

**Technical Compliance Matrix**  
**Electrochemical Dilatometer and accessories**

S. No	Parameters	Technical specification / Requirements	Supplier Compliance (Yes/ No) with offered specification in detail
1	<b>End application</b>	High resolution electrochemical dilatometer for characterization of energy storage materials and single layer cell stack of battery	
2	<b>Characterization requirements</b>	a) Measurement of thickness changes of single electrode and full cell stack in active mode while performing electrochemical cycling tests and different electroanalytical techniques like Voltammetry, EIS etc b) Suitable for conducting long term life cycle tests without any degradation of internal cell holder construction materials and maintain the seal proof assembly for gas pressure monitoring	
<b>3</b>	<b>Test holder features</b>		
3.1	Configurations	Suitable for 2 and 3 electrode cell configuration	
3.2	Construction material	Materials in contact with cell stack shall be of corrosion resistant and compatible for aprotic organic electrolytes	
3.3	Chemical compatibility	Shall be of borosilicate glass, stainless steel 316L type of material, PTFE seals or equivalent with compatibility for aprotic organic electrolytes Viz . Li based systems. O-ring materials used shall be specified	
3.4	Hermetically sealed test holder	a) Complete seal proof design with glass to metal seals and He leak tested b) Test certificate for He MSLD shall be provided along with supply	
3.5	Glove box mounting	a) Shall be a compact design and suitable for mounting inside glove box for testing under inert environment conditions b) Dimension : 90(L) x 90 (W) x180 (H) mm (Maximum) c) Weight : 3 Kg or lesser	
3.6	Additional sensors	Shall be provided with pressure sensor (0- 3 bar abs) and temperature sensor(-20 to 80°C) for monitoring internal gas pressure ,temperature during testing	
3.7	Testing protocol	Configuration shall able to support conducting charge , discharge cycling, CV/ Impedance measurement , dilatometer studies and acquire cell potential , current , internal temperature and cell stack gas pressure in time synchronized mode	

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<b>4. Displacement sensor</b>			
4.1	Measurement principle	a) Capacitive displacement sensor or equivalent b) Shall be with better accuracy and drift stability c) Drift stability <20 nm / hour or better	
4.2	Range	250 µm or closer	
4.3	Resolution	Resolution < 5 nm or better	
4.4	Operational temperature range	0 to 40 °C	
<b>5. Electrode stack specification</b>			
5.1	Electrode thickness	1 ± 0.05 mm	
5.2	Cell electrolyte volume	0.2-0.5 ml	
5.3	Separator dimension	Circular , 10 mm dia Max	
5.4	Working electrode dimension	Circular , 10 mm dia Max	
5.5	Counter electrode dimension	Circular , 12 mm dia Max	
5.6	Separator material	Glass frit and Trilayer Polyolefin shall be supplied along with	
5.7	Load on test specimen / full cell stack	Constant 1 N load throughout cell testing	
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<b>6. Communication interface</b>			
6.1	<b>Communication interface</b>	Shall be provided with Ethernet communication interface for recording the electrode displacement, temperature, cell potentials and current parameters with dedicated software.	
6.2	<b>Analog outputs</b>	Conditioning electronics with analog output signals (0 to 10 V) for displacement and temperature suitable for integrating with standard electrochemical work station	
6.3	<b>Consumables &amp; accessories</b>	Party shall separately quote for the required consumable for conducting minimum 50 number of tests (Separator, current collector disc, Li metal electrode) and additional accessories if any.	
7	<b>Configuration review</b>	<ul style="list-style-type: none"> <li>a) It shall be arranged within two weeks of placement of supply order, in which all relevant technical data sheets of the equipment shall be submitted to VSSC.</li> <li>b) Necessary changes suitable for improvement of the system performance/functionality within the scope of supply as suggested by VSSC shall be incorporated.</li> <li>c) Final configuration must be approved by VSSC as part of design approval.</li> </ul>	
8	<b>Pre-Delivery Inspection</b>	<ul style="list-style-type: none"> <li>a) Once the instrument is ready for shipment, the party shall offer the item for pre-delivery inspection at the party's site in online mode for verifying the conformance to specifications with standard electrode samples</li> <li>b) The shipment clearance will be given based on the acceptance of the system during pre-delivery inspection.</li> </ul>	
9	<b>Warranty &amp; AMC Spares</b>	<ul style="list-style-type: none"> <li>a) System shall be warranted for a minimum period of 2 year from the date of installation of the instrument at VSSC.</li> <li>b) Separate quote AMC for five years after the warranty period should be included.</li> <li>c) AMC cost will be considered for grading the vendor, along with instrument cost.</li> <li>d) Quote for non-comprehensive AMC without spares shall be submitted separately. Number of visits per year: Two preventive &amp; One breakdown visit.</li> <li>e) Delivery period shall be preferably within 16 weeks from the date of PO placement and party shall provide the tentative period of obtaining export clearance applicable if any.</li> </ul>	

10	<b>Essential accessories and spares</b>	<p>a) Essential accessories/spares required for operation shall be available with supply. List of items shall be provided in the technical bid without price.</p> <p>b) Party has to quote separately for standard spares for 2 years operation.</p>	
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**GENERAL CONDITIONS:**

S.No	Terms & conditions	Supplier compliance
1.	Installation and commissioning of the instrument has to be carried out by supplier at our laboratory in VSSC and the performance has to be demonstrated. Onsite training must be provided to VSSC personnel on the installed instrument for operation and data processing	
2	Since the item is required for characterization and evaluation of testing sophisticated samples and also the characterization output will be used to design mission critical energy systems, only companies having proven track record in the manufacturing of electrochemical characterization systems will be considered	
3	Party shall enclose a compliance / deviation matrix with respect to each of the specification along with their offer for easy comparison without which the offer will not be considered. Documentary evidence (leaflets/ Catalogues/ Datasheet) shall be submitted to substantiate the conformance statement	
4	Offer shall consist of construction details with well-supported catalogues and leaflets, schematics of configuration having images of actual instrument without which their offer will not be considered.	
5	List of customers to whom similar units were supplied elsewhere shall be given along with the offer. End user details should include model No, year of supply, end user full contact details (Telephone/Email) to be furnished (Minimum 2 end users) along with offer.	
6	Vendor shall be original manufacturer/authorized representative of the system. Vendor shall provide the authorization certificate from the principals for the offered system along with the offer	
7	Vendor shall have an experience of supplying similar system for the stated applications at least to 3 customers (details of customers to be provided) as on date of tender opening.	
8	Certificate of satisfactory performance/ User acceptance certificate shall be furnished from at least one such customer.	

9	Operation, and maintenance manual, calibration procedure of sensors shall be supplied along with the equipment. Calibration certificate shall be given along with the equipment for the sensors Viz. Pressure, displacement sensor.	
10	Foot print of the system, dimension and weight shall be provided	
11	Tele maintenance and remote trouble shooting shall be provided during the operation life of the equipment in VSSC	
12	Cost incurred for characterization charges as part of PDI shall be free of cost	