIGHT - OBLIGATION OF THE NAVY

8.1 - The Navy must:

8.1.1 - Verify that all obligations assumed by the Contractor are being complied with, in accordance with the terms of the contract and its Annexes;

8.1.2 - Check and inspect the provision of services, by the Officer on Duty, recording keeping a record of detected faults, indicating the day, month and year of its occurrence, as well as the name of the employees involved, and forward the notes to the competent for the appropriate measures;

8.1.3 - Notify the Contractor in writing about the occurrence of any inadequacies in the course of the execution of the contract, setting a deadline for its correction;

8.1.4 - Pay the Contractor the value of the object of the contract, within the time period and conditions established in the Subclause 6.1;

8.1.5 - Provide, in writing, the information needed to perform the services of the contract;

8.1.6 - Conduct periodical evaluations of the quality of the services;

8.1.7 - Fill in all documents related to the provision of the services; and



8.1.8 - Apply administrative and pecuniary penalties pursuant to this Contract.

CLAUSE NINE - OBLIGATION OF THE CONTRACTOR

9.1 - The Contractor must:

9.1.1 - Comply with the obligations stated within the Contract and its Annexes, taking full responsibility for the risks and expenses for the good and perfect execution of the object of the contract;

9.1.2 - Deliver the goods/services object in perfect conditions, according to the specifications, the terms and the location specified in the Annex A - Terms of Reference and its Appendix and its quotation;

9.1.3 - Maintain throughout the contract period, in compliance with the obligations assumed, all the conditions of qualification required for the provision of the goods and/or services;

9.1.4 - Use qualified employees with full knowledge of the services to be performed, in accordance with current standards and determinations, taking full responsibility for damages or failures that may compromise the performance of their duties;

9.1.4.1 - Employees between the ages of fourteen and sixteen are expressed forbidden, except when they are hired under an apprentice scheme. Employees under the age of eighteen are not permitted in the night shift, and in dangerous or unhealthy jobs.

9.1.5 - Instruct its employees regarding the activities to be carried out, warning them not to perform activities not included in the contract. The Contractor shall report to the NAVY any and all occurrences in this regard, so as to prevent any deviation from the duties;

9.1.6 - Maintain a representative, accepted by the NAVY, with powers to make decisions compatible with the commitments undertaken, at all times and places established for the provision of the services;

9.1.7 - Comply with the NAVY's request for the replacement of any employee allocated for the service, within the term set by the contract's inspector, in case a failure to fulfil the obligations hereof occurs due to the employee's performance of the service;

9.1.8 - Be responsible for all labour, social security, tax, over time and other obligations provided for in specific legislation, in regards to its employees. The contractor's failure to do so, does not transfer the responsibility to the NAVY;

9.1.9 - Keep confidential all information obtained as a result of the performance of the contract;

9.1.10 - Provide the services within the parameters and routines defined, supplying all materials, equipment and tools in suitable quantities, quality and technology, in compliance with the recommendations accepted by good technique, Standards and legislation for the service;

9.1.11 - Conduct the technical and administrative management of the services in order to carry them out in an effective and efficient manner, according to the documents and specifications that are part of this Contract, within the deadline established for the project;

9.1.12 - Provide any clarification and/or information requested by the NAVY, or its representatives, ensuring access at any time to the work site as well as to the documents connected to the provision of the service;

9.1.13 - Stop, upon request from the NAVY, any activity not being performed in compliance with the good techniques, or which poses a hazard to the safety of people or properties of third parties;

9.1.14 - Repair, correct, remove or replace, at its own expense, in whole or in part, within the period fixed by the contract's supervisor, any services performed in which there are defects or errors, resulting from the performance or the material used;

9.1.15 - Keep, maintain and oversee material, tools and whatever necessary for the provision of the services, including the provision of the necessary safety equipment for its employees, throughout the duration of the contract;

9.1.16 - Submit for the approval of the Navy, in writing, any changes to the performance methods that differ from the specifications previously agreed;

9.1.17 - Inform the Navy, at least 15 (fifteen) days prior to the day of delivery, of any obstacle that may prevent the Contractor from delivering the services, or meet the expected deadline, with the adequate proof;

9.1.18 - Report to the NAVY any and all irregularities found during the provision of the services.

9.1.19 - The Contractor will be responsible for obtaining the necessary Export Licence, if requested by the authorities of its country, or a Declaration stating that the Licence is not required. In the case of the Export Licence being needed, the Navy will provide the Contractor with an End User Certificate within 15 (fifteen) days from the signature of the Contract.

9.1.20 - The Contractor shall comply with all relevant health and safety, as well as sanitary and environmental legislation in force for the industry's best practice, in the country where the work is taking place.

9.1.21 - The contractor shall be responsible for all expenses arising from the execution of the training and technical support services as per subclause 6.2 of the Appendix Purchase Specification.

CLAUSE TEN - PERFORMANCE WARRANTY

10.1 - In order to guarantee the due and faithful performance of its contractual obligations, the Contractor shall issue, in favour of the Navy, a Performance Bond Guarantee amounting to 5 %(*five percent*) of the Contract value, valid for at least 90 days from the final acceptance issued by the Supervisor of the Agreement.

10.2 - The Performance Bond must be issued by a first-class bank and delivered to the BNCE up to 30 days of the Effective Date of the Contract, as per Subclause 2.1.

10.2.1 - All costs related to the issuance and extension of the Performance Bond Guarantee, must be borne by the Contractor.

CLAUSE ELEVEN - INFRACTIONS AND ADMINISTRATIVE PENALTIES

11.1 - An administrative infraction is committed by a Contractor who:

- a) fails to perform the contract, due to the total or partial non-performance of any of the obligations assumed in the Contract;
- b) delays the execution of the object without reasonable explanation;
- c) defrauds in the execution of the Contract;
- d) behaves in a disreputable way; or
- e) commits tax fraud.

11.2 - Due to the total or partial non-performance of the service object of this contract, the Contracting party may, ensuring full right of prior defence, apply the following penalties to the Contractor:

a) **Written Warning** for minor faults, considered those that do not cause significant damage to the provision of the service object of the contract;

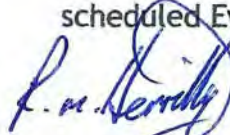
b) **Suspension of entering Public Tenders and impediment from contracting with BNCE**, for a period of up to two years;

c) **Impediment from entering Public Tenders and contracting with the Brazilian Government**, while the reasons for the penalty persist or until they have been addressed/resolved with the authority that applied the penalty, upon reimbursement, to the Brazilian Navy, for the resulting losses;

d) **Fine** as per terms of this Contract.

11.3 - The aforementioned fine, in the event of delays not validated under the terms of Force Majeure, may be applied by the Navy as compensation in the amount of 0,15% of the value of the contract, per each day of delay until the day the delivery is successfully carried out. The maximum figure for the compensation may not exceed 5% (five per cent) of the total contract price.

11.3.1 - When applicable, the fine will be calculated over the total value of the scheduled Event, in accordance with the Physical and Financial Schedule (PFS).



11.4 - After notification of the penalty, the Navy may deduct the fine from the payments due to the Contractor or request that the Contractor pay the fine within 10 (ten) days after the notification.

11.5 - The Supplier may appeal against the penalties to the President of the Brazilian Naval Commission in Europe within 5 (five) working days from the penalty notice. The President of the BNCE will issue his final decision within 5 (five) working days from the day in which the BNCE acknowledged the Supplier's appeal. Upon the President's decision and if the imposed penalty persists, the penalty will be collected as per item 11.4.

11.6 - After 20 (twenty) working days of the last date of the payment of the fine, if the Supplier has not settled the payment, the Navy may cancel this contract in accordance with Clause 12 - Termination.

11.7 - When the total amount of the penalties exceeds 5% (five per cent) of the total estimated contract price, the contract may be terminated and the Navy will demand the payment of the owed fines.

11.8 - The application of the sanctions provided for in this Contract does not exclude, under any circumstances, the obligation to fully repair the damage caused to the Contractor.

11.9 - The penalties mentioned in sub-items 11.2 "a", "b" e "c", may be applied to the Contractor in addition to the fines.

11.10 - The relevant authority, when applying the penalties, will take into consideration the seriousness of the offence, the educational character of the penalty, as well as the damage caused to the Navy, complying with the principle of proportionality.

11.11 - The written notices referred in this item shall be forwarded by recorded delivery.

11.12 - The contractor is liable for death, injury, loss or damage to persons or property, which shall have been caused by the negligence of the Supplier, their servants or agents in the course of the execution of this contract.

11.13 - The enforcement of any of the foreseen penalties will be preceded by an administrative process and will ensure the Contractor's full defence.

CLAUSE TWELVE - TERMINATION

12.1 - The contract is terminated when the obligations of both parties have been fulfilled, even if this occurs before the duration stipulated for this purpose.

12.2 - The contract may be terminated, before the obligations stipulated therein are fulfilled, or before the duration set therein:

a) non-compliance with contractual clauses, specifications or deadlines;

- b) irregular compliance with contractual clauses, specifications and deadlines;
- c) delay in fulfilling obligations within the stipulated deadlines;
- d) the unjustified delay in starting the provision of the service;
- e) highly relevant reasons of public interest, known by the public, justified and determined by the competent authority of the contracting body registered in the administrative process of this contract;
- f) delay in payments due by administration, of more than 90 (ninety) days, related to services or supplies already received or executed, in full or partially, except in cases of public calamity, serious disturbance of internal order or war, guaranteeing to the contracted party the right to opt for the suspension of the fulfillment of its obligations until the situation is normalized;
- g) the occurrence of proved fortuitous event or force majeure, preventing the performance of the contract.

12.3 - The termination term shall be:

12.3.1 - An agreement between the parties, provided it is appropriate for the Administration. The party who wishes to terminate this contract must give the other party 30 days' notice.

12.3.2 - Requested by the contracting party, in the cases listed in items 12.2 a), b), c), d) and e).

12.3.2.1 - When the termination occurs based on the aforementioned items, without the contractor's fault, the contractor will be compensated for the proven damages suffered and will be entitled to payments due for the services provided until the date of termination.

12.4 - The requirement for termination of the contract will be formally discussed to ensure the full right of defense to the other party.

12.5 - The term of termination, whenever possible, shall be preceded by:

- a) Balance of contractual events already fulfilled or partially fulfilled;
- b) List of payments already made and still due; and
- c) Indemnities and fines.

CLAUSE THIRTEEN - ALLOCATION OF FUNDS

13.1 - The expenses for this contract are part of the budget of the Brazilian Government, as per details below:

R\$ 1.500.000,00

Management/Unit: 45000

Source of resources: 1050000144

Work Programme: 236885

Expenditure element: 440952

Internal Plan: P4CCTP001L0

R\$ 500.000,00
Management/Unit: 45000
Source of resources: 1050000144
Work Programme: 174672
Expenditure element: 440952
Internal Plan: P4CCTP0Z1B4

13.2 - The allocation of funds for subsequent financial years may be amended upon the approval of the corresponding budget, through an internal formal document, to be signed by the Navy.

CLAUSE FOURTEEN - UNFORESEEN CASES

14.1 - Unforeseen cases will be decided by the parties, according to the provisions contained in this Contract, and it's Annexes, with the support of the legislation that governs it.

CLAUSE FIFTEEN - WAIVERS AND VARIATIONS

15.1 - No waiver or variation by either the BNCE or the Contractor will be treated as such unless through a formal variation or contract amendment.

15.2 - Any variation to the Contract or the provision of any additional services from those defined in the Object of the Contract will be subject to mutual agreement in writing.

15.3 - The additions or reductions resulting from an agreement signed between the contracting parties may not exceed the limit of 25% (twenty-five percent) of the initial estimated value of the contract and be under the same terms and conditions.

15.4 - The merger, split or incorporation of the Contractor with/into another legal entity is permitted, provided that the new legal entity complies with all qualification requirements demanded in the original bidding process and all clauses and conditions of the Contract are maintained.

15.5 - Alterations that do not characterize an amendment to the Contract can be made by simple apostille, waiving the signature of an Addendum.

CLAUSE SIXTEEN - PUBLICITY

16.1 - It is the contractor's responsibility to publish, in the Brazilian Official Gazette of the Union, an extract of the administrative act (waiver) that preceded this agreement, and deemed unnecessary, for this reason, the requirement to publish the extract of the contract.

CLAUSE SEVENTEEN - DRAFT OF THE CONTRACT, LAW AND ARBITRATION

17.1 - The draft of this contract was examined and approved by the *Consultoria Jurídica Adjunta Junto ao Comando da Marinha (CJACM)*, through Parecer n. 00199/2025/CJACM/CGU/AGU.

17.2 - This Contract is governed by the English law and has its authoritative text in the English language. All matters arising there under shall be determined in accordance with the English laws of England and under the jurisdiction of the English courts.

17.3 - Without prejudice of the determined in Subclause 17.2, any dissension, arising from this Contract, which had not been settled by means of an agreement between the parties, can be resolved by Arbitration, in London, in accordance with the Rules of Conciliation and Rules of Arbitration of the International Chamber of Commerce by one or more arbitrators appointed in accordance with the said Rules.

CLAUSE EIGHTEEN - FORCE MAJEURE OBLIGATION OF THE CONTRACTOR

18.1 - The parties shall consider force majeure, for the effect of counting the periods established in this Contract, those which, being impossible to foresee or to avoid may prevent one of the parties from complying with the scheduled dates. Proof of Force Majeure must be presented and accepted by the affected party.

18.2 - Therefore, the following are considered force majeure: war, insurrection, revolution, civil war, strike, lockouts, and acts of nature, adverse meteorological conditions, government actions, and others, which in accordance with Subclause 18.1 escape the control of the affected party and prevent the services in the sites where the object of this Contract is being fulfilled.

18.3 - In the event of force majeure, the affected party shall notify the other party, in writing, within 10 (ten) working days of the start of the force majeure period. The affected party must inform the other party of the consequences of the force majeure regarding the delays under the Contract and the period required in order to overcome those delays. Upon the agreement of the parties, the scheduled dates will be extended by the respective period of the force majeure.

18.4 - The contracting parties may terminate this Contract if the period of Force Majeure persists for 6 (six) months.

CLAUSE NINETEEN - DELEGATION OF POWER

19.1 - In accordance with the legal instrument "Rules for Administrative Agreements of the Brazilian Navy", "Portaria" Nr. 38, dated 21/03/2022, the Brazilian Navy has delegated power to the President of the Brazilian Naval Commission in Europe, to sign contracts, on behalf of the Navy, in the area of his jurisdictional sector. In addition, "Portaria" Nº 153, dated August 5th, 2025, from the DGMM was issued to support this specific contract.

CLAUSE TWENTY - NOTICES AND CORRESPONDENCE

20.1 - Where in accordance with the Contract, a notice in writing is required, it shall be sent by registered post to the address of the party to receive it, stated in this Contract or such other address as may from time to time be notified by either party to the other in writing.

20.2 - Formal communications between parties must be made in writing through a letter, although the provision of a copy of the said letter by electronic mail is allowed. All correspondence between the parties hereto concerning the Contract shall be in the English Language.

20.3 - The day-to-day correspondence and formal notices given by both parties should be sent to the following:

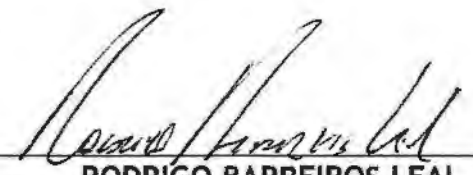
- a) Brazilian Naval Commission in Europe
170 Upper Richmond Road, London SW15 2SH
Tel: + 44 020 8246 4464/4439/4467
FAO: Contracts Division
- b) Contractor: HBL Engineering Limited
Address: 8-2-601, Road No 10 Banjara Hills, Hyderabad, 500 034, TG, India
E mail: contact@hbl.in

CLAUSE TWENTY ONE - COPIES

This Contract is made in two originals, one for the BNCE and one for the Contractor, and a copy for the DIRECTORATE OF NAVAL ENGINEER (DEN).

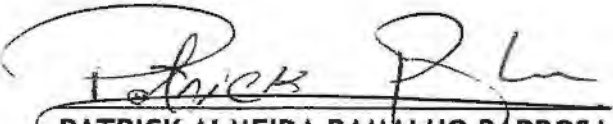
AND, it is hereby agreed that both parties accept the provisions of the Clauses of this Contract, which was read and agreed with and is now signed by Captain RODRIGO BARREIROS LEAL President of the Brazilian Naval Commission in Europe, representing the Navy, and Mr.(s) ROBERT HERRITTY, representing the Contractor and witnessed by Commander PATRICK ALMEIDA RAMALHO BARBOSA and Commander MAURO TAVARES DOS SANTOS JUNIOR, at this whole act present.

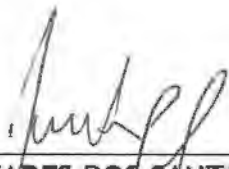
London, 27 of August 2025.


RODRIGO BARREIROS LEAL
Captain Brazilian Navy
President of the Brazilian Naval
Commission in Europe - BNCE


ROBERT HERRITTY
Director
HBL Engineering Limited

Witnesses:


PATRICK ALMEIDA RAMALHO BARBOSA
Commander Brazilian Navy
BNCE


MAURO TAVARES DOS SANTOS JUNIOR
Commander Brazilian Navy
BNCE

**BRAZILIAN NAVY
DIRECTORATE OF NAVAL ENGINEER**

TERMS OF REFERENCE

1 - GENERAL CONTRACTING CONDITIONS

1.1 - The object of this term is the provision of a set of battery cells and a set of accessories for battery cells, in the quantities defined in Subclause 1.2, to meet the needs of the Submarine "Tupi", in accordance with the conditions and requirements established in these Terms of Reference and in the Appendix:

Appendix: Purchase Specification

1.2 - Object

I T E M	DESCRIPTION	SUPPLY UNITY	QUANTITY
a)	Lead-acid battery cells designed with positive tubular plates and negative plates with CSM technology	UN	123
b)	Acid level indicator for 31DD16 cell without temperature sensor and with gasket	UN	354
c)	Acid level indicator for 31DD16 cell with temperature sensor and with gasket	UN	20
d)	Maintenance plug for 31DD16 cell with gasket	UN	374
e)	Ventilation plug explosion proof for 31DD16 cell	UN	364
f)	Small ventilation plug explosion proof for 31DD16 cell	UN	10
g)	Distributors (manifolds) with six (6) nipples each for air agitation (individual supply)	UN	90
h)	Spare parts, accessories, instruments, special tools and onboard mounting accessories according to Subclause 6.1.2 of Purchase Specification	UN	as Subclause 6.1.2 of Purchase Specification
i)	Documentation according to Subclause 6.1.1 of Purchase Specification	UN	as Subclause 6.1.1 of Purchase Specification
j)	Training and technical support according to Subclause 6.2 of Purchase Specification	UN	as Subclause 6.2 of Purchase Specification

- a) One hundred twenty-three (123) lead-acid battery cells designed with positive tubular plates and negative plates with CSM technology, which will be installed on the "Tupi" Submarine. The cells are to be divided into the following groups:
 - (i) One hundred twenty (120) lead-acid battery cells with all the individual components and accessories necessary for the correct operation on board including acid level indicator, maintenance plug with nipple to connect to the agitation system, ventilation plug explosion proof, insulation measuring probe and connectors (bus bars). The acid level indicator for six (6) of these cells shall also have temperature sensor assembled;
 - (ii) One (01) cell for FAT;
 - (iii) Two (02) spare cells;
- b) Three hundred fifty-four (354) acid level indicator for 31DD16 cell (already purchased by BN) without temperature sensor and with gasket;
- c) Twenty (20) acid level indicator for 31DD16 cell (already purchased by BN) with temperature sensor and with gasket;
- d) Three hundred seventy-four (374) maintenance plug for 31DD16 cell (already purchased by BN) with gasket;
- e) Three hundred sixty-four (364) ventilation plug explosion proof for 31DD16 cell (already purchased by BN);
- f) Ten (10) small ventilation plug explosion proof for 31DD16 cell (already purchased by BN);
- g) Ninety (90) distributors (manifolds) with six (6) nipples each for air agitation (individual supply);
- h) Spare parts, accessories, instruments, special tools and onboard mounting accessories according to Subclause 6.1.2 of Purchase Specification;
- i) Documentation according to Subclause 6.1.1 of Purchase Specification;
- j) Training and technical support according to Subclause 6.2 of Purchase Specification.

1.3 - The detailed description of the item must be contained in this Term of Reference, in its Appendix - Technical Specification.

1.4 - The object of the contract is not a luxury item. The services are ordinary and non-continuous nature, without dedicated labour on an exclusive basis.

1.5 - The contract or other suitable instrument that replaces it provides details of the rules that will be applied in relation to the duration of the contract.

2 - DESCRIPTION AND JUSTIFICATION FOR PROCUREMENT

2.1 - The justification for the Contract and the quantities described for the object aim to complete the repair of the Submarine "Tupi".

3 - DESCRIPTION OF THE SOLUTION AS A WHOLE CONSIDERING THE OBJECT LIFE CYCLE AND THE PRODUCT SPECIFICATION

3.1 - The description of the solution as a whole is found in the Appendix - Purchase Specification and in the Contract.

3.2 - The product specifications are defined in the Appendix - Purchase Specification

4 - REQUIREMENTS

Sustainability

4.1 - The Supplier must conduct business in accordance with the principle of sustainable development and adhere to internationally recognised fundamental standards for occupational health and safety, environmental protection, labour and human rights as well as responsible corporate governance.

The requirement for tests, certificates and documentation

4.2 - All tests and their reports must be performed as defined in the Appendix - Purchase Specification.

4.3 - All certificates must be provided as defined in the Appendix - Purchase Specification.

4.4 - All documentation must be provided as defined in the Appendix - Purchase Specification.

4.5 - All documents, certificates and reports indicated in item 4 must be sent for approval by the Brazilian Navy.

Performance guarantee

4.6 - The contract or other suitable instrument that replaces or amends it provides greater detail on the rules that will be applied in relation to the contract performance guarantee.

Assessment of the premises

4.7 – Prior assessment of the place where the services are to be performed is not required.

5 - TYPE OF DELIVERY

Delivery terms

5.1. The deadline for delivery of goods, as well as the provision of services, counted from the effective date of the contract, will comply with the provisions of the Physical and Financial Schedule (PFS).

5.2. The delivery of goods and the provision of services consist of the installments indicated in the Physical Financial Schedule below:

Event	Description	Scheduled Date	%
1	Signature of the Contract.	D ₀	-
2	Effective Date of the Contract.	D	-
4	Delivery of orders for all materials required for manufacturing.	D + 10 days	15
5	Delivery of Technical Documentation as per subclause 6.1.1 of the Appendix Purchase Specification.	D + 15 days	5
6	Delivery of Logistic Support Documentation as per subclause 6.1.1 of the Appendix Purchase Specification.	D + 30 days	5
7	Delivery of Quality Assurance Documentation as per subclause 6.1.1 of the Appendix Purchase Specification.	D + 45 days	10
8	Delivery of Shipping Documentation as per clause 3.4 and 3.6 of this contract.	D + 240 days	30
9	Delivery and arrival of the equipment CIP Rio de Janeiro Seaport, INCOTERMS 2020, with all components and parts.	D + 280 days	20
10	Signature of the Term of Provisional Receipt (TRP) by the Navy at the conclusion of the training and the tests at the end of the activation of battery cells.	D + 320 days	5
11	Signature of the Term of Definitive Receipt (TRD) by the Navy.	D + 340 days	5
	TOTAL		100

5.2.1 – Event 3 Delivery of proof of completion of the preparation of the production line for manufacturing, 5% (five per cent) of the total contract price, against the presentation of the original invoice (stating the contract number, event it refers to, amount for payment and total amount of the contract) and proof of completion of the preparation of the production line for manufacturing.

5.2.2 – Event 4 Delivery of orders for all materials required for manufacturing, 15% (fifteen per cent) of the total contract price, against the presentation of the original invoice (stating the contract number, event it refers to, amount for payment and total amount of the contract) and the order of all materials required for manufacturing.

5.2.3 – Event 5 Delivery of Technical Documentation, 5% (five per cent) of the total contract price, against the presentation of the original invoice (stating the contract number, event it refers to, amount for payment and total amount of the contract) and the delivery of Technical Documentation as per subclause 6.1.1 of the Appendix Purchase Specification.

5.2.4 – Event 6 Delivery of Logistic Support Documentation, 5% (five per cent) of the total contract price, against the presentation of the original invoice (stating the contract number, event it refers to, amount for payment and total amount of the contract) and the delivery of Logistic Support Documentation as per subclause 6.1.1 of the Appendix Purchase Specification.

5.2.5 – Event 7 Delivery of Quality Assurance Documentation, 10% (ten per cent) of the total contract price, against the presentation of the original invoice (stating the contract number, event it refers to, amount for payment and total amount of the contract) and the delivery of Quality Assurance Documentation as per subclause 6.1.1 of the Appendix Purchase Specification.

5.2.6 - Event 8 Delivery of Shipping Documentation, 30% (thirty per cent) of the total contract price, against the presentation of the original invoice (stating the contract number, event it refers to, amount for payment and total amount of the contract) and all original Shipping Documents, listed in Clauses 3.4 and 3.6.

5.2.7 - Event 9 Delivery and arrival of the equipment CIP Rio de Janeiro Seaport, INCOTERMS 2020, with all components and parts, 20% (twenty per cent) of the total contract price, against the presentation of the original invoice (stating the contract number, event it refers to, amount for payment and total amount of the contract) and after cargo clearance.

5.2.8 – Event 10 Signature of the Term of Provisional Receipt (TRP), 5% (five per cent) of the total contract price, against the presentation of the original invoice (stating the contract number, event it refers to, amount for payment and total amount of the contract) and signed Term of Provisional Receipt (TRP), issued by the NAVY at the conclusion of the training and the tests at the end of the activation of battery cells.

5.2.9 - Event 11 Signature of the Term of Definitive Receipt (TRD), 5% (five per cent) of the total contract price, against the presentation of the original invoice (stating the contract number, event it refers to, amount for payment and total amount of the contract) and signed Term of Definitive Receipt (TRD), issued by the NAVY.

5.3 - Payment will be made by bank transfer, within 30 days of receipt of the original Invoice, upon successful completion of the respective event and the approval of the appropriate Navy's representative.

5.4 - Delivery must be in accordance with INCOTERMS 2020 of the CIP (Carriage and Insurance Paid to) type in Rio de Janeiro Seaport, RJ, Brazil.

5.5 - The services will be provided at the following address: Arsenal de Marinha do Rio de Janeiro – AMRJ, Praça Barão de Ladário, s/nº - Ilha das Cobras – Centro. Post Code 20091-000 - Rio de Janeiro/RJ – Brazil.

Goods warranty, Maintenance and Technical Assistance

5.6 - The contractual warranty period for goods for any defects arising from supply and testing that may be detected by the Brazilian Navy is for a period of twelve (12) months from Date of Manufacturing.

5.7. The warranty shall be provided with in order to maintaining the equipment supplied in perfect working order, without any additional cost or burden to the NAVY.

5.8. The warranty covers corrective maintenance of the goods by the Contractor itself, or, if applicable, by authorized technical assistance, in accordance with specific technical standards.

5.9. Corrective maintenance shall be understood as that intended to correct defects in the goods, including the replacement of parts, the performance of adjustments, repairs and necessary corrections.

5.10. Parts that present defects or faults during the warranty period must be replaced with new, first-use, original parts that present quality and performance standards equal to or higher than those of the parts used in the manufacture of the equipment.

5.11. Once notified, the Contractor shall repair or replace any goods that present defects or faults within 180 (one hundred and eighty) days, counted from the date the equipment is removed from the NAVY premises by the Contractor or authorized technical assistance.

5.12. The term indicated in the previous subitem may be extended once during the period of validity, for the same period, upon written and justified request from the Contractor, accepted by the NAVY.

5.13. In the event of the subclause above, the Contractor shall provide equivalent equipment, with specifications equal to or higher than those previously supplied, for temporary use by the Contracting Party, in order to ensure the continuity of administrative work during the execution of the repairs.

5.14. After the deadline for repairs and replacements has elapsed without the Contractor's request being met or the Contractor presenting justifications, the NAVY is authorized to hire a different company to perform the repairs, adjustments or replacement of the item or its components, as well as to require the Contractor to reimburse the respective costs, without this resulting in the loss of the equipment warranty. The reimbursement will not exceed the original price paid to the Contractor.

5.15. The cost of transporting the equipment covered by the warranty will be the responsibility of the Contractor.

5.16. The legal or contractual warranty of the object has its own duration and is unrelated to that established in the contract, allowing for the possible application of penalties in the event of non-compliance with any of its conditions, even after the contractual term has expired.

5.17. The term for the provision of technical support by the Contractor for the goods supplied, at no cost to the NAVY, will be 06 (six) years from the date of activation of the battery cells at the NAVY facilities.

5.18. Technical support is understood as the service intended to provide guidance and advisory with technical problems presented by the goods, including the indication of specific products or services, parts to be replaced, adjustments, repairs and corrections to be carried out. The continuity of the supply of spare parts must also be guaranteed even after the discontinuation of the goods

6 - CONTRACT MANAGEMENT AND SUPERVISION OF PERFORMANCE

6.1 - NAVY shall indicate two representatives to act as Contract's Manager and Contract's Inspector.

6.2 - The inspections and tests to be carried out by the CONTRACTOR may be witnessed by a BN representative. The CONTRACTOR must notice BN within 60 days before the day of the tests. The absence of a BN representative does not characterize a holding point to the execution of the tests.

6.3 - The CONTRACTOR shall provide live video transmission to NAVY remote witness to the inspections and tests in factory and at least the following manufacture processes:

- (i) Negative grid CSM galvanization;
- (ii) Negative plate pasting;
- (iii) Positive plate (tubular) filling;
- (iv) Pole bridge welding;
- (v) Pole bridge lead galvanization;
- (vi) Pole bridge tests;
- (vii) Rubber bag test;
- (viii) Cell container manufacture;
- (ix) Block cell mounting and plates welding;
- (x) Block cell insertion on rubber bag;
- (xi) Cell container mounting;
- (xii) Cell tightness test (typical leak test using helium and air).

6.3 - The Contract's Inspector will be appointed to monitor and supervise the delivery of the goods, making notes in a proper register of all occurrences related to performance and determining what is necessary to correct the flaws or defects found.

6.4 - The inspection referred to in this item does not exclude or reduce the Supplier's liability, including in relation to third parties, for any irregularity, even if resulting from technical imperfections or latent defects.

6.5 - The Contract's Inspector will record in the appropriate register all occurrences related to the supply, indicating the day, month and year, as well as the name of the employees eventually involved, determining what is necessary to correct the observed flaws or defects and forwarding the notes to the Contract's Manager for the appropriate measures.

6.6 - The Contract's Manager will be appointed to coordinate the updating of the monitoring process, changes and contract extensions, preparing a report with view to the verifying the need for adjustments of the contract in order to meet the administration's purpose. The Contract's Manager will take steps to formalize the administrative process of responsibility in order to apply sanctions to be conducted by the sector with competence to do so, as appropriate.

7 - RECEIPT AND PAYMENT

Receipt of the order

7.1 - The goods may be rejected, in whole or in part, when not in accordance with the specifications and must be replaced at the Supplier's expense at no cost to NAVY up to 180 (thirty) days.

Validation of expenditure

7.2 - A duly signed original commercial invoice with full bank details is required for validation of the expenditure.

8 - SUPPLIER SELECTION METHOD AND CRITERIA

Proposal selection method and evaluation criteria

8.1 - The Supplier will be selected through bidding waiver procedure, according to the qualification requirements.

Qualification requirements

8.2 - For purposes of qualification, the Contractor must submit the following documents:

Legal qualification

8.3 - The submission of the Certificate of incorporation or equivalent document.

Economic and financial qualification

8.4 - The submission of economic and financial statements showing the capacity of the company fulfil the object ordered.

Technical qualification

8.5 - A qualification testimonial or past performance attesting the expertise of the company in supplying the object of this contract.

9 - ESTIMATED PRICES

9.1 - The estimated total price is US\$ 939,107.19 (Nine hundred thirty nine thousand, one hundred seven US dollars and nineteen cents).

10 - BUDGET ALLOCATION

10.1 - The expenses arising from any eventual Purchase Order will be supported by specific financial resources included in the General Budget of the Brazilian Government.

10.2 - The indication of the availability of budgetary funds for the payment of this contract will be provided subsequently, at the time of the formalization of the contract.

11 - RESPONSIBLE



Documento assinado digitalmente
ANTONIO FELIPE FREIRE DE CASTRO LIMA
Data: 16/06/2025 14:33:09-0300
Verifique em <https://validar.iti.gov.br>

ANTONIO FELIPE FREIRE DE CASTRO LIMA
Support Team



Documento assinado digitalmente
ANDRE GUSTAVO BARBOSA
Data: 16/06/2025 16:00:12-0300
Verifique em <https://validar.iti.gov.br>

ANDRE GUSTAVO BARBOSA
Support Team

Rio de Janeiro, June 16, 2025.

ALEXIS ZAKARTCHOUK JUNIOR
Capitão de Mar e Guerra (BN)
Superintendente Técnico
ASSINADO DIGITALMENTE

BRAZILIAN NAVY NAVAL ENGINEERING DIRECTORATE



PROJECT :				PHASE:			
DISCOUNT DOC.: PURCHASE SPECIFICATION				CODE PHASE:		CYCLE:	
DOCUMENT CODING						DATE OF DOCUMENT	
CONTROL	DOCUMENT TYPE	SHIP/CLASS	SWBS	SEQ.	LT.		
DEN	832/7	IKL01	223	050		10/03/2025	
DOCUMENT TITLE							
"TUPI" SUBMARINE – PROPULSION SYSTEM – PROPULSION BATTERY – PURCHASE SPECIFICATION							
DEGREE OF CONFIDENTIALITY:		RESPONSIBLE:				DEPARTMENTS:	
UNCLASSIFIED		LT(NE) RONEI ERLACHER				DEN-24	
S	APPROVED DATE	END. FILM	IDENTIFICATION OF VESSEL(S)			DIST.	EST. DOC
U	16/06/2025		-----				AP
MARCELO CYRINO DE OLIVEIRA Captain (R) Head of Technical Coordination Department DEN-21		MATTERS			MILTON DE LIMA PINHEIRO Commander (NE) Head of Electrical and Automation Systems Department DEN-24		
ORIGINAL DOCUMENT NUMBER				INSTITUTION NAME		CONTRACT No.	
				DEN			
SUMMARY :							
This document establishes the technical requirements applicable for obtaining a set lead-acid battery cells and a set of accessories for battery cells, that will constitute the propulsion battery for the "Tupi" Submarine (IKL 209-1400ton) of Brazilian Navy (BN), as well as defines the scope of supply, tests, documentation, and other information required for the purchase of the equipment.							

BRAZILIAN NAVY
NAVAL ENGINEERING DIRECTORATE
TECHNICAL SUPERINTENDENCE
(DEN-20)

ELECTRICAL AND AUTOMATION SYSTEMS DEPARTMENT
(DEN-24)

**TITLE: “TUPI” SUBMARINE – PROPULSION SYSTEM – PROPULSION BATTERY –
PURCHASE SPECIFICATION.**

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- A -LIST OF REQUIREMENTS**
- B - APPLICABLE STANDARDS**
- C - 31DD16 CELL CONTAINER DRAWING**
- D - CELL HOOK POSITION AND BATTERY ROOM DRAWING**
- E - MAINTENANCE PLUG FOR 31DD16 CELL DRAWING**
- F - ACID LEVEL INDICATOR FOR 31DD16 CELL DRAWING**
- G - VENTILATION PLUG EXPLOSION PROOF FOR 31DD16 CELL DRAWING**

1. PURPOSE

This document establishes the technical requirements applicable for obtaining a set lead-acid battery cells and a set of accessories for battery cells in the quantities defined in item 5.0 of this Specification, that will constitute the propulsion battery for the “Tupi” Submarine (IKL 209-1400ton) of Brazilian Navy (BN), as well as defines the scope of supply, tests, documentation, and other information required for the purchase of the equipment.

2. BIBLIOGRAPHIC REFERENCES

- A) DIRETORIA DE ENGENHARIA NAVAL, ENGENALMARINST nº 05-03A: Abreviaturas e Definições de Terminologia de Engenharia e Construção Naval, Rio de Janeiro;
- B) HIRSHORN, Steven R.; VOSS, L.; BROMLEY, L. NASA systems engineering handbook, Rev 2, National Aeronautics and Space Administration (NASA), Washington, 2016.

3. LIST OF ACRONYMS AND ABBREVIATIONS

Table 1 - List of Acronyms and Abbreviations.

BN	Brazilian Navy
CODEMP	Código da Empresa (Company Code)
CSM	Copper Stretched Metal
DEN	Diretoria de Engenharia Naval (Naval Engineering Directorate)
FAT	Factory Acceptance Trial
IEC	International Electrotechnical Commission
NATO	North Atlantic Treaty Organization
NCAGE	NATO Commercial and Government Entity
NCB	National Coding Bureau
NCS	NATO Coding System
NSN	NATO Stock Number
LITEQ	Lista de Item por Equipamento (Item List for each Equipment)

4. DEFINITIONS

Table 2: Definitions.

Term or expression	Definition
Certificate of inspection	Document attesting that an inspection was carried out, recording the summary of the results obtained, as well as the designation of the material or equipment inspected and the number of the Inspection Procedure or Inspection Form to which the Certificate belongs, according to the reference <u>A</u>
Test certificate	Document analogous to a Certificate of Inspection for Tests, in accordance with reference <u>A</u>

Term or expression	Definition
Contractor	An individual or legal entity that signs a contract with the Public Administration. In a broad sense, any firm that intends to be contracted by the Public Administration, in accordance with the reference <u>A</u>
Test forms	Documents that define test procedures applicable to equipment, sub-systems and systems, in accordance with the reference <u>A</u>
Quality Assurance	Set of planned and systematic actions that focuses on practically all aspects of the intervening organizations (designers, manufacturers, suppliers, among others) in order to maximize the probability that a product or service will have the specified quality, according to the reference <u>A</u>
Inspection	Set of examinations, measurements and tests, that aim to verify one or more characteristics of an equipment or system construction (geometry, weight, shape, color, materials, finishing, others), comparing them with the requirements specified, in according to the reference <u>A</u>
Proof	Test or set of tests carried out on board (on the pier or at the anchorage, and sea) that aim to verify the functioning of equipment and systems installed, and the ship as a whole, comparing them with those contractually established, according to the reference <u>A</u>
Test	Use of a final product to obtain detailed data for performance verification or validation, or to provide sufficient information to verify or validate performance through a more in-depth analysis, in accordance with reference <u>B</u>
Validation	Demonstration that the product fulfills the intended purpose based on stakeholder expectations as per reference <u>B</u>

5. OBJECT OF THE SPECIFICATION

This Specification involves supplying:

- a) One hundred twenty-three (123) lead-acid battery cells designed with positive tubular plates and negative plates with CSM technology, which will be installed on the "Tupi" Submarine. The cells are to be divided into the following groups:
 - (i) One hundred twenty (120) lead-acid battery cells with all the individual components and accessories necessary for the correct operation on board including acid level indicator, maintenance plug with nipple to connect to the agitation system, ventilation plug explosion proof, insulation measuring probe and connectors (bus bars). The acid level indicator for six (6) of these cells shall also have temperature sensor assembled;
 - (ii) One (01) cell for FAT;
 - (iii) Two (02) spare cells;
- b) Three hundred fifty-four (354) acid level indicator for 31DD16 cell (already purchased by BN) without temperature sensor and with gasket;
- c) Twenty (20) acid level indicator for 31DD16 cell (already purchased by BN)

- with temperature sensor and with gasket;
- d) Three hundred seventy-four (374) maintenance plug for 31DD16 cell (already purchased by BN) with gasket;
- e) Three hundred sixty-four (364) ventilation plug explosion proof for 31DD16 cell (already purchased by BN);
- f) Ten (10) small ventilation plug explosion proof for 31DD16 cell (already purchased by BN);
- g) Ninety (90) distributors (manifolds) with six (6) nipples each for air agitation (individual supply);
- h) Spare parts, accessories, instruments, special tools and onboard mounting accessories according to Subclause 6.1.2;
- i) Documentation according to Subclause 6.1.1;
- j) Training and technical support according to Subclause 6.2.

The requirements of the object are defined in Annex A of this Specification.

6. ACQUISITION DESCRIPTION

6.1. Deliveries

The deliveries provided are divided in two categories: documentation, and materials.

6.1.1. Documentation

- a) The planning for delivery of the following contractual documents set is shown in Table 3:
 - (i) Technical Documentation;
 - (ii) Integrated Logistic Support Documentation; and
 - (iii) Quality Assurance Documentation.

Where:

- E - Delivery of the object of supply; and
- Ai - Document submission to the BN, where index "i" is the number of months elapsed after the effective date of the contract.
 - b) The CONTRACTOR shall use the document titles indicated in Table 3. If this is not possible, it shall prepare a mailing list, observing the equivalence with those mentioned in Table 3;
 - c) For the documents indicated in Table 3, BN will require their approval on two separate occasions: firstly just after the conclusion and following the application; secondly, the approval will require the correct fulfilling of the inspection, test and proof document.

Table 3: Document delivery schedule.

DOCUMENT SUPPLY SCHEDULE		DOCUMENTS
Ai	E	
		1. TECHNICAL DOCUMENTATION
		1.1. Dimensional and installation drawings
A2	E	1.1.1. Battery cells
A2	E	1.1.2. Acid level indicator
A2	E	1.1.3. Maintenance plug
A2	E	1.1.4. Ventilation plug explosion proof
A2	E	1.1.5. Connectors (bus bars)
		2. LOGISTIC SUPPORT DOCUMENTS
A3	E	2.1. Technical manual
A3	E	2.2. Equipment items list (liteq)
A3	E	2.3. Board spare parts list
A3	E	2.4. Base spare parts list
A3	E	2.5. Special tools and instruments
		3. QUALITY ASSURANCE DOCUMENTATION (acc. Item 6.1.1.3)
A3	E	3.1. Factory test forms
A3	E	3.2. Inspection and testing certificates
A3	E	3.3. Inspections and tests reports
A3	E	3.4. Activation procedure

6.1.1.1. Technical Documentation Content

- a) Dimensional and internal arrangement drawings:
 - (i) Main dimensions;
 - (ii) Dimensioning drawings of accessories or components;
 - (iii) Dimensioning drawings necessary for the correct shape definition;
 - (iv) Internal arrangement components.
- b) Drawings:
 - (i) Able to clarify the understanding of the operation of the system and the function of each equipment, components and accessories;
 - (ii) Nominal design values (pressure, temperature, flow, voltage, current, among others) of each component shall be indicated; and
 - (iii) All instruments and devices shall be represented.

- c) Electrical connection diagrams:
 - (i) Terminal strips of the interconnected equipments and accessories;
 - (ii) Interconnected equipment and its location;
 - (iii) The function of each connection;
- d) The equipment installation drawings shall contain, at least, the following information:
 - (i) Necessary spaces for operation and maintenance;
 - (ii) Detailing drawing of all parts connecting to other equipment, components or accessories, including orifice draws, material specification and instructions necessary for tightening screws;
 - (iii) Information about alignment with other equipment, accessory or component;
 - (iv) Full information about interface connections and unions with support systems, indicating the patterns, dimensions and detail of each union and its placement in the equipment, component or accessory;
 - (v) Material specification, indicating associated standards.
- e) Instrument specification sheets for the supplied instruments shall be provided, as well as technical standard applied to calibration of each instrument;

6.1.1.2. Integrated Logistic Support Documentation Contents

- a) Technical manuals:
 - (i) General description and characteristics of the equipment;
 - (ii) Shall be up in a family of curves, listed below, which express the relationship between the values of the variables characteristics of the equipment, component or accessory, and among those who translate their performance, which will be verified in test benches and evidence board:
 - ii.1. Battery capacity and discharge voltage curve relative to the discharge current;
 - ii.2. Battery discharge voltage and energy curve relative to the discharge current;
 - ii.3. Battery capacity curve relative to the temperature of the electrolyte;
 - ii.4. Discharge curves;
 - ii.5. Charging rates curves;
 - ii.6. Gasification voltage curve relative to temperature of electrolyte;
 - ii.7. Discharge state curves percentage relative to the discharge voltage;
 - ii.8. Discharges curves based on battery voltage and discharge current;
 - ii.9. Discharge state curves relative to the electrolyte density;
 - ii.10. Density variation curves of the electrolyte as a function of temperature, and
 - ii.11. Remaining capacity curves in passing the various currents.

- (iii) As attached to curves, shall be all the necessary instructions for correction in function of temperature and all values involved by means of others graphics or curves.
 - (iv) The CONTRACTOR may provide other graphics in addition to those provided above that it deems necessary.
 - (v) Operating instructions under normal, special and emergency conditions, including safety precautions;
 - (vi) Maintenance plans with detailed procedures, frequency of the planned routines, including the list of spare parts, test equipment and special tools used, as well as the applicable safety precautions;
 - (vii) Instructions for equipment assembly and disassembly, including torques and adjustment values;
 - (viii) Necessary calibrations and adjustments, with detailing procedures ;
 - (ix) Troubleshooting table, which shall list the most common problems, main causes and the adequate corrective actions;
 - (x) Spare parts list;
 - (xi) List of equipment parts and components containing the reference number and manufacturer for each item.
- b) Proposal for onboard and base spare parts containing the allocation required for a period of 3 months and two years respectively. The list shall contain the respective manufacturer's reference number for each item.
- c) Training Plan for each level of training of the workforce (onboard or naval base/shipyard), covering installation, operation, repair and maintenance on board.
- d) Cataloging documentation containing the list of onboard spare parts, base spare parts and special tools according to the following situations:
- (i) For items that have an assigned NSN code, the following information shall be provided: name, name of real supplier, reference number and NSN code. It should be noted that the agency responsible for cataloging will be the NCB, if this is a NATO member country, or affiliated to the NCS;
 - (ii) For items that do not have an assigned NSN code, the following information shall be provided:
 - ii.1. Name (technical name and colloquial name, if any);
 - ii.2. Supplier information such as name, trade name (if any) full address (city, state, address, zip code, telephones, fax, e-mail), CODEMP or NCAGE (code assigned to national suppliers or supplier from NATO countries, if applicable) and manufacture code;
 - ii.3. Standards and manufacturing specifications, if not included in the technical documentation;
 - ii.4. Code in which the item appears on the CONTRACTOR's documentation (Parts Catalog);
 - ii.5. Unit price;

- ii.6. Supply unit;
 - ii.7. Shelf life;
 - ii.8. Storage period;
 - ii.9. Mean time between failures;
 - ii.10. Reparability condition;
 - ii.11. Interchangeability;
 - ii.12. Packed and unpacked weight; and
 - ii.13. Storage space.
- e) LITEQ – list of components, accessories and parts of each equipment (including accessories such as pressure gauges, thermometers, others), in one or more exploded views, containing the reference number, the respective manufacturer and the amount applied. This document shall specify and illustrate the parts of the equipment.
- f) List of special tools and instruments applied to maintenance and the procedure to handle the equipment.

6.1.1.3. Quality Assurance documentation content

- a) Test forms are documents in which the CONTRACTOR defines, detailed and systematically, the procedures applicable for testing systems, subsystems and equipment. They shall contain, at least, the following information:
- (i) Purpose of the test or proof;
 - (ii) Prerequisites;
 - (iii) Reference documents (drawings and specifications);
 - (iv) Instruments to be used, with their respective calibration certificates;
 - (v) Detailed description of the inspection/test procedure;
 - (vi) Acceptance criteria;
 - (vii) Participating personnel safety prescriptions;
 - (viii) Items to be checked;
 - (ix) Data record sheet; and
 - (x) Test or Proof Certificates (performance and acceptability).
 - (xi) The following form tests and procedures shall be contemplated:
 - xi.1. Test form for evaluating the battery capacity in the factory test;
 - xi.2. Test form for evaluating the hydrogen generation factory test;
 - xi.3. Inspection procedure for individual weighing of battery cell;
 - xi.4. Inspection procedure for measuring the isolation of individual battery cells;
 - xi.5. Procedure for inspection of dimensions (length, width and height) of each cell of the battery;
 - xi.6. Procedure for evaluating of 45° angle inclination test;
 - xi.7. Test form for individual weighing of all battery cells before shipping;

- xi.8. Test form for individual isolation measuring of all battery packs before shipment;
- xi.9. Test form for evaluate the capacity after activation;
- xi.10. Test form for evaluation of capacity over the useful life;
- xi.11. Test form for evaluation of hydrogen generation over the useful life; and
- xi.12. Activation procedure.

a) Reports or Certificates of Inspections, Tests or Evidence containing, at least, the following information:

- (i) Organization responsible for the inspection, test or proof;
- (ii) Place and date of inspection, test or proof;
- (iii) Reference standards or normative regulations;
- (iv) Name, model and serial number of the item submitted for inspection, testing or proof;
- (v) Type of inspection, test or proof;
- (vi) Result of the inspection, test or proof;
- (vii) Corrective actions taken in order to eliminate non-conformity observed;
- (viii) Names and signatures of the person responsible for the inspection or test and other participants;
- (ix) The following report or certificate shall be supplied, at least:
 - ix.1. Certificate of Inspection of measuring isolation of individual battery cells
 - ix.2. Report on the total weight of the battery (with dry cells), which shall provide the calculation of the total weight of the battery based on the data presented in Certificates of Inspection individual weighing battery cells
 - ix.3. Certificate of inspection of the dimensions (length, width and height) of each cell of the battery;
 - ix.4. Shock test report;
 - ix.5. Rubber bag test report; and
 - ix.6. Pole bridge test report.

If, during the execution of the Contract, BN finds that there are still important aspects of achieving the object of the contract, which technical documentation is not provided in the following table, the BN may require the necessary documents.

6.1.2. Materials

The CONTRACTOR shall deliver to Navy the materials presented in Subclauses 5 “a” to “g”, except Subclause 5 “a” “ii”. The material of Subclause 5 “h” are listed in the Tables 4, 5 and 6. All the material to be supplied shall meet the requirements contained in Annex A as well as the technical standards and documents listed in Annex B.

Table 4: Description of spare parts.

ITEM	SPARE PARTS	QUANTITY
01	Nipple for air distributor	30
02	Flat washer for air distributor	60
03	Flow limiter	60
04	Level indicator without temperature sensor and with gasket*	08
05	Level indicator with temperature sensor and with gasket*	02
06	Maintenance plug complete with gasket*	10
07	Ventilation plug explosion proof*	10

(*) These items are additional to which are already part of the cell, to be supplied by the CONTRACTOR, related to the 120 cell as item 5.a.i of this Specification.

Table 5: Description of components.

ITEM	COMPONENTS	QUANTITY
01	Steel nipple on the pole posts for cooling water	528
02	Gasket for poles nipples	528
03	Level indicators (buoys) for activation of cells	132
04	Lids to seal the transport plug	132

Table 6: Description of instruments and special tools.

ITEM	INSTRUMENTS AND SPECIAL TOOLS	QUANTITY BASE
01	Portable digital densimeter with memory (Anton Paar DMA-35 Basic - reference model). Maximum permitted dimensions (L x W x H): 150 mm x 140 mm x 30 mm	03
02	Flowmeter air 20-200 l/h	03
03	Wrench grip for lids to seal the transport plug	03
04	Isolated wrench for tightening the nipple	03

6.2. Training and technical support

- The contractor shall provide training for the BN crew, with the approach to design specification, operation and maintenance of the cells that will be supplied.
- The contractor shall provide technical support related to cell activation, capacity testing advisory for the cells that will be supplied;
- The training and the activation process will be held in Arsenal de Marinha of Brazilian Navy premises, located in Rio de Janeiro, Brazil, after the delivery of the object of this Specification in date to be informed by BN.
- The contractor shall provide technical support as the service intended to provide guidance and advisory with technical problems presented by the goods, including the indication of

specific products or services, parts to be replaced, adjustments, repairs and corrections to be carried out for the period of six years from the date of activation of the battery cells at the BN facilities.

6.3. Inspections and Tests

The CONTRACTOR shall carry out the inspections and tests indicated in Table 7.

Table 7: Inspections and tests to be carried out.

EQUIPMENT	FACTORY	BN FACILITIES
BATTERY CELLS	1. Battery capacity (rates of 100h, 20h, 5h and 1,25h) 2. Hydrogen generation 3. Individual weighting 4. Resistance insulation 5. Dimensions 6. Inclination	1. Activation

7. RESPONSIBILITIES

7.1. CONTRACTOR:

- a) To perform the FAT, indicating to BN the period of the tests with 60 days anticipate;
- b) To fix any cells and accessories defects coming from supply and testing that may be detected by BN for a period of one (01) year from the delivery date in the BN facilities;
- c) To update the documents related to equipment/component that could be modified in accordance to the purpose of this specification;
- d) To provide, maintain and control the equipment and instruments necessary for inspections and tests;
- e) To provide free access to BN representatives to all CONTRACTOR premises related to the manufacture of the object;
- f) To repeat inspections and tests when nonconformities are detected;
- g) To support costs related to the replacement of partially or totally damaged items derived from inspections, tests or activation;
- h) To indicate a representative to participate in activation on BN facilities;
- i) To provide technical support for BN during the technical warranty period of the minimum period of six years from the date of the activation of the battery cells in the BN facilities.
- j) To guarantee that the capacity of the 120 battery cells supplied is greater than 80% in relation to nominal capacity for a period of six years from the date of the activation of the battery cells in the BN facilities.
- k) To keep verifiable Quality Assurance standards, providing access to evidences and documentation to BN of the execution of Quality Assurance processes.
- l) To keep an organized and updated file, available to BN, that shall contain the contract Quality Assurance documentation, considering the principle of traceability;

m) To carry out visit on board and/or BN facilities to ensure the compatibility between de cells manufactured by CONTRACTOR with the cell already purchased by BN (31DD16 cells).

7.2. BRAZILIAN NAVY

- a) To provide, upon request by the CONTRACTOR, copies of documents and standards on her own responsibility necessary to achieve the Object;
- b) To indicate representatives to participate in the planned FAT;
- c) To indicate technical personnel to participate in activation on BN facilities;
- d) To carry out the activation of battery cells accordingly with the documentation provided by the CONTRACTOR and with technical support of the CONTRACTOR representative;
- e) To inform the CONTRACTOR within 30 (thirty) days before the date to be held the training and the activation process in the BN facilities.
- f) To inform the CONTRACTOR the date of the delivery of goods in the BN facilities, which will refers to the delivery date of the last good, and the date of the activation of battery cells.

8. APPLICABLE REQUIREMENTS

The requirements applicable to this Specification are described in Annex A.

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ANNEX A

LIST OF REQUIREMENTS

Table A 1: List of requirements.

Codification	Requirement Description	Verification
CELLS CONSTRUCTION		
SE-CEC-001	The length of the individual cells shall be 290mm $\pm$ 1mm	Inspection
SE-CEC-002	The width of the individual cells shall be 450mm $\pm$ 1mm	Inspection
SE-CEC-003	The height of the individual cells without poles shall be 1405mm $\pm$ 1mm	Inspection
SE-CEC-004	The height of the individual cells with poles shall be 1490mm $\pm$ 1mm	Inspection
SE-CEC-005	The reference value of the weight of each individual cell battery in its empty condition (i.e., without electrolyte) shall be 427kg $\pm$ 8.5 kg	Inspection
SE-CEC-006	The weight value of each individual cell in its full condition (i.e., with electrolyte) and charged shall be 555kg $\pm$ 2%	Inspection
SE-CEC-007	The insulation between the poles (positive and negative) and the lead strip cell shall be equal or more than 50 M Ω	Test in Factory
SE-CEC-008	The insulation between the poles (positive and negative) and hook on the bottom of the cell shall be equal or more than 50 M Ω	Test in Factory
SE-CEC-009	The insulation between strip lead and hook on the bottom of the cell shall be equal or more than 50 M Ω	Test in Factory
SE-CEC-010	Each cell shall be capable to withstand a inclination of 45° without present any damage to its structure and as any spill electrolyte	Test in Factory
SE-CEC-011	Each cells that composed the battery shall be able to withstand the level of acceleration in the vertical direction with 50g of the pulse application time of 10 milliseconds, without loss of performance and without incurring damage or detachment of parts or components	Certification
SE-CEC-012	Each cell shall be provided with internal agitation system in order to homogenize the electrolyte by injecting air of external system	Analysis
SE-CEC-013	The agitation system air flow for individual cell shall be between 40l/h to 120l/h	Analysis
SE-CEC-014	Each cell shall be provided with internal pole cooling system by injecting demineralized water	Analysis

SE-CEC-015	The cooling system ensure the average temperature of the electrolyte of the cells in a maximum 45° C in any normal operating condition of the batteries	Analysis
SE-CEC-016	The cells shall be lead-acid type design with positive tubular plates and negative CSM technology	Analysis
SE-CEC-017	The cells shall be manufactured with four pole posts, i.e., with two pole posts for each terminal (positive and negative terminal), such as the original battery design for IKL-209 class	Analysis
SE-CEC-018	The density of the electrolyte cell charged at 30°C shall be $1,280 \pm 10 \text{ g/dm}^3$	Analysis
SE-CEC-019	Maximum allowable temperature continuous for each cell shall be 45°C and non continuous 55°C (5h each month), at least	Analysis
SE-CEC-020	The maximum short-circuit current of the cell fully charged, at 30°C, shall be 48kA	Analysis
SE-CEC-021	The top covers of the cells shall be include features that allow lifting cells, safely and easily during the manufacturing process as well as the installation of the battery on-board	Inspection
SE-CEC-022	The top covers of the cells shall have one maintenance plug to allow adjustment of the electrolyte level, and to enable the introduction of a densimeter and a thermometer to measure individual density and temperature, respectively. This plug shall be a connection (nipple) to the electrolyte agitation system	Inspection
SE-CEC-023	The top covers of the cells shall have one plug with anti explosion valve and filter to allow output of gas within the cell while retaining electrolyte particles in suspension and to block entry of external particles inside the cell	Inspection
SE-CEC-024	The top covers of the cells shall have one plug to connect the level indicator	Inspection
SE-CEC-025	Each cell shall have a level indicator electrolyte fixed in the top cover cell, and attached to the plug by screwing	Inspection
SE-CEC-026	The acid level indicators of the cells that will also measure temperature shall have provided by temperature sensor PT-100 type (Platinum Resistance Temperature Detector)	Analysis
SE-CEC-027	Each cell shall have a strip of lead to the insulation measuring. This strip shall be installed between the tub and the rubber bag cell, and the access terminal strip shall be through the cover cell	Analysis
SE-CEC-028	Each cell shall have a identification plate with series number and shall have installed on the top of the cell	Inspection
SE-CEC-029	The external bottom of the cell container shall have a fourteen (14) screw hole type M12 to fix the cell hook with de same pattern of 31DD16 cells already purchased by BN, as presented in Annexes C and D	Inspection

SE-CEC-030	All sets of bolts, nuts, washers and nipples to be manufactured in stainless steel and supplied shall be resistant to sulfuric acid. In order to guarantee this requirement, the sets mentioned in this item shall be made of SAE 316L stainless steel or higher material	Analysis
SE-CEC-031	Each cell shall have drilled hole with thread to fix the support of the service cart rail	Analysis
SE-CEC-032	The cells to be acquired shall be compatible with the copper connectors of the 31DD16 cells already purchased by BN	Analysis
CELL PERFORMANCE		
SE-CEP-001	The maximum permissive hydrogen generator of each cell shall be 330ml/h	Test in Factory
SE-CEP-002	The value of the rated battery and each cell capacity for 20 hours rate shall be of 11,800Ah (590A)	Test in BN facilities and Factory
SE-CEP-003	The battery shall meet the other requirements of capacity shown in the Table A2	Test in Factory
31DD16 CELL ACCESSORIES		
SE-31D-001	The maintenance plug shall have an M.55 x 3 external thread, in accordance with the DIN 13 standard, to be affixed to the cell cover using a ϕ 75/55 x 2.0mm sealing ring, as well as having an opening through screw cap with a smaller diameter in order to enable the introduction of a densimeter and a thermometer for individual measurement of density and temperature, respectively, as well as the insertion of a filling device, according drawing presented in Annex E	Analysis
SE-31D-002	The maintenance plug shall have a connection via an M14 nipple for the electrolyte agitation system, as well as a pressure seal ϕ 11.8/5 x 13mm, to guarantee the correct connection between the nipple and the internal electrolyte agitation tube, according drawing presented in Annex E	Analysis
SE-31D-003	The maintenance plug shall be designed and manufactured to ensure the sealing of the cells with a maximum tilt of 45° in all directions, as well as to guarantee the correct connection between the internal systems of the cells and the external system for electrolyte agitation	Analysis
SE-31D-004	The level indicator housing shall be made of transparent polystyrene and shall have level indications, divided into 12 levels with 5 mm each level, corresponding to the equivalent of 0.5 liters each. The indicator housing shall have an indication highlighted in black that corresponds to the "zero" electrolyte level, according drawing presented in Annex F	Analysis

SE-31D-005	The acid level indicator is screwed into one of the outlet holes in the cell cover. To do this, the level indicator supplied shall be equipped with an M.45x3 external thread, in accordance with the DIN 13 standard, and a sealing ring ϕ 36/27.5 x 2.5mm, according drawing presented in Annex F	Analysis
SE-31D-006	The level indicator shall have a red plastic disc connected to a float by means of rods surrounding a central rod, so that the float, in contact with the electrolyte, can move the disc indicating, through the markings on the housing indicator, the electrolyte level. A disc shall be provided at the bottom of the central rod to prevent the float from detaching if the acid level is too low	Analysis
SE-31D-007	The acid level indicators of the cells that will also measure temperature shall have provided by temperature sensor PT-100 type (Platinum Resistance Temperature Detector)	Analysis
SE-31D-008	The ventilation plug explosion proof valve will allow the gas inside the cell to escape, while retaining suspended electrolyte particles and simultaneously blocking the entry of external particles into the cell	Analysis
SE-31D-009	The ventilation plug explosion proof shall be screwed into the cell cap using an M.45x3 thread, according to the DIN 13 standard and a sealing ring ϕ 36/27.5 x 2.5mm with dimensions presented in Annex G	Analysis
SE-31D-010	The ventilation plug shall be equipped with an external porous ceramic filter, as well as a pin that functions to relieve internal pressure within the cells, allowing the condensation of acid vapors inside, while blocking the entry of external particles into the cell	Analysis
SE-31D-011	The small ventilation plug explosion proof shall be screwed into the cell cap using an M.45x3 thread, according to the DIN 13 standard cited in Appendix I of this Specification, and a sealing ring ϕ 36/27.5 x 2.5mm with maximal height of 62mm (in relation of cell top) and maximal filter diameter of 43,5mm	Analysis

Table A2 - Nominal capacity battery for the various discharge rates

Time (h)	Discharge Current (A)	Capacity (Ah)	Initial Vol- tage	Average Voltage	Final Voltage (Average)		Individual Final Vol- tage
			(V/elem) U_i (V)	(V/elem) U_m (V)	(V/elem) U_f 80% (V)	(V/elem) U_f 100% (V)	(V/elem) $U_{f\min}$ (V)
1,25	5896	7370	1,825	1,73	1,645	1,5	1,265
1,5	5060	7590	1,86	1,765	1,68	1,54	1,33
2	4045	8090	1,905	1,805	1,725	1,585	1,415
3	2940	8820	1,95	1,855	1,77	1,635	1,505
5	1940	9700	1,99	1,895	1,815	1,68	1,585
10	1090	10900	2,03	1,93	1,85	1,715	1,655
20	590	11800	2,05	1,95	1,87	1,74	1,695
50	250	12500	2,065	1,965	1,885	1,755	1,72
100	128	12800	2,07	1,97	1,89	1,76	1,73

NOTE: The capacity values of the table are referred to 30°C.

- U_i (V)..... Voltage value after discharge 10%;
- U_m (V)..... Average voltage value during discharge period;
- U_f 80% (V)..... Final value of the voltage to the discharge 80%;
- U_f 100% (V)..... Final value of the voltage discharge to 100% (total consumption);
- $U_{f\min}$ (V)..... Minimum tolerable voltage value at the discharge end to an individual cell.

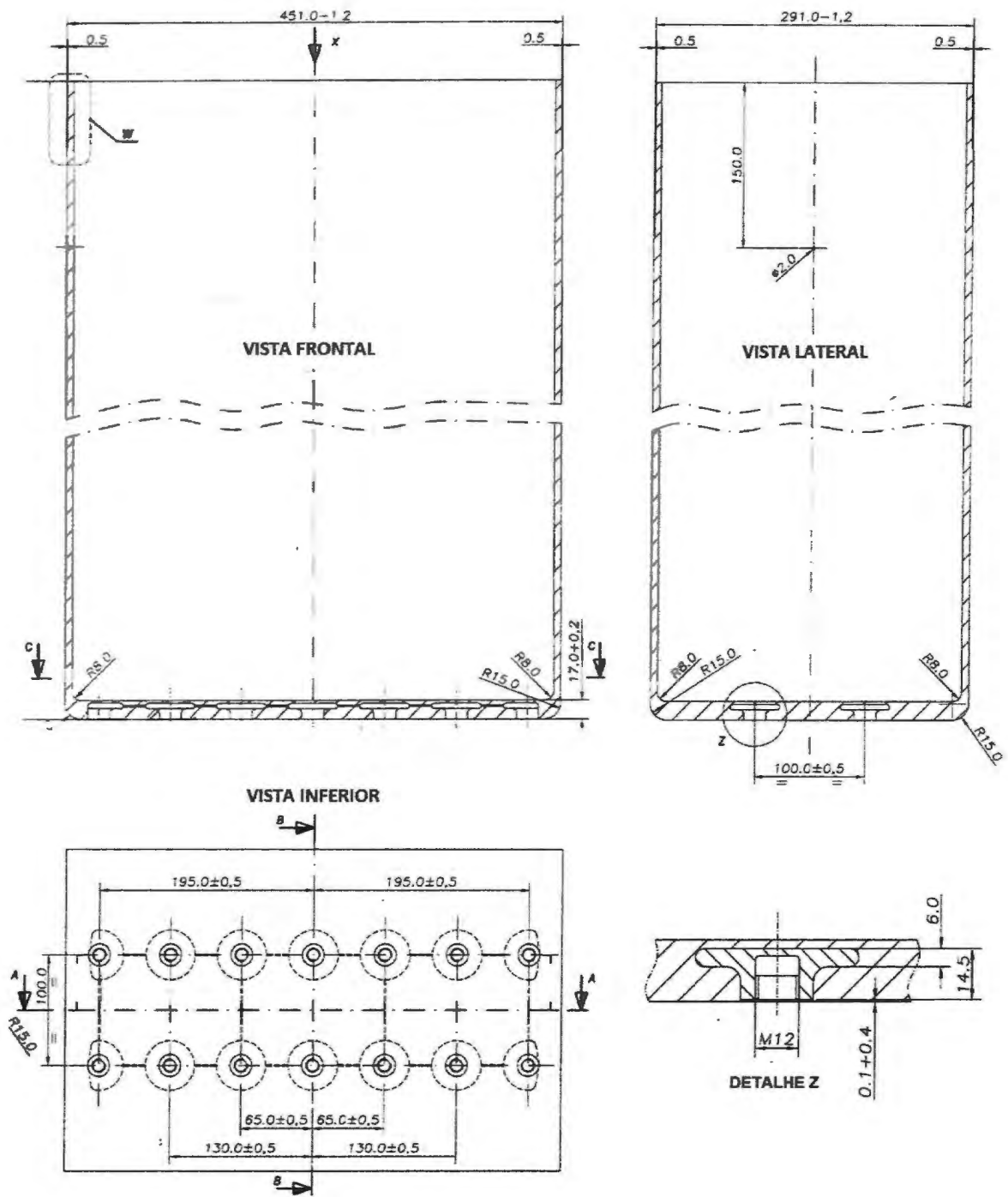
The values U_i (V), U_m (V), U_f 80% (V) and U_f 100% (V) are average voltage values of all cells of a battery to a specified partial cell.

ANNEX B**APPLICABLE STANDARDS**

Technical Standard	Title
a) Technical Manual 300 (TM 300)	Manual System: Partes 1-4 – Siemens AG – HDW Brazil: 1989
b) ENGENALMARINST N° 85-01A	Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment
c) IEEE 450: 2010	IEEE Recommended Practice for Maintenance, Testing and Replacement of Vented Lead-Acid Batteries for Stationary Applications
d) DIN 13	General purpose ISO metric screw threads
e) BV043: 1985	Shock Resistance
f) IEC 62877-1:2016	Electrolyte and Water for Vented Lead Acid Accumulators - Part 1: Requirements for Electrolyte
g) ENGENALMARINST N° 20-16B	Eletrólito para Baterias de Chumbo-ácido 31DD16 dos Submarinos das Classes “Tupi” e “Tikuna”
h) MIL-STD-2073	Standard Practice for Military Packaging
i) ENGENALMARINST N° 05-03	Abreviaturas e Definições de Terminologia de Engenharia e Construção Naval

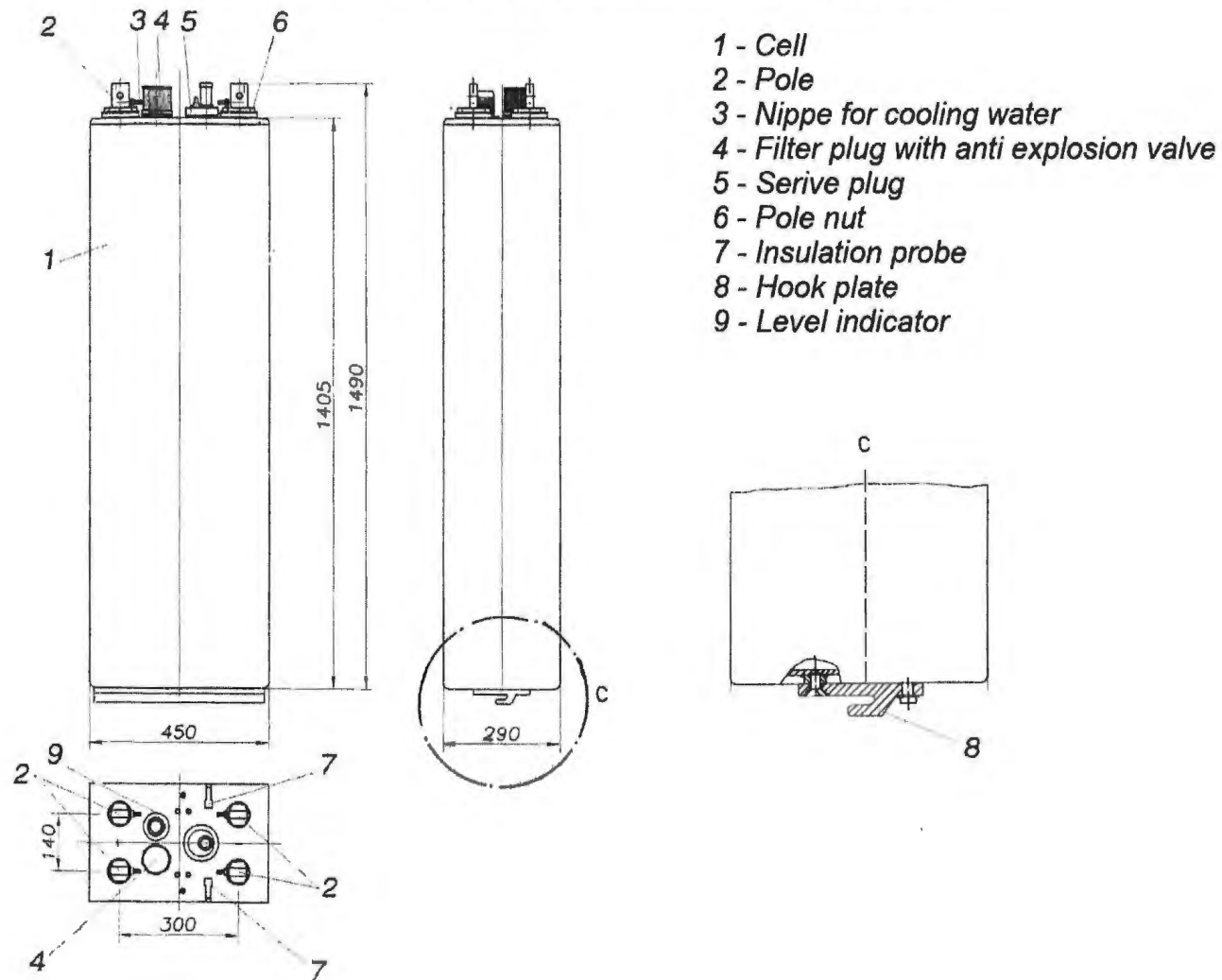
ANNEX C

31DD16 CELL CONTAINER DRAWING

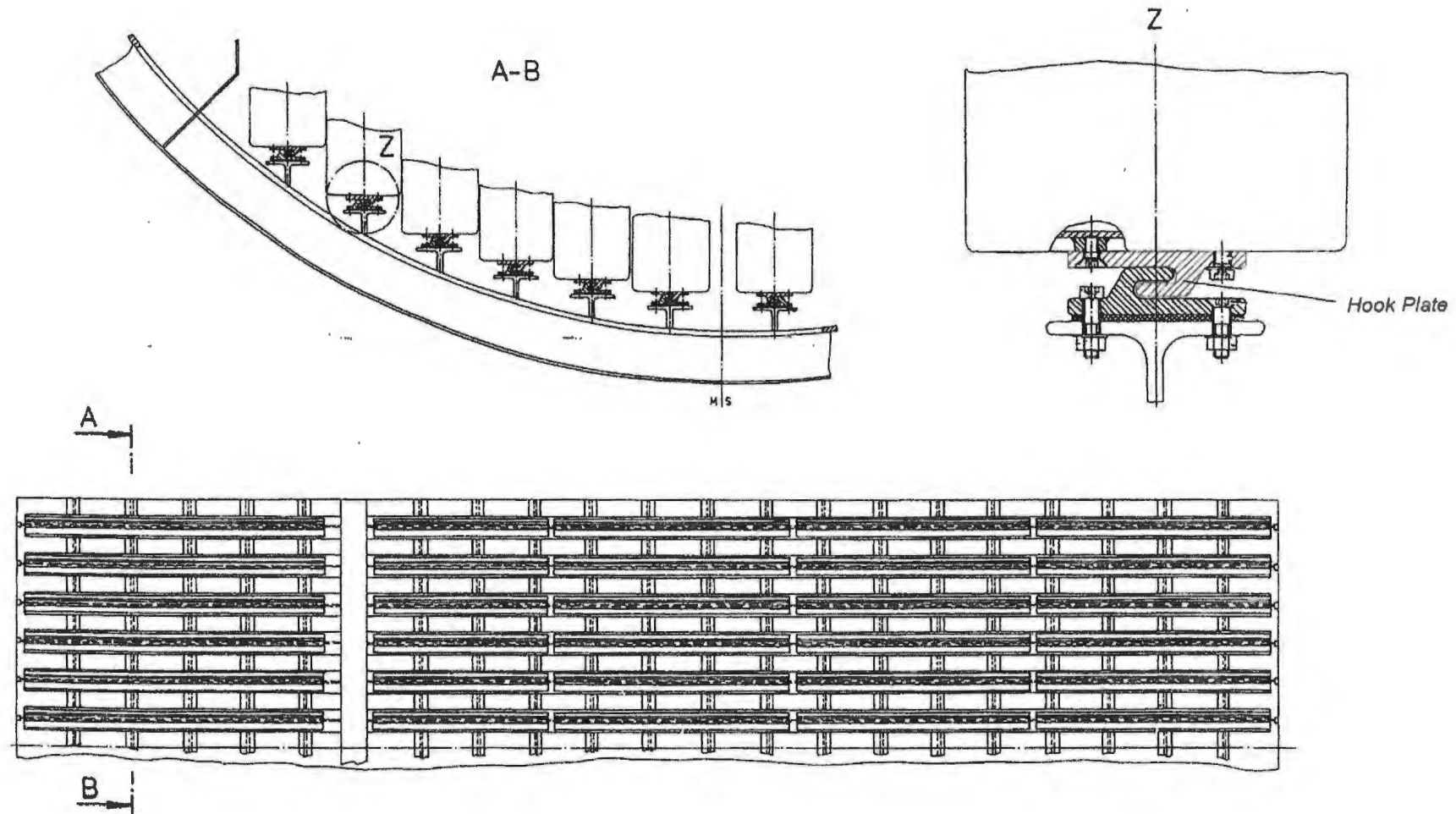


ANNEX D

CELL HOOK POSITION AND BATTERY ROOM DRAWING

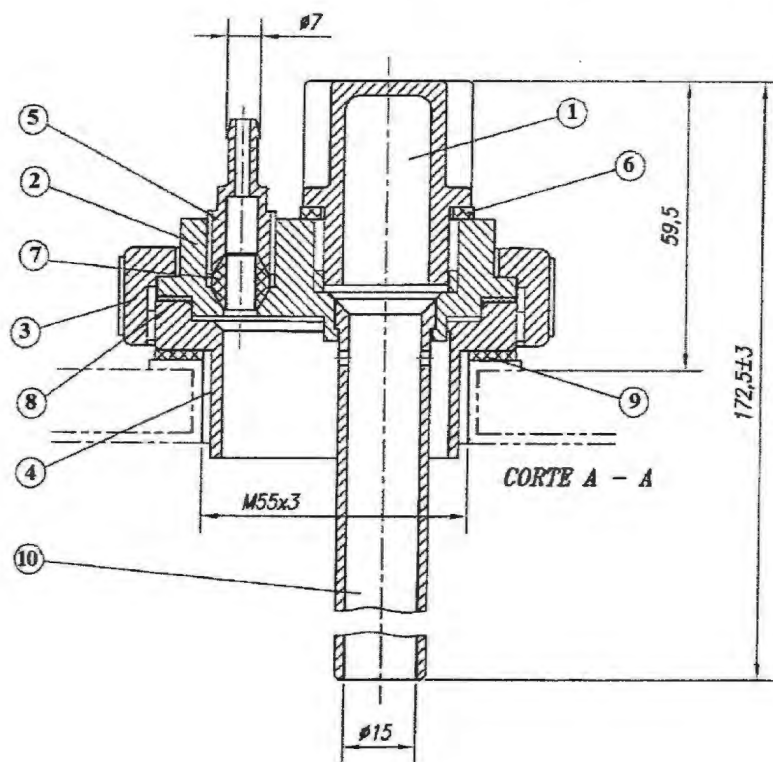


Hook arrangement of cells battery room

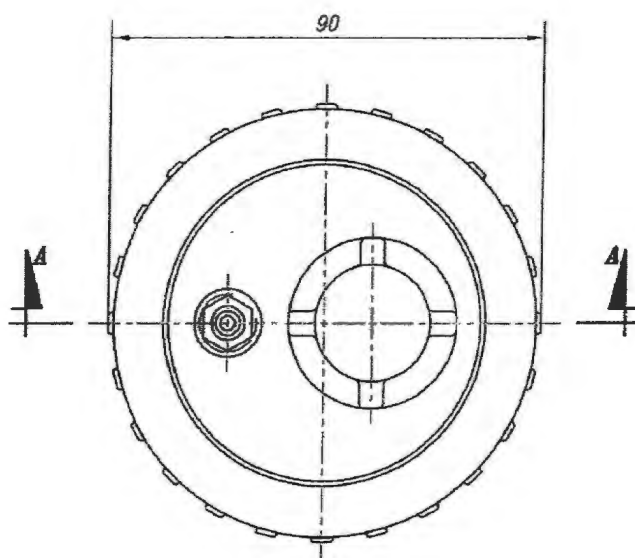


ANNEX E

MAINTENANCE PLUG FOR 31DD16 CELL DRAWING

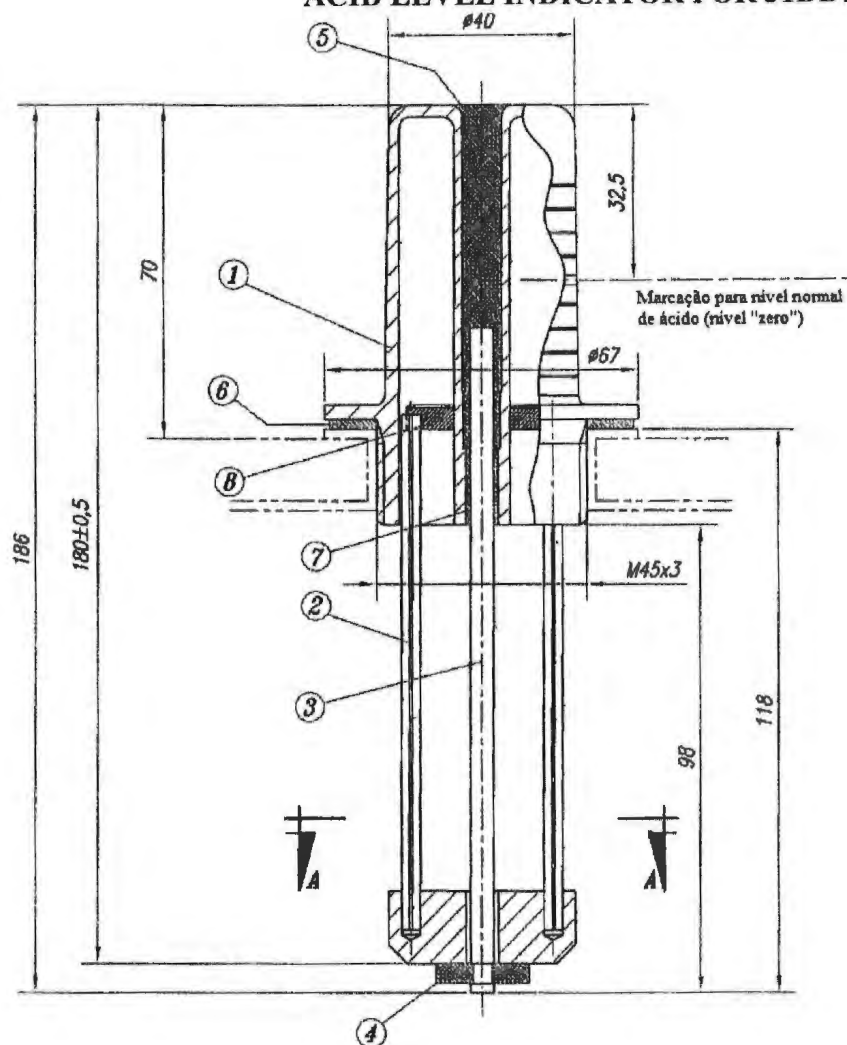


Item	Descrição
1	Tampa
2	Carcaça
3	Porca
4	Bucha
5	Nipple
6	Junta
7	Junta
8	Junta
9	Junta
10	Tubo guia

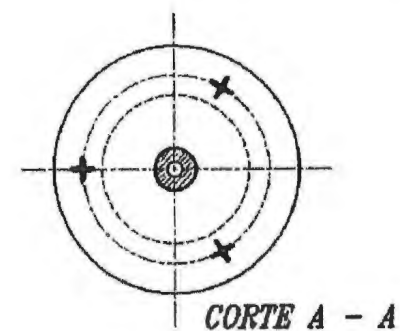


ANNEX F

ACID LEVEL INDICATOR FOR 31DD16 CELL DRAWING

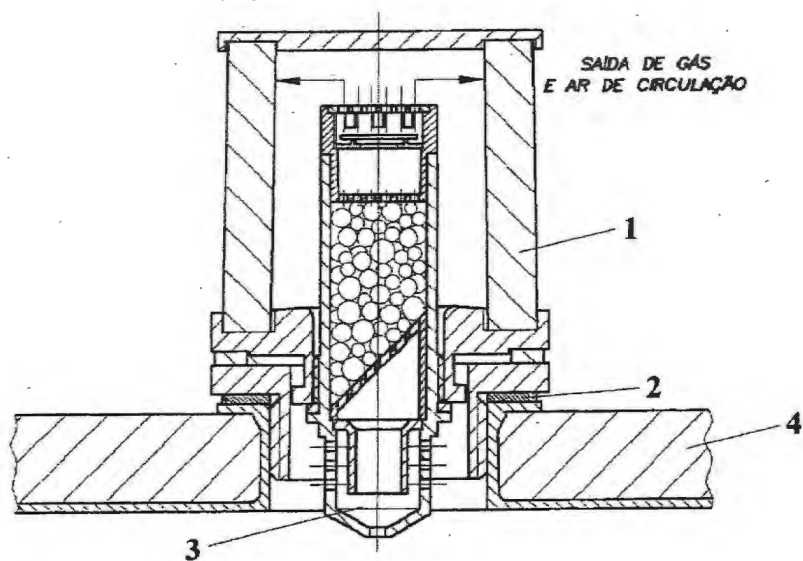


Item	Descrição
1	Carcaça
2	Haste do flutuador
3	Vareta central
4	Disco de trava
5	Vedação
6	Junta
7	Selagem
8	Anel indicador de nível (vermelho)



ANNEX G

VENTILATION PLUG EXPLOSION PROOF FOR 31DD16 CELL DRAWING



Item	Descrição
1	Filtro cerâmico
2	Anel de vedação
3	Pino de alívio
4	Superfície da tampa do elemento 31DD16

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HBL Engineering Ltd.

Ref No.: HBL/BRAZIL/209/25072024/ R6

14th June 2025

ANTONIO FELIPE FREIRE DE CASTRO LIMA
Capitão de Corveta
Gerente de Meios Prontos e Apoio do ComForS
Diretoria de Engenharia Naval (DEN)
Tel:(21) 2104-6527 RETELMA: 8110-6527
E-mail: castro.lima@marinha.mil.br

Sub: Your request for information on HBL Power Systems Limited in supplying HBL Make Lead Acid Battery for U209 submarine

Reference : All emails exchanged between HBL and BN as on 13th June, 6th June , 4th June, 28th May, 27th May, 23rd May, and 22nd May 2025.

We thank you for your enquiry for supply of HBL Make Lead Acid Battery Bank for 123 cells for U209 submarine. We are pleased to propose as under. This offer to be read in conjunction with HBL's Technical proposal and compliance report attached.

PRICE QUOTE

SL No	Item Description	Quantity of cells	Unit cell price in US\$	Total Price in USD (Packing Included) for 123 cells.
1.	HBL Make Lead Acid Battery Bank for U209 Class Submarine(Dry cells) as per technical proposal submitted..	123	5656	695,688
2	Electrolyte as per specification provided by HBL			Brazilian navy scope of supply
2	Inter cell connectors and accessories as listed in the technical proposal are to be provided by the customer. For 120 cells, 119 interconnecting copper bus bars are required. Each connection has a pair of bus bars. These bus bars need to be lead plated. For full set of connectors (120 cells connection), copper bus bars.			Brazilian navy scope of supply
3	Supervision of installation & Commissioning (Optional):			Please see details in the table below

HBL Engineering Limited
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Scope of supply continued as per clause 1.2 of draft CONTRACT ENTERED BETWEEN THE BRAZILIAN NAVY, REPRESENTED BY THE BRAZILIAN NAVAL COMMISSION IN EUROPE (BNCE) AND HBL ENGINEERING LIMITED FOR THE PROVISION OF SUBMARINE BATTERY CELLS AND ACCESSORIES.

Clause	Description	Unit Price USD	Total Price USD
5	(b) Three hundred fifty four (354) acid level indicator for 31DD16 cell without temperature sensor and with gasket;	52.08	18,436.32
	(c) Twenty (20) acid level indicator for 31DD16 cell with temperature sensor and with gasket;	1,041.67	20,833.40
	(d) Three hundred seventy four (374) maintenance plug for 31DD16 cell with gasket;	31.25	11,687.50
	(e) Three hundred sixty four (364) ventilation plug explosion proof for 31DD16 cell;	104.17	37,917.88
	(f) Ten (10) small ventilation plug explosion proof for 31DD16 cell;	104.17	1,041.70
	(g) Ninety (90) distributors (manifolds) with six (6) nipples each for air agitation (individual supply);	156.25	14,062.50
	Sub Total		103,979.30

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Scope of Spare parts, accessories, instruments, special tools and onboard mounting accessories according to Subclause 6.1.2 of Purchase Specification			
Clause	Description	Unit Price in USD	Total in USD
6.1.2	1. Nipple for air distributor, Qty 30	3.13	93.90
	2. Flat washer for air distributor Qty 60	2.08	124.80
	3. Flow limiter Qty 60	104.17	6,250.20
	4. Level indicator without temperature sensor and with gasket* Qty 08	52.08	416.64
	5. Level indicator with temperature sensor and with gasket* Qty 02	1,041.67	2,083.34
	6. Maintenance plug complete with gasket* Qty 10	31.25	312.50
	7. Ventilation plug explosion proof* Qty 10	104.17	1,041.70
	(*) These items are additional to which are already part of the cell, to be supplied by the CONTRACTOR, related to the 120 cell as item 5.a.i of this Specification.		
	Sub Total		10,323.08

Scope of Spare parts, accessories, instruments, special tools and onboard mounting accessories according to Subclause 6.1.2 of Purchase Specification			
Clause	Description	Unit Price in USD	Total in USD
6.1.2	1. Copper Connector(Busbar Connector)	Not Included	
	2. Steel Nipple on the Pole Posts for cooling water, Qty 528 numbers	31.25	16,500.00
	3. Gasket for Poles nipples Qty 528 numbers	2.08	1,098.24
	4. Level Indicators (buoys) for active of cells Qty 132 numbers	52.08	6,874.56
	5. Lids to seal the transport plug Qty 132 Numbers	31.25	4,125.00
	Sub Total		28,597.80

Scope of Spare parts, accessories, instruments, special tools and onboard mounting

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accessories according to Subclause 6.1.2 of Purchase Specification			
Clause	Description	Unit Price in USD	Total in USD
6.1.2	1. Portable digital densimeter with memory (Anton Paar DMA-35 Basic - reference model). Maximum permitted dimensions (L x W x H): 150 mm x 140 mm x 30 mm, Qty 3 Numbers	12,500.00	37,500.00
	2. Flowmeter air 20-200 l/h Qty 3 Numbers	1,875.00	5,625.00
	3. Wrench grip for lids to seal the transport plug Qty 3 Numbers	208.33	624.99
	4. Isolated wrench for tightening the nipple Qty 3 Numbers	208.33	624.99
	Sub Total		44,374.98

Training and technical support according to Subclause 6.2 of Purchase Specification			
Clause	Description	unit Price in USD	Total in USD
6.2	a) The contractor shall provide training for the crew, with the approach to design specification, operation and maintenance of the cells that will be supplied;	10,416.67	10,416.67
	b) The contractor shall provide technical support related to cell activation, capacity testing advisory for the cells that will be supplied for the period of six years;	31,250.00	31,250.00
	Sub Total		41666.67

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Commercial Terms and Conditions

1. **Price:** Unit Price quoted is in US Dollars.
2. **Price basis:** CIF Brazil sea port, US\$ 13,200 as CIF sea freight charges and with transit time of 52 to 55 days from Exworks to Rio De Janeiro, Brazil.
3. **Payment :**

Event	Description	Scheduled Date	%
1	Signature of the Contract.	D ₀	-
2	Effective Date of the Contract.	D	-
3	Delivery of proof of completion of the preparation of the production line for manufacturing.	D + 5 days	5
4	Delivery of orders for all materials required for manufacturing.	D + 10 days	15
5	Delivery of Technical Documentation as per subclause 6.1.1 of the Appendix Purchase Specification.	D + 15 days	5
6	Delivery of Logistic Support Documentation as per subclause 6.1.1 of the Appendix Purchase Specification.	D + 30 days	5
7	Delivery of Quality Assurance Documentation as per subclause 6.1.1 of the Appendix Purchase Specification.	D + 45 days	10
8	Delivery of Shipping Documentation as per clause 3.4 and 3.6 of this contract.	D + 240 days	30
9	Delivery and arrival of the equipment CIP Rio de Janeiro Seaport, INCOTERMS 2020, with all components and parts.	D + 280 days	20
10	Signature of the Term of Provisional Receipt (TRP) by the Navy at the conclusion of the training and the tests at the end of the activation of battery cells.	D + 320 days	5
11	Signature of the Term of Definitive Receipt (TRD) by the Navy.	D + 340 days	5
	TOTAL		100

4. **Delivery Schedule:** 123 cells shall be ready for dispatch within 08 months (Ex-Works) from the date of receipt of technically clear and commercially firm Purchase Order along with advance payment.

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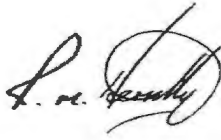
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5. **Validity:** This offer is valid for 60 days from date. Thereafter subject to our confirmation.
6. **Warranty:** The cells are warranted against any manufacturing defect for a period of 12 months from Date of Manufacturing.
7. **End User Certificate:-** End User Certificate is required. Supplies are subject to obtaining No Objection Certificate (NOC) from Ministry of Defense, India.

We shall be happy to answer and queries that you may have . .

We sincerely hope that you will find our quotation acceptable and look forward to service your valuable order.

Thanking you
Yours Sincerely



Robert M. Herritty
Executive Director - International Business

Note: The proposal has be read in conjunction with our technical proposal.