

REQUEST FOR QUOTATION



BHARAT HEAVY ELECTRICALS LIMITED
Electronics Division
PB No. 2606, Mysore Road Bangalore - 560026
INDIA

RFQ NUMBER:
AKSPROP103

RFQ DATE :
06.01.2025

Due Date/Day: 20.01.2025 MON
Time : 13:00 HRS

MMI:PU:RF:003

(address for communication) :

(for all correspondence)

Purchase Executive : ABHISHEK
Phone : 26998102
Fax : 00918026989215
E-mail: singh.abhishek@bhel.in

This RFQ is for entering into Rate contract(RC)for 1 year.

Sl No.	Description	Qty	Unit	Delivery qty	Delivery Date
1	TI0668104228 DC LINK CAPACITOR C= 750 uF, Ue= 2800V, * HSN/SAC : 3921 CAPACITOR (DRY TYPE-DC LINK) CAPACITOR C= 750 uF, Ue= 2800V, In= 150A conforming to spec PS4452596 As per Specification PS4452596 Rev01	4,500	NO	4,500	30.04.2025

Total Number of Items - 1

- 1.
- 2.

NOTES:

1. This RFQ is governed by:
 - a) INSTRUCTIONS TO BIDDERS/SELLERS and GENERAL CONDITIONS OF CONTRACT FOR PURCHASE available at <http://edn.bhel.com> (RFQ-PO Terms & Conditions)
 - b) Any other specific Terms and Conditions mentioned.

* The HSN/SAC no mentioned against the line items in the RFQ are indicative only.

For and On behalf of BHEL.

ABHISHEK
Control Equipment

1 OF 1

1. SCOPE

The Pre-Qualification Requirement document specifies the requirements to be met by the vendors (hereafter called Bidder) who wish to participate in the tender for supply of **750µF DC Link Capacitor for rolling stock applications**.

This PQR should be read in conjunction with the Purchase Technical Specification **PS4452596 R01 dtd 10.11.2023**.

2. CREDENTIAL

- a) The Bidder should be Manufacturer or authorized dealer / supplier of - **750µF DC Link Capacitor** used in Rolling Stock applications. Documentary proof like relevant POs / invoice copies, valid authorization certificate etc shall be provided along with the offer.
- b) The Rolling Stock Applications under consideration shall include Locomotive, EMU, MEMU, Metro Trains, High Speed Trains, Train sets, Inspection Cars and Special Track Machines.
- c) For the vendors outside India, documentary proof for usage of the product in rolling stock applications shall be submitted. Acceptance of such certification shall be at BHEL's discretion.
- d) The Bidder should not be under the category of "hold" or "blacklisted" by any of the BHEL units/ any Govt of India PSU/ Govt of India/ statutory bodies of any state Govt as on date of bid submission. A declaration to this effect shall be submitted along with the offer.

3. QUALITY SYSTEM

- a) The manufacturer should have valid ISO 9001:2015 or latest certification covering the manufacturing and testing of the subject item
- b) The manufacturer should possess a clearly laid down quality Assurance Plan for the product covering the following aspects
Organization Chart, clearly indication the quality control set up
Qualification of key personnel and officials deployed in the quality control cell.
- c) Process Flow Chart indicating process of manufacture for an individual product or for a family of products, if the process is same.
- d) Quality Assurance System – Inspection and Testing plan to cover
 - Incoming material
 - Process control
 - Product control
 - System control
 - Testing facility
- e) Stage inspection details shall include the inspection procedure, inspection parameters, method of testing/ test procedure, sample sizes for destructive & non-destructive testing etc.
- f) Calibration scheme and status of calibration of test equipment
The process, testing and measuring equipment shall be duly calibrated by approved agency and the validity of calibration should be current.

4. GENERAL REQUIREMENTS

- a) It is preferred that the bidder is the manufacturer of this item. If the bidder is importing some portion of the components, then minimum value addition in India shall be 20%. Bidder to confirm this in the offer. Value addition less than 20% is not acceptable. A declaration to this effect shall be submitted along with the offer.
- b) The technical bid of bidders, which qualify technically but are not approved for the subject item by the Customer Approving Authority, shall be referred by BHEL to the customer Approving Authority for approval with intimation to the bidder. Consequent to the decision of Customer Approving Authority, the bidder shall be added to the vendor list of the subject item for future tenders. Concurrently BHEL shall consider placing developmental order on the bidder after accessing the capability of the bidder to manufacture / develop the subject item. However, BHEL shall treat the offer as “Not meeting” Pre-Qualification Criteria for the subject tender.
- c) The Customer Approving Authority shall be RDSO/CLW/BLW/PLW/ICF/RCF/MCF or any other agency as designated by the Customer.
- d) The bidder should possess a valid type test report, not older than five years, as per relevant standards mentioned in the specification with respect to time during the bid submission in case of catalog items. In case of custom made items, a bidder can submit the type test report of an item of similar or higher rating with a declaration for conducting the type test in case of award of order or developmental order. The bidder can also submit the test reports conducted in their own facility with the document of their lab accreditation. However, BHEL reserve it's right to insist on conducting the Type test again in a laboratory of it's choice.
- e) For the bid of vendors already qualified and appearing in BHEL's source list, the requirement of type test report and proof of supply shall not be applicable.

5. DOCUMENTATION TO BE SUBMITTED ALONG WITH OFFER

- a) Documentary proof for experience as per clause 2.a
- b) Clause by Clause compliance to the technical specification
- c) Declaration regarding status as per clause 2.d
- d) Declaration on MII (Make in India) as per clause 3.a
- e) Declaration for conducting Type Test as per clause 3.d



A4-12

PURCHASE SPECIFICATION FOR
750 μ F DC LINK CAPACITOR

GROUP : TRACTION ENGINEERING , EDN

PS NO : PS4452596

REV. NO : 01

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REVISION HISTORY SHEET

REV. NO	DATE	NATURE OF CHANGE	REASONS	PREPARED BY	CHECKED BY	APPROVED BY
00	18.04.2018	FIRST ISSUE	--	VVNSSRM Krishna	VVNSSRM Krishna	R Shekar
01	10.11.2023	Revision	Mounting bracket included	L Sunitha	R.S. Agosh Chandran	Bharat Arora

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Revision: 01

Date : 10.11.2023

Distribution

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Approved:

(Bharat Arora)

L Sunitha
(L Sunitha)
Prepared

R S Agosh Chandran
(R S Agosh Chandran)
Checked

10.11.2023

Date

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**PURCHASE SPECIFICATION FOR
750 μ F DC LINK CAPACITOR****GROUP : TRACTION ENGINEERING , EDN****PS NO : PS4452596****REV. NO : 01****PAGE 03 OF 07****1. Detailed Specification:**

Description	Value
Electrical Parameters	
Capacitance	750 μ F +/- 5%
Rated Voltage	2800 V DC
Rated Current	150A RMS
Non-recurrent Surge Voltage	4200 V DC
Test voltage b/w terminals and case	AC 6900 V /50 Hz/1 min
Test voltage b/w terminals	DC 4200 V/10 sec
Series resistance	<0.3m Ω
Tangent of Loss angle	2*10 ⁻⁴
Self-Inductance	<30nH
Maximum Peak current	>20KA
Maximum Surge Current	>40KA
Cooling	Natural convection
Superimposed AC Ripple frequency	0.3 to 2 KHz
Mechanical Parameters	
Height	Refer to Fig-2
Width	Refer to Fig-2
Depth	Refer to Fig-2
Terminal Height	Refer to Fig-2
Power Terminals type	Bar
Weight	24 Kg +/-10%
Materials	
a) Type	Dry type, Resin filled, Self-healing
b) Case	Stainless Steel
c) Brackets	Stainless Steel
d) Terminals	Copper , Tin plated
e) Earthing Contact	Stainless Steel
Clearance distance between terminals	>= 60mm
Clearance distance between terminals and case	>= 40mm
Rating plate/Marking	As per specification Clause 8
Colour	Grey RAL 7031
Shock Resistance	As per IEC 61373
Vibration	As per IEC 61373

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A4-12

PURCHASE SPECIFICATION FOR
750 μ F DC LINK CAPACITOR
GROUP : TRACTION ENGINEERING , EDN

PS NO : PS4452596

REV. NO : 01

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5. Reliability, availability, maintainability and Safety

Description	Value	Unit	Notes
Design life	30	years	Expected lifetime: 30 x 8640 = 260000 hours
Failure rate	50	FIT	
Maintenance			To be defined by supplier
Safety			The risk of explosion due to over voltage, ageing, loss or other

6. Dimensional Details

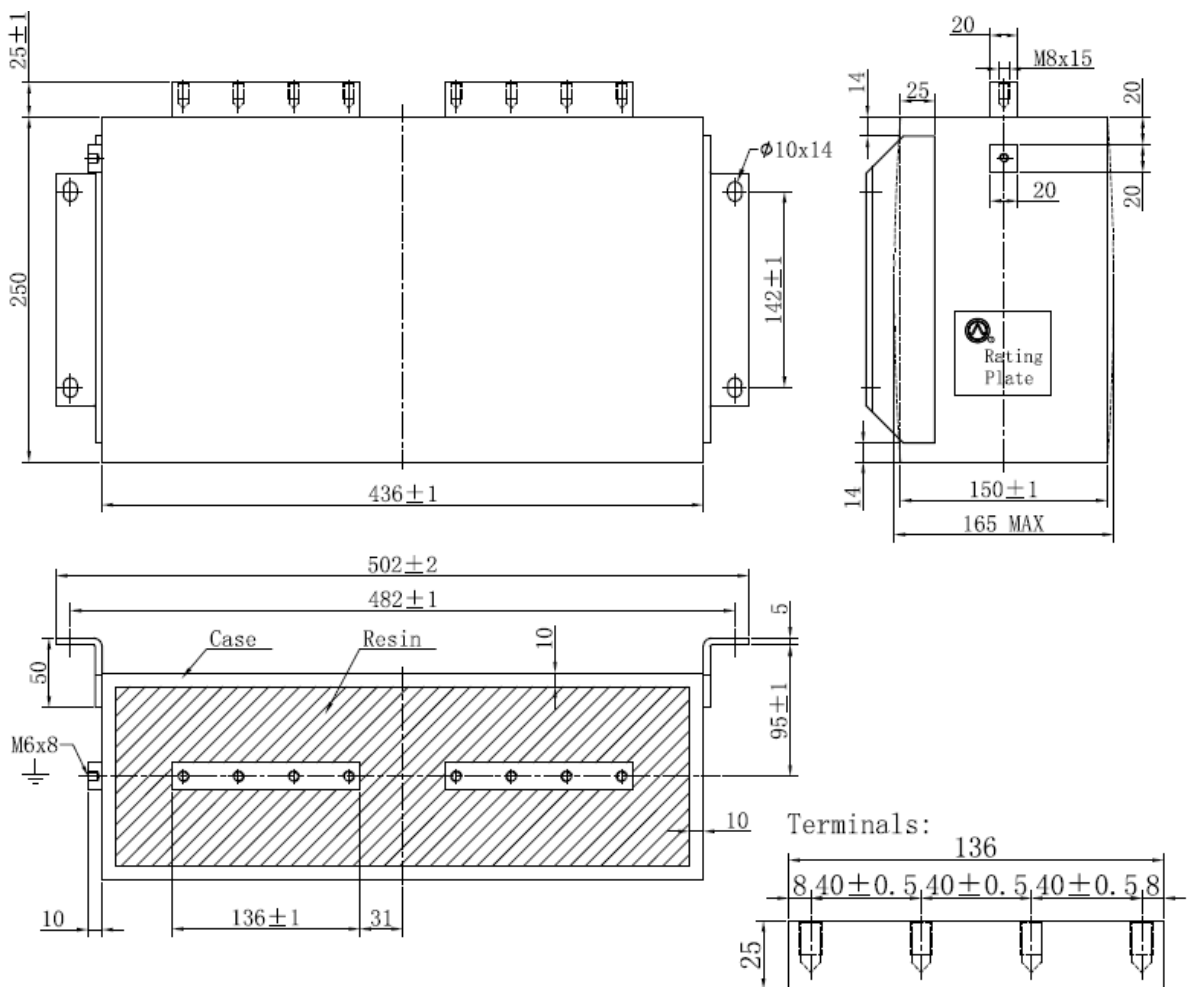


Fig 2: Dimensional Drawing



A4-12

**PURCHASE SPECIFICATION FOR
750 μ F DC LINK CAPACITOR****GROUP : TRACTION ENGINEERING , EDN****PS NO : PS4452596****REV. NO : 01****PAGE 06 OF 07****7. Testing**

Sl No	Test	Acceptance criteria	Type/Routine Test
1	Capacitance and Tan δ measurement	Measurements should be within the tolerances specified by the manufacturer	Type/Routine
2	Dimensional check	Dimensions to comply with the Approved drawing	Type/Routine
3	Voltage test between terminals and case	During the test neither flashover nor puncture should occur.	Type/Routine
4	Voltage test between terminals	During the test neither flashover nor puncture should occur. Capacitance measured after the test should be within the range specified	Type/Routine
5	Surge discharge test	After conducting the test capacitance to be measured and the change should be < +/-1%	Type
6	Thermal stability test and loss angle tangent measurement test	No breakdown of the capacitor should occur during the test. The capacitor losses should be measured after the test and should be within the tolerances specified by the manufacturer	Type
7	Self-healing test	Change of capacitance after the test should be < +/- 0.5%	Type
8	Resonance frequency measurement	The self-inductance measured should be within the tolerances specified by the manufacturer	Type
9	Environmental Test 1. Damp heat test 2. Change of temperature	Change of capacitance after the test should be < +/-2%	Type
10	Mechanical tests Mechanical tests of terminals 1. External inspection 2. Vibration and shocks	No mechanical damage should occur after the test.	Type
11	Endurance test	Change of capacitance after the test should be < +/-3%	Type



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PURCHASE SPECIFICATION FOR 750 μ F DC LINK CAPACITOR

GROUP : TRACTION ENGINEERING , EDN**PS NO : PS4452596****REV. NO : 01****PAGE 07 OF 07**

8. Rating plate

The following information shall be given on the rating plate of each capacitor unit:

1. Manufacturer
2. Identification number and manufacturing date
3. $C = \mu F$
4. Tol = %
5. UNDC or UN = V
6. $\theta \text{ min} = ^\circ C$
7. $\theta \text{ max} = ^\circ C$
8. Maximum tightening torque = Nm

9. Documentation

1. Datasheet
2. Dimensional Drawing
3. Type test Procedure, Type test Report
4. Routine test Procedure, Routine test Report

10. Acceptance

1. Routine test report to be submitted along with each delivery.
2. Equipment shall be packed in a manner suitable for delivery and storage at the appointed delivery address. Transport packaging will provide adequate protection against accidental damage during normal handling. Terminals, leads, mounting brackets will be protected from mechanical damage.

Notes:

1. Mounting dimensions needs to be strictly adhered as per the approved drawing submitted by the vendor.
2. Supplier should try to minimize the self-inductance and series resistance to a lower value as much as possible.