



**BHARAT HEAVY ELECTRICALS LIMITED
SOLAR BUSINESS DIVISION**

**EOI Ref:
BHEL/SBD/FRPROD/EOI/01**

BHEL SBD Herewith Publishes

Expression of Interest

(EOI)

and

Invites Prospective vendors to partner with BHEL

for SUPPLY OF FRP RODS

Ref: BHEL/SBD/FRPROD/EOI/01 Dated 31.05.2025

Due Date of Receiving duly filled EOI: 14.05.2025 14:00 Hrs

About BHEL

BHEL is India's largest engineering and manufacturing enterprise, operating in the energy, industry and infrastructure sector. Company was established in the year 1964 and since then it has been "Making in India" offering comprehensive products, systems, and services in various areas including power generation (thermal, hydro, gas, nuclear, and solar PV), transmission, transportation, defence, aerospace, oil and gas, and emerging sectors like battery energy storage systems and electric vehicle chargers. BHEL has been instrumental in developing the country's power generation capacity, contributing to core industrial and strategic sectors since the time of its humble beginning. The company's commitment toward its customer is evident through wide range of product portfolio, development and absorption of new technologies, consistent investment of more than 2.5% of its revenue on R&D and innovation, establishment of world-class manufacturing facilities and offering sustainable business solutions. Apart from serving customers, BHEL has been supporting communities through programs like skill development, promoting health, hygiene, education, cleanliness and environmental protection, thus contributing to the society as a whole.

The purpose of publishing this EOI is to provide opportunities to probable vendors who can partner with BHEL for SUPPLY OF FRP RODS.

Note: BHEL reserves its right to independently verify the documents submitted and visit the vendor works for assessment. Necessary arrangements shall be made by the prospective vendors



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Queries:

Bidders to note that any queries related with EOI are to be submitted online only at Email ID provided in Table A with CC to ashukla@bhel.in. Queries/clarifications received in any other form are liable to be unanswered. A reply from the concerned will be given on the same Email ID.

Table A

Description	Email Id
For Technical Queries	navit@bhel.in
For General & Commercial Queries	ashukla@bhel.in
For submission of offers against EOI	<u>technicalbid-epd@bhel.in</u>

Submission of EOI

Offers against EOI to be submitted on Email address to technicalbid-epd@bhel.in with subject as Ref: **BHEL/SBD/FRPROD/EOI/01 Dated 31.05.2025 "SUPPLY OF FRP RODS."** (Mail size should not be more than 20 MB. In case the size is larger, offer can be submitted partwise in multiple mails).

Following documents to be attached while submitting EOI:

1. Annexure I (Duly filled, signed, stamped on official letterhead)
2. Documents in support of Pre-Qualification Requirements- Technical, Special terms & conditions
3. Filled Vendor assessment form (Duly filled, signed, stamped)
4. Documentary evidences for Manufacturing capabilities
5. Any other documents

Note: Bidders may adopt this mode at their own risk. BHEL does not own any responsibility /liability for delays in receipt / loss of secrecy of such offers.

No physical offers for EOI will be accepted.

Plant Location details:

**BHARAT HEAVY ELECTRICALS LTD
SOLAR BUSINESS DIVISION
Prof. CNR Rao Circle,
Opp. Indian Institute of Science,
Malleswaram Bangalore – 560012 India**



**BHARAT HEAVY ELECTRICALS LIMITED
SOLAR BUSINESS DIVISION**

**EOI Ref:
BHEL/SBD/FRPROD/EOI/01**

ANNEXURE – I

FORMAT FOR SUBMISSION OF EOI

(to be printed on the official letterhead of the APPLICANT)

To,

Mr. Vinay Kumar
AGM-Materials Management
BHEL SBD Bengaluru-560012

Dear Sir,

Subject: Submission of Expression of Interest Ref: BHEL/SBD/FRPROD/EOI/01 Dated 31.05.2025
“SUPPLY OF FRP RODS”

With reference to your EOI inviting notice Ref: BHEL/SBD/FRPROD/EOI/01 Dated 31.05.2025 and after examining the detailed documents and other details mentioned in the EOI document, I/We hereby offer to submit my /our Expression of Interest.

1. All the annexures and documents necessary in this connection are enclosed hereto. All the documents/ photocopies of the documents have been self-attested by me/us and BHEL is free to reject our offer if any of the documents/photocopies of the documents is/are found to be false or forged.
2. I/we, hereby also declare(s) that I/we have read all terms and conditions in the EOI and all terms and conditions mentioned in the EOI are acceptable.
3. I/we, hereby also declare(s) that my/our organisation/firm is not debarred/ blacklisted by any Central/State Govt. department, agency, PSUs/ Institution/ Agencies/ Autonomous organization.
4. The information sought from me as per the EOI notice is enclosed to this letter.

Yours Faithfully,

(Signature & Stamp of Authorised Signatory)

Name

Designation:


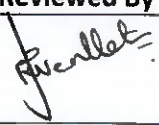

Date:

Place:

Purchase Specification - Fiber Reinforce Plastic (FRP) Rod

SECTION	1602
Specification No	EL/DIVF/FRP/04
Rev No	04
Rev Date	06.03.2025
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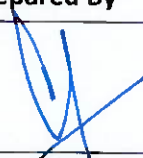
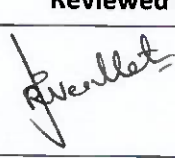

S. No.	PARAMETER	REQUIREMENTS			
1	PURPOSE	To manufacture Composite Insulators (Long Rod, Post, Bracket, Stay Arm etc.) by Injection molding technique for Transmission Line, Traction, Sub Station and other applications up to 1200 kV systems.			
2	DESCRIPTION	Fiber Reinforce Plastic (FRP) rods must be manufactured by pultrusion technique by using Boron free, Electrical grade corrosion resistant (ECR) glass fiber with suitable epoxy resin system to meet following technical requirements. FRP rods must be post cured and cut to the required length using diamond cutting tool. Centre-less grinding must be done of FRP surface. No additional coating is acceptable on the FRP rod surface.			
3	GENERAL REQUIREMENT	<div>1. Material shall be a glass-fiber reinforced (FRP rod) epoxy resin rod of high strength. The rod shall be resistant to hydrolysis. Glass fibers and resin shall be optimized.</div> <div>2. The rod shall be electrical grade corrosion resistant (ECR), boron free, glass and shall exhibit both high electrical integrity and high resistance to acid corrosion.</div> <div>3. SEM (Scanning Electron Microscopic) Analysis with EDS (Energy Dispersive Spectroscopy) on FRP rod cross-section, Surface analysis by optical spectrograph, FTIR Signature analysis is to be submitted along with ARC Tender (or) at the time of Vendor Assessment.</div> <div>4. The Glass Transition temperature of manufactured FRP rod should be a minimum of 140 °C.</div> <div>5. The leakage current during Water Diffusion Test (as per IEC 62217) is to be maximum of 0.5 mA.</div>			
4	TECHNICAL REQUIREMENT				
	Test Parameter	Supplier min Sample size	Reference standard	Specified Value	
4.1	Visual Inspection	100%	--	Free from Void, crack, deformations, foreign materials, scratches, bends, flaws, dents etc.	
4.2	Verification of dimension	100%	BHEL drawing	As per Drawing	
4.3	Hardness Test (Barcol)	3 Nos/ lot	ASTM D2583 13a	60 minimum	

Prepared By	Reviewed By	Approved By
		
Navit Mahajan Manager / CI & NP	PR Venkateswaran DGM / Ins. Engg.	P. Jayaprasad AGM / AC, CI & NP

Purchase Specification - Fiber Reinforce Plastic (FRP) Rod

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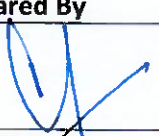
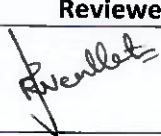

	Test Parameter	Supplier min Sample size	Reference standard	Specified Value
4.4	Specific Gravity	3 Nos/ Lot	ASTM D792	2.0 to 2.20
4.5	Dye Penetration Test	10 Nos / Lot	IEC 62217 (Clause No 9.4.1)	No dye shall raise through the specimens before the 15 minutes have elapsed.
4.6	Water absorption Test	3 Nos / Lot	IEC61109 and ASTMD5	0.1 % Max. by weight
4.7	Percentage of glass content	3 Nos / Lot	ASTMD2584	80% +/- 5%
4.8	Water diffusion Test	6 Nos / Lot	IEC 62217	During the test, 12 kV is to be applied. No puncture or surface flashover shall occur. The current during the whole test shall not exceed 0.5 mA (r.m.s.).
4.9	Flexural Strength	3 Nos / Lo	ASTMD790	10,000 Kg/cm ²
4.10	Bend Test (Only for FRP rods dia > 25mm)	1 Nos / Lo	--	210 Kgf.m
4.11	Brittle fracture test	1 Nos / 5000 Nos	--	Test is to check the resistance to acid in tensile condition. Minimum 10mm of IN-HNO ₃ acid thickness around naked rod must be in contact (min contact rod length = 40mm) with for a duration of 96 hours under 80% of the rated tensile load. Rod must not indicate any sign of crack on its surface during & after 96-hour duration.
4.12	Glass Transition Temperature	Random	---	140 °C minimum
4.13	Rod Bend	100 %	---	1.5 mm per m (maximum)
4.14	Power Frequency withstand test	Random	---	The plain rod should withstand the power frequency withstand test for a voltage of 250 kV with temperature rise in the rod should not be more than 5 °C over a period of 30 mins.

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Navit Mahajan Manager / CI & NP	PR Venkateswaran DGM / Ins. Engg.	P. Jayaprasad AGM / AC, CI & NP

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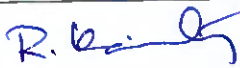

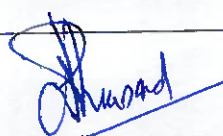
	Test Parameter	Supplier min Sample size	Reference standard	Specified Value
4.15	SEM and FTIR Signature Analysis	Random/One per every PO supply of every dimension.	---	SEM (Scanning Electron Microscopic) Analysis with EDS (Energy Dispersive Spectroscopy) on FRP rod cross-section, Surface analysis by optical spectrograph, FTIR Signature analysis.
4.16	Tensile Strength	3Nos. / Lot	BHEL Drawing / ASTM D 638	>5000
S. No.	PARAMETER	REQUIREMENTS		
5	Packing	As per drawing		
6	Marking	Unique Manufacturer's identification mark (2 characters) must be present on each FRP rod face without altering any drawing dimension		
7	Supplier test certificate/Report. (Mandatory).	1. Glass fiber Certificate consisting Boron Free, ECR grade 2. Dimensional & Gauge check report 3. Test reports for all Technical requirements in S. No. 4 4. SEM Analysis with EDS on FRP Rod Cross Section 5. Surface Analysis by optical spectrograph. 6. FTIR Signature Analysis of FRP Rod Cross Section.		
8	Material Safety Data Sheet	Latest MSDS must accompany the supplies		

Prepared By	Reviewed By	Approved By
		
Navit Mahajan Manager / CI & NP	PR Venkateswaran DGM / Ins. Engg.	P. Jayaprasad AGM / AC, CI & NP

Special Terms & Conditions for Expression of Interest: FRP Rod used in Composite Insulators

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- BHEL will have the right to assess all participating bidders through Bidder Assessment/Audit and Evaluation Criteria that are mandated in Technical Specifications. BHEL will have the right to accept or reject the bidder proposal based on the outcome of the Bidder Assessment/Audit.
- The specification for the FRP rod supply will be as per BHEL SBD Specification EL/DVF/FRP/04 R04. Bidder to submit a test report for parameters mentioned in the Technical Specification.
- FRP rods of four different diameters namely 24 mm, 33 mm, 63 mm and 89 mm are proposed in this EOI. Bidders have the flexibility of choosing, providing necessary documents, carry out type tests and obtain PGCIL (Powergrid) approval for one or more of these dimensions. However, the approval and test reports are to be taken separately for each of the diameters. Qualifying for one diameter will not imply qualification in another diameter.
- The following bidders are eligible to participate in this EOI:
 - Bidders who have PGCIL approval for supply of FRP Rods for diameters specified in the EOI.
OR
 - Bidders who have already applied for PGCIL approval for supply of FRP Rods for different diameters in EOI and the PGCIL approval is under progress.
OR
 - Bidders who do not qualify in both (a) and (b) but agreeing to take through the PGCIL approval process by participation in EOI Process. Bidders quoting against this Cl. 4. c. are to submit a confirmation for undertaking the tests required for PGCIL approval without which the bids will not be accepted.
- Bidders have the option to participate ONLY in selected diameters of the FRP rod sizes offered in the Tender. It is NOT mandatory that the Bidder should participate for all the FRP Rod sizes mentioned in the Tender. However, if bidder is willing to participate for all FRP Rod sizes, the bidder shall submit the PGCIL approval letter for each category of FRP rods. Hence, bidder shall be responsible for carrying out PGCIL approval process for each of the diameter opted for separately for qualification by PGCIL. Qualifying for one diameter will not imply qualification in another diameter.
- Bidders opting for 4 (a) are to provide the PGCIL approval letter during Bid submission. The PGCIL approved bidders are waived off the tests required for approval for the FRP Rod diameters indicated in the approval document.
- Bidders opting for 4 (b) have to provide the application submitted to PGCIL along with supporting documents during EOI submission. Bidders to provide an undertaking that they are ready to undergo additional assessment and testing (if mandated by PGCIL) at their cost. Submission of PGCIL approval is Sole responsibility of Bidder and BHEL cannot be held responsible in any way for delay in submission.

Prepared By:	Reviewed By:	Approved By:
		
R. Krishna Murthy, Manager / CI	Navit Mahajan, Manager / CI & NP	P. Jayaprasad, AGM / AC, CI & NP

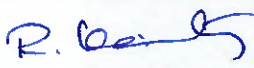

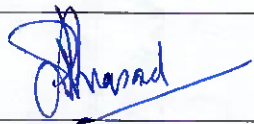
Special Terms & Conditions for Expression of Interest: FRP Rod used in Composite Insulators

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8. Bidders opting for 4 (c) are to give an undertaking for taking up the PGCIL approval process including Design/Type Tests as specified by PGCIL. The bidder approval process will be coordinated by SBD, BHEL for all bidders opting for 4 (c). All bidders shall submit documents proving the statutory compliances as a prequalification requirement
9. The charges incurred towards the procedures and testing for PGCIL approval are to be borne by the bidders and BHEL will not be providing any subsidy for the same.
10. The following are the minimum set of tests to be conducted with Insulators (manufactured at SBD, BHEL Bengaluru). The tests shall be conducted at NABL accredited lab, preferably CPRI Bengaluru:

SN	Test Name	Applicable Standard
1	Interfaces and connections of end fittings	IEC 62217
2	Assembled Core Load Time Tests	IEC 61109
3	Dye Penetration Test	IEC 62217
4	Water Diffusion Test	IEC 61109
5	Damage limit proof test and Test of the tightness of the interface between fittings and rod and housing	IEC 61109

11. SBD will be the coordinating agency for submission of Test request to the identified laboratory in line with approval process by SBD, BHEL. All other correspondence and coordination with the laboratory will be handled by the bidder directly with the laboratories and the Type Test Certificates should be in the name of Bidder. The type test certificates should mention FRP rods manufactured at SBD, BHEL, Bengaluru using (Bidder's Name) FRP rod. Test Certificates without this specific reference will NOT be accepted by PGCIL for approval process.
12. Previous supply details of the FRP materials. Bidders to attach the supply details of such cases in the immediately preceding five years along with Performance Certificates (preferably) from the customers.
13. Test Certificates are to be handed over to SBD/BHEL immediately after Test Completion. They will be uploaded to PGCIL portal with other documents and all communication in this part of the process will be handled by SBD/BHEL. There will be a POWERGRID online verification and approval of the submitted documents and test reports, followed by process audit and compliance verification.
14. PGCIL decision on the acceptance/rejection of the Bidder approval will mark the end of the process. PGCIL decision is final and BHEL has no role in the decision.
15. BHEL will be floating tenders for FRP rod procurement in which only PGCIL approved bidders will be permitted to participate. The PGCIL qualification for participating bidders should be available as on date of the floating of the limited tender. The tender quantity will be split between L1, L2 and L3 vendors as per the terms specified in the Limited Tender.

Prepared By:	Reviewed By:	Approved By:
		
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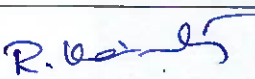
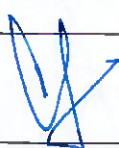
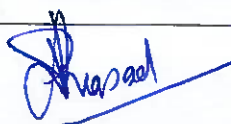
Special Terms & Conditions for Expression of Interest: FRP Rod used in Composite Insulators

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16. Vendors who are not having PGCIL qualification but are in the process of getting the approval will not be considered for the limited tender if the approval is not made available on the date of floating the tender.
17. Vendors who qualify in EOI and PGCIL approval and in subsequent Limited Tender should ensure adherence to all PGCIL specification and quality control requirements. If in any point of time of contract of supply, there are failures in quality, the order will be short closed and be redistributed to the remaining winning bidders.
18. It is to be noted that Limited Tenders will be initiated at time intervals on the business exigencies of BHEL. PGCIL vendor approval process is not the limiting factor for floating of Limited Tenders.
19. BHEL has the right to modify/short close/extend the terms and conditions of the EOI based on its requirements and its decision will be deemed final.

Checklist for EOI Bidders

SN	Tender Requirement	Submitted (YES / NO)
1	Test Certificate for the FRP rod (matching BHEL-Technical Specifications)	
2	Technical Data Sheet of FRP Rod Properties (for each of the FRP Rod Dimension)	
3	Manufacturer's Quality Assurance Plan	
4	SEM Analysis Report with EDS on FRP Rod Cross-Section (for each of the FRP Rod Dimension)	
5	Surface Analysis Report by Optical Spectroscope (for each of the FRP Rod Dimension)	
6	FTIR Signature Analysis Report (for each of the FRP Rod Dimension)	
7	Glass Transition Temperature Report ($T_g \geq 140^\circ\text{C}$)	
8	Interested for item: i) 24mm Dia. FRP Rod ii) 33mm Dia. FRP Rod iii) 63mm Dia. FRP Rod iv) 89mm Dia. FRP Rod	
9	Signed Undertaking for PGCIL approval process (if applicable)	


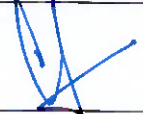

Prepared By:	Reviewed By:	Approved By:
		
R. Krishna Murthy, Manager / CI	Navit Mahajan, Manager / CI & NP	P. Jayaprasad, AGM / AC, CI & NP

Technical Pre-Qualification Requirements for Expression of Interest: FRP Rod used in Composite Insulators

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1. Fully completed and signed copy of the Technical PQR is mandatory for Technical Qualification of the Bidder.
2. Bidder will be qualified only for the dimension of the FRP Rod (**24mm / 33mm / 63mm / 89mm**) for which PGCIL approval is available. Bidder willing to undertake the PGCIL approval process have to undergo the approval process for each of the FRP Dimensions separately.
3. Bidder has to provide evidence for all technical requirement as per documents indicated in the Table. The application of the Bidder will be rejected if Noncompliance is observed for any one of the criteria.



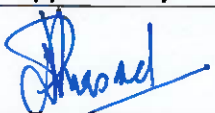
S. No.	Details of Requirement	Supporting documents to be submitted by the bidder	Remarks
1	Bidder should be the manufacturer of the FRP Rod. No Trading/Franchise/Agency is allowed to participate in this EOI	Factory License/Udhyam Certificate as manufacturer or any other document as proof being a manufacturer of FRP materials.	Bidder to Submit the document.
2	The specification for the FRP rod supply will be as per BHEL SBD Specification EL/DIVF/FRP/04 R04 dated 06.03.25.	Test report from a NABL accredited Laboratory covering <u>ALL</u> parameters in Technical Requirement Section of the Specification Sheet.	Bidder to Submit the Test Report
3	Bidder to provide the Technical Data sheet and Quality Plan of FRP Rod properties.	1. Manufacturing Quality Plan of FRP Rod. 2. Technical Data Sheet	Bidder to Submit the documents.
4	Bidder to provide/opt for ANY ONE (mandatorily) of the options from 4.a., 4.b and 4.c.		
a	Bidder is having PGCIL approval for FRP Rod of selected diameter	PGCIL approval letter for FRP Rod dimension and valid as on the date of EOI submission date.	Bidder to Submit the document.
b	Bidder has applied for PGCIL approval and the application is under processing.	Bidder application Details to PGCIL portal.	Bidder to Submit the document.
c	Bidder not having PGCIL approval as on date.	Bidder to give a written declaration of acceptance for undertaking the PGCIL approval process with its associated Design/Type Test charges as specified by PGCIL.	Bidder to Submit undertaking.

Prepared By	Reviewed By	Approved By
		
R Krishna Murthy Manager / CI	Navit Mahajan Manager / CI & NP	P. Jayaprasad AGM / AC, CI & NP

Technical Pre-Qualification Requirements for Expression of Interest: FRP Rod used in Composite Insulators

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S. No.	Details of Requirement	Supporting documents to be submitted by the bidder	Remarks
5	Bidder should supply FRP Rod with glass transition temperature $T_g \geq 140^\circ \text{C}$.	Tg test report to be submitted by Bidder. Test shall be carried out by Govt. or NABL accredited laboratory.	Bidder to Submit the Test Certificate.
6	Bidder should have previously supplied FRP materials in the preceding 5 (five) years from the date of EOI submission.	PO Copy and Delivery Challan or Invoice Copy (Acknowledged by customer) or Supply Completion Certificate from customer.	Bidder to Submit the document.

Prepared By	Reviewed By	Approved By
		
R Krishna Murthy Manager / CI	Navit Mahajan Manager / CI & NP	P. Jayaprasad AGM / AC, CI & NP



VENDOR ASSESSMENT REPORT

Name of the Vendor	
Date of Visit	
BHEL SBD Representatives	
Vendor Representatives	
Objective	
Address Of The Manufacturer	
Plant Details	Basic Details: Total area: sq feet Covered area: sq feet Total No. of Permanent employee: Total No. of Temporary employee: It was verified on documents as well as on the shop floor during audit, that no child labour is employed by M/s
Factory License	
CIN as per MCA	
Registration to UDYAM	
Registration to GST	
Pollution Clearance	
ISO certification	

Process Audit & Verifications: Process flow chart was used as the reference for process audit. Along with process some of the basic facilities were also verified. Detailed report is given below along with supporting documents in Annexure

Organization chart with name and qualification of key persons	
Storage for Raw material, Finished goods	
List Of Available plant machineries	
List Of Testing instruments / machines	
Available system of documentation	
Type Test Reports	
Storage of finished goods instructions , MSDS	

Signature	Signature
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VENDOR ASSESSMENT REPORT

Safety instructions & arrangements	
5S practices	
Systems for handling non conformities, customer complaint & feedback	

Photos: -

1. Raw material Storage area of approx sq ft on the first floor	
2. Kneading with kneaders having capacity of kg cumulative	
3. Mixing with mixing mills having capacity of kg	
4. Preforming & Rolling	
5. Finished goods storage area of approx sq ft in ground floor	
6. Testing Compression Press for preparing sheets for checking tensile properties	
7. Laboratory in area of approx. sq. ft	
8. Testing facilities details with photographs	
9. Voltage Stabilizer	
10. Power Backup	
11. Fire Safety awareness & arrangements	
12. First Aid awareness & arrangements	
13. Quality awareness & 5S awareness	

Signature	Signature
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VENDOR ASSESSMENT REPORT

Annexure List:

1. Factory License
2. CIN as per MCA
3. Registration to UDYAM
4. Registration to GST
5. Pollution Clearance
6. ISO certificate
7. Name and qualification of key persons & skill matrix
8. Technical catalogue
9. List of Available plant machineries
10. List of Testing instruments / machines
11. Raw material inspection plan (inwards testing)
12. Process flow chart
13. Checklists for machine operations.
14. Sample inspection Report
15. Test Reports from NABL laboratories for material properties.
16. Systems for traceability of material, SOP for stores department, handling non-conformities, customer complaint
17. Safety Manual & relevant provisions

Note: The list is not comprehensive and only a guiding document. All related documentation/testing as mandated by PGCIL/BHEL is to be taken up and completed.

Signature	Signature
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FRP rod requirement for fulfilling existing confirmed orders and future anticipated orders

SN	FRP Rod Diameter	Quantity (Rounded) in Meters
1	24mm	175000
2	33mm	3000
3	63mm	2500
4	89mm	2000

FRP Rod Requirement for Confirmed Orders as per Annexure I

S. No.	Product	Quantity (Nos.)	Dia. in mm	Length Per Pc. (mm)	Total Length (mm)
1	Bikaner III Neemrana II	1032	24	3659	3776088
2	Bikaner III Neemrana II	591	24	4395	2597445
3	Bikaner III Neemrana II	555	24	2536	1407480
4	UJVNL, Chilla HEP	177	24	1515	268155
5	Talabira TPS	261	24	3659	954999
6	Talabira TPS	141	24	4395	619695
7	Singrauli	90	24	4395	395550
8	HPGCL Yamunanagar	75	24	4395	329625
9	HPGCL Yamunanagar	261	24	2536	661896
10	Koppal II Extn Raichur	552	24	3659	2019768
11	Koppal II Extn Raichur	144	24	4395	632880
12	Koppal II Extn Raichur	207	24	2536	524952
13	Koppal II Gadag II	600	24	3659	2195400
14	Koppal II Gadag II	264	24	4395	1160280
15	Koppal II Gadag II	276	24	2536	699936
16	NTPC Lara	474	24	3553	1684122
17	NTPC Lara	30	24	3553	106590
18	NTPC Talcher	127	24	3247	412369
19	NTPC Talcher	21	24	3247	68187
20	Sikar Extn./Kettri Extn.	600	24	3659	2195400
21	Vataman and Halvad	984	24	3659	3600456
22	NTPC Sipat	180	24	3659	658620
23	NTPC Sipat	66	24	1515	99990

FRP Rod Requirement for Anticipated Orders as per Annexure II

S. No.	Product	Quantity (Nos.)	Dia. in mm	Length Per Pc. (mm)	Total Length (mm)
1	765KV 210KN CLR	8500	24	3000	25500000
2	400kV 210kN CLR	7000	24	4000	28000000
3	400kV 160kN CLR	10500	24	4000	42000000
4	400kV 120KN CLR	9500	24	4000	38000000
5	500kV 160kN HVDC CLR	2000	24	4500	9000000
6	220 kV , 160KN CLR	1000	24	2200	2200000

7	132 kV, 160KN CLR	1000	24	1700	1700000
8	66kV 120KN CLR	300	24	900	270000
9	220kV 8KN Polymer Bus Post Insulators	1000	63	2235	2235000
10	Composite Stay Arm Insulator (1600mm CD)	2000	33	450	900000
11	Composite Bracket Insulator (1600 mm CD)	2000	33	450	900000
12	Composite 9 Tonne Insulator (1600mm CD)	2000	33	450	900000
13	CICA	500	89	4000	2000000