



ISO
9001:2008, 14001:2004,
50001:2011 & OHSAS
18000
MAHARATNA COMPANY

MATERIAL MANAGEMENT (PURCHASE)
CENTRAL FOUNDRY FORGE PLANT, BHEL HARDWAR
RANIPUR, HARIDWAR (INDIA) – 249403
Phone No. +91-1334-281277/284548, FAX No. 225892
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Sub: Tender Enquiry No. 201703261 / 6116 due on 06.11.17 at 2.00 PM.

Dear Sir,

We are pleased to invite offer in **E-Tender (Open Tender)** as per enclosed specifications & terms and conditions for the under mentioned items

Sl No	Tender No	Description of Material	Qty	Date & Time of Opening
01	201703261 / 6116	BREAK ISOLATOR AS PER NIT	6 Nos.	06.11.17 at 2.00 PM

Kindly read terms and conditions. Offer not in accordance with the instructions is liable to be disqualified or ignored.

Please visit www.bhel.com or www.bhelhwr.co.in for more details & corrigendum if any for the tender enquiry.

Offers are to be submitted online in E-tender portal at <https://bheleps.buyjunction.in/>

Offer to be submitted only on e-procurement portal. Hard copy of offer is not required to be submitted to CFFP. Any offers received in Hard copy shall not be accepted and straightaway rejected by CFFP.

Before proceeding for submitting quotation in e-portal, supplier to ensure that they are having a valid Digital Signature Certificate (DSC). Valid DSC refers to an Active Signing and Encryption Certificate (both), with specification Class III SHA2 2048 bit

Please arrange to fill the SRF (Supplier Registration Form) of your company **online** at our site www.bhel.com or www.bhelhwr.co.in

Your company can fill the SRF of your company at this link: <https://supplier.bhel.in/>

Thanking You,

Yours Faithfully,
For & On behalf of CFFP, BHEL, Hardwar

(Amit Kumar Gupta)
Dy. Manager (Purchase)

Note: Corrigendum if any shall not be published, kindly refers websites for any changes.



CFFP HWR, BHEL, Haridwar, POSTAL CODE :700091, HARDWAR, UTTARANCHAL, INDIA

RFQ/NIT HEADER DETAIL

ORGANIZATION NAME	CFFP HWR, BHEL	RFQ FLOATED UNDER THE	PURCHASE POLICY
RFQ/NIT REFERENCE	201703261 / 6116	POLICY	
CODE/ENQUIRY NO		RFQ OWNER/NIT	MR AMIT KUMAR GUPTA(Dy.
RFQ/NIT TYPE	OPEN TENDER	OFFICER/ENQUIRY OWNER	MANAGER)
NUMBER OF ITEMS ALREADY	2		
ATTACHED			
CURRENCY	ANY		
DESCRIPTION	BREAK ISOLATOR		
DETAILED DESCRIPTION	BREAK ISOLATOR		
NUMBER OF BID PART(S)	2		

PUBLISHED DATE 16 Oct , 2017 4:38:27 PM

ATTRIBUTE(S)

ATTRIBUTE NAME	ATTRIBUTE VALUE
Inspection Required	Y
Validity of the Offer (In days- Excluding Tender Opening Date)	120 days
Remarks-I	1. Kindly submit the offer only on e-procurement portal. No need to submit hard copy of offer against this enquiry. * 2. Offer must be submitted strictly in line with specification, terms & conditions of enquiry else offer is likely to be ignored. 3. All taxes/duties/levies etc. must be specified correctly in amount or in percentage in respective fields. Incomplete offer shall not be accepted.
Remarks-II	GST WILL BE APPLICABLE AS PER GOVT. RULES AT THE TIME OF DISPATCH. TAXES AND DUTIES WILL BE EXTRA AS PER GST RULES. In case of any issue related to GST & pertaining to CFFP, BHEL, kindly send query on mail id: gst.cffp@bhelhwr.co.in GST WILL BE REIMBURSED TO VENDOR AGAINST GST COMPLIANT INVOICE, FILLING OF ONLINE RETURN AND DEPOSIT OF SAME TO GOVT. ACCOUNT. KINDLY CONFIRM THE RA ACCEPTANCE AS PER ATTACHED ANNEXURE.
Remarks-III	Open tender documents are attached. Conditions to break ties in landed price Cases where landed price of two or more vendors are same then while ordering preference will be given to Vendor whose conditions are favorable to CFFP. If all conditions are same for vendors then the vendor whose SPR is more shall be given preference. First time vendor (new vendor) or vendor who has not executed any PO in material category of tender enquiry item/s, their Supplier performance rating (SPR) will be treated as zero. In case, SPR of vendors are equal, then quantity will be distributed equally between those vendors who have quoted lowest landed rate. If quantity ordered is only one piece or where quantity can't be divided equally then preference will be given to vendor whose quality rating is more. If quality rating is also same then ordering will be on vendor whose delivery rating is better.
Minimum Quotation Validity Required(In Days)	120 (VALUE)

DATE-TIME DETAIL(S)

BID START DATE	16 Oct , 2017 4:45:56 PM	BID DUE DATE	6 Nov , 2017 2:00:00 PM
BID OPEN DATE (SCHEDULED)	6 Nov , 2017 2:00:05 PM		





CFFP HWR, BHEL, Haridwar, POSTAL CODE : 700091, HARDWAR, UTTARANCHAL, INDIA

PRE-BID DISCUSSION DETAILS

PRE-BID DISCUSSION TYPE NOT REQUIRED

ALTERNATE BID DECRYPTOR(S)

USER DETAILS	
MR Rohit Varshney (MANAGER)	
MR RAJ KISHORE (Sr. MANAGER)	
MR AMIT KUMAR GUPTA (Dy. MANAGER)	

TERM AND CONDITION DETAIL(S) - SPECIAL TERM(S)

SL. NO.	CATEGORY	DESCRIPTION
1	SPECIAL TERM(S)	SPECIAL TERM(S) TEST CERTIFICATE IS REQUIRED. EARLY DELIVERY SHALL BE ACCEPTABLE. ACCEPTANCE OF MATERIAL SHALL BE AFTER FINAL INSPECTION AT CFFP, BHEL, HARIDWAR. DELIVERY SCHEDULE:- FOR, Destination (Door delivery basis). Destination will be C. Store, CFFP, BHEL, Haridwar. DELIVERY IN ONE LOT WITHIN 45 DAYS FROM P.O. DATE
2	SPECIAL TERM(S)	SPECIAL TERM(S) GUARANTEE / WARRANTEE CERTIFICATE IS REQUIRED FOR 18 MONTHS FROM DATE OF SUPPLY OR 12 MONTHS FROM DATE OF COMMISSIONING, AS PER SPECIFICATION. PDI TO BE CARRIED OUT BY REPRESENTATIVE OF CFFP, BHEL, HARIDWAR. E&C WILL BE DONE BY SUPPLIER. KINDLY QUOTE THE OFFER AS PER SPECIFICATION, COMMERCIAL ANNEXURE , PQC AND NIT CONDITIONS.

RFQ SPECIFIC REQUIRED ATTACHMENT(S)

PREQUALIFICATION

SL. NO.	SUPPORTING DOCUMENT NAME	MANDATORY	ALLOW EXEMPTION	GROUP
1	PQC	YES	NO	EXPERIENCE
2	SRF FOR NEW VENDOR	NO	NO	PERSONAL
3	KINDLY ATTACH INVOICE COPY AND C FORM AGAINST PQC OF PO PLACED	NO	NO	FINANCIAL

RFQ/NIT ITEM DETAILS

SL. NO.	CODE	DESCRIPTION	QUANTITY	RFQ/NIT U.O.M	OFFER U.O.M
1	FF8511150102	ISOLATOR 132KV, 1600A, 3PHASE, 50HZ AC, OUTDOOR, HORIZONTAL, SINGLE CENTRE BREAK ISOLATOR COMPLETE WITH EARTH SWITCH AS PER SPECIFICATION NO - CFF/CDS/ ISOLATOR/01 SIZE: 132KV, 1600A, 3PHASE, 50HZ AC DIM.: S	05.00	NO	NO
	ATTRIBUTE DETAILS	ATTRIBUTE NAME	ATTRIBUTE VALUE		
		Lot 1	1		
		Lot Date	31-JAN-18		
		Lot Qty	5		
2	FF8511150129	ISOLATOR 132KV, 1600A, 3PHASE, 50HZ AC, OUTDOOR, HORIZONTAL, SINGLE CENTRE BREAK ISOLATOR COMPLETE WITHOUT EARTH SWITCH AS PER SPECIFICATION NO - CFF/CDS/ ISOLATOR/01. SIZE: 132KV, 1600A, 3PHASE, 50HZ AC DIM.: S	01.00	NO	NO





CFFP HWR, BHEL, Haridwar, POSTAL CODE :700091, HARDWAR, UTTARANCHAL, INDIA

ATTRIBUTE DETAILS	ATTRIBUTE NAME	ATTRIBUTE VALUE
	Lot 1	1
	Lot Date	31-JAN-18
	Lot Qty	1

IMPORTANT NOTICE

PLEASE READ THE FOLLOWING ATTACHMENT(S) [SEPARATELY DOWNLOADABLE] ALONG WITH THIS RFQ/NIT/ENQUIRY .

RFQ/NIT/ENQUIRY - ATTACHMENTS

LABEL	FILE NAME
TENDER ENQUIRY CONDITION FINAL	TENDER ENQUIRY CONDITION FINAL.pdf
4 MSE Suppliers	4 MSE Suppliers.pdf
CA CERTIFICATE FOR MSE VENDOR	CA CERTIFICATE FOR MSE VENDOR.pdf
Reverse Auction terms conditons	Reverse Auction terms conditons.docx
Specification	Specification.pdf
PQC 6116	PQC 6116.pdf
COmmercial terms conditions new	COmmercial terms conditions new.pdf



Commercial Terms

Annexure: /

Item - Break Isolator

Qty - 06 (05+01) Nos.

Confirmation/comments on the conditions given below are mandatory. Please confirm the following or else your offer is liable to be rejected.

Sr. No.	Description	Vendor Confirmation
1	Material shall be supplied as per tender enquiry no 201703261/6116 in all respects without any deviation. Point wise reply / confirmation of attached specification no. CFF/ CDS/ ISOLATOR/01 is required to be submitted along with offer.	
2	Pointwise confirmation of PQC of Water Ring Pump is required along with offer.	
3	Supplier will provide Guarantee or Warranty for 18 months from the date of supply or twelve months from the date of commissioning.	
4	Pre dispatch inspection (PDI): Suppliers should give PDI call at least 20 days in advance . If supplier fails to give pre-inspection call with in stipulated time, this will not be a reason of penalty waiver or delivery extension. However Final inspection will be done after receipt of material at CFFP, BHEL, Haridwar. Note : Travel, Lodging & Boarding charges of BHEL inspectors / trainees during pre-inspection and training will be borne by BHEL.	
5	Delivery Term: a) For Indian supplier: FOR Destination basis, destination being Stores/CFFP/BHEL Haridwar. b) For Foreign supplier: Delivery CIF, Mumbai: - Date of B / L. Quoted rate should be inclusive of the charges like freight, service tax on freight, insurance, packing & forwarding etc. for the delivery term given above or else proper loading.	

6	Payment Terms: Indigenous Supplier: 80% payment of Supply value plus 100% Taxes & Duties shall be made within 45 days from the date of receipt of material at CFFP / BHEL. Balance 20% of Supply value will be paid after commissioning of equipment at CFFP, BHEL Haridwar. For foreign supplier: 80 % Payment of Supply value plus 100% Taxes & Duties shall be made through USANCE L/C on 70th day of bill of lading date (B/L date) and balance 20% of supply value of purchase order will be through trunk transfer after commissioning of equipment at CFFP, BHEL Haridwar Note : Any deviation, in Payment Terms by bidder w.r.t. tender conditions following loading shall be applicable: (a) Base rate of SBI (as applicable on the date of bid opening: Techno commercial bid opening in case of two part bids) + 6 %, shall be considered for loading for the period of relaxation sought by bidders.. (b) On account of payment through LC, Bank charges shall also be loaded for the deviation in (i) opening of LC by BHEL and (ii) period and amount of LC w.r.t. above NIT terms.	
7	Currency of offer: Indian Vendor: Only in Indian Rupee. Foreign Vendor: Only in USD /EURO / POUND STERLING/YEN.	
8	Validity of offer: Minimum 180 days from tender opening date.	
9	Prices shall be firm till execution of Order.	
10	Provide name of contact person, mobile no. & email address.	
11	LATE DELIVERY PENALTY CLAUSE (LD): Penalty for late delivery shall be applicable @ 0.5% per week and part thereof subject to a maximum of 10% of total P.O. value (Total material cost + packing and forwarding + freight) from the date of scheduled delivery of Purchase Order.	
12	Disputes: In event of any dispute arising out of contractual obligation, the order being finalized at Haridwar, India will be subject to Indian laws and falls under jurisdiction of the court of Law at Haridwar, India. The overseas supplier hereafter referred to as "Vendor" shall therefore abide by the verdict of court of law at Haridwar, India.	

13	Delivery of material will be required within 75 days from the date of purchase order.	
14	Planned time for commissioning work will be 15 days .	
15	Unregistered vendors have to fill SRF (Supplier Registration Form) of their company online at our website www.bhel.com or www.bhelhwr.co.in . They can fill the SRF of their company at this site link : https://supplier.bhel.in/	
16	BHEL will prefer to deal directly with foreign vendor/ original manufacturer. In case, vendor engages any Indian agent or take service of any Indian agent, copy of agent agreement required along with offer in line with Annexure-IV attached.	
17	Risk Purchase: In case of delayed/defective supplies or non-fulfillment of any other terms & conditions given in the purchase order, the purchaser may cancel the purchase order and may also make the purchase of such material at the risk & cost of supplier.	
18	Conditions for opening of Price :- As per Reverse Auction clause attached along with tender documents. Kindly read the same carefully and provide your acceptance for the same.	
19	- In case any column is left blank, it shall be deemed to be accepted by vendor. - If any difference is found for any term and condition in the offer and this annexure "I", the terms quoted in this annexure 'I' shall be deemed as final and binding on vendor. - Evaluation shall be on the basis of delivered cost at CFFP(i.e.) "Landed cost Input Tax Credit (ITC)".	
	Note: Attach separate sheet for additional information if necessary. The above terms & conditions supersedes the terms & conditions found contradictory writenelse where in the tender enquiry.	

PRE QUALIFICATION CRITERIA (P Q C) FOR 132 KV ISOLATOR.

Indent No : 20170326

S.N.	Description	Instruction	Bidder's Response
1	Bidder must be original manufacture or authorised representative of original manufacture.	Enclose relevant supporting documents of being manufacturer. OR Valid authorization certificate from manufacturer in case of other than manufacturer.	
2	Bidder must have license for 'A' class electrical contractor from suitable government authority.	Submit copy of valid license for 'A' class electrical contractor.	
3	Bidder must have executed an order for supply & installation OR supply & retrofitting / replacement work for 132KV or above voltage grade isolator in last 3 years from tender opening date. Purchase order date will be considered for time period calculation.	Enclose at least one purchase order.	
4	Bidder should have minimum average Turn Over (Annual Sales) of 40 lacs in last three (03) Financial years (14-15,15-16 & 16-17).	Enclose balance sheet highlighting sales turnover figure.	

Specification of 132 KV Isolator

GENERAL CONDITIONS:

The scope of work includes supply & work as per technical specifications.

- a. All the necessary materials, Labour, transportation etc. required for the retrofitting and supply of 132kv Isolators, shall be arranged by the contractor.
- b. Any loss and/or damage to the materials during the transportation and erection, commissioning, repair/maintenance work shall be the entire responsibility of the contractor.
- c. Any defective/inferior quality work shall have to be redressed by the contractor free of cost to the satisfaction of BHEL.

TECHNICAL SPECIFICATIONS

1. SCOPE OF WORK:

- a. The scope of work briefly covers supply of new isolators, Retrofitting of new supplied Isolators on existing structures, shifting of dismantled old isolators outside the switchyard, testing and commissioning as per the conditions mentioned and the technical specification as specified.
- b. Retrofitting of isolators should be done in 132 KV switchyard of CFFP, nearby bay will be in charged condition.
- c. The work shall include removal and connection of jumpers for isolators to be retrofitted so that bay may be charged after completion of work.
- d. Any cable/lugs/sleeves etc. required for inter-pole cabling for successful commissioning of isolators should also be in supplier's scope.
- e. All the items which are incidental and necessary for putting the equipment into operation and its successful performance should be deemed to be the part of the scope of work.
- f. All necessary tools and tackle, plants and equipments will be arranged and transported to the site by the contractor at his cost and expense.
- g. The shutdown will be provided for carrying out the work by BHEL, and the supplier has to carry out the work within the specified shutdown period. The notice of shutdown will be provided at least before 7 days.

2. APPLICABLE STANDARDS:-

The equipment covered by this specification should unless otherwise stated, be designed, constructed and tested in accordance with latest revision of relevant IEC and should conform to the regulations of local statutory authorities. Other standards ie. IS 9921 (alternatively current disconnecter and earthing switches for voltage above 1000volts), IS 2629 recommended practice for hot dip galvanizing of iron and steel, IS2633 method of testing weight, thickness and uniformity of galvanizing material, IS -2544, IS- 2147 and IEC 62270 shall also be applicable.

3. ISOLATOR Horizontal Center, Single Break Type:-

- a. Construction of make-Break contacts of main blade shall be such that no external springs are in used to achieve pressure.
- b. All joint in link mechanism exposed directly to external environment shall have such materials that they do not call for any periodic lubrication and will not create jamming or excessive play which can result into loss of setting of complete isolator or deformation in links and levers.

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Checked By	A R Idrisi	Dy. Manager/ CDS
Approved By	Surendra Kumar	AGM (M&S, PMG and HSE)

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- c. Provision of continuous adjustment/alignment of insulator shall be there which is required to compensate permitted tolerances of insulator and structure or base frame assembly. Adjustment/alignment using shim washers are not allowed.
- d. Bottom bearing assembly of base frame shall be sealed such that there cannot be ingress of dust/dirt water etc. Whole assembly shall be lubricated for life long service.
- e. Terminal head of isolator arms should be strong and robust. It should have 360 degree freedom of rotation and should have built-in cover to eliminated deposition of dust or foreign particles.

4. OPERATING MECHANISMS OR DRIVE:

A) MOTOR DRIVE

- i. Design of operating mechanism shall be such that angular travel of output shaft shall not alter even if motor over- runs due to any eventuality like failure of limit switch etc.
- ii. Requirement of auxiliary contacts for signalling/interlocking shall be as per IEC129.
 - a) Signaling/Interlocking of the closed position of disconnector shall not take place unless it is certain that the contacts have reached a position in which the rated normal current, the peak withstand current and the short-time withstand current can be carried safely.
 - b) Signaling/Interlocking of open position shall not take place unless the movable contacts have reached a position such that the clearance between contacts will reach their fully open position.
- iii. Operating mechanism box shall be made of at least 3mm thick Aluminium sheet to avoid damage during handling.
- iv. Power supply for all the motor operation shall be single phase 230V AC/ three phase 415 Volts AC.

B) HAND DRIVE

- i. Requirement of Auxiliary contacts for Signaling/ interlocking shall be as per IEC 129.
 - c) Signaling/Interlocking of the closed position of disconnector shall not take place unless it is certain that the contacts have reached a position in which the rated normal current, the peak withstand current and the short-time withstand current can be carried safely.
 - d) Signaling/interlocking of open position shall not take place unless the movable contacts have reached a position such that the clearance between contacts is at least 80% of the gap or the isolating distance, or unless it is certain that the movable contacts will reach their fully open position.
- ii. Operating mechanism box shall be made of at least 3mm thick Aluminium sheet to avoid rusting and damage during handling.

5. MAKE: The isolator should be of any of the makes as specified below:

ABB/ SIEMENS/ AREVA/ Crompton Greaves/ Elpro.

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6. TECHNICAL PARTICULARS:

S.	Description	Unit	145KV CB type DC
1	No of phases		3
2	Type		Horizontal, Centre single break
3	Service		Outdoor
4	Nominal System Voltage	KV RMS	132
5	Highest System Voltage	KV RMS	145
6	Rated Frequency	HZ	50
7	Rated Continuous current of Isolator	Amps	1600A
8	Rated Short time with stand current, 3Sec, Symmetrical (I)	KA	40
9	Rated Peak with stand Current	KA Peak	100
10	System earthing		Solidly earthed
11	Type of support Insulators		Solid Core
12	Insulation Level		
	Power Frequency with stand Voltage		
	a. Against ground	KV RMS	275
	b. Across isolating distance	KV RMS	315
13	Lightening Impulse 1.2 x 50μ seconds withstand voltage		
	c. Against ground	KV peak	650
	d. Across isolating distance	KV peak	750
14	Discharge inception voltage	KV	>95
15	Radio Interference Voltage	Micro V	<500 at 78KV
16	Operating Mechanism		
	For main blades		Manual/ motor operated
	Earth switch		Manual/ motor operated
17	Contact Resistance	Micro Ohm	<=95
18	Permissible increase in contact resistance per annum	Micro Ohm	<=7

Prepared By Vineet Kumar

Asstt Engr /CDS

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Checked By A R Idrisi

Dy. Manager/ CDS

Rachman 11/09/17

Approved By Surendra Kumar

AGM (M&S, PMG and HSE)

11/09/2017

7. GENERAL CONTRUCTIONS:

The isolator shall be complete and suitable for mounting at base with insulators, auxiliary contacts, terminal box, blades, and terminal connector (wedge type) operating mechanisms. Isolators shall be constructed such that it cannot be dislodged by gravity (open or closed positions), wind pressure, vibrations, shocks, accidental touching, breaking of the connecting rods of the operating mechanism and it should not open under influence of short circuit. The design shall be such that no lubrication shall be required for any part at frequent intervals.

The isolator shall not have sharp points, edges and other corona producing surfaces. The design shall be such that it is free from visible corona discharge in both closed and open positions at visible discharge test voltages as per applicable standards. Necessary stress relieving rings or shields shall be provided to meet the requirement. Factory adjustment shall be made on each single pole so that no field adjustment shall be required on the switch excluding mounting assemblies, coupling rods between the poles, high-tension leads, and electrical connection for operating mechanisms. Stud bolts shall be provided to adjust inaccuracies in insulator position caused due to tensile forces.

When inter phase connections are provided with isolators in the field, all phases shall make and break simultaneously. Isolators shall have pad locking arrangement in both "Open" and "closed" position. The isolator blades and all conducting parts shall be of high conductivity Copper/copper alloy. All switch bases, operating mechanisms, rods & other steel parts shall be hot-dip galvanized.

Live metal parts shall be non-rusting and non-corroding metal. Current carrying parts shall be of non-ferrous material such as copper. During the course of normal operation, if the isolator/earth switch left in open/closed position for long duration of time, it should operate satisfactorily. The Isolator shall be delivered with following assemblies – lower part with rotary pedestals, diagonal rod, current path halves, support insulators, operating mechanism and other accessories required for normal operation.

7.1 CONTACTS:

The main blades of all isolators shall have adequate strength and current carrying capacity conforming to the maximum rating and short circuit current. There shall be no relative movement of other part along with switch blade. The current path shall not pass through any springs (it should be spring less) or movable pin connection. The contact shall be adjustable, self-aligning high pressure type. All contact surfaces shall be of silver plated copper alloy. All contacts shall be replaceable at site.

Additionally, the female contact assemblies shall ensure thermal withstand ability during short circuits and Electro- dynamic withstand ability during short circuit without any risk of repulsion of contacts.

7.2 EARTH SWITCH (Not applicable for isolator without earth switch):

Earth switch shall be provided wherever specified and shall form an integral part of each pole of the isolator. Each earth switch shall be mechanically interlocked with its own main switch to prevent closure of the earth blades when the main blades are closed and vice versa. A

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flexible tinned copper braid of size 25X6mm shall be suitably attached to the earthing connector for common earth wire connection.

The grounding blades shall be counter balanced to ensure ease of operation. The entire grounding mechanism shall be hot dip galvanized and design shall match in quality with that of the main isolator.

7.3 INSULATORS:

Solid Core porcelain insulators shall be provided and it should be homogeneous, free from laminations, cavities and other flaws or imperfections that might affect the mechanical or dielectric quality, tough and impervious to moisture. The glazing of the porcelain shall be of uniform brown/dark brown colour, free from blisters, burns and other defects.

The insulators shall have creepage distances as specified in the IS. The porcelain and metal parts shall be assembled in such a manner that any thermal expansion difference between the metal and the porcelain part throughout the range of temperature variation should not create any space and undue internal stresses which may affect the electrical or mechanical strength and rigidity. Each cap and base shall be of high grade cast steel or malleable steel castings and they shall be machine faced smoothly and galvanized.

7.4 BEARING:

Bearing housing shall be weather proof. All bearings shall be sealed type such that no lubrication or maintenance is required. All bearing shall be weather protected by means of covers and grease retainers. Bearing pressure shall be kept low to ensure long life and ease of operations.

7.5 HORIZONTAL CENTRE BREAK DISCONNECTOR:

It shall consist of a steel base frame with two rotary pedestals, insulators, current carrying conductors (current path) and driving mechanisms. Steel components shall be hot dip galvanized to protect against atmospheric influences, each of the three phases of the disconnecter consists of two insulators mounted on maintenance free, sealed rotary pedestals which are carried by the steel base frame. The support post insulators carry the current paths consisting of two halves, with finger contacts and fist contacts.

The current transfer takes place at the rotary heads of the two current paths via tulip-type contact fingers. The rotary heads can be turned 360 deg and therefore the installation of a pipe connection or the straining of connection cable is possible in any direction. Flat terminal plates can be provided as per DIN standard 46203, NEMA or any other standards. The current carrying conductors and rotary pedestals are designed for easy adjusting and alignment.

7.6 OPERATING MECHANISM:

The isolator operating mechanism shall be so designed and fabricated that it should not cause excessive deflection to the member to whom it is attached. All isolators shall be self-locking in the open and closed positions independent of the control shaft restraint. Each mechanism shall be provided with an indicator showing opening/closing of the blade.

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The operating mechanism shall also be suitable for manual opening & closing of isolator and earth switch without much effort. The operating mechanism shall be provided with sufficient adjustment to allow for final alignment of the isolator blades for simultaneous operation. The operating pipes or rods shall be sufficiently rigid to maintain positive control under most adverse conditions and when operated in tension or compression for isolator closing. They shall also be capable of withstanding all tensional and bending stresses due to the operation of isolator.

The manual operating handles shall be mounted on one side of the base of supporting structure and should not be in the middle of isolator. The operating mechanism design shall be such that during the operation of the isolator, the isolator closing is independent of manual efforts.

Link mechanism shall have 'Dead center interlocking to prevent any change in end position of disconnecter due to external forces on the arm (e.g. Earthquake, Short line fault, Wind etc.) even when the drive is de-coupled from disconnecter.

7.7 INTERLOCK:

Provision for mechanical interlock (castle key type) shall be incorporated for interlocking with associated circuit breaker. The key shall be released only when the isolator is fully closed or fully opened. Sufficient quantity of locks, identical to the one fitted on the isolator, shall be supplied for fixing on the circuit breaker. In addition, an electrical interlock should also be provided.

In case of isolators with earth switches, interlocking should be provided between main switches and earthing switches. All interlocks shall be designed to prevent mal-operation. This may be achieved by means of mechanical levers etc. Earth switches for the line isolators shall be interlocked electro mechanically to prevent closure of earth switch blades when the line is live. This interlock shall be through a solenoid operated by AC 230V, 50Hz supply taken. The necessary relays shall be provided to attain interlock.

7.8 POSITION INDICATOR: A mechanical position indicator shall be provided for each isolator/ earthing switch.

7.9 EARTHING PADS: Each pole of the isolator shall be provided with two earthing pads of non-corrosive material at opposite ends and brazed at the base. Flexible tinned copper braid of adequate size shall be provided for connecting operating handles, earthing switches to the earthing system.

7.10 AUXILIARY SWITCH:

Each isolator shall be provided with a mechanically driven auxiliary switch with all necessary contacts for control, indication and interlocking purposes and with six normally open and six normally closed spare contacts.

All connections from the auxiliary switches shall be brought out to a terminal block housed in the mechanism box. The spare contacts shall also be brought out on to the terminal block.

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Approved By	Surendra Kumar	AGM (M&S, PMG and HSE)

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Auxiliary switches and auxiliary circuits shall have a continuous current carrying capacity of at least 10 A. Mechanically coupled auxiliary contacts shall not slip during smooth operation of the isolator.

- 7.11 PERFORMANCE REQUIREMENTS:** During the course of normal operation, it is likely that the isolator may be left in the open/ closed position for long periods of time. They shall be designed to operate satisfactorily even after being kept in one position for long period. The isolator shall be capable of breaking the magnetizing current of associated power transformer of capacity up to 60 MVA.

7.12 TEMPERATURE RISE:

The temperature rise of any part of the isolator and associated equipment shall not exceed the maximum permissible temperature rise values as stipulated in the applicable standard of latest issue corresponding to design ambient temperature.

7.13 CONTROL CABINET FOR ISOLATOR:

The control cabinet of the operating mechanism shall be made out of 3 mm thick sheet steel duly hot dip galvanized or 10 mm thick Aluminium plate or casting. Hinged door shall be provided with pad locking arrangement. Sloping rain hood shall be provided to cover all sides. Neoprene or better type of gaskets shall be provided to ensure degree of protection of at least IP:55 as per IS:2147. The cabinet shall be suitable for mounting on support structure with adjustment for vertical alignment.

7.14 CONTROL CIRCUITS:

Control device shall store OPEN and CLOSE command even if the corresponding switch is momentarily pressed until the command is fully executed and the components get de-energized after execution. Failure of auxiliary power supply or loose contact shall not cause faulty operation.

7.15 LIMIT SWITCH:

Auxiliary switch shall not be used as limit switch. Limit switches for control shall be fitted on the isolator shaft within the cabinet to sense the open and close positions of the isolators and earth switches. Limit switches shall be of reputed make.

7.16 OVERLOAD AND SINGLE PHASING PREVENTOR:

Suitable relay device shall be provided to prevent overloading for three phase motor. Single phase preventer shall be provided to operate on open circuiting of any phase and shall trip off the motor.

7.17 TERMINAL BLOCK AND WIRING:

Each operating mechanism shall be provided with 1100 V grade stud type terminal block having washers, nuts & check nuts. All auxiliary switches, interlocks and other terminals shall be wired upto terminal block. The terminal block shall have at least 20% extra terminals. All wiring shall be carried out with 1100 V grade insulated 2.5 sq mm copper wires.

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7.18 SPACE HEATERS:

Space heater, thermostatically controlled, suitable for single phase 240 V AC supply shall be provided for motor operated operating mechanism to prevent condensation. A switch and fuse/link shall be provided in the operating mechanism.

7.19 INTERIOR ILLUMINATION:

Switch, HRC fuse and holder suitable for a 240 V lamp shall be provided in of the motor operated mechanism box of isolator and manually operated mechanism box of earth switch.

7.20 POWER SOCKET:

Single phase 240 V 15A power socket and switch shall be provided in the motor operated operating mechanisms of the isolator poles.

7.21 CONTROL AND AUXILIARY SUPPLY:

Three phase switch with HRC fuses for phases and link for neutral shall be provided for power supply and a 2 way switch with HRC fuses shall be provided for control supply in the motor operated mechanisms of the isolators.

7.22 COUNTER BALANCE SPRING:

Counter balance springs, cushions etc., shall be provided to prevent impact at the end of travel both on opening and closing of the isolator. The springs shall be made of durable and non-rusting type alloy.

8. TESTS:

All routine, acceptance & type tests shall be carried out in accordance with the relevant IS/IEC. All routine/acceptance tests shall be witnessed by authorized representative of BHEL. All the components should also be type tested as per the relevant standards. Following routine tests shall be necessarily conducted on the Isolator.

- a) Power Frequency voltage dry tests of the main circuit.
- b) Voltage control tests on auxiliary circuit.
- c) Operation Tests.
- d) Measurement of resistance of main circuit.
- e) Mechanical Operating Tests.
- f) Galvanizing measurement.
- g) Tinning Thickness Measurement.

9. DRAWINGS

All type of drawings including control circuit drawings, general arrangement drawings etc. should be supplied in two hard copies and soft copy as well.

10. Guarantee/ Warrantee

Supplier will provide guarantee or warrantee of at least 18 months from the date of supply or 12 months from the date of commissioning .

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