TENDER DOCUMENT

SUPPLY AND INSTALLATION OF EQUIPMENT FOR THE FABRICATION OF CYLINDRICAL TYPE SUPERCAPACITOR CELL

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INTERNATIONAL ADVANCED RESEARCH CENTRE FOR POWDER METALLURGY AND NEW MATERIALS (ARCI),
Balapur P.O, R.R. District, Hyderabad – 500 005, Telangana, India
Tel: 040-24452326, Fax: 040-24442699
Web Site: www.arci.res.in eMail: stores@arci.res.in

TENDER NOTICE

International Advanced Research Centre for Powder Metallurgy and New Materials (ARCI) is an Autonomous Research and Development Centre of Department of Science and Technology (DST), Government of India with main campus at Hyderabad and with operations in Chennai and Gurgaon.

ARCI would like to procure the following equipment. The Technical Specifications Schedule of Requirements and Allied Technical details are given in Part-1 of tender document.

Item: SUPPLY AND INSTALLATION OF EQUIPMENT FOR THE FABRICATION OF CYLINDRICAL TYPE SUPERCAPACITOR CELL

Tender Enquiry No: (Case No.) SC20180189/PO dated 13.12.2018

• Last date and time of submission of Tender (EMD, Technical and Price Bid): 21.01.2019 before 3:30 PM.

• EMD should be in the form of Demand Draft drawn in favour of Director, International Advanced Research Centre, payable at Hyderabad.

• Estimated value: Rs. 1,50,00,000/-

• The item to be delivered and installed at:

  International Advanced Research Centre for Powder Metallurgy and New Materials, Balapur Post, Hyderabad – 500 005, Telangana, India.

• Estimated Delivery period: 60 days (2 months)

The tender document should consist of the following:

Two bid system should be followed for this tender. In this system the bidder must submit offer in three separate sealed envelopes i.e., one envelope for each for EMD, Technical Bid and Commercial Bid. These envelopes should be securely sealed and stamped separately and clearly marked as “Envelope No.1- EMD”, “Envelope No. 2- Technical Bid” and “Envelope No.3 – Commercial Bid”. All the sealed envelopes should be placed in another larger envelope. The main envelope which will contain all the envelopes should be super-scribed with the tender enquiry no. SC20180189/PO date 13.12.2018 due on 21.01.2019 with name of the equipment /item and is to be submitted to the address given below so as to reach on or before 21.01.2019 by 03:30 PM.
The Bidder should ensure that the Prices are mentioned only in the Financial Bid and nowhere in the Technical Bid.

Validity of Bid

Quotation should have minimum validity of 120 days from the date of opening.

Address for submission of the Tender:

International Advanced Research Centre for Powder Metallurgy and New Materials, Balapur Post, Hyderabad – 500 005, Telangana, India.

Last date for submission: 21.01.2019 at 03:30 PM

Tender should be submitted before last date stated above. The Tenders not accompanied by EMD in the form of Demand Draft in favour of Director, ARCI, payable at Hyderabad are liable for rejection.

The bid can be submitted in person or through post/courier. ARCI will not be responsible for transit delay for tenders submitted by Post / Courier etc.

All the tenders, in which any of the prescribed conditions are not fulfilled or incomplete in any respect are liable to be rejected.

Clarification on bid

Bidders can seek clarification as per the schedule start and end date through email IDs given below:

For technical clarifications: pavan.srinivas@project.arci.res.in

For commercial clarifications: stores@arci.res.in

Opening of the tender

The offer/bid will be opened by a committee duly constituted for this purpose. The bidder if interested may participate on the tender opening date and time. The bidder should produce authorization letter from their company to participate in the tender opening. Only one representative will be allowed to participate in the tender opening. The schedule of tender opening is:

Technical Bid opening date and Time: 25.01.2019 at 02.30 PM (Friday)

PLACE: - International Advanced Research Centre for Powder Metallurgy and New Materials, Balapur Post, Hyderabad – 500 005, Telangana, India.
The bidders who are technically qualified will be called separately for opening of price bids.

**Award of Contract**

Contract will be awarded to successful bidder and a copy of the award of the contract will be uploaded in CPP portal after finalizing the tender.

**Disqualification of the Tenders:**

The tenders are liable for rejection in the following circumstances:
- If they are not in line with the terms and conditions of this tender notice
- Conditional quotations
- Incomplete tenders
- Tenders without EMD
- Tenders submitted through Fax or e-mail
- If two bid system is not followed.

Director, ARCI reserves the right to accept or reject any or all tenders either in part or in full or to split the order without assigning any reasons there for.

**IMPORTANT NOTE:** Amendment, Corrigendum if any to this tender document, WILL BE HOSTED ONLY IN ARCI WEBSITE and CPP Portal and no separate Press Notification will be issued. Bidders are advised to visit our website and CPP Portal regularly to know such details.

**Director, ARCI, Hyderabad**
PART–1

TECHNICAL BID (Terms and Conditions)

I. Vendor qualification criteria:

A. Original Equipment Manufacturer (OEM) or authorized representatives of OEM only can quote for this tender. Vendor should submit authorization letter valid on tender date from OEM along with the quotation.

B. The OEM should have proven expertise in manufacture and supply of the item.

C. The bidder should have supplied at least 02 or more similar units in India or abroad in the last 4 years.

D. It is essential that the manufacturer shall provide the list of users of the equipment with contact particulars.

E. OEM is required to submit a letter of commitment at the time of quote for supply of spares and also for efficient and prompt after sales service of the equipment for a minimum period of 5 years after the guarantee/warranty period under mutually agreed terms and conditions.

F. Failure to meet any of the above vendor qualification criteria may lead to disqualification of tender at technical evaluation stage itself and vendor’s quotation may not be considered for procurement.

II. Pre dispatch inspection

A. The manufacturer/supplier of the unit shall demonstrate, if required, at their works during pre-dispatch inspection by ARCI personnel and shall satisfy all the technical specifications as described in the tender document.

B. The manufacturer /supplier of the unit shall demonstrate the features as provided in Annexure-I (Scope of supply work).

C. All the consumables, raw materials, required for the above demonstration should be arranged by the tenderer.

D. All the utilities and manpower required for the demonstration shall be arranged by the supplier only

III. Acceptance criteria:

A. The manufacturer/supplier’s trained engineer should carry out installation and commissioning of the unit at ARCI.

B. The entire functionality of the equipment according to the specifications should be demonstrated at ARCI.
C. The manufacturer/supplier of the unit shall demonstrate the features as specified in **Annexure I (Scope of work)**.

D. Infrastructure required for the above demo will be arranged by ARCI.

E. The manufacturer/supplier should comply with the Safety and Compliance Standards as specified in **Annexure I (Scope of Work)**.

**IV. Other aspects:**

1. **PATENT RIGHTS:**

   The Supplier shall indemnify ARCI against all third-party claims of infringement of patent, trademark or industrial design rights, copyright arising from use of the Goods or any part thereof in India.

2. **Training:**

   The manufacturer shall impart training in the operation and preventive/breakdown maintenance of the complete unit including sub-parts during installation to ARCI personnel for at least 7 no. of days at ARCI.

3. **Utilities/Infrastructure for installation:**

   A. Supplier shall indicate all the required utilities/infrastructure such as power, water, gas, etc including power backup requirements.

   B. Supplier shall provide overall dimensions of the Unit along with floor area/height of the site or building, including foundation details if any, for accommodating the Unit.

   C. The operating environment for the Unit including temperature and humidity control, anti-vibration, EMI, EMC etc. should be indicated.

   D. If any charges extra are payable for Installation and Commissioning, the same should be included in the total cost of the stores as per the price schedule.

4. **Manuals, software and other drawings etc.:**

   The following documents (in English) shall be provided along with the Unit in both hardcopy and softcopy forms:

   A. Operation and maintenance manuals, troubleshooting procedures, calibration methods, wiring and other schematic diagrams, list of components, spares and accessories.
   
   B. If there are any bought-out systems and components, manuals should be provided in hardcopy and softcopy forms for the same.
   
   C. Calibration certificates for sensors, instruments, gauges, display units etc. must be provided.
   
   D. Software upgrades pertaining to the supplied Unit should be provided free of cost as and when new versions are released by the OEM.
   
   E. Safety and security instruction manual should be provided.
5. After-sales service:
The supplier shall guarantee efficient and prompt after-sales service including the supply of the spares for a minimum period of 5 years after the guarantee/warranty period under mutually agreed terms and conditions.

6. Bought-out items:
All bought-out sub-systems and components if any should be of reputed make conforming to international standards. Make and details of all bought-out sub-systems and components shall be specified.

7. General Quote:
The breakup for accessories or sub system(s) /attachments apart from the basic system, if any, should be quoted separately.

8. Export License:
The supplier should clearly indicate their ability/readiness to obtain the export license /clearance from the concerned authority for the supply of the unit as per the contract specifications to ARCI.

9. Technical compliance statement:
The vendor should provide item wise details against each and every specification, Deviations if any are to be highlighted.

10. Guarantee/warranty:
The Unit shall be under warranty **for a period of two years from the date of acceptance**. During the warranty period, all software and hardware updates shall be provided free of cost. Items, if any, excluded from the warranty shall be explicitly mentioned by the supplier.

The Unit shall be guaranteed for satisfactory performance for 3 years from the date of installation, commissioning and acceptance at ARCI. The manufacturer shall replace premature failure of parts during the guarantee period at their cost and risk.

11. Delivery/ time schedule:
The offer shall be accompanied by a detailed delivery time schedule showing the individual time schedule required for delivery.

12. Packing:
The Supplier shall provide such packing of the Goods as is required to prevent their damage or deterioration during transit to their final destination. The packing shall be sufficient to withstand, without limitation, rough handling during transit and exposure to extreme temperatures, salt and precipitation during transit and open storage. Packing case size and weights shall take into consideration, where appropriate, the remoteness of the Goods' final destination and the absence of heavy handling facilities at all points in transit. In order to maintain safety of the equipment, we prefer to have wooden crating with adequate cushion inside for transportation of any goods.
The material has to be dispatched with International standard packing to withstand rigors, and to avoid any transit damages.

13. Packing Instructions:

Each package will be marked on three sides with proper paint/indelible ink, the following:

i. Purchaser Name & Address
ii. Item Nomenclature
iii. Order/Contract No.
v. Packing list reference number

14. Insurance:

The Goods supplied under the Contract shall be fully insured in Indian Rupees against loss or damage incidental to manufacture or acquisition, transportation, storage and delivery.

For delivery of goods at the purchaser’s premises, the insurance shall be obtained by the Supplier in an amount equal to 110% of the value of the goods from “Warehouse to warehouse” (final destinations) on “All Risks” basis including War Risks and Strikes. The insurance shall be valid for a period of not less than 3 months after dispatch or upto installation and commissioning of stores whichever is later. However, in case of orders placed on FOB/FCA basis, the purchaser shall arrange insurance.

15. General instructions:

A. The Technical Bid must be submitted in an organized and structured manner. No brochures/leaflets etc. should be submitted in loose form. Please indicate page nos. on your quotation. The price should not be mentioned anywhere in this document.

B. Tenders, which are submitted without following the Two-Bid Offer System, are liable to be rejected.

C. The technical offer should be complete to indicate that all products and services asked for are quoted. Each page of the bid and cutting/corrections shall be duly signed and stamped by the bidder. Unsigned Tenders are liable to be rejected. Failure to comply with this requirement may result in the bid being rejected.

D. The purpose of certain specific conditions is to get or procure best product/service etc. for ARCI. The opinion of Technical Committee shall be the guiding factor for technical short listing.

E. Vendor should provide list of deliverables / bill of materials and services.
PART- 2

EARNEST MONEY DEPOSIT

Earnest Money Deposit (EMD) in the form of Indian or foreign demand draft Drawn in favour of Director, International Advanced Research Centre, Payable at Hyderabad.

No interest is payable on EMD. The EMD will be returned to the bidders(s)/Agents whose offer is not accepted by ARCI within one month from the date of the placing of the final order(s) on the selected bidder(s). EMD of the successful bidder shall be converted into performance guarantee and shall be release on submission of bank guarantee.

EMD in the form of BG is not acceptable.

Amount of EMD Rs. 3,75,000.00 (Rupees Three Lakh Seventy Five Thousand only) in INR or equivalent foreign currency.

Bidder registered with Department of Micro, Small and Medium Enterprises as MSMEs and having valid NSIC registration are exempted for payment of EMD subject to submission of documentary evidences. Copies of registration certificate and other supporting documents should be submitted in Cover No. 1.
PART–3

PRICE BID

I. Terms and Conditions:

a) Envelope 3 should contain price schedule (as per the table) complete in all respects with proper seal and signature of authorized person.
b) Tender with any condition, including conditional rebate, are liable to be rejected.
c) Cost of all the items should be mentioned clearly and individually in the Commercial Offer (Part- III) only.
d) AMC scope with associated costs including number of visits has to be quoted separately.
e) The Bidders are requested to quote for research institutional prices for Machine/Equipment and, since ARCI is eligible for the same. The quoting party should ensure that the quoted prices are the minimum and that have not quoted the same item on lesser rates than those being offered to ARCI to any other customer.
f) Printed conditions of the vendor submitted with the tender will not be binding on ARCI.
g) The commercial bids of only the technically qualified bidders shall be considered for further processing.
h) The price quoted shall be considered firm and no price escalation will be permitted during the currency of contract. The quotation should be in standard currency on Ex works/FOB/FOR basis. Freight, insurance, Agency commission (if any) and commissioning charges, if not included, may be quoted separately in Commercial Bid.
i) Commercial Bid (prices quoted) should not be enclosed in the technical bid envelope. If the price quote is submitted with technical bid the tender are liable to be rejected.
j) The Director ARCI reserves the right to accept the offer in full or in parts or reject summarily or partly thereof.

II. Payment terms:

1. For import:

An irrevocable Letter of Credit [L/C] for 100% of the order value will be established by the purchaser in favour of the supplier, through purchaser's bank in India once the following condition is met:

Receipt of order acknowledgement and acceptance of the order.

THE ACTUAL PAYMENT TO SUPPLIER WILL HOWEVER BE RELEASED IN TWO STAGES IN THE FOLLOWING MANNER:

Payment for 90% of the order value will be made upon shipment of the equipment and negotiation of the following shipping documents through L/C:

A) Signed Commercial Invoice - Original + 5 Copies

B) Airway Bill/Bill of lading - Original + 5 Copies.

C) Packing List -Original + 5 Copies

D) Certificate of conformity from the supplier that stores/equipment has been tested by the supplier and the same meet the technical specification - Original + 3 Copies.
E) Supplier's Certificate to the effect that the contents in each package are not less than those entered in the Invoice and the Packing List - Original + 3 Copies.

Balance 10% of the order value will be released through L/C upon submission of the following documents:

A) Commercial Invoice for 10% order value.

B) Final Acceptance Certificate [FAC] issued by the purchaser/authorized representative in original against satisfactory installation and commissioning of the equipment at ARCI Site.

C) Bank Guarantee Equivalent to 10% of total order value covering warranty period of the equipment issued or counter guaranteed by an Indian Bank clearly mentioning the relation with OEM if submitted by Indian Agent.

D) If the above-mentioned performance bank guarantee is not provided, 10% of the order value (i.e. second stage payment) will be released only after the expiry of the warranty period from the date of FAC.

2. Domestic purchase:

Payment Terms

Subject to deduction of taxes at source, if any,

90% of the goods cost + 100% taxes will be paid after receipt of the goods at our site subject to inspection & acceptance of the goods/works/commissioning by ARCI authorities.

Balance 10% will be paid against submission of Performance Bank Guarantee (i.e. 10% of the total order value excluding taxes etc.) from a Nationalized /Scheduled Bank valid till the expiry of the warranty period OR after completion of warranty period from the date of successful commissioning of equipment at ARCI.

III. Final Acceptance Certificate (FAC):

On installation, the working of the equipment should be demonstrated so as to comply with all the technical specifications. In this connection, it is to be noted that the installation report is not to be treated as the Final acceptance certificate (FAC)

The FAC will be issued by the PURCHASER only on demonstration of the technical specifications. The warranty shall commence only from the date of the issuance of the FAC. The FAC shall be issued by the PURCHASER at a date not later than 30 (thirty) days from the date of installation provided the equipment functions as per the specifications.

IV. Liquidated Damages (LD):

As time is the essence of the contract, delivery period mentioned in the Purchase Order should be strictly adhered to. Otherwise, LD clause will be applicable /enforced. If the supplier fails to Supply, Install and Commission the equipment as per specifications mentioned in the order within the due date, ARCI may levy a penalty for such delay by way of liquidated damages, at 0.5% per week of delay or part thereof, and in aggregate not exceeding 10% of the order value. Such LD will be deducted from any amount due or which may become due to the supplier.
V. Order acceptance:

The successful bidder, on award of contract / order, must send the contract / order acceptance in writing, within 15 days of award of contract / order failing which the EMD will be forfeited.

VI. Award of contract:

ARCI reserves the right at the time of award of Contract to increase or decrease the quantity of items specified in the Schedule of Requirements without any change in price or other terms and conditions.

VII. Corrupt or Fraudulent Practices:

ARCI requires that the bidders who wish to bid for this project have highest standards of ethics. ARCI will reject a bid if it determines that the Bidder recommended for award has engaged in corrupt or fraudulent practices while competing for this contract. ARCI may declare a vendor ineligible, either indefinitely or for a stated duration, to be awarded a contract if it at any time determines that the vendor has engaged in corrupt and fraudulent practices during the execution of contract.

VIII. Interpretation of the clauses in the Tender Document / Contract Document:

In case of any ambiguity / dispute in the interpretation of any of the clauses in this Tender Document, Director, ARCI’s interpretation of the clauses shall be final and binding on all parties.

The equipment must be supported by service personnel trained by the principal vendors. The vendor will have to arrange for all the testing equipment & tools required for installation, testing & maintenance etc. Installation and integration of all supplied hardware and software shall be done by the vendor. The vendor shall install and configure all required hardware and software. The bidder must install and configure user application / software, and demonstrate its running in parallel as part of the system acceptance. The application software will be provided by the Institute.

IX. Indemnity:

The vendor shall indemnify, protect and save ARCI against all claims, losses, costs, damages, expenses, action suits and other proceeding, resulting from infringement of any law pertaining to patent, trademarks, copyrights etc. or such other statutory infringements in respect of all the equipment’s supplied by him.

X. Arbitration

For Domestic Supplier

In case of Dispute or difference arising between the Purchaser and a domestic supplier relating to any matter arising out of or connected with this agreement, such disputes or difference shall be settled in accordance with the Indian Arbitration & Conciliation Act, 1996, the rules there under and any statutory modifications or re-enactments thereof shall apply to the arbitration proceedings. The dispute shall be referred to arbitrator appointed by Director ARCI. The award of the arbitrator so appointed shall be final, conclusive and binding on all parties to this order.
The venue of the arbitration shall be the place from where the purchase order/contract is issued.

Notwithstanding any reference to arbitration herein, the parties shall continue to perform their respective obligations under the Contract unless they otherwise agree.

For Imports

In the case of a dispute between the purchaser and a Foreign Supplier, the dispute shall be settled by arbitration in accordance with provision of sub-clause (a) above. But if this is not acceptable to the supplier then the dispute shall be settled in accordance with provisions of UNCITRAL (United Nations Commission on International Trade Law) Arbitration Rules.
**PRICE SCHEDULE FOR FOREIGN SUPPLIERS**

Currency__________: Country of origin___________

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>ARCI item code</th>
<th>Name of the Goods</th>
<th>Unit of measurement</th>
<th>Quantity</th>
<th>Price</th>
<th>Discount</th>
<th>Taxes if any</th>
<th>Price in currency</th>
</tr>
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</table>

Total in foreign Currency

Packing and forwarding Charges

Ex work prices

AMOUNT IN WORD

*Note: The Bidder may please fill in this form or the same may be typewritten on the Letter Head of the Bidder exactly as per the above format and submit the same as per the instructions given in the tender document.*

**NOTE:** For imports, ARCI is entitled for concessional Customs duty as per Notification No.51/96-Custom (as notified by GST council). Hence rates to be quoted accordingly.

**PRICE SCHEDULE FOR DOMESTIC SUPPLIERS**

<table>
<thead>
<tr>
<th>Sl No.</th>
<th>ARCI item code</th>
<th>Name of the Goods / Services / Works</th>
<th>HSN / SAC codes</th>
<th>UOM</th>
<th>Quantity</th>
<th>Unit Price</th>
<th>Discount</th>
<th>C GST</th>
<th>SGST</th>
<th>IGST</th>
<th>Total Tax amount</th>
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Total price (FOR ARCI, Hyderabad)

AMOUNT IN WORDS:

*Note: The Bidder may please fill in this form or the same may be typewritten on the Letter Head of the Bidder exactly as per the above format and submit the same as per the instructions given in the tender document.*

**NOTE:**

I. ARCI is a public funded research institution, concessional GST rate @ 5% may please be quoted for the supply of goods with reference to GST Notification no. 45/2017 dated 14.11.2017. ARCI will provide certificate for the same.

II. For imports, ARCI is entitled for concessional Customs duty as per Notification No.51/96-Custom (as notified by GST council). Hence rates to be quoted accordingly.

**Other information:**

a) Installation and commission charges, if any to be added as a line item in the format given above.
b) Prices of accessories, spares and consumables must be added as a line item as per the format given above
c) Optional items, if any, and their prices should be mentioned separately

[Signature of Bidder]

NAME AND ADDRESS OF BIDDER
**Declaration by the Vendor**

It is hereby declared that I/We the undersigned, have read and examined all the terms and conditions etc. of the tender document for which I/We have signed and submitted the tender under proper authorization. It is also certified that all the terms and conditions of the tender document are fully acceptable to me/us and I/We will abide by the conditions of the tender. We have not given any printed conditions beyond the scope of this tender. This is also certified that I/We/our principal manufacturing firm has no objection in signing the purchase contract if the opportunity for the supply of the items against this tender is given to me/us.

Date:

Signature:

Name:

Address:

Designation:

On behalf of:
SCOPE OF WORK
Scope of the Supply: Supply and Installation of Equipment for the Fabrication of Cylindrical Type Supercapacitor Cell

Cylindrical type Supercapacitor Cell Fabrication Equipment
The proposed equipment will be used for supercapacitor cell fabrication with 60 mm diameter and 80 mm height cell dimensions for making approximately 1000F capacitance cell using activated carbon material.

A. Roll to Roll Coating Machine
Roll to roll coating machine for coating indigenously developed activated carbon material to make homogenous thickness electrode foils on 20 microns thick Aluminium current collector for supercapacitor cell fabrication.

1) Coating Method: Comma coating method for high precision coating (The machine should be capable of single face Continuous and Intermittent coating modes)
2) The coating head should be made of SS316 grade material
3) The machine shall support coating on the substrate (current collector) with thickness of 0.008-0.03 mm (depending on Al or Cu current collector foil)
4) The machine should be able to feed up to 300 mm width substrate (current collector) for coating
5) The coating width should be adjustable up to 260 mm of the substrate (current collector) width
6) The wet coating thickness should be adjustable up to maximum of 400 microns; with accuracy of 3 microns at lower thickness ranges
7) The coating speed should be adjustable up to 2 meters per minute
8) The coating accuracy should be plus or minus 3 microns
9) Variation in dry thickness of the coating should be less than or equal to 2.5 micrometres
10) Line tension range: 0-50 N to withstand 10 microns Cu foil and 20 micron Al foil for winding
11) Edge sensors should be provided for proper web alignment
12) The machine should have a drying zone length of 1 meter with either one zone or two zones; in case of two zones, zone length should be 500 mm each.
13) Drying method: hot air circulation with upper and lower double sided blowing for electrode drying with single layer independent heating
14) Temperature Range: Room temperature to 150 degree centigrade, adjustable.
15) Temperature Accuracy: plus or minus 5 degree centigrade
16) Main drive motor: Servo motor should be provided
17) Re-winding method: Constant speed mechanism, adjustable
18) Winding method: Automatic winding with tension and rectifying precession controls
19) Exhaust should be provided for the removal of solvent vapours during electrode drying process
20) Solvent recovery system should be provided for NMP recovery processing
21) The system components should be made of stainless steel (SS316 grade) for corrosion free operation

B. Semi-automatic Winding Machine

Semi-automatic winding machine for making electrode jelly rolls for 60 mm diameter and 80 mm height cylindrical type Supercapacitor cell fabrication

1) The system should have a cylindrical type winding unit
2) Two needles should be provided for making jelly rolls suitable for 60 mm diameter and 80 mm height cell cans
3) Needle diameter (Mandrel): 6-8 mm (suitable for making jelly rolls for 60 mm diameter cell cans. The needle should be able to withstand the jelly roll weight during winding process and should not break.
4) Needle length: suitable to make Jelly rolls for 80 mm height cell can size. Additional needle should be provided suitable to make jelly rolls for 138 mm height cell cans.
5) The machine should be able to wind electrode foils having a width of minimum 45 mm and maximum 145mm (depends on cell can height)
6) The machine should be able to wind electrode foils having length of minimum 600 mm and maximum 4000 mm (depends on cell can diameter)
7) The machine should be able to wind an electrode having thickness of minimum 100 microns and maximum 200 microns
8) The machine should be able to feed and wind a separator roll having width of minimum 50 mm and maximum 150mm (depends on cell can height)
9) The separator should be feed as a roll (150-200 meters length and 15-50 microns thickness)
10) Separator roll diameter: External diameter should be minimum of 150 mm
11) Maximum jelly roll diameter should be within the range of 57-58 microns suitable for 60 mm diameter cell cases
12) Jelly roll winding speed should be adjustable with production rate of 1-2 rolls/min
13) Line tension should be in the range of 0.1-0.7 MPa
14) Automatic winding, automatic needle change, automatic separator cut off, stick termination of tape and blanking should be provided
15) The system should come with an electrode dust removal system
16) The system should have a detection for loose core and electrode dislocation
17) Electrode alignment by guide plate should be provided
18) Termination tape length should be in roll and should have a width of minimum 10mm and maximum 50 mm and thickness of minimum 10 microns and maximum 50 microns
19) Winding accuracy: The electrode width error should be plus or minus 0.2 mm, electrode alignment error should be plus or minus 0.5 mm and separator alignment error should be plus or minus 0.5 mm
20) The error in the alignment of the finished products section should be plus or minus 0.5 mm
21) Motor type: Servo motor should be provided
22) The winding machine should supply along with 1 set of rack and mounting (guiding) plate, 1 set of jelly roll system, 2 set of electrode supply system, 2 set of separator supply system, and 1 set of rubberizing system.
23) Automatic functions: Principle axis rotation, timing belt advance, pulley, needle, advance and retreat cylinder and needle.
24) Manual Assisted function: Feeding the electrode to the guiding plates, fixing separator spool in the mandrel, final rounding wheel, press the tape cylinder.
25) Control system: PLC and HMI, servo and stepper motor.
26) Sensors should be provided to operate the system safely.
27) Power supply requirements should be suitable for Indian standards.
28) The system components should be made of stainless steel (SS316 grade) for corrosion free operation

C. Grooving machine

Grooving machine for grooving cylindrical cell cans with 60 mm diameter and variable height (50-150 mm) for supercapacitor cell fabrication.
1) Grooving height accuracy should be plus or minus 0.05 mm
2) Grooving depth accuracy should be plus or minus 0.02 mm
3) The machine should have a capacity of grooving minimum of 1 cell case per minute
4) The machine utilization rate for achieving the desired grooving on the cell can should be minimum of 98 percentage
5) The service life of the tooling moulds should be minimum of 5 million times
6) Power supply requirements should be suitable for Indian standards.
7) The machine should be pneumatically controlled.
8) Motor type: Servo motor should be provided
9) The cylinder case should not rebound due to compression resistance and should have a uniform grooving
10) PLC control should be provided for adjusting the required parameters for smooth operation
11) HMI (Man-machine interface) display should be provided to easily form an automation
12) The machine should come with a proper protection and safety systems for hassle free operation
13) The machine should be able to work at room temperature (20-30 degree centigrade) and under a relative humidity of maximum 70 percentage.
14) The system components should be made of stainless steel (SS316 grade) for corrosion free operation
D. Sealing machine

Sealing machine for sealing/crimping cylindrical cell cans with 60 mm diameter and variable height (50-150 mm) for supercapacitor cell fabrication

1) The machine should come with a sealing die suitable for sealing 60 mm diameter and variable height (50-150 mm) cell cans
2) Capacitor height accuracy after sealing should be plus or minus 0.05 mm
3) The change in size of the sealing shell after sealing should be plus or minus 0.03 mm
4) The machine should have a capacity of sealing minimum of 1 cell case per minute
5) The machine utilization rate for achieving the desired sealing of the cell can should be minimum of 98 percentage
6) The service life of the tooling moulds should be minimum of 5 million times
7) The sealing should result in airtight sealing of the case to prevent electrolyte leakage.
8) The machine should come with a booster cylinder control mould for parallel sealing of the upper and lower moulds to easily form an automation
9) The sealing height should be adjustable to seal different size cell cans having 60 mm can diameter
10) Sealing pressure and holding time should be adjustable
11) Power supply requirements should be suitable for Indian standards.
12) The machine should be pneumatically controlled.
13) PLC control should be provided for adjusting the required parameters for smooth operation
14) The machine should come with a proper protection and safety systems for hassle free operation
15) The machine should be able to work at room temperature (20-30 degree centigrade) and under a relative humidity of maximum 70 percentage
16) The system components should be made of stainless steel (SS316 grade) for corrosion free operation

E. Vacuum filling machine

Vacuum filling machine to inject electrolyte into the cylindrical cell cans through filing port and should be operated inside a glove box or in a dry room with less than 1 percentage relative humidity.

1) The machine should be suitable to fill electrolyte in cell cans with 60 mm diameter and variable height (50-150mm)
2) The system should have two filling stations to fill 2 cells at a time
3) The amount of electrolyte injected should be adjustable to fill minimum amount of 20 ml and maximum amount of 250 ml with automatic injection mechanism with 2% filling accuracy
4) The vacuum level during injection of electrolyte should be around $10^{-3}$ to $10^{-4}$ Kpa
5) The tubing used for electrolyte filling should be compatible with the electrolyte (Acetonitrile solvent)
6) The system should be able to evacuate the cell can before injection and after injection to infiltrate the electrolyte for proper wetting of the separator with the electrolyte.

7) Motor type: Servo motor should be provided

8) The evacuation time, the level of vacuum, electrolyte injection time and injection pressure should be adjustable

9) The machine should be pneumatically controlled.

10) Rubber caps should be provided to seal the filling port after electrolyte filling to take out the cell from glove box for laser welding.

11) PLC control should be provided for adjusting the required parameters for smooth operation

12) The machine should come with a proper protection and safety systems for hassle free operation

13) The machine should be able to work at room temperature (20-30 degree centigrade) inside a glove box under inert atmosphere

14) The system components should be made of stainless steel (SS316 grade) for corrosion free operation

F. Suitable laser welding machine should be quoted as an optional machine for welding guide plates to the jelly roll, welding threads to the can top and bottom caps, and for welding the filling port after electrolyte filling.

G. Accessories required for cell fabrication should be provided along with the equipment

1. 50 Kg of carbon coated Al-foil rolls with 100-150mm width (the Al foil should be 20 microns thick which is coated on each side with 3 microns thick carbon coating) & 200 meters length. The carbon coating width should be 70-75 mm, suitable to make electrodes for 80 mm height cell cans. [The activated carbon based aqueous slurry will be coated on the pre-carbon coated Al current collector foil].

2. 4 rolls of cellulose paper separator for supercapacitor application with 30 microns thickness and minimum of 200 meters length and 70-80mm width suitable to make 80 mm height cell cans should be provided

3. Termination tape (4 tapes) to seal the jelly roll after winding should be provided

4. 200 full sets of cell cans with 60 mm diameter and 80 mm height suitable to make 1000F supercapacitor cells along with guide plates for laser welding, and top and bottom
caps should be provided. The cans should be suitable for making a threaded type supercapacitor cell.

5. A digital viscosity meter should be included for measuring viscosity of slurry during slurry preparation.

6. 1 Cutter for 60mm diameter and 80 mm height supercapacitor cell cans to slit the electrode foils using slitting machine. The cutter should have single knife hobbing cutting method with upper and lower round knife with 80 mm hobbing diameter. Knife material should be a tool steel of JIS SKD11 or equivalent standard for rust free operation.

Supplier’s eligibility criteria for bidding:

- The supplier’s bid should contain all the equipment mentioned in the specifications along with accessories
- The supplier should be a registered company for minimum of 5 years
- Supplier should have an experience in supercapacitor cell R&D production, and must have established similar supercapacitor fabrication lines globally (references must be given)
- Installation of the equipment should be done by service engineer and training should be given to handle the equipment at Centre for Nanomaterials, ARCI Hyderabad, India.
- Supercapacitor cell fabrication should be demonstrated starting from electrode coating to final electrolyte filling at the time of pre-inspection at supplier’s site before shipping the equipment.

Supply, installation, commissioning, training and services must be done at

International Advanced Research Centre for Powder Metallurgy and New Materials, Balapur Post, Hyderabad – 500 005, Telangana, India

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CHECK LIST

BIDDER HAS TO FILL IN THE CHECK LIST GIVEN BELOW

(State YES/NO for each item)

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>1</td>
<td>If bidder is not an original equipment manufacturer, authorization letter attached.</td>
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<tr>
<td>2</td>
<td>Whether Earnest Money Deposit (EMD) Submitted (envelope I)</td>
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<tr>
<td>3</td>
<td>Whether Technical Bid (envelope II) Submitted</td>
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<tr>
<td>4</td>
<td>Whether Commercial Bid (envelope III) Submitted</td>
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<tr>
<td>5</td>
<td>Whether the EMD (envelope I), Technical Bid (envelope II) and Price Bid (envelope III) are submitted in separate covers and all the covers enclosed in a common envelope.</td>
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<tr>
<td>6</td>
<td>Whether copies of GST Registration certificate and PAN Card enclosed</td>
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<td>7</td>
<td>Whether declaration form signed and submitted</td>
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<td>8</td>
<td>Validity of 120 days from the date of opening</td>
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<td>9</td>
<td>Whether warranty clause mentioned</td>
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<td>10</td>
<td>Does the instrument comply with all the specifications mentioned</td>
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<tr>
<td>11</td>
<td>Whether all pages of tender document signed and submitted</td>
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**NOTE:** Please ensure all the relevant boxes are marked YES/NO against each column.

**IMPORTANT NOTE:** **Tenderers must ensure that all the required documents indicated in the Tender documents are submitted without fail. Tenders received without supporting documents for the various requirements mentioned in the tender document are liable to be rejected at the initial stage itself.**