BHUTAN POWER CORPORATION LIMITED

(An ISO 9001:2015, ISO 14001:2015 & OHSAS 18001:2007 Certified Company)

(*Registered Office, Thimphu*)

PROCUREMENT SERVICES DEPARTMENT

THIMPHU: BHUTAN

(Tender No. BPC/PSD/2021 Materials/2020/10 dated August 15, 2020)

BID DOCUMENT

FOR

THE SUPPLY AND DELIVERY OF ELECTRICAL LINE AND SUBSTATION MATERIALS (PACKAGE B)

Procurement Services Department
Thimphu : Bhutan
Bhutan Power Corporations Limited

འབྲུག་གློག་མེ་ལས་འཛིན།།

Bhutan Power Corporation Limited
(An ISO 9001:2015, ISO 14001:2015 & OHSAS 18001:2007 Certified Company)
Registered Office, Thimphu
Procurement Services Department
Thimphu: Bhutan

Invitation for Bids

Date: August 15, 2020
Tender No.: BPC/PSD/2021 Materials/2020/10

1. The *Procurement Services Department* invites sealed bids from eligible bidders for the Supply and Delivery of Electrical line and substation materials (Package B).
2. Interested eligible bidders may obtain further information on the bid form and inspect the bidding documents at the office of *General Manager, Procurement Services Department, Bhutan Power Corporation Ltd., Thimphu, Bhutan.*
3. A complete set of bidding documents can be purchased by any interested eligible bidder on the submission of written application to the above address on or before *12:00 hours* on September 17, *2020* and upon payment of non-refundable fee of Nu. 2,000.00. Bidding documents can be also downloaded from the Purchaser's website but should register with the Purchaser on or before the closing of Bid Sale Date and time after paying registration fee of Nu. 200.00 (Ngultrum two hundred) only. The registration shall be done through written application together with the business license copy and tax clearance certificate to make the bid enforceable.
4. All bids must be accompanied by a bid security and must be delivered in accordance with the Instructions to Bidder on or before *12:30 hours* on September 17, *2020* and will be publicly open immediately thereafter.

Sl.#	Lot Description	Amount (Nu.)
Lot 1	Distribution Boards	210,000.00
Lot 2	Switching Equipment	188,000.00
Lot 3	Lightning Arrestors	168,000.00
Lot 4	Distribution Transformers	240,000.00
Lot 5	Lubricants	41,000.00
Lot 6	Earthing Equipment	35,000.00
Lot 7	Poles	495,000.00
Lot 8	Steel Tubular Pole Fittings	153,000.00
Lot 9	Telescopic Pole Fittings	105,000.00

Procurement Services Department, Bhutan Power Corporation Ltd. shall not be responsible for any costs or expenses incurred by bidders in connection with the preparation or delivery of bids.

(General Manager)

Phone: +975-2-326289; Box 580; E-mail: psdbpc@gmail.com; psd@bpc.bt; web: www.bpc.bt

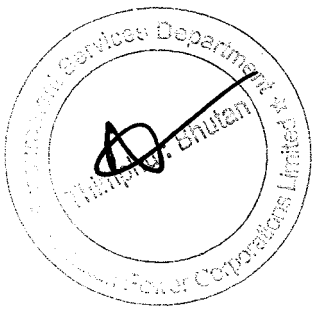
TENDER NO: **BPC/PSD/2021 Materials/2020/10**

DATE: **August 15, 2020**

WORK: **Supply and Delivery of ELECTRICAL LINE AND SUBSTATION MATEERIALS (PACKAGE B)**

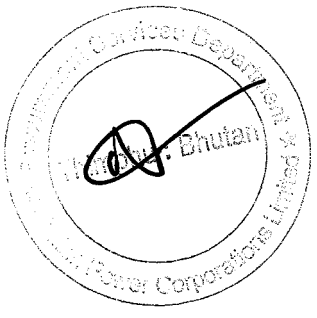
CONTENTS OF THE BID DOCUMENT

Note: Part 1 Section IV (Bidding Forms) are enclosed at the end of the bidding document for convenience.

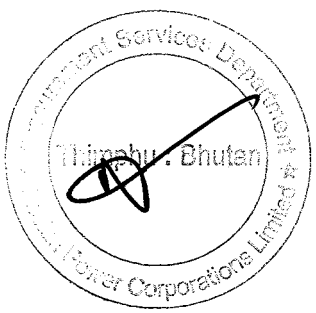


CHECKLIST FOR BID SUBMISSION

Sl #	PARTICULARS	Purchasers Requirement	Bidders to fill up
		YES/NO	YES/NO
1	Signed Bid Form and Price Schedule (BOQ)	**YES**	
2	Power of Attorney	**YES**	
3	Valid Trade License/ Manufacturing License	**YES**	
4	Manufacturer's authorisation (In case the supplier is a dealer)	**YES**	
5	Document Establishing Eligibility of the Bidder	**YES**	
6	Documents establishing of the Bidders qualification to perform the contract	**YES**	
7	Documents establishing the goods' conformity to the bidding documents	**YES**	
8	Guaranteed Technical Particulars (GTP)	**YES**	
9	EMD drawn in favor of General Manager, Finance & Account Services, BPC, Thimphu, Bhutan.	**YES**	
10	Signed Integrity Pact	**YES**	
11	Signed Vendor Performance Management System (VPMS)	**YES**	
12	Joint Venture, Consortium or Association (JV/C/A) Partner Information Form (If applicable)	**YES**	

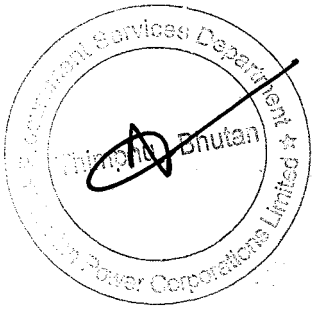


PART 1- Bidding Procedures



Section I. Instructions to Bidders

Table of Contents



Section I. Instructions to Bidders

A. General

1. Scope of Bid

1.1	The Purchaser, as indicated in the Bid Data Sheet (BDS), issues these Bidding Documents for the supply of Goods and Services incidental thereto as specified in Section V, Schedule of Supply. Tender number and tender description, lot numbers and lot description are provided in the BDS.		
1.2	All bids are to be completed and returned to the Purchaser in accordance with these instructions to the bidders.		
1.3	Throughout this Bidding Document :		
	a.	the term "in writing" means communicated in written form with proof of receipt;	
	b.	if the context so requires, singular means plural and vice versa; and	
	c.	"day" means calendar day	

2. Fraud and Corruption

2.1	It is Corporation policy to require that Purchasers, Bidders and Suppliers observe the highest standards of ethics during the procurement and execution of contracts.[1] In pursuance of this policy, the Corporation:		
	a.	defines, for the purposes of this provision, the terms set forth below as follows:	
		i.	"Corrupt practice"[2] is the offering, giving, receiving or soliciting, directly or indirectly, of anything of value[3] to influence improperly the actions of another party;
		ii.	"Fraudulent practice"[4] is any intentional act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation;

[1] In this context, any action taken by a Bidder, and Supplier to influence the procurement process or contract execution for undue advantage is improper.

[2] "another party" refers to a Corporation official acting in relation to the procurement process or contract execution. In this context, "Corporation official" includes employees of BPC taking or reviewing procurement decisions.

[3] "anything of value" includes, but is not limited to, any gift, loan, fee, commission, valuable security or other asset or interest in an asset; any office, employment or contract; any payment, discharge or liquidation of any loan, obligation or other liability whatsoever, whether in whole or in part; any other services, favour or advantage, including protection from any penalty or disability incurred or apprehended or from any action or proceeding of a disciplinary or penal nature, whether or not already instituted and including the exercise or the forbearance from the exercise of any right or any official power or duty.

[4] a "party" refers to a Corporation official; the terms "benefit" and "obligation" relate to the procurement process or contract execution; and the "act or omission" is intended to influence the procurement process or contract execution.

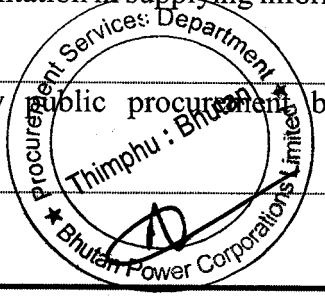
Procurement Department * Thimphu : Bhutan * Bhutan Power Corporation Limited

		iii.	"Collusive practice"[5] is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party;	
		iv.	"Coercive practice"[6] is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;	
		v.	"Obstructive practice" is	
			aa.	deliberately destroying, falsifying, altering or concealing of evidence material to the investigation or making false statements to investigators in order to impede any investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; and/or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation; or
			bb.	acts intended materially to impede the exercise of the inspection and audit rights of the Purchaser or any person appointed by the Purchaser and/or any relevant agency provided for under ITB Sub-Clause 2.1 (d) below.
	b.	will reject a proposal for award if it determines that the Bidder recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive or obstructive practices in competing for the contract in question;		
	c.	will sanction a firm or individual, including declaring them ineligible, either indefinitely or for a stated period of time, to be awarded contract if it at any time determines that they have, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive or obstructive practices in competing for, or in executing contract;		
	d.	will have the right requiring Bidders and Suppliers to permit the Purchaser, any agency or person appointed by the Purchaser to inspect their accounts and records and other documents relating to their Bid submission and contract performance and to have them audited by auditors appointed by the Purchaser;		
	e.	requires that Bidders, as a condition of admission to eligibility, execute and attach to their bids an Integrity Pact Statement in the form provided in Section IV, Bidding Forms. Failure to provide a duly executed Integrity Pact Statement shall result in disqualification of the Bid; and		
	f.	will report any case of corrupt, fraudulent, collusive, coercive or obstructive practice to the relevant RGoB agencies, including but not limited to the Anti-		

[5] "parties" refers to participants in the procurement process (including corporation officials) and an "improper purpose" includes attempting to establish bid prices at artificial, non competitive levels.

[6] a "party" refers to a participant in the procurement process or contract execution.

		corruption Commission (ACC) of Bhutan, for necessary action in accordance with the statutes and provisions of the relevant agency.
3.	**Eligible Bidders**	
3.1	The Invitation for bids is open to all Manufacturers/Export House/Authorized Dealers from outside Bhutan and to Manufacturers/Authorized Dealers/National Suppliers licensed under the Ministry of Economic Affairs of Royal Government of Bhutan (Supporting evidence to corroborate the claim must be enclosed).	
3.2	A Bidder shall not be eligible who have a conflict of interest. All Bidders found to have a conflict of interest shall be disqualified. Bidders are considered to have a conflict of interest in this bidding process if they:	
	a.	are associated, or have been associated in the past, with a firm or any of its affiliates which has been engaged by the Purchaser to provide consulting services for the preparation of the design, specifications and/or other documents to be used for the procurement of the Goods to be purchased pursuant to these Bidding Documents, or
	b.	employ or otherwise engage, either directly or through any of their affiliates, a family member of a Corporation who either is employed by the Purchaser or has an authority over it. For the purposes of this Sub-Clause a family member is defined as parents, spouse and children as mentioned in the Service Record of the employee.
4.	**Exclusion of Bidders**	
4.1	A bidder shall be excluded from participating in a procurement procedure under the following circumstances who:	
	a.	is suspended/debarred by any Statutory Agencies in Bhutan or in the region to Corporation's knowledge;
	b.	has been declared bankrupt, judgment or pending legal action that could impair operating as a going concern;
	c.	has been found guilty of professional misconduct by a recognised tribunal;
	d.	has not fulfilled his obligations with regard to any statutory dues;
	e.	is or has been guilty of serious misrepresentation in supplying information required under this Section.
	f.	is debarred from participation in any public procurement by any Competent Authority as per law;



	g.	does not qualify under the performance assessed through the Vendor Performance Management System of the Corporation;
	h.	as a matter of law or official regulation, Royal Government of Bhutan prohibits commercial relations with the country in which the Bidder is constituted, incorporated or registered.
5.	**Vendor Performance Management System (VPMS)**	
5.1	The performance of the vendor shall be assessed as per the guidelines contained in the Vendor Performance Management System available in BPC website (www.bpc.bt) for the purpose of determining the eligibility in participating in subsequent tenders.	
5.2	The VPMS acceptance form is provided in the Section IV, Bidding Forms of the bidding documents. The bidders are required to sign VPMS Acceptance Form agreeing to the applicability of VPMS. In case the VPMS Acceptance Form is not signed, the bid for that bidder shall be liable for rejection.	
6.	**Joint Ventures (JV)**	
6.1	Bids submitted by a Joint Venture of two or more Companies as partners shall comply with the following requirements:	
	a.	the Bid, and in case of successful Bid, the Contract form, shall be signed so as to be legally binding on all partners;
	b.	one of the partners shall be authorized to be in charge; and this authority shall be evidenced by submitting a power of attorney signed by legally authorized signatories of all the partners;
	c.	the partner in charge shall be authorized to incur liabilities, receive payments and receive instructions for and on behalf of any or all partners of the joint venture;
	d.	all partners of the joint venture shall be liable jointly and severally for the execution of the Contract in accordance with the Contract terms, and a relevant statement to this effect shall be included in the authorization mentioned under (b) above as well as in the Bid Form and the Form of Agreement (in case of a successful Bid); and
	e.	a copy of the registration certificate/license of joint venture shall be submitted with the Bid;
	B. Contents of Bidding Documents	
7.	**Sections of Bidding Documents**	

7.1	The Bidding Document consist of Parts 1, 2, and 3, which include all the Sections indicated below, and should be read in conjunction with any Addenda issued in accordance with ITB 9.
	PART 1 Bidding Procedures • Section I. Instructions to Bidders (ITB) • Section II. Bid Data Sheet (BDS) • Section III. Evaluation and Qualification Criteria • Section IV. Bidding Forms **PART 2 Supply Requirements** • Section V. Schedule of Supply **PART 3 Conditions of Contract and Contract Forms** • Section VI. General Conditions of Contract (GCC) • Section VII. Special Conditions of Contract (SCC) • Section VIII. Contract Forms
7.2	The Purchaser is not responsible for the completeness of the Bidding Document and its addenda, if they were not obtained directly from the Purchaser.
7.3	The bidder is expected to examine the bidding documents, including all instructions, forms, terms and specifications. Failure to furnish all information required by the bidding documents or submission of a bid not substantially responsive to the Bidding Documents in every respect would result in the rejection of that Bid.
8. Clarification of Bidding Documents	
8.1	The bidders shall not be allowed to seek any clarifications on the bidding documents in person or through any verbal communications.
8.2	Prospective bidders requiring any further information or clarification of the bidding documents may notify the Purchaser in writing at the Purchaser's mailing address indicated in the BDS. The Purchaser will respond in writing to any request for information or clarification of the bidding documents, which it receives no later than 10 (ten) days prior to the deadline for the submission of Bids prescribed by the Purchaser. The Purchaser's response (including an explanation of the query) will be sent in writing to all prospective bidders who have purchased the Bidding Documents.
8.3.	Pre bid meeting shall be conducted if necessary to clarify doubts and concerns of the bidders prior to submission of bids. Minutes of the pre bid meeting shall be circulated to all bidders that have purchased bidding documents and shall form an integral part of the bidding document.

9. Amendment of Bidding Documents	
9.1	At any time prior to the deadline for submission of bids, the Purchaser may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective bidder, modify the Bidding Documents by addendum.
9.2	The addendum shall be part of the Bidding Documents and shall be notified in writing to all prospective bidders who have purchased the Bidding Documents. Such addendum shall be binding and shall require that prospective Bidders confirm receipt of it before the time established for the opening of Bids.
9.3	In order to afford prospective bidders reasonable time in which to take the addendum into account in preparing their Bids, the Purchaser may, at its discretion, extend the deadline for the submission of Bids.
9.4	Prospective bidders who may have downloaded the bidding documents from the website, the corrigendum to the bidding documents will also be published on the web site. It will be the responsibility of such bidders to regularly visit the website for any addendum to the bidding documents until the last date of bid submission. Purchaser shall in no way be responsible for any ignorance of the bidder about the addendum to the bidding documents.
C. Preparation of Bids	
10. Cost of Bidding Documents	
10.1	The bidder shall bear all costs associated with the preparation and delivery of its bid and the Purchaser will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.
10.2	Prospective bidders who may have downloaded the bidding documents from the web site should register with Purchaser on or before the closing of Bid Sale Date and make payment for the cost of the bid documents.
11. Language of Bid	
11.1	The Bid and all correspondence and documents relating to the Bid exchanged by the bidder and the Purchaser shall be written in the language specified in the BDS. Supporting documents and printed literature that are part of the Bid may be in another language provided they are accompanied by an accurate translation of the relevant passages in language specified in BDS, in which case, for purposes of interpretation of the Bid, *such* translation shall govern.
12. Documents Comprising the Bid	
12.1	The Bid shall comprise the following:

	a.	Bid Form and Price Schedules completed in accordance with ITB13, 14,16 and 17;
	b.	Documentary evidence establishing in accordance with ITB 18, that the bidder is eligible to bid.
	c.	Documentary evidence establishing in accordance with ITB 19, that the bidder is qualified to perform the Contract if its Bid is accepted;
	d.	Documentary evidence establishing in accordance with ITB 20, that the goods to be supplied by the bidder conform to the Bidding Documents;
	e.	Bid security furnished in accordance with ITB 22;
	f.	Written confirmation authorizing the signatory of the Bid to commit the Bidder, in accordance with ITB 23;
	g.	Alternative bids, if permissible, in accordance with ITB 15;
	h.	Integrity Pact Statement, in accordance with ITB 2.1(e);
	i.	VPMS acceptance form, in accordance with ITB 5; and
	j.	Any other document required as per the bidding documents.
13.	**Bid form**	
13.1	The bidder shall complete the Bid Form furnished in Section IV, Bidding Forms. This form must be completed without any alterations to its format, and no substitutes shall be accepted. All blank spaces shall be filled in with the information requested. A bid in which the bid form is not duly filled, signed and sealed by the bidder shall be rejected.	
14.	**Price Schedules**	
14.1	The bidder shall complete the appropriate Price Schedule included herein, stating the unit prices, total price per item, the total amount and the expected countries of origin of the Goods to be supplied under the Contract. This Price Schedules form must be completed without any alterations to its format, and no substitutes shall be accepted.	
15.	**Alternative Bids**	
15.1	Unless otherwise indicated in the **BDS**, alternative bids shall not be considered.	
16.	**Bid Prices and Discounts**	
16.1	The prices and discounts quoted by the Bidder in the Bid Form and in the Price Schedules shall conform to the requirements specified below.	
16.2	All lots and items must be listed and priced separately in the Price Schedules.	

16.3	The price to be quoted in the Bid Form shall be the total price of the Bid excluding any discounts offered.			
16.4	The Bidder shall quote any unconditional discounts and the methodology for their application in the Bid Form. The discount letter offer shall be accepted only when enclosed inside the main envelope of the bidding document.			
16.5	The terms EXW, CIF, CIP, DDP and other similar terms shall be governed by the rules prescribed in the current edition of Incoterms, published by The International Chamber of Commerce, at the date of the Invitation for Bids or as specified in the **BDS**.			
16.6	Prices shall be quoted as specified in each Price Schedule included in Section IV, Bidding Forms. The disaggregation of price components shall be solely for the purpose of facilitating the comparison of Bids by the Purchaser. This shall not in any way limit the Purchaser's right to contract on any of the terms offered:			
	a.	For Goods manufactured in Bhutan:		
		i.	the price of the Goods, quoted ex works, ex-factory, ex-warehouse, ex showroom or off-the-shelf, as applicable, including all Customs duties and sales and other taxes already paid or payable on the components and raw material used to manufacturer or assembly of Goods, if specified in BDS;	
		ii.	any Bhutan sales and other similar taxes which will be payable on the Goods if the contract is awarded to the Bidder, if specified in BDS; and	
		iii.	the total price for the item.	
	b.	For Goods to be offered from outside Bhutan:		
		i.	the price of the Goods, quoted CIP/DDP place of entry in Bhutan, as specified in BDS;	
		ii.	custom duties and any other taxes which will be payable on the Goods in Bhutan, if specified in BDS;	
		iii.	the cost of inland transportation, insurance and other local costs incidental to delivery of the Goods from the port of entry to their final destination, if specified in BDS; and	
		iv.	the total price for the item.	
	c.	For Related Services, other than inland transportation and other services required to convey the Goods to their final destination, whenever such Related Services are specified in Section V, Schedule of Supply:		

		i.	the price of each item compromising the Related Services (inclusive of any applicable taxes).
16.7	Prices quoted by the Bidder shall be fixed during the Bidder's performance of the Contract and not subject to variation on any account, unless otherwise specified in the BDS. A bid submitted with an adjustable price quotation shall be treated as non-responsive and shall be rejected pursuant to ITB 33 unless adjustable price quotations are permitted by the BDS. If, in accordance to BDS, prices quoted by the Bidder shall be subject to adjustments during the performance of the Contract, a Bid submitted with a fixed price quotation shall not be rejected, but price adjustment shall be treated as zero.		
16.8	If so indicated pursuant to ITB 1.1, Bids are based on Lots/Packages, for which all goods are grouped in lots for easy identification. For the purpose of bidding and inventory management, related SKUS shall be grouped under specific lots like transformers, conductors, cables and fabrication items or in the manner most advantageous to the BPC for a particular tender. Bidders shall have the option of submitting a proposal on any or all LOTS. Each lot consists of items grouped in packages. Unless otherwise indicated in the BDS, prices quoted shall correspond to one hundred percent (100%) of the items specified for each lot and to one hundred percent (100%) of the quantities for each item of a lot. Bidders can offer any price reduction (discount) for any or all Lots and shall specify in their Bid the price reductions applicable to each Lot, or for all the Lots. Price reductions or discounts shall be submitted in accordance with ITB 16.4.		
17.	**Bid Currencies**		
17.1	Bid Prices shall be quoted in Ngultrum for goods offered from Bhutan, in Indian Rupees for goods offered from India; and in US dollar/major foreign currencies for goods offered from other Countries. Bid Prices expressed in Indian currency and US Dollars/ major foreign currencies shall be accepted and evaluated in accordance to ITB 37. For bid evaluation purpose the exchange rate will be based on the Telegraphic Transfer (TT) selling rate published by the Royal Monetary Authority of Bhutan on the day of bid opening. For bid expressed in Indian currency and US Dollars/major foreign currencies, payments shall be made in equivalent Ngultrum through banking channel and the responsibilities of payment transfer and transfer charges lie on the Suppliers.		
18.	**Documents Establishing Eligibility of the Bidder**		
18.1	The bidder shall furnish, as part of its Bid, certification establishing the bidder's eligibility to bid pursuant to ITB 3.		
18.2	The necessary documents and literatures viz. ISO Certificate, Type Test Certificates and Lists of Past Performance Certificates from the users must be submitted for new makes/brands introduced in Bhutan.		

18.3	If the Bidder is JV in accordance with ITB 6, a copy of the registration certificate/license shall be submitted.	
19.	**Documents Establishing Qualifications of the Bidder.**	
19.1	The documentary evidence of the Bidder's Qualification to Perform the Contract, if its bid is accepted, shall establish to the purchaser's satisfaction:	
	a.	That, if required by the BDS, a Bidder is not a manufacturer or otherwise produce the goods it offers to supply, shall submit the Manufacturer's Authorization using the form included in Section IV, Bidding Forms to demonstrate that it has been duly authorized by the' manufacturer or producer of the Goods to supply these Goods in Bhutan;
	b.	That, if required by the BDS, in the case of a bidder not doing business in Bhutan, the Bidder is, or will be (if the contract is awarded to it), represented by authorised representative in Bhutan equipped and able to carry out the Supplier's maintenance, repair and spare parts-stocking obligations prescribed in the Conditions of Contracts and/or Technical Specifications.
	c.	That the Bidder meets each of the qualification criteria specified in Section III, Evaluation and Qualification Criteria.
20.	**Documents Establishing the Goods' Conformity to the Bidding Documents.**	
20.1	To establish the conformity of the Goods to the Bidding Documents, the Bidder shall furnish as a part of its Bid, the documentary evidence that the Goods conform to the technical specifications and standards specified in Section V, Schedule of Supply.	
20.2	The documentary evidence may be in the form of literature, drawings or data, and shall consists of a detailed item by item description of the essential technical and performance characteristics of Goods. If required by the BDS, the bidders are required to confirm and sign on the guaranteed technical particulars of the goods (GTPS) that is indicated in the Section V, Schedule of Supply. Any deviations from the indicated specifications must be clearly indicated in the deviation schedule, Section IV, Bidding Form.	
20.3	If required, the Bidder shall also furnish a list giving full particulars, including available sources and current prices, of all spare parts, special tools, etc., necessary for the proper and continuing functioning of the Goods.	
20.4	Standards for workmanship, material and equipment, and references to brand names or catalogue numbers, specified by the Purchaser in Section V, Schedule of Supply, are intended to be descriptive only and not restrictive. The bidder may offer other standards of quality, brand names and/or catalogue numbers in its Bid, provided that it demonstrates to the Purchaser's satisfaction that the substitutions are equivalent or superior to those designated in Section V, Schedule of Supply with the exception in strategic critical and strategic security items category.	

20.5	In order to prove that the Goods offered are of acceptable quality and standard, the bidders shall furnish the documentary evidence that the Goods offered have been in production and all relevant catalogues, test certificates, ISO certificates, list of previous clients, value of business and company or manufacturer profile for all new brands are submitted.	
21.	**Period of Validity of Bids**	
21.1	Bids shall remain valid for the period specified in the BDS days from the date of bid opening prescribed by the Purchaser, pursuant to ITB 28. A bid valid for a shorter period shall be rejected by the Purchaser as non-responsive.	
21.2	In exceptional circumstances, prior to the expiration of the bid validity period, the Purchaser may solicit bidder's consent to an extension of the period of bid validity. The request and the responses thereto shall be made in writing. If the bidder agrees to the extension request, the validity of the bid security provided under ITB 22 shall also be suitably extended. In the event the Bidder refuses the request, the bid shall be disqualified without forfeiting the bid security. Bidders granting the request shall not be required or permitted to modify its Bid.	
22.	**Bid Security**	
22.1	The bidder shall furnish, as part of its Bid, a Bid Security in original form, denominated in Ngultrum or a freely convertible currency and in amount specified in the BDS.	
22.2	The Bid Security shall be in one of the following forms acceptable to the purchasers:	
	a.	Unconditional bank guarantee issued by a reputed Financial Institution acceptable to the Purchaser in the Bid Security Form included in Section IV Bidding Form or another form acceptable to the Purchaser.
	b.	Banker's cheque/ cash warrant.
	c.	Demand draft.
	d.	If the institution issuing the Bid Security furnished by the Bidder is located outside the Purchaser's country, the Bid Security shall be counter guaranteed by a correspondent financial institution located in the Purchaser's country to make it enforceable,
22.3	The Bid Security shall be valid for period of thirty (30) days beyond the validity period of the Bids as specified in BDS.	
22.4	Any Bid not secured in accordance with ITB 22.1, 22.2 and 22.3 above shall be rejected by the Purchaser as non-responsive.	
22.5	An unsuccessful bidder's bid security will be discharged/returned within fifteen (15) days after signing of the Contract with the successful Bidder.	

22.6	The successful bidder's bid security will be discharged/returned upon furnishing the performance security, pursuant to ITB 46 and the bidder's executing the Contract, pursuant to ITB 47 .			
22.7	The bid security may be forfeited:			
	a.	If a bidder withdraws its Bid during the period of bid validity specified by the bidder on the Bid Form, except as provided in ITB 21.2;		
	b.	If a bidder does not accept arithmetical corrections of its bid price;		
	c.	In the case of a successful bidder, if the bidder fails		
		i.	To sign the Contract in accordance with ITB 47; or	
		ii.	To furnish the performance security in accordance with ITB 48.	
22.8	The Bid Security of a JV must be from the JV that submits the Bid.			
23.	**Formats and Signing of Bid**			
23.1	The Bidder shall prepare one original of the documents comprising the Bid as described in ITB 12 and clearly mark it as "Original ". In addition, the Bidder shall submit copies of the Bid, in the number specified in the BDS and clearly mark them "COPY". In the event of any discrepancy between the original and the copies, the original shall prevail.			
23.2	The original and all copies of the Bid shall be typed or written in indelible ink and shall be signed by the bidder or a person(s) duly authorized to sign on behalf of the bidder. Written power-of-attorney shall indicate such authorization and shall be attached to the Bid. The name and position held by each person signing must be typed or printed below the signature.			
23.3	The Bid shall contain no interlineations, erasures or overwriting except as necessary to correct errors made by the bidder, in which case such correction shall be initialled by the person or persons signing the Bid.			
	D. Submission and Opening of Bids			
24.	**Submission, Sealing and Marking of Bids**			
24.1	Bids shall be delivered by hand, courier or registered post. The Bidder shall seal the original of the Bid and the number of copies stipulated in the BDS, including alternative Bids if permitted in accordance with ITB 15 in separate inner envelopes contained within one outer envelope. All envelopes shall be sealed with adhesive or other sealant to prevent reopening.			
24.2	The inner envelopes shall:			

	a.	Be sealed and bear the name of the Bidder.
	b.	Be marked "ORIGINAL", "ALTERNATIVE" (if any) and "COPY".
24.3	The outer envelope shall:	
	a.	Be marked "Confidential";
	b.	Bear the name and address of the Bidder;
	c.	Be addressed to the Purchaser in accordance with ITB 25.1;
	d.	Bear the identification number pursuant to ITB 1.1 and any additional identification marks as specified in the BDS; and
	e.	Bear a warning not to open before the time and date for bid opening, in accordance with ITB 29.1.
24.4	If the outer envelope is not sealed and marked as required by ITB 24.3, the Purchaser will assume no responsibility for the bid misplacement or premature opening.	
25.	**Deadline for submission of Bids**	
25.1	Bids shall be delivered by hand, courier or registered post to the Purchaser at the address and no later than the date and time indicated in BDS.	
25.2	The Purchaser may, at its discretion, extend the deadline for the submission of Bids by amending the Bidding Documents in accordance with ITB 9, in which case all right and obligations of the Purchaser and bidders previously subject to the deadline will thereafter be subject to the deadline as extended.	
26.	**One Bid per Bidder**	
26.1	Each bidder shall submit only one Bid either by itself, or as a partner in a joint venture or as a responsible officer in the management of the company. A bidder who submits or participates in more than one Bid (except alternative Bids if allowed, pursuant to ITB 15) shall be disqualified.	
27.	**Late Bids**	
27.1	Any Bid received by the Purchaser after the deadline for Submission of Bids prescribed by the Purchaser, pursuant to ITB 25, shall be declared "Late" and rejected and returned unopened to the bidder.	
28.	**Modification, Substitution and withdrawal of Bids**	
28.1	The bidder may modify or substitute its Bid after it has been submitted by sending a written notice in accordance with the ITB 24, duly signed by an authorized representative, and shall include a copy of authorization in accordance with ITB 23.2.	

	The corresponding substitution or modification of the Bid must accompany the respective written notice. All notices must be:	
	a.	Submitted in accordance with ITB 23 and 24, and in addition, the respective envelops shall be clearly marked "SUBSTITUTION" or "MODIFICATION;' and
	b.	Received by the Purchaser prior to the deadline prescribed for the submission of Bids, in accordance with ITB 25.
28.2	The bidder may withdraw its Bid after it has been submitted by sending a written notice prior to the deadline prescribed for the submission of Bids, in accordance with ITB 25, duly signed by an authorized representative, and shall include a copy of authorization in accordance with ITB 23.2. The Purchaser then shall mark the envelope as "WITHDRAWN".	
28.3	No Bid may be modified, substituted or withdrawn in the interval between the deadline for submission of Bids and the expiration of the period of bid validity specified by the bidder on the Bid Form or any extension thereof, neither any modification shall be accepted.	
29.	**Bid Opening**	
29.1	The Purchaser shall conduct the bid opening in the place at the address, date and time specified in the BDS in the presence of bidders or bidders' authorized representatives who choose to attend.	
29.2	The bidder's authorized representatives attending the bid opening shall have an Authorization Letter from the bidder. Only the authorized representative shall attend the bid opening.	
29.3	The bidders or bidder's authorized representatives shall not be permitted to approach the members of the Bid Opening Committee or any of the officials.	
29.4	The bidders or bidder's authorized representatives who are present shall sign a bidder's attendance sheet evidencing their attendance.	
29.5	First, envelopes marked as "WITHDRAWN" shall be read out and returned unopened to the Bidder. Next, envelopes marked "SUBSTITUTION" shall be opened and read out and exchanged with the corresponding Bid being substituted. The substituted Bid shall not be opened, but shall be returned to the Bidder. Envelopes marked "MODIFICATION" shall be opened and read out with the corresponding Bid. Only envelopes that are opened, read out and recorded at Bid Opening shall be considered.	
29.6	All other envelopes shall be opened one at a time, and the following read out and recorded: the name of the Bidder and whether there is a modification; the Bid Prices (per lot if applicable), any discounts and alternative offers; the presence of a Bid Security, if required; and any other details as the Purchaser may consider appropriate. Only	

	discounts and alternative offers read out and recorded at bid opening shall be considered for evaluation. No Bid shall be rejected at bid opening except for late bids, in accordance with ITB 27.1.	
29.7	The Purchaser shall prepare a record of the Bid Opening, which shall include the information disclosed to those present in accordance with ITB 29.6. The minutes shall include, as a minimum:	
	a.	The Tender Number and Description;
	b.	The name of the Bidder, Bid number and whether there is a withdrawal, substitution or modification;
	c.	The Bid deadline date and time;
	d.	The date, time and place of Bid Opening;
	e.	Bid prices, per lot if applicable, offered by the Bidders, including any discounts and alternative offers;
	f.	The presence or absence of Bid Security and, if present, its amount;
	g.	The names of Bidders at the Bid Opening, and of the Bidders authorized representatives (if any);
	h.	Details of any feedbacks or other comments made by Bidders/Bidders authorized representatives attending the Bid Opening, including the names and signatures of the Bidders/Bidders authorized representatives making the feedback(s) and/or comment(s); and
	i.	The names, designations and signatures of the members of the Bid Opening Committee.
	The Bidders/Bidders authorized representatives who are present shall sign the record. The omission of a Bidders/Bidders authorized representative's signature on the record shall not invalidate the contents and effect of the record.	
E. Evaluation and Comparison of Bids		
30.	**Confidentiality**	
30.1	Information relating to the examination, clarification, evaluation and comparison of Bids and recommendations for the award of a contract shall not be disclosed to Bidders or any other persons not officially concerned with such process.	
30.2	Any effort by a Bidder to influence the Purchaser's processing of Bids or award decisions may result in the rejection of the bidders Bid.	

Procurement Services Department ★ Thimphu · Bhutan ★ Bhutan Power Corporation Limited

31.	**Clarification of Bids**	
31.1	To assist in the examination, evaluation and comparison of Bids, the Purchaser may, at its discretion, ask the bidder for a clarification of its Bid. Any clarification submitted by a Bidder with regard to its Bid and that is not in response to a request by the Purchaser shall not be considered. The Purchaser's requests for clarification and the response shall be in writing. No change in the price or substances of the Bid shall be sought, offered or permitted, except to confirm the correction of arithmetic errors discovered by the Purchaser in the evaluation of the Bids, in accordance with ITB 34.	
32.	**Deviations, Reservations, and Omissions**	
32.1	During the evaluation of bids, the following definitions shall apply:	
	a.	"Deviation" is a departure from the requirements specified in the Bidding Document. Any comments, remarks, observations and feedbacks will constitute as deviation and shall be indicated in the deviation sheet;
	b.	"Reservation" is the setting of limiting conditions or withholding from complete acceptance of the requirements specified in the Bidding Document; and
	c.	"Omission" is the failure to submit part or all of the information or documentation required in the Bidding Document.
33.	**Responsiveness of Bids**	
33.1	The Purchaser's determination of a Bid's responsiveness shall be based on the contents of the Bid itself, and is to determine which of the Bids received are responsive and thereafter to compare the responsive Bids against each other to select the lowest evaluated Bid.	
33.2	A substantially responsive Bid is one that conforms to all the terms, conditions and specifications of the Bidding Documents without material deviation, reservation or omission. A material deviation, reservation or omission is one that:	
	a.	Effects in any substantial way the scope, quality or performance of the supplies; or
	b.	Limits or is inconsistent with the bidding documents in a substantial way, the Purchaser's rights or the bidder's obligations under the Contract; or
	c.	Whose rectification would affect unfairly the competitive position of other Bidders presenting substantially responsive Bids.
33.3	If a Bid is not substantially responsive to the Bidding Documents, it shall be rejected by the Purchaser and may not subsequently be made responsive by the bidder by correction of the material deviation, reservation or omission.	

34.	**Nonconformities, Errors and Omissions**	
34.1	Provided that a Bid is substantially responsive, the Purchaser may waive any non-conformities or omissions in the Bid that do not constitute a material deviation.	
34.2	Provided that a Bid is substantially responsive, the Purchaser may request that the Bidder submit the necessary information or documentation within a reasonable period of time, to rectify nonmaterial nonconformities or omissions in the Bid related to documentation requirements. Such omission shall not be related to any aspect of the price of the Bid. Failure of the Bidder to comply with the request may result in the rejection of its Bid.	
34.3	Provided that the Bid is substantially responsive, the Purchaser shall correct arithmetical errors on the following basis:	
	a.	If there is a discrepancy between the unit price and the total price per item that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price per item will be corrected unless in the opinion of the Purchaser there is an obvious misplacement of the decimal point in the unit price, in which case the total price as quoted shall govern and the unit price shall be corrected.
	b.	If there is a discrepancy between the Total Amount and the sum of the Total price per item, the sum of the total price per item shall prevail and the Total Amount will be corrected.
34.4	If the Bidder that submitted the lowest evaluated Bid does not accept the correction of errors, its Bid shall be disqualified and its Bid Security shall be forfeited.	
35.	**Preliminary Examination of Bids**	
35.2	The Purchaser shall examine and confirm that the following documents and information have been provided in the Bid. If any of these documents or information is missing, the Bid shall be rejected.	
	a.	Bid Form, in accordance with ITB 12.1 (a);
	b.	Price Schedules, in accordance with ITB 12.1 (a);
	c.	Bid Security, in accordance with ITB 22.
36.	**Examination of Terms and Conditions; Technical Evaluation**	
36.1	The Purchaser shall examine the Bid to confirm that all terms and conditions specified in the GCC and the SCC have been accepted by the Bidder without any material deviation or reservation.	
36.2	The Purchaser shall evaluate the technical features of the Bid submitted in accordance with ITB 20, to confirm that all requirements specified in Section V, Schedule of	

	Supply of the Bidding Documents have been met without any material deviation or reservation.	
36.3	If, after the examination of the terms and conditions and the technical evaluation, the Purchaser determines that the Bid is not substantially responsive in accordance with ITB 33, the Bid shall be rejected.	
36.4	No conditional offer(s) shall be allowed. A bid with conditional offers shall be rejected	
37.	**Conversion to Single Currency**	
37.1	For evaluation and comparison purposes, the Purchaser shall convert all bid prices, expressed in amounts in various currencies into a single currency and use the exchange rates specified in the BDS.	
38.	**Margin of Preference**	
38.1	A margin of preference may apply to domestic goods manufactured in Bhutan as provided for in the BDS. To avail a margin of preference, the Bidder shall provide a value addition certificate from the Ministry of Economic Affairs.	
39.	**Detail Evaluation of Bids**	
39.1	The Purchaser shall evaluate each Bid that has been determined, up to this stage of evaluation, to be substantially responsive.	
39.2	To evaluate a Bid, the Purchaser shall only use all the factors, methodologies and criteria defined in this ITB 39. No other criteria or methodology shall be permitted.	
39.3	To evaluate a Bid, the Purchaser shall consider the following:	
	a.	Evaluation shall be done for Items or Lots, as specified in the BDS;
	b.	The Bid Price, as quoted in accordance with ITB Clause 16;
	c.	Price adjustment for correction of arithmetic errors in accordance with ITB 34.3;
	d.	Price adjustment due to discounts offered in accordance with ITB Clause 16.4;
	e.	Adjustments due to the application of the evaluation criteria specified in the BDS from amongst those set out in Section III, Evaluation and Qualification Criteria; and
	f.	Adjustments due to the application of a margin of preference, in accordance with ITB Clause 38, if applicable.
39.4	The Purchaser's evaluation of a Bid shall exclude and not take into account any allowance for price adjustment during the period of execution of the contract, if provided in the bid.	

39.5	The Purchaser's evaluation of a Bid may require the consideration of other factors in addition to the Bid Price quoted in accordance with ITB Clause 16. These factors may be related to the characteristics, performance, and terms and conditions of purchase of the Goods and Related Services. The effect of the factors selected, if any, shall be expressed in monetary terms to facilitate comparison of Bids, unless otherwise specified in Section III, Evaluation and Qualification Criteria. The factors, criteria and the methodology of application shall be as specified in ITB 39.3 (e).
39.6	If so specified in BDS, Goods are grouped in two or more lots, the Purchaser will evaluate Bids on the basis of LOT WISE or a combination of Lots and the Purchaser shall award one or multiple lots to more than one Bidder.
40.	**Comparison of Bids**
40.1	The Purchaser shall compare all substantially responsive Bids to determine the lowest evaluated Bid, in accordance with ITB 39.
40.2	If the Bid price of the lowest evaluated Bid appears abnormally low, high and/or seriously unbalanced price as compared to other Bidders or past rates, then the Purchaser may require the Bidder to produce written explanations of, justifications and detailed price analyses for any or all items offered. Such explanations may include, but are not limited to, details of the method by which the Goods and Related Services are to be provided, the technical solutions chosen, exceptionally favourable conditions available to the Bidder for the execution of the Contract, and the originality of the Goods proposed by the Bidder. After objective evaluation of the explanations, justifications and price analyses, if the Purchaser decides to accept the Bid with an abnormally low and/or seriously unbalanced price, the Purchaser shall require that the amount of the Performance Security stipulated in ITB 48 be increased at the expense of the Bidder to a level sufficient to protect the Purchaser against financial loss in the event of default of the successful Bidder under the Contract.
41.	**Post qualification of the Bidder**
41.1	The Purchaser will determine to its satisfaction whether the bidder selected as having submitted the lowest-evaluated and substantially responsive Bid is qualified to satisfactorily perform the Contract.
41.2	The Purchaser will determine the reasonability of the Bid Prices based on the past purchase rate and the prevailing market rate during the evaluation.
41.3	The determination based upon an examination of the documentary evidence of the bidder's qualifications submitted by the bidder, pursuant to ITB 19, as well as such other information as the Purchaser deems necessary and appropriate.
41.4	If required, the Purchase may carry out the inspections of the Bidder's factories to assess the production, technical, financial and manpower capacity of the Bidder to perform the Contract. The Purchaser shall notify in advance of the date in writing on which the inspection will be made. If the Bidder does not meet the required capacity as assessed by the inspection team, the bid shall be rejected

41.5	An affirmative determination shall be a prerequisite for award of the Contract to the bidder. A negative determination will result in rejection of the bidder's Bid, in which event the Purchaser shall proceed to the next lowest evaluated Bid to make a similar determination of that Bidder's capabilities to perform satisfactorily.
42.	**Contacting the Purchaser**
42.1	Subject to ITB 31, no bidder shall contact the Purchaser on any matter relating to its Bid, from the time of bid opening to the time the Contract is awarded.
42.2	Any effort by a Bidder to influence the Purchaser in the Purchaser's decisions in respect of bid evaluation, bid comparison or Contract awards will result in the rejection of the bidder's Bid.
43.	**Purchaser's Right to Accept Any Bid and to Reject Any or All Bids**
43.1	The Purchaser reserves the right to accept or reject any Bid and to annul the bidding process and reject all Bids at any time prior to award of Contract, without thereby incurring any liability to the affected bidder or bidders or any obligation to inform the affected bidder or bidders of the ground for the Purchaser's action.
	F. Award of Contract
44.	**Award Criteria**
44.1	The Purchaser will award the Contract to the successful bidder whose Bid has been determined to be the lowest-evaluated responsive Bid, provided further that the bidder is determined to be qualified to satisfactorily perform the Contract.
45.	**Purchasers Right to Vary Quantities at Time of Award**
45.1	At the time the Contract is awarded, the Purchaser reserves the right to increase or decrease the quantity of Goods and Related Services specified in Section V, Schedule of Supply, provided this does not exceed the percentages indicated in the BDS, and without any change in the unit prices or other terms and conditions of the Bid.
46.	**Notification of Award**
46.1	The Purchaser will notify the successful bidder in writing that its Bid has been accepted.
46.2	Until a formal Contract is prepared and executed, the notification of award shall be binding on the Supplier.
47.	**Signing of Contract**
47.1	Within 15 (Fifteen) days from the date of issue of the notification of award of contract, the successful bidder are required to come and sign, date and seal the contract agreement at the office as specified in BDS.

47.2	Where the contract is not signed by both parties simultaneously:	
	a.	The Purchaser shall send to the successful bidder two original copies of (1) the full agreed contract and (2) the letter of acceptance, each copy to be signed by the bidder or its duly authorized representative, together with the date of signature;
	b.	The letter of acceptance shall indicate the deadline by which it must be accepted as specified in BDS;
	c.	The successful bidder, if agrees to conclude the contract, must sign and date all original copies of the contract and letter of acceptance and return one copy of each to the Purchaser before the expiry of the deadline indicated in the letter of acceptance;
	d.	Failure of the successful bidder to accept the award/ sign the contract shall constitute sufficient grounds for the annulment of the award and forfeiture of the bid security.
47.3	Notwithstanding ITB 47.1 above, in case signing of the Contract Agreement is prevented by any export restrictions attributable to the Purchaser, to Bhutan, or to the use of the products/Goods, systems or services to be supplied, where such export restrictions arise from trade regulations from a country supplying those products/Goods, systems or services, the Bidder shall not be bound by its Bid, always provided, however, that the Bidder can demonstrate to the satisfaction of the Purchaser that signing of the Contact Agreement has not been prevented by any lack of diligence on the part of the Bidder in completing any formalities, including applying for permits, authorizations and/or licenses necessary for the export of the products/Goods, systems or services under the terms of the Contract.	
48.	**Performance Security**	
48.1	Within 15 (Fifteen) working days of the receipt of notification of award of contract, the successful bidder shall furnish the performance security, in accordance with the Conditions of Contract.	
48.2	The Performance Security @10% of the supply contract value shall be furnished by the successful bidder in one of the following forms:	
	a.	Unconditional bank guarantee issued by the reputed Financial Institution in the form provided for in Section VIII, Contract Forms or another form acceptable to the Purchaser; or
	b.	Banker's Cheque/Cash Warrant, or
	c.	Demand Draft.
48.3	If the institution issuing the Performance Security furnished by the Bidder is located	

	outside the Purchaser's country, the Performance Security shall be counter guaranteed by a correspondent Financial Institutions located in the Purchaser's country to make it enforceable.
48.4	Failure by the successful Bidder to submit the above-mentioned Performance Security shall constitute sufficient grounds for the annulment of the award and forfeiture of the Bid Security. In that event the Purchaser may award the Contract to the next lowest evaluated Bidder whose offer is substantially responsive and is determined by the Purchaser to be qualified to perform the Contract satisfactorily. Such a failure shall be considered as default and all relevant clauses shall apply.

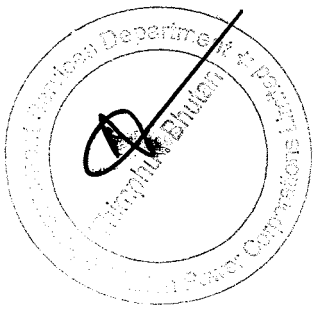
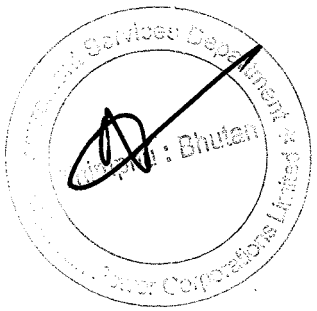


Table of Contents



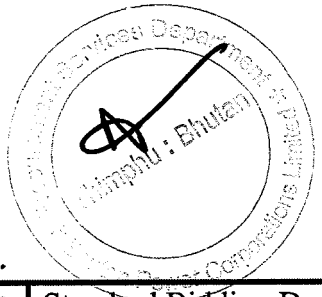
Section II. Bid Data Sheet (BDS)

<table>
<tr><th colspan="2">A. Introduction</th></tr>
<tr><td>ITB 1.1</td><td>The Tender No. is: BPC/PSD/2021 Materials/2020/10 dated August 15, 2020</td></tr>
<tr><td>ITB 1.1</td><td>The Tender Name is: Supply and Delivery of Electrical Line and Substation Materials (Package B)</td></tr>
<tr><td>ITB 1.1</td><td>The Purchaser is: Procurement Services Department, Bhutan Power Corporation Limited, Yarden Lam, Post Box No. 580, Thimphu, Bhutan.</td></tr>
<tr><td>ITB 1.1</td><td>The number and identification of Lots comprising this tender are:
<table>
<tr><th>Lot No.</th><th>Lot Description</th></tr>
<tr><td>Lot 1</td><td>Distribution Boards</td></tr>
<tr><td>Lot 2</td><td>Switching Equipment</td></tr>
<tr><td>Lot 3</td><td>Lightning Arrestors</td></tr>
<tr><td>Lot 4</td><td>Distribution Transformers</td></tr>
<tr><td>Lot 5</td><td>Lubricants</td></tr>
<tr><td>Lot 6</td><td>Earthing Equipment</td></tr>
<tr><td>Lot 7</td><td>Poles</td></tr>
<tr><td>Lot 8</td><td>Steel Tubular Pole Fittings</td></tr>
<tr><td>Lot 9</td><td>Telescopic Pole Fittings</td></tr>
</table></td></tr>
<tr><th colspan="2">B. Bidding Documents</th></tr>
<tr><td>ITB 8.2</td><td>For <u>clarification of Bid purposes</u> only, the Purchaser's address is:
Attention: The General Manager.
Address: Procurement Services Department, Bhutan Power Corporation Limited, Yarden Lam, Post Box No. 580, Thimphu, Bhutan.
Telephone number: +975-2-326289
Facsimile number: +975-2-333583
Electronic mail address: nim.dorji@bpc.bt
copy to: kinzangwangmo@bpc.bt , manikumargurung@bpc.bt</td></tr>
<tr><th colspan="2">C. Preparation of Bids</th></tr>
<tr><td>ITB 11.1</td><td>The language of the Bid is: English</td></tr>
<tr><td>ITB 12.1(h)</td><td>The bidders shall submit a signed Integrity Pact: Yes</td></tr>
<tr><td>ITB12.1 (j)</td><td>The Bidder shall submit with its Bid the following additional documents: None</td></tr>
<tr><td>ITB 15.1</td><td>Alternative Bids "shall not be" permitted.</td></tr>
<tr><td>ITB 16.5</td><td>The Incoterms edition is: 2010 edition.</td></tr>
<tr><td>ITB 16.6 (a) (i) & (ii)</td><td>The price shall be inclusive of all taxes and duties that are applicable both inside and outside the purchaser's country.</td></tr>
<tr><td>ITB 16.6(b) (i)</td><td>The price of the goods quoted shall be DDP (Delivery duty paid), RSD, Malbase/Pasakha (Place of destination) for all the lots as per incoterm 2010. Notwithstanding any possible misinterpretation/ambiguity in interpretation, it is</td></tr>
</table>

Procurement Services Department Thimphu : Bhutan Bhutan Power Corporations Limited

<table>
<tr><td></td><td>explicitly clarified that the offered prices shall be all inclusive covering all costs including but not limited to transportation, insurance, taxes and duties and any other costs for delivery of the materials to the Purchaser at the designated place of delivery/destination.</td></tr>
<tr><td>ITB 16.6(b) (ii)</td><td>Add "The Price quoted shall be inclusive of all the taxes and duties that are payable inside as well as outside purchaser country".</td></tr>
<tr><td>ITB 16.6(b) (iii)</td><td>Final destination (Project Site) if relevant: Not Applicable.</td></tr>
<tr><td>ITB 16.7</td><td>The prices quoted by the Bidder "shall not" be adjustable.</td></tr>
<tr><td>ITB 19 (a)</td><td>Manufacturer's Authorization (MA)"is" required
<table>
<tr><th>Lot#</th><th>Lot Description</th><th>Item No.</th><th>MA</th></tr>
<tr><td>Lot 1</td><td>Distribution Boards</td><td>All the items</td><td>Yes</td></tr>
<tr><td>Lot 2</td><td>Switching Equipment</td><td>All the items</td><td>Yes</td></tr>
<tr><td>Lot 3</td><td>Lightning Arrestors</td><td>All the items</td><td>Yes</td></tr>
<tr><td>Lot 4</td><td>Distribution Transformers</td><td>All the items</td><td>Yes</td></tr>
<tr><td>Lot 5</td><td>Lubricants</td><td>All the items</td><td>Yes</td></tr>
<tr><td>Lot 6</td><td>Earthing Equipment</td><td>All the items</td><td>Yes</td></tr>
<tr><td>Lot 7</td><td>Poles</td><td>All the items</td><td>Yes</td></tr>
<tr><td>Lot 8</td><td>Steel Tubular Pole Fittings</td><td>All the items</td><td>Yes</td></tr>
<tr><td>Lot 9</td><td>Telescopic Pole Fittings</td><td>All the items</td><td>Yes</td></tr>
</table>
The bid for that item(s)/Lot(s) shall be rejected if the Manufacturer's Authorization is not submitted for which the Manufacturer's Authorization is required.

The brands (restricted/preferred) are mentioned in the price schedule and bidders are to quote accordingly. Item/lots for which brands are restricted, no alternative/ substitute brand shall be accepted and shall be considered as non-responsive for that particular item/lot.</td></tr>
<tr><td>ITB 19 (b)</td><td>After sales maintenance, repair, spare parts stocking and related services "are not" required, and the Bidder therefore "is not" required to be represented by a suitably equipped and able agent in Bhutan.</td></tr>
</table>



ITB 20.2

Guaranteed Technical Particulars (GTP) *"is"* required.

Lot#	***Lot Description***	***Item No.***	***GTP***
Lot 1	Distribution Boards	All the items	Yes
Lot 2	Switching Equipment	All the items	Yes
Lot 3	Lightning Arrestors	All the items	Yes
Lot 4	Distribution Transformers	All the items	Yes
Lot 5	Lubricants	All the items	Yes
Lot 6	Earthing Equipment	All the items	No
Lot 7	Poles	All the items	Yes
Lot 8	Steel Tubular Pole Fittings	All the items	No
Lot 9	Telescopic Pole Fittings	All the items	No

The Technical Specifications are detailed out in respective Annexure for respective items under the lot. Any technical deviation shall be brought out in the GTP forms for the items where GTP forms are provided and for the items where GTP forms are not required, the deviation shall be brought out in the deviation sheet provided. If the deviations are not mentioned in GTP and deviation sheet provided, the specification shall be considered as complied with the requirement.

The bid for that item(s)/Lot(s) shall be rejected if the GTP is not submitted as specified in Section V, Schedule of Supply where GTP Forms are provided for bidders to fill up. The bidders are required to duly fill up the GTP forms provided in the bidding document. The catalogue/brochures of the items shall not be considered as GTP of the item. Further, if there are discrepancies between the item catalogue/brochures and the offered GTP, then GTP shall prevail.

For the item(s)/Lot(s) of which GTP forms are not provided in Section V, Schedule of Supply of the bidding document, the bidders are requested to submit the catalogue or drawings for individual items. The offered items shall be clearly indicated in the catalogue and deviation brought out in deviation sheet provided.

ITB 21.1

The Bid validity period shall be *90 days* (i.e., **till December 16, 2020**) from the date of bid opening.

ITB 22.1

The amount and currency of the Bid Security are as follows:

Procurement Services Department * Thimphu : Bhutan * Bhutan Power Corporation Limited

	<table><tr><th>Lot#</th><th>Lot Description</th><th>Amount (Nu.)</th></tr><tr><td>Lot 1</td><td>Distribution Boards</td><td>210,000.00</td></tr><tr><td>Lot 2</td><td>Switching Equipment</td><td>188,000.00</td></tr><tr><td>Lot 3</td><td>Lightning Arrestors</td><td>168,000.00</td></tr><tr><td>Lot 4</td><td>Distribution Transformers</td><td>240,000.00</td></tr><tr><td>Lot 5</td><td>Lubricants</td><td>41,000.00</td></tr><tr><td>Lot 6</td><td>Earthing Equipment</td><td>35,000.00</td></tr><tr><td>Lot 7</td><td>Poles</td><td>495,000.00</td></tr><tr><td>Lot 8</td><td>Steel Tubular Pole Fittings</td><td>153,000.00</td></tr><tr><td>Lot 9</td><td>Telescopic Pole Fittings</td><td>105,000.00</td></tr></table> Preferably Bid Security should be submitted for the individual lots. Combined Bid Security would be also accepted, however, if the combined Bid Security is not sufficient in terms of total amount, the offer for the entire quoted lots would be treated as non-responsive as per ITB 22.4 and not considered for further evaluation.
ITB 22.3	The Bid Security validity period shall be 120 days from the date of bid opening (**i.e. till January 15, 2021).**
D. Submission and Opening of Bids	
ITB 23.1 and 24.1	In addition to the original of the Bid, the number of copies is: *One copy.*
ITB 24.3 (d)	The identification of this bidding process is: *BPC/PSD/2021 Materials/2020/10 dated August 15, 2020 (Supply and Delivery of Electrical Line and Substation Materials (Package-B)*
ITB 25.1	For **Bid submission purposes** only, the Purchaser's address is: Attention: *The General Manager* Address: *Procurement Services Department, Bhutan Power Corporation Limited, Yarden Lam, Post Box No. 580, Thimphu, Bhutan.*
ITB 25.1	The deadline for Bid submission is: ***Date: September 17, 2020*** ***Time: 12:30 hours***
ITB 29.1	The Bid opening shall take place at: Address: *BPC Conference Hall, Bhutan Power Corporation Limited, Yarden Lam, Post Box No. 580, Thimphu, Bhutan.* ***Date: September 17, 2020*** ***Time: 14:00 hours***

E. Evaluation and Comparison of Bids	
ITB 37.1	Bid prices expressed in different currencies shall be converted into Ngultrum (BTN). The source of exchange rates shall be as published by the Royal Monetary Authority of Bhutan. The date for the exchange rates shall be the date of Bid Opening, as prescribed in ITB 29.1 and the exchange rate shall be TT selling rate.
ITB 38.1	A margin of five percent (5%) Domestic Preference *"shall not"* apply.
ITB 39.3 (a)	Bids will be evaluated on following basis: *Bids will be evaluated on lot wise bases. A lot with an alternative item price shall be rejected and that lot shall not be considered for further evaluation.* In case some items are not quoted for a particular lot, the corporation reserves the right to cost load the highest responsive rate of other bidders for the purpose of evaluation of that lot if it was determined that the non-quoted items are not a major component of the lot or do not form an integral element of the lot. Actual order shall however be done based on the lowest rate that has been quoted in that bid package.
ITB 39.3 (e)	The adjustments shall be determined using the following criteria from amongst those set out in Section III, Evaluation and Qualification Criteria: Deviation in Delivery schedule: *Yes.[Clause 2.2 of Evaluation Criteria (ITB 39.3 (e)]* Deviation in payment schedule: *No [Clause 2.3 of Evaluation Criteria (ITB 39.3 (e)]* The cost of major replacement components, mandatory spare parts, and service: *No. The cost of spare components, mandatory spares and services if submitted by the Bidder shall not be taken into consideration during the evaluation.* The availability in Bhutan of spare parts and after-sales services for the equipment offered in the Bid: *No* The projected operating and maintenance costs during the life of the equipment: *No.* The performance and productivity of the equipment offered: *Yes.* *The performance warranty period for the equipment offered will be 12 months from the date of receipt at the place of destination.*
ITB 39.6	Bidders *"shall not"* be allowed to quote separate prices for one or more items/lots. *[refer to Section III, Evaluation and Qualification Criteria for the evaluation methodology, if appropriate]*
F. Award of Contract	
ITB 45.1	The maximum percentage by which quantities may be increased is *20% percentage of the contract value.* The maximum percentage by which quantities may be decreased is *20% percentage of the contract value.*
ITB 47.1	The signing of Contract Agreement will take place at: Address: *Procurement Services Department, BPC, Yarden Lam, Post Box No. 580, Thimphu, Bhutan.*

Procurement Services Department ★ Bhutan Power Corporation Limited ★ Thimphu : Bhutan

Section III. Evaluation and Qualification Criteria

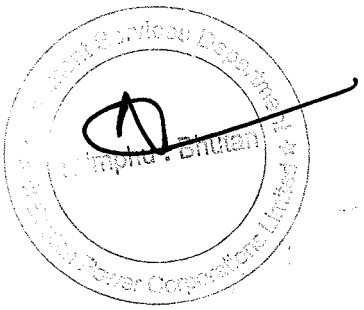
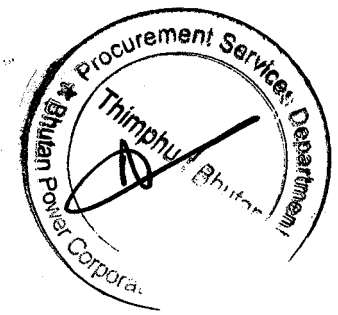


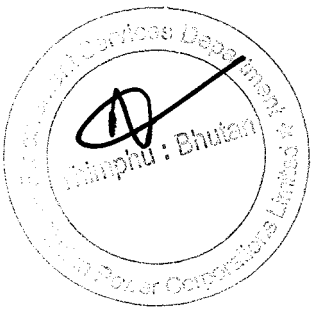
Table of Contents



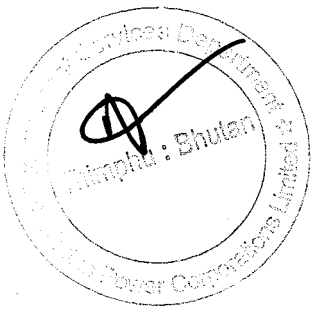
1. Domestic Preference (ITB 38)		
1.1	If the Bidding Data Sheet (BDS) so specifies, in comparing Bids, a margin of preference will be granted to Goods of Bhutanese Origin.	
1.2	For application of domestic preference, all responsive Bids will first be classified into the following three categories:	
	a.	*Category I:* Goods shall be considered to be of Bhutanese Origin based on the percentage of value addition as prescribed by the Ministry of Economic Affairs, Bhutan ;
	b.	*Category II:* All other bids offering Goods manufactured in Bhutan;
	c.	*Category III:* Bids offering Goods manufactured outside Bhutan that have been already imported or that will be imported.
1.3	In the first step, all evaluated bids in each group shall be compared to determine the lowest bid in each group. Such lowest evaluated bids shall be compared with each other and if, as a result of this comparison, a bid from Category I or Category II is the lowest, it shall be selected for the award.	
1.4	If as a result of preceding comparison, the lowest evaluated bid is a bid from Category III, for the purpose of further comparison only, an upward five percent (5%) price adjustment will be made to the CIF/CIP/DDP bid prices of Category III bidders. The lowest evaluated bid determined from this last comparison shall be selected for the award.	
1.5	Bidders applying for the preference shall provide all supporting documents to prove that the Goods offered by them are from Category I and Category II respectively.	
2. Evaluation Criteria (ITB 39.3 (e))		
The Purchaser's evaluation of a Bid may take into account, in addition to the Bid Price quoted in accordance with ITB 16.6, one or more of the following factors as specified in ITB 39.3(e) and in the BDS referring to ITB 39.3(e), using the following criteria and methodologies.		
2.1	Brand Name	
	BPC has adopted the policy of restricting certain Strategic Critical Items (SC-SKU's) as per the provision of the BPC Procurement Manual to ensure high quality, reduce inventory and to sustain long-term smooth operation and maintenance services. Bidders must ensure that for these lots, only the listed brand names are quoted and effort must be made to source this equipment directly from the manufacturers and or	

	their authorized dealers. Preferred Brands/Restricted Brands are specified in Price Schedule.		
2.2	Delivery Schedule *(as per Incoterms specified in BDS)*		
	The Goods are required to be delivered in accordance with and completed as specified in the Section V, Schedule of Supply. No credit will be given to earlier completion. Bids offering late delivery schedules (LDS) will be accepted but the Bids shall be adjusted for the purpose of the bid evaluation only adding at the rate of @one (1) per cent of the bid price for each week of delay to the bid price. Bids offering delivery schedules beyond 1 (one) month of the date specified in Section V, Schedule of Supply shall be rejected.		
2.3	Adjustment for Deviations from the Terms of Payments		
	Deviation from terms of payment as specified in special condition of contract shall not be permitted. All bids deviating from specified terms of payment will be treated as non-responsive.		
2.4	Contractual and Commercial Deviations		
	The cost of all quantifiable deviations and omissions from the contractual and commercial conditions shall be evaluated. The Purchaser will make its own assessment of the cost of any deviations for the purpose of ensuring fair comparison of Bids.		
3. Multiple Contracts (ITB 39.6)			
3.1	The Purchaser shall award multiple contracts to the Bidder that offers the lowest evaluated combination of Bids (one contract per Bid) and meets the post qualification criteria (this Section III, Sub-Section ITB 39.2, Post qualification Requirements)		
3.2	The Purchaser shall:		
	a.	Evaluate only items/lots that include at least the percentages of items per lot and quantity per item as specified in ITB 16.8.	
	b.	Take into account:	
		i.	the lowest-evaluated Bid for each lot; and
		ii.	the price reduction per lot and the methodology for its application as offered by the Bidder in its Bid.
4. Post qualification Requirements (ITB 41.2)			
4.1	After determining the lowest-evaluated Bid in accordance with ITB 40.1. If required, the Purchaser shall carry out the post qualification of the Bidder in accordance with		

	ITB 41, using only the requirements specified. Requirements not included in the text below shall not be used in the evaluation of the Bidder's qualifications.	
	a.	Financial Capability The Bidder shall furnish documentary evidence that it meets the following financial requirement(s): *Not Applicable.*
	b.	Experience and Technical Capacity The Bidder shall furnish documentary evidence to demonstrate that it meets the following experience requirement(s): *ISO Certificate; list of previous clients, relevant catalogues, test certificates, list of past performance certificates and manufacturer's profile for all new brands that are introduced in BPC.*
	c.	The Bidder shall furnish documentary evidence to demonstrate that the Goods it offers meet the following usage requirement(s): *Not Applicable*

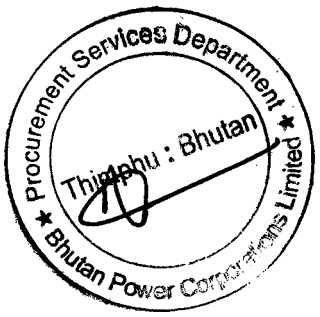


Part 2 – Supply Requirement



Section V. Schedule of Supply

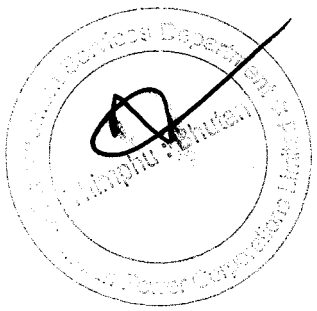
Table of Contents



1. Delivery and Completion Schedule

a. The delivery period shall commence from the date of signing contract.

Lot No.	Description of Goods	Location/Destination as specified in BDS	Required Delivery Period of Goods or Completion Date for Related Services
1	Distribution Boards	DDP, Chief Manager, RSD, Malbase/Pasakha	120 days
2	Switching Equipment	DDP, Chief Manager, RSD, Malbase/Pasakha	120 days
3	Lightning Arrestors	DDP, Chief Manager, RSD, Malbase/Pasakha	120 days
4	Distribution Transformers	DDP, Chief Manager, RSD, Malbase/Pasakha	120 days
5	Lubricants	DDP, Chief Manager, RSD, Malbase/Pasakha	90 days
6	Earthing Equipment	DDP, Chief Manager, RSD, Malbase/Pasakha	90 days
7	Poles	DDP, Chief Manager, RSD, Malbase/Pasakha	180 days
8	Steel Tubular Pole Fittings	DDP, Chief Manager, RSD, Malbase/Pasakha	90 days
9	Telescopic Pole Fittings	DDP, Chief Manager, RSD, Malbase/Pasakha	90 days



2. Technical Specifications and Drawings

Table of Content

Section I - Common Technical Requirements

1.1 General

In the following sections, this document describes equipment required for the tender. The common technical specifications are to mainly state the general requirements commonly applied for all the Packages. If there is any discrepancy in the requirements between the General Specifications and the Technical Specifications in this Section, the requirements mentioned in Technical Specifications shall prevail.

1.2 Scope of Work

The supply contract includes the design, manufacture, testing, insurance, delivery in complete form (assembly at warehouse if required) unloading and proper handing over the supplies to the Purchaser's Warehouse at Phuentsholing/Pasakha, Bhutan, of the Equipment as specified in the Price Schedule.

All necessary foundation bolts, rag bolts, nuts and washers, grouting packing and the like required for mounting and securing the equipment/assemblies should be included in the supply.

Bidders shall furnish guaranteed particulars in the Schedules enclosed. Drawings of all components shall be provided together with the equipment type and reference number to ensure their identification.

The unloading of the goods (items) in the purchaser's warehouse shall be in the scope of the suppliers.

1.3 Units of Measurement

Metric units of measurement (System International) shall be used on all Contract documentation. Angular measurement shall be in degrees with 90 degrees comprising one right angle.

1.4 Standards

The design material, construction, manufacture, inspection and testing of all equipment supplied under this Specification shall conform to the latest editions of the International Electro-technical Commission (IEC) Specifications and other international standards where the material is not covered by IEC. Other national or international standards are accepted if they promise to confer equal or superior quality and performance than IEC or the specified standards.

The Supplier shall provide to the Purchaser, English language copies of any Standards and Codes of Practice, which the Supplier wishes to use. The Supplier shall provide English language translations of any Standards and Codes of Practice which the Supplier wishes to use and which are in a language other than English.

1.5 Language

The English language shall be used on all Contract documents, drawings and calculations and in all correspondence between the Supplier and the Purchaser. Any documents and drawings submitted by the Supplier in the language other than English to the Purchaser will be returned to the Supplier without review by the Purchaser.

1.6 Site Conditions

1.6.1 The conditions for the design of the equipment are as follow:

Basic Design Parameters	**Basic Design Value**
Altitude	2400 metres
Ambient Air Temperature : minimum Maximum	-10°C +40°C
Average Annual Isokeraunic Level	75 thunderstorm days
Average Annual Rainfall & Period	1400 mm (May to September)
Climate	Varied (From tropical to severe winters)
Relative Humidity	20 – 100%
Seismic Acceleration : Horizontal Vertical	0.1 g 0.05 g
Snow Incidence and period	150 –300 mm (December to March)
Wind Pressure : Conductors Towers, Supports	45 kg/m^2 195 kg/m^2

1.6.2 Special Conditions

The equipment under this tender shall be designed for 2400m and accordingly shall the equipment/components shall be altitude corrected to 2400m.

1.7 Electrical Design Parameters

The electrical parameters of the equipment in accordance with relevant IEC and IS standards for 33kV and below are shown in following tables.

Medium Voltage

Nominal System Voltage	**kV**	**33**	**11**	**6.6**
Nominal System Frequency	Hz	50	50	50
Maximum System Voltage	kV	36	12	7.2
Rated Impulse withstand voltage (Peak)	kV	170	75	60
Rated one minute power frequency withstand voltage (rms)	kV	70	28	20

Rated one second short time current (rms)	kA	16	20	20
Rated short circuit withstand current (peak)	kA	40	50	50
Creepage Distance	(mm/kV)	25	25	25

Low Voltage

Insulation parameters- Low Voltage

Nominal System Voltage	**V**	**400/230**
Nominal System Frequency	Hz	50
Maximum System Voltage	V	424/244[1]
Rated one minute power frequency withstand voltage (rms)	V	3000
Rated impulse withstand voltage (peak)	kA	7500

Note 1: Phase to Phase / Phase to Neutral

System Variation

Parameters permissible at 75 °C		**Variation**
Voltage Regulation of MV System	33,11,6.6 kV	±10%
Voltage Regulation of LV System	400/230 V	±6%
System Frequency	50 Hz	-2%, +1% [1]
Parameters permissible at 75 °C		Variation

Note 1: Maintain the System frequency between 49.0-50.5Hz.

1.7.1 De-rating

Since various standards or recommendations enforce validity limits on device characteristics, therefore the values mentioned in this specification are for the normal condition of use i.e. below 1000 m. Beyond these limits, it is necessary to deduce certain values, in other words to de-rate the device. De-rating must be considered;

- For insulation level of external insulation.
- For electrical clearances of two conductive parts measured through air.

1.7.2 Basic Insulation Level (BIL) De-rating According to Altitude

For installation at an altitude higher than 1000 m, the correction method recommended in IEC 60694 is convenient to use for purpose of the determination of withstand test voltages.

1.7.3 Electrical Clearance De-rating According to Altitude

If the equipment is specified for operation at an altitude higher than 1000 m, the clearance requirements shall be increased by 1.25% for every 100 m by which the altitude exceeds 1000 m. Requirements are given for phase-to-earth; phase-to-neutral and phase-to-phase clearance.

1.8 Spare Parts, Tools and Appliances

The bidder shall attach the spares, special tools and/ or appliances which are recommended.

The Purchaser may order all, none or any of the recommended items. Those ordered shall be delivered not later than the date of receipt of the last shipment of the associated item of plant. The price of the items shall be subject to the same price conditions as the associated item of plant.

All spares shall be interchangeable with the original parts. They shall be treated and packed for long term storage under the climatic conditions of site.

Each item shall be clearly and permanently labelled on the outside of its container with its description and purpose. When several items are packed in one case, a general description of the contents shall be given on the outside of the case. Spare parts shall not be shipped in the same cases as components, which are used for erection. The cases shall be clearly labelled to indicate that they contain spare parts or tools and each tool or appliance shall be clearly marked with its size and purpose.

All case containers or other packages are liable to be opened for inspection and checking on site.

The cost of recommended spares, special tools (other than those specified in the BOQ) will not be taken into consideration when comparing bids.

1.9 Electrical Power Supplies

a) Power Supplies

Power supplies for plant and equipment shall be:

i. 400 V, 3 phase, 4-wire, 50 Hz for power.
ii. 230 V, 1 phase, 50 Hz for lighting, indication, and anti-condensation heaters.

48/110 V DC for relays, essential indication, CB spring charging, controls/ protection, alarms, CB tripping and closing.

b) Miniature Circuit Breakers

Means shall be provided for protection and isolation of circuits associated with protection, control and instruments. They shall be of approved type and grouped, as far as possible, according to their functions. They shall be clearly labelled both on the panels and the associated wiring diagrams.

Miniature circuit breakers shall be of the thermal and magnetic tripping type, and comply with IEC 60898 and IEC 60947-2.

c) Instruments

All electrical instruments and meters shall comply with IEC 60051 and IEC 61010 and, unless otherwise specified, shall be of industrial grade accuracy. Three-phase power measuring instruments shall be of the three-phase unbalanced load pattern wherever the current and Voltage references permit. Energy meters shall be three phase four wire having maximum demand indicator, RS485 port and optical port.

All indicating and recording instruments shall be flush mounted in dust proof cases complying with IEC 60068 and dimensions to IEC 61554.

The size of all indicating instruments shall be 96 mm square with long scale and instruments supplied from transducers shall have 4-20 mA movements. Running hour meters shall have 6 digit cyclo-meter type indicators.

Instrument dials shall be white with black markings. A red line shall be drawn on each scale to represent rated conditions. Bezels shall have uniform semi-gloss black high-grade finish.

The movements of all electrically actuated instruments shall be of the deadbeat type. Instruments shall be provided with a readily accessible zero adjustment wherever possible.

d) Terminals

Moulding materials shall be self-extinguishing or resistant to flame propagation, substantially non-hygroscopic and shall not carbonise when tested for tracking. The insulation between any terminal & framework or between adjacent terminals shall withstand a test of 2 kV rms. for one minute. The mouldings shall be mechanically robust to withstand handling while making terminations.

All terminals shall be mounted in accessible positions. Adjacent terminals shall be adequately spaced with respect to each other and to the incoming cable gland plate. Separate terminations shall be provided on each terminal strip for the cores of incoming and outgoing cables including all spare cores.

Terminal blocks for CT and VT secondary leads shall be provided with test links and isolating facilities. Terminals provided for current transformers shall incorporate facilities to enable secondary windings to be short-circuited without disturbing fixed wiring and earthing facilities.

Terminations for circuits operating at Voltages greater than 60 V shall be protected by transparent insulating covers marked with the working Voltages.

DC circuit terminals shall be segregated from AC terminals.

Unless otherwise specified, all the terminal blocks except the terminal blocks for CTs shall be suitable for connecting minimum two 2.5 sq.mm copper conductors of the external cables at each connecting point. The terminal blocks for CTs and PTs shall be suitable for connecting minimum of 4.0 sq. mm and 2.5 sq. mm copper conductors respectively.

All spare contacts and terminals of the panel mounted equipment and devices shall be wired to terminal blocks.

The terminal assemblies shall give the required number of ways plus 20% spare with a minimum of 5 terminals. These shall be uniformly distributed on all rows of terminal blocks.

e) Panel Wiring

All wiring shall be carried out with 1100 V grade, single core, stranded copper conductor wires with FRLS PVC insulation and shall be Vermin, rodent proof. The minimum size of the stranded copper conductor used for panel wiring shall be as follows:

a) All circuits except CT circuits : 1.5 mm2 per lead.
b) CT Circuit : 2.5 mm2 per lead.

The minimum number of strands per conductor shall be seven. Extra flexible wires shall be used for wiring of devices mounted on moving parts such as swinging panels and doors.

The wiring shall be bound and supported by clamping, roughing or lacing. Spiral wrapping will not be accepted. Wire ways shall not be more than 50% full. Adequate slack wire shall be provided to allow for one re-stripping and reconnection at the end of each wire. When screened cables or wires are necessary, an insulating sheath shall be included.

Wiring and supports shall be of fire resistant material.

Wiring shall only be jointed or teed at terminals. Terminals of the clamp type shall not have more than two wires connected.

f) Wire Colour Code

Wire colours shall be as follows:

Colour	Purpose
Red	R-phase connections in current and Voltage transformer circuit only
Yellow	Y-phase connections in current and Voltage transformer circuits only

Blue	B-phase connections in current and Voltage transformer circuits only.
Green with Yellow Stripes	Connections to earth
Black	AC neutral connections, earthed or unearthed, connected to the secondary circuits of current and Voltage transformers.
Any other Colours	AC connections other than those above.

Alternatively, where equipment is wired in accordance with a manufacturer's standard diagram, wiring may be carried out in a single colour except that all connections to earth shall be green with yellow stripes.

g) Terminations and Ferrules

The ends of every wire and every cable tail shall be fitted with numbered ferrules of white with alpha numbers clearly engraved in black.

Moisture and oil resisting insulating material shall be used. The ferrules shall be of the interlocking type and shall grip the insulation firmly.

Wires and terminals associated with tripping circuits shall be distinctively marked.

h) Electrical Insulation

Insulating materials shall be finished to prevent deterioration of their qualities under the specified working conditions.

Plastics, elastomers, resin-bonded laminates and inorganic materials shall be of suitable quality selected from the grades or types in the appropriate IEC Standard.

All cut or machined surfaces and edges of resin-bonded laminates shall be cleaned and then sealed with an approved Varnish as soon as possible after cutting.

i) Electronic and Control Equipment

Equipment shall be capable of withstanding randomly phased transient over-voltages of either polarity on the power supply or interruptions of the power supply without damage or impairment to the equipment's subsequent performance. In the case of controls, no mal-operation shall occur.

Where manufacturers require that electronic equipment supplied under this Contract should not be subjected to insulation resistance tests ("Meggering"), suitable warning notices shall be provided and installed in appropriate locations.

No thermionic valves shall be used in the equipment. Wherever possible, integrated circuits shall be used.

- It shall be possible to remove/replace card from/to electronic equipment without damage and without interfering with the operation of the rest of the equipment or system. If necessary, consideration should be given to switching off the supplies locally to a card to prevent inadvertent interference to the equipment or system during removing/replacing a card.

j) Alternating Current Supply Practice

- Double-pole switches shall be used to break single-phase ac mains supplies. For multi-phase supplies, each phase shall be switched simultaneously and the neutral should preferably not be switched. If it is switched, it shall be opened after and closed before the phase-lines.

All mains circuits shall be protected only in the phase-lines by MCBs of suitable rating or by other suitably approved protective devices. The neutral shall be connected by a removable link located near the protective devices.

All main transformers shall have an electrostatic screen, which shall be earthed.

k) Direct Current Supply Practice

Double pole switches shall be used to break dc supplies, one pole for the positive line and one pole for the negative.

DC circuits shall be protected by MCBs of suitable rating installed in both positive and negative lines.

Measures shall be taken to prevent arcing across switches or relay contacts which are required to break inductive circuits (e.g. bypass diodes or capacitors connected across coils).

- Power supply bus bars in cubicles shall be shrouded.

The duplicate auxiliary power supply feeders shall be provided in Control panels. Auto-changeover facility in DC DB shall be provided so that in case of failure of one power source, other shall cut in automatically. The protective relays shall not give a trip signal for momentary loss of control Voltage or during changeover of control Voltage.

l) Batteries

Electronic equipment shall not use local internal batteries unless the approval has been obtained. Where approval is given, batteries used inside equipment shall be of the totally sealed, leak-proof type.

m) Earthing

Provision shall be made for earthing all equipment intended for connection in an ac mains supply.

All structural metal work and metal chassis shall be connected to earth. Earthing conductors shall be at least equal in cross-sectional area to the supply conductors and shall be capable of carrying the fault current for 1 second.

n) Anti-Condensation Heaters

Any items of electrical equipment which are liable to suffer from internal condensation (due to atmospheric or load variations) shall be fitted with heating devices suitable for electrical operation at 230 Volts ac, 1 phase, 50 Hz of sufficient capacity to raise the internal ambient temperature by 5°C. The electrical apparatus so protected shall be designed so that the maximum permitted rise in temperature is not exceeded if the heaters are energised while the apparatus is in operation. Where fitted, a suitable terminal box and control switch shall be provided and mounted in an accessible position. A thermostat shall be provided in the heater control circuit to cut-off the heater at 45° C.

o) Interior lighting and Receptacles

The panels shall be provided with a compact fluorescent lamp (CFL) lighting fixture (11 W) rated for 240 V, 1 phase, 50 Hz supply for the interior illumination of the panel during maintenance. Switching of the fitting shall be controlled by the respective panel door switch. All CFL lamps shall be with pin type holder.

The panels shall be provided with a 230 V, 1 phase, 50 Hz, 6 Amps, 3 Pin receptacle with switch. The receptacle with switch shall be mounted inside the panel at a convenient location.

1.10 Materials and Finishes

1.10.1 General

Unless otherwise provided for in the Contract, all materials, fixtures, fittings, and supplies furnished (hereafter called "materials") shall be new and of standard first grade quality. All assembly and construction work shall be done in a neat and professional manner. Materials shall be free of defects. Materials shall be brought to site only after inspection and issuance of proper dispatch clearance. The dispatch clearance shall be issued within three working days after the inspection from the BPC head office. The local materials like bricks, sand aggregates shall be tested in the local laboratories before bulk supply.

All of the plant, whether temporary or permanent, shall be in accordance with the Contract with respect to character, type, construction, constituent substances, weight, strength, shape, dimensions, etc.

In choosing materials and their finishes, due regard shall be given to the harsh climatic conditions which can occur in the area. Some relaxation of the following provisions may be permitted where equipment is hermetically sealed, but weatherproof materials should be used wherever possible.

All structural members, nuts and bolts shall be galvanised and shall conform to the requirements.

1.10.2 Surface Coating and Galvanising

All ferrous metalwork shall be provided with an effective galvanised or corrosion resistant paint treatment applied in accordance with the best trade practice. The paint treatment for each application shall be selected from the 'Paint Procedure' described in subsequent paragraphs.

The formulation and application procedure for the paint shall be as recommended by the manufacturer for the appropriate exposure conditions.

Coatings shall not be applied before vessels and chambers have passed any required pressure or vacuum tests. Precautions shall be taken to prevent corrosion occurring in the period of time between cleaning of the steel and commencing the painting.

Adequate amounts of each type and colour of finish coat as applied to the major equipment items shall be provided for "touch-up" purposes.

The colour of equipment shall be painted with RAL 7032 (exterior) and glossy white (interior).

1.10.3 . Paint Procedure

(a) For Mild Steel Items Exposed to Weather:
  (i) Blast clean.
  (ii) 1st coat - Inorganic zinc primer to give a dry film build of not less than 75 microns.
  (iii) 2nd coat - Chlorinated Rubber to give a dry film build of not less than 100 microns.
  (iv) 3rd coat - Chlorinated Rubber to give a dry film build of not less than 75 microns.

(b) Mild Steel Items Immersed in Oil :
  (i) Blast clean.
  (ii) 1st and 2nd coats - Epoxy paint treatment system in accordance with coating manufacturer's recommendation for oil immersion.
  (iii) Total dry film build thickness shall not be less than 350 microns.

1.10.4 Galvanising

Galvanising shall be applied by the hot dipped process generally in accordance with ASTM A 123-78 for structural steel and ASTM A 153-73 for iron and steel hardware.

For structural steel, galvanising shall average not less than 0.61 kg/m^2 (no individual specimen shall show less than 0.55 kg/m^2) except for 6.35 mm and heavier materials in which case galvanising shall average not less than 0.702 kg/m^2 (no individual specimen shall show less than 0.61 kg/m^2).

For iron and steel hardware, galvanising shall be in accordance with Table 1 of ASTM A 153-73.

The zinc coating shall be smooth, clean, of uniform thickness and free from defects. The preparation for galvanising and the galvanising itself shall not adversely affect the mechanical properties of the coated material.

1.10.5 Castings

All castings shall be free from blowholes, flaws and cracks as far as is practicable. No welding, filling or plugging of defective parts shall be done under any circumstances. All cast-iron shall be of close-grained quality approved by the Engineer.

1.10.6 Welding

All joints shall be bolted joints and welded joints shall not be permitted either during the design stage or the construction stage. However, during erection in case of additional unforeseen requirements by the Employer, if welding needs to be resorted to, the same shall be done with prior approval of the Engineer, and shall conform to BIS specifications. In such a case, the Contractor shall specifically indicate the location and purpose along with the proposed methodology for welding for the Engineers' approval. The wielding shall be carried out by a certified welder who have undergone minimum of certificate level training in this trade.

1.10.7 Nuts and Bolts

Nuts and bolts for incorporation in the plant shall conform to ISO Metric. Other sizes or threads may be permitted only for threaded parts not to be disturbed once manufacturing is complete. Each bolt shall have rolled threads, one hexagonal nut and two washers. Thread length shall be 50 percent of bolt length or maximum 150 mm.

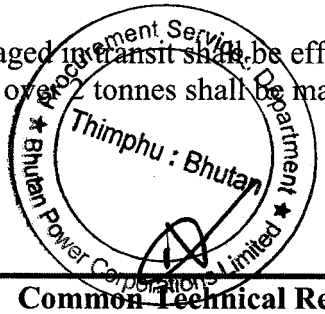
All steel bolts and screwed rods shall be galvanised including the threaded portions. All associated nuts shall be galvanised with the exception of the threads which shall be oiled. The thickness of zinc coating shall be not less than 0.45 kg/sq. metre of surface area.

All bolts, nuts and washers shall be of non-corroding material where they are in contact with non-ferrous parts in conductor clamps and fittings and elsewhere where specifically required by the Purchaser.

1.11 Packing and Shipping

1.11.1 The goods/materials shall not be shipped/ dispatched unless dispatch clearance from Purchaser/Engineer is issued. The dispatch clearance will be issued from the BPCs office after the inspectors submits its inspection report to BPC, within 4 working days after the submission of the report.

1.11.2 Any items liable to be damaged in transit shall be effectively protected and securely fixed in their cases. All cases of over 2 tonnes shall be marked to show where slings should be placed.



1.11.3 All cases shall be clearly identified giving particulars of manufacturer's name and type of equipment. All identification marks on the outside of cases shall be waterproof and permanent. All electrical equipment shall be adequately sealed and desiccating agents used where necessary to prevent damage from condensation. All equipment shall be packed and protected, bearing in mind that it will be shipped to a harsh environment, that a considerable period may elapse between its arrival on site and it's unpacking and that covered storage may not always be possible.

1.11.4 All wood and other materials used in packing cases shall be insect free. Adequate protection and precautions are to be taken to exclude termites and other vermin, noxious insects, larvae or fungus from the packing materials or plant. All contents are to be clearly marked for easy identification against the packing list.

1.11.5 The Supplier shall protect all steelwork before shipment, to prevent corrosion and/ or damage. Bundles of steel sections shall be properly tied together by an approved method and care shall be taken to ensure that they are robust and that they can be handled easily during shipment.

1.11.6 Bolts and nuts shall be double bagged and crated for shipment. Crating of dissimilar metals is not acceptable.

1.11.7 Packing cases where used, shall be strongly constructed and in no case shall timber less than 25 mm in thickness be used. The contents of packing cases shall be securely bolted or fastened in position with struts or cross battens. Cross battens supporting weight in any direction shall not rely for their support on nails or screws driven lengthwise into the grain of the wood, but shall be supported by cleats secured from inside.

1.11.8 The following information shall be marked on the containers/cartons as well as boxes:

a) Supplier's name, Project title and Contract reference
b) Identification number
c) Net/Gross weight
d) Purchaser's name with other despatch particulars such as destination.

Sl. No.	Description	Marking
1	Cables	Every 1 meter Consecutively

1.12 Cable / Conductor Drums

1.12.1 HV Cables shall be supplied in a steel drum. The covers with wood is acceptable. LV Cables and bare conductors shall be wound on non-returnable seasoned wooden drums provided with lagging of adequate thickness and treated to an approved international standard by vacuum impregnation with copper-chrome-arsenate (CCA) preservative to resist rotting and termite and fungus attacks. Drums with an outside diameter exceeding 2.0 metres and an outside width exceeding 1.4 metres shall not be used. The central hole of the drums shall be reinforced with a steel plate of thickness not less than 10 mm, or be fitted with suitable steel hub bushing to suit an axle diameter of 95 mm.

1.12.2 The drums shall be new and sturdy in construction so as to withstand several times loading and unloading, transport on rough roads, storage for five (5) years in tropical areas and

hauling and handling during field erection etc. In the event that the drums are received at the destination in damaged condition thereby, preventing rolling out of cable, the Supplier shall supply extra drums at his own cost. Also, the cost incurred by the Purchaser in rewinding the cable from the damaged drums onto the new drums will be deducted from the amount due to the Supplier.

1.12.3 Internal and external surfaces of the drum shall be painted with bitumen based paint. A layer of waterproof material shall be provided on the barrel under the cable and on the inner surfaces of the flanges. Another layer of waterproof material shall be provided over the outer layer of cable under lagging.

1.12.4 Drums shall be adequately protected by securely fastening substantial wooden battens around the periphery. These battens shall be secured by means of steel tap bindings.

1.12.5 Cables shall be securely fastened around the periphery of the drum. Cables shall be supplied with both ends properly capped, and protected against damage. Each drum and one of each cable length shall bear a metal label detailing manufacturer's name, specified voltage and type and length of conductor. The leading end of cable on cable drums shall be the 'A' end as defined in BS 6480.

1.12.6 The inner cable end attached to the drum shall be capped and sealed in such a manner that the core screening and sheath can be meggered from the outer cable end without removing the inner end cap.

1.13 Labels

1.13.1 All equipment shall be provided with labels or name plates, giving a description of the equipment, together with information regarding the rating, nominal voltage, nominal current and the like under which the item of plant in question has been designed to operate. The labels shall be provided on packaging to the Purchaser's approval.

1.13.2 Such nameplates or labels are to be of non-corrodible, non-hygroscopic material with lettering of a contrasting colour.

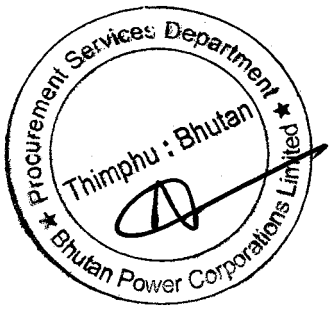
1.13.3 Labels on cable drums shall state the cable details, including the length in metres.

1.14 Locks

Provision shall be made for padlocking of mechanism boxes, isolators and outdoor switchgear as required by the Specification or as necessary to limit access or the safety of personnel. All padlocks will be provided by the Purchaser.

1.15 Supplier Documents and Drawings

1.15.1 General



The Supplier shall be responsible for submission, re-submission and obtaining approval as required of all the documents and drawings listed below (but not limited to), so that there shall be no delay to the work due to the absence of such documents and drawings. Any approval by the Purchaser will not relieve the Supplier of any obligations under the Contract.

Any alterations to the documents and drawings which may be required by the Purchaser for approval shall be made by the Supplier at his own expense. All materials and work involved in their manufacture shall be as indicated in such drawings.

No work shall be done on any part of the Goods, the design or construction of which is dependent on the approval of such drawings or data, until such approval has been given.

1.15.2 Manner of Submission and Approval of Drawings

The Supplier shall submit three prints of each drawing or document (including all the drawings, documents, calculations, manuals required under the Contract) for approval marked 'For Approval'. One copy will be returned to the Supplier marked up with approval or any proposed alterations or conditions. The Supplier shall provide the same number of further prints for any drawings that are altered. The submission of drawings for approval shall be repeated until 'Approved' or 'Approved with conditions' is given by the Purchaser.

Within fifteen working days after receipt by the Purchaser of any drawing or document requiring the Purchaser's approval, the Purchaser shall either return one copy thereof to the Supplier with its approval endorsed thereon or shall notify the Supplier in writing of its disapproval thereof and the reasons therefore and the modifications that the Purchaser proposes.

All drawings, information, design reports, etc shall be neatly type written and be presented as bound documents. The documents presented shall have neatly drawn title pages that clearly show the name of the Purchaser, identify the project name, the contract number, the date, the revision number, etc, and shall be provided with a table of contents.

Bidder need to submit 3 (three) hard copies of GTP's and drawing for approval after the award of contract.

1.15.3 Manuals

The Supplier shall submit the instruction manual for all the goods supplied under the contract. The Supplier shall follow the requirements as mentioned in the relevant clauses in the Technical Specifications.

1.16 Quality Assurance

1.16.1 : The manufacturer must operate a quality assurance system that complies with ISO 9000. The Supplier shall provide current certification showing the manufacturers' compliance

with ISO 9000 or equivalent national standard. The certificate must be issued by an independent, accredited issuing authority.

1.16.2 In compliance with the proposed quality assurance system of ISO 9000 or equivalent, Bidder shall submit with Bid the quality assurance plan for manufacturing the Goods. Especially, if the Bidder proposes to form a joint-venture or consortium, such a Bidder shall submit with Bid a quality assurance plan, including explanation how to manage the same quality of Goods by the joint-venture partners.

1.17 Tolerance

The variation in quantity to be supplied against confirmed order shall be permissible up to One (1) percent per item per consignee for delivery. However, for the short supply the payment shall be made as per the actual supply and for over supply the payment shall be limited to the ordered quantity.

1.18 Inspection and Testing

The materials will be inspected at the Manufacturer's works by the Purchaser's representative. Tests shall be performed in accordance with the relevant IEC standards. In the absence of IEC recommendations the tests must be equivalent at least to the conditions, provisions and definitions of the above-mentioned standards. The supplier shall give at least one month's notice for readiness of equipment for testing at the manufacturer's works. The tests shall be divided into the categories described below.

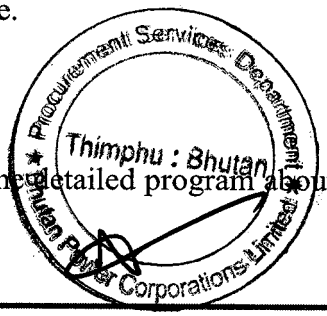
1.18.1 Routine Tests

All the routine tests specified by the standards shall be carried out. If the tests are not witnessed by the Purchaser's representative, test certificates shall be submitted to the Purchaser for approval. Despatch clearance will be given only if the test results are approved.

1.18.2 Type Tests

Bidder shall include with his bid type test certificates, issued by an approved, reputed, independent testing laboratory. The type tests should have been carried out in the last five years.

In addition, the Purchaser may call for type tests to be carried out at the Manufacturer's Works and to be witnessed by the Purchaser or his representative. Such tests will be on random samples at the discretion of the Purchaser and failure to meet the conditions of test could result in the rejection of a complete batch of equipment. Type testing shall only be performed if the manufacturer is unable to provide type test certificates issued by an independent test laboratory of international repute.



Inspection

The Supplier shall intimate the Purchaser about the detailed program about the tests and inspection at least one month in advance.

Inspection and tests on all the Goods offered shall be carried out in the presence of Purchaser's representative unless inspection waiver has been given to the Supplier. The inspection shall be carried out as per the test procedure that has been approved by the Purchaser. The Supplier shall assist the work of the Purchaser's inspector by providing copies of all relevant Standards and test procedures, and allowing the inspector full use of the necessary tapes, measures and laboratory equipment, together with ample space and assistance in the handling of Goods for inspection.

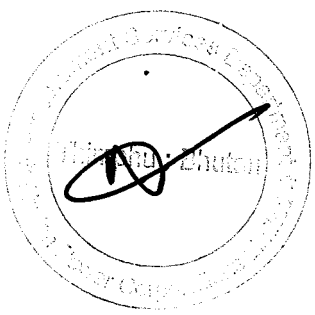
The Supplier shall submit all final test and inspection reports to Purchaser's representative (inspector) during his stay at the workshop for the inspection. The inspector shall issue a "Dispatch Clearance" to the Supplier when the tests and inspection has successfully completed in compliance with the Technical Specifications.

1.19 Dispatch Clearance

1.19.1 The Supplier shall submit all final test and inspection reports to Purchaser's representative (inspector) during his stay at the workshop for the inspection. The inspector shall issue a "Dispatch Clearance" to the Supplier when the tests and inspection has successfully completed in compliance with the Technical Specifications.

1.19.2 The goods have to reach to the delivery warehouse within Twenty (20) days from the date of issuance of dispatch clearance (if the goods are supplied/manufactured from India & Nepal).

1.19.3 The goods have to reach to the delivery warehouse within Forty Five (45) days from the date of issuance of dispatch clearance (if the goods are supplied/manufactured from Third Countries).



Section – 2 Technical Requirements -Electrical

The following electrical technical requirements shall also apply to the equipment supplied under this Contract.

2.1 Electrical Supplies for Auxiliary Plant

The equipment provided under this Contract shall be capable of operating reliably at voltages down to 80% of the nominal voltage except where otherwise specified.

2.2 Electric Motors

2.2.1 All motors shall be in accordance with IEC 60034 and 60072 unless otherwise specified, shall be of the totally enclosed fan cooled type, suitable for continuous operation and direct on-line starting.

2.2.2 They shall be suitable in all respects for service in a damp tropical climate. Main conductor and slot insulation shall be non-hygroscopic and in accordance with Class F as per IEC 60085.

2.2.3 Motors to be located outdoor shall be entirely suitable for operation under the climatic conditions at site.

2.2.4 Motors shall be capable of operating continuously at rated output at any frequency between 48 and 51 Hz and at any voltage within ten percent of the nominal value. Motors shall be designed to be operated for a period of not less than five minutes at a voltage of 25% below the nominal value and at normal frequency without injurious overheating. If required by the purchaser, the supplier shall demonstrate that the motors comply with this requirement.

2.2.5 The starting current at full voltage shall not exceed six times the rated full load current.

2.2.6 All bearings shall be fitted with oil or grease lubricators. Vertical shaft motors shall have approved thrust bearings.

2.2.7 All terminals shall be of the stud type of adequate size for the particular duty, marked in accordance with an approved standard and enclosed in a weatherproof box.

2.2.8 All terminal boxes shall be fitted with an approved sealing chamber, conduit entry or adapter plate, as required, together with the necessary fittings to suit the type of cable specified.

2.3 Starters and Contactors

2.3.1 Where starters are to be provided under this Contract, each motor shall be equipped with two or three pole control gear as appropriate and suitable, unless otherwise specified, for direct starting by the switching of full line voltage on to a standing motor. All starters should preferably be supplied by one manufacturer.

2.3.2 Contactors are to be of robust design and are to comply with IEC 60947-4. They shall operate without undue noise or vibration.

2.3.3 Contactors shall be mounted in ventilated metal cubicles. Unless otherwise approved, the metal surface of the cubicle walls adjacent to the contactors shall be protected by fireproof insulating material. Where two or more contactors are contained in the same

cubicle, they shall be separated by barriers of fireproof insulating material. The cubicles shall be complete with all locks, cable sealing boxes, busbars, internal wiring, terminal boards and accessories. All bare copper connections shall be taped and all secondary wiring is to be so arranged and protected as to prevent it being damaged due to arcing.

2.3.4 Starters shall be of the electrically held-in type with integral "start" and "stop" push buttons mounted externally on the door, with integral interlocked isolators. Where required, auxiliary switches shall be included for the operation of "red" and "green" indicating lights in remote instrument panels.

2.3.5 All motor contactors and their associated apparatus must be designed to operate for a period of not less than 5 minutes at a voltage of 25% below the nominal value and at normal frequency without injurious overheating.

2.3.6 For circuits controlling motors of 15 kW and above, transformer operated overload and phase failure relays shall be provided. For controlling motors of less than 15 kW, thermal overload trips shall be acceptable.

2.4 Cables, Cable Boxes, Sealing End Chambers and Glands

2.4.1 This Contract includes power, auxiliary power and multi-core control cabling as specified in the appropriate sections of the Specification. All cables where required shall be fitted with approved cable end boxes or glands, complete with all necessary fittings.

2.4.2 Air filled cable boxes shall be of adequate dimensions and designed in such a manner that they can be opened for inspection without disturbing the gland plate or incoming cable. Disconnecting chamber shall be provided for disconnecting and moving away the transformer without unscaling the cables leaving the cable box or chamber.

2.4.3 Phase to phase and phase to ground clearances shall be subject to purchaser's approval.

2.4.4 Provision shall be made for earthing the body of each cable box.

2.4.5 Corrosion protected brass material, compression type glands with armour and bonding clamps for the termination of all solid dielectric multi-core cables designed to secure the armour wires and to provide electrical continuity between the armour and the threaded fixing component of the gland and to provide watertight seals between the cable outer sheath and gland and between the inner sheath and threaded fixing component. The gland shall project above the gland plate to avoid ingress of condensed moisture.

2.4.6 All cable boxes shall have at least IP 54 degree of protection.

2.5 Electronic and Control Equipment

2.5.1 Component Ratings

Components and materials shall not be subjected to voltages; currents, temperature stresses, or any other condition outside the operational values given in the manufacturer's published data, over the range of temperature variations and climatic conditions indicated elsewhere.

Where circuits use components, which operate under unusual conditions, the Bidder shall produce documentary evidence that the life, stability and characteristics of the components used will be satisfactory.

Components which in their normal function may have full supply voltage applied shall be capable of withstanding continuous energisation.

2.5.2 Component Tolerances and Aging

The design of the circuits used shall be such that initial tolerances and also cyclic and non-cyclic changes in component values and parameters which may occur during the operational life of the equipment are either inconsequential or are compensated for.
Such compensation shall not necessitate the use of adjustable controls without the prior approval of the purchaser.
Standard components only shall be used and any individual selection necessary to obtain particular parameters shall be subject to the approval of the purchaser.
The combined effects of all tolerances, within a single component and between components, shall be allowed for by taking all tolerances in all worst case combinations produced by environmental and operating conditions. Other statistical assumptions that only certain combinations of tolerances will occur shall not be made, unless the relevant parameters involved are invariably interdependent.

2.5.3 Protection

All circuits shall be protected so that in the event of a component fault, no damage occurs to any interconnecting wiring and any other damage that does occur is confined as closely as possible to the fault.
Protective devices shall be so arranged that the risk of fire within the equipment be minimised. The greatest possible protection shall be provided, consistent with reliability and the ability to withstand operational conditions.
Power supply units' with/without stabilisers shall be protected with voltage trip and overload current circuits with an auto recovery feature.
If any protective device, such as MCB, is incorporated in the output circuits of a current-limited power supply unit, the available current under short circuit conditions shall be sufficient to operate them. MCBs shall be in the 'non-common side of the circuit.
Indication of trip of MCBs shall be clearly displaced by monitoring of trip. Circuits shall be grouped so that, following the operation of a protective device, no false operation shall occur as a result of an MCB trips.
The design, location and connections of MCB shall be such that they do not present a danger to the operator when it is in service.

2.5.4 Interference

a) Self-generated Interference

- Equipment shall not generate any type of interference at a level which could be detrimental to the performance of any other equipment or which could cause annoyance or discomfort to personnel.
  The earthing and cabling arrangements shall be such that detrimental interference is not generated.

b)External Interference

- In the presence of interference expected in power station and substation environments, the design of the equipment shall be such that no damage occurs and performance is maintained to the requirements of the individual specifications.

c) Spark Quenching

Spark quenching devices shall be fitted wherever necessary to ensure continued satisfactory operation of contacts and prevent mal-operation of electronic devices.

d)Noise and Vibration

The acoustical noise levels and/or vibration produced by the equipment in operation shall be as low as is reasonably practicable for the type of equipment concerned and shall be agreed with the purchaser.

2.5.5 Setting-Up and Maintenance Facilities

All equipment shall be provided with sufficient easily accessible test points to facilitate setting-up and fault location together with maintenance aids such as extension boards, jumper leads and special maintenance tools.
Pin or terminal numbering of all cards in all crates shall be consistently uniform throughout. Power supplies shall use the same pin positions on all cards in an equipment or system.

2.5.6 Loose Equipment

Special connecting leads extension boards and any special item required for calibration or maintenance purposes, together with the mating half of all necessary connectors shall be supplied.

2.5.7 Printed Circuit Boards

Printed circuit boards shall be epoxy glass fabric boards to comply with IEC - 60321 suitable for use in hot humid climates. Printed circuit boards may be single-sided, double-sided or multi-layer.
Printed boards shall, in general, comply with IEC 60326. They shall not bow perceptibly when they are mounted in their shelves or racks. Means shall be provided to prevent boards being plugged into the wrong sockets and the plugging in/out action shall be arranged in a positive manner.
An approved protective coat shall be applied to the printed circuit side of the board to protect against tracking, tarnishing and general deterioration due to moisture and deposition of dust. The coating shall not have any adverse reaction with any other

material or components used and shall be suitable for use under tropical conditions. When boards are repaired in the field it shall be possible to apply (or 'touch up') such a finish by simple convenient means.

2.5.8 Component Identification

a. A component reference number shall be marked adjacent to each component. Where this is impossible, components shall be identifiable from the layout drawings provided.

b. The following shall be marked in all instances:

MCBs

The rating and the circuit identification of each MCB shall be marked adjacent to the MCB base.

Control, Protection and Indication Devices

The function of each control, protection and indication device shall be marked. The caption and its arrangement shall be subject to the approval of the purchaser.

Preset Controls

The circuit reference and if possible, the function shall be marked adjacent to each preset control in a position where it will be clearly visible while the adjustment is being made.

Connectors

The diagram reference number shall be marked on or adjacent to each connector.

Test points shall be individually marked with the diagram reference number.

The polarity of any polarised devices (e.g. diodes) shall be marked.

Section – 3 Technical Requirements - Mechanical

The following mechanical general technical requirements shall apply to equipment supplied under this Contract.

3.1 Pipe Supports

3.1.1 The whole of the pipework and accessories included in this Contract shall be supported and mounted in an approved manner. All necessary saddles, structural steelwork, foundation bolts, fixing bolts and all other attachments shall be supplied.

3.1.2 The number and positions of all intermediate flexible supports between anchor points shall be determined by the weights to be carried and by the steelwork available for the purpose and will be subject to the approval of the purchaser.

3.2 Valves

3.2.1 Valves shall be arranged so that the hand wheel moves in a clockwise direction to close the valve. The face of each hand wheel shall be clearly marked with the works "open" and "shut" and be provided with an arrow to indicate direction for opening and shutting. As far as possible valves shall not be fitted in an inverted position.

3.2.2 It shall be possible to remove and replace, or recondition in situ, the seats and to remove the gates. Valves of 50-mm nominal bore and above shall be provided with valve position indicators showing the amount by which the valve is open or closed in relation to its full travel.

3.2.3 All valve hand wheels shall be fitted with nameplates.

3.2.4 Suitable means shall be provided to protect the operating mechanisms of all valves against mechanical damage and dust or dirt. Adequate provision shall be made for the lubrication of the mechanism and guides and this shall preferably be of the pressure type.

3.2.5 Where it will be necessary to lock valves in the open or closed position, they shall be provided with a non-detachable locking arrangement.

3.3 Oil Level Indicators

3.3.1 Unless otherwise approved, oil level indicators of approved design shall be fitted to all oil containers other than hermetically sealed items.

3.3.2 The indicators shall show the level at all temperatures 'likely to be experience in service, be marked with the normal level at 20°C clearly visible from normal access levels and be easily dismantled for cleaning.

3.4 Pressure Gauges

3.4.1 All pressure gauges shall be fitted with stopcocks immediately adjacent to each gauge and all pressure gauge piping shall be fitted with an isolating valve at each point of connection to the main system. Where pressure gauges are mounted on panels, the stopcocks shall be suitable for the connection of a test gauge.

3.4.2 Where a difference in level exists between the situation of the gauge and the point at which pressure is to be measured, appropriate compensation shall be made in the dial reading and the dial must be marked with the amount of compensation applied. Where the compensation would amount to two percent or less of the total movement indicated under normal conditions, it may be ignored.

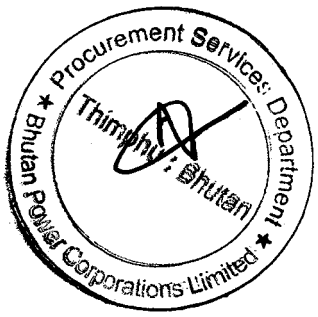
3.4.3 All pressure gauges where practicable shall be mounted on panels in locations approved by the Purchaser. Stopcocks of gauges must be readily accessible. All pressure gauges shall be clearly identified by means of separate labels of approved type and lettering.

3.4.4 All high pressure gauge piping shall be of rustless steel but other pressure gauge piping may be of copper tube or other material approved by the purchaser.

3.5 Thermometer Pockets

3.5.1 Thermometer pockets and instruments connections of an approved pattern are to be fitted in such a position as may be determined to suit the operation and testing of the plant to the approval of the purchaser. Where necessary, the pocket shall be of approved material suitable for the required service.

3.5.2 All thermometer pockets shall comply with the requirements of BS 2765 or equivalent Indian standard.



2. Test Standards

1. Standards

The design material, construction, manufacture, inspection and testing of all equipment supplied under this Specification shall conform to the latest editions of the International Electrotechnical Commission (IEC) Specifications and other international standards where the material is not covered by IEC. Other national or international standards are accepted if they promise to confer equal or superior quality and performance than IEC or the specified standards.

2. Testing

The tests shall be divided into the categories described below.

2.1 Routine Tests

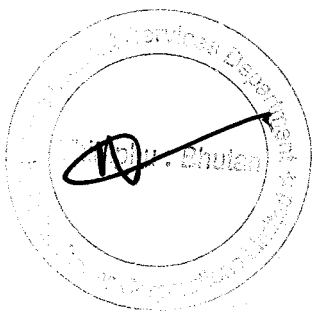
All the routine tests specified by the standards shall be carried out. If the tests are not witnessed by the Purchaser's representatives, test certificates shall be submitted to the Purchaser for approval. The test certificates must show the actual values obtained from the tests, in the units used in this Specification, and not merely confirm that the requirements have been met. No materials shall be dispatched until the test certificates have been received by the Purchaser and the Supplier has been informed that they are acceptable.

Despatch clearance will be given only if the test results are approved.

2.2 Type Tests

Bidder shall include with his bid type test certificates, issued by an approved, reputed, independent testing laboratory. The type tests should have been carried out in the last five years. Type tests shall be carried out at an independent testing laboratory or be witnessed by a representative of such laboratory or some other representative acceptable to the Purchaser. Type tests may be dispensed with at the Purchaser's discretion, if the Supplier furnishes evidence to the Purchaser's satisfaction, that the relevant tests have already been performed on identical materials and equipment.

In addition, the Purchaser may call for type tests to be carried out at the Manufacturer's Works and to be witnessed by the Purchaser or his representatives. Type testing shall only be performed if the manufacturer is unable to provide type test certificates issued by an independent test laboratory of international repute. Such tests will be on random samples at the discretion of the Purchaser and failure to meet the conditions of test could result in the rejection of a complete batch of equipment.



3. Inspection and Testing of Pole Fittings

The inspector shall examine the poles for, among other things, the following characteristics:

- general appearance;
- finish;
- dimensions; and
- straightness.

At least the following dimensional checks shall be made by the inspector:

- length;
- butt diameter and circumference;
- top diameter and circumference;
- non-circularity;
- accuracy of drillings;
- suitability of pole sections to overlap and bolt together;
- straightness, where appropriate;
- internal dimensions.

All cross-arms, clamps and fittings shall be examined by the inspector for, among other things, the following characteristics:

- general appearance;
- finish;
- dimensions;
- straightness;
- appropriate markings; and
- accuracy of drillings.

At least the following dimensional checks shall be made by the inspector:

- length;
- cross section of cross arm
- dimensions of clamp;
- position and size of holes;
- vertical alignment of all through holes.

The group of poles or fittings offered at any one time shall constitute a batch. Within a batch, poles and fittings presented for inspection shall be segregated on a size basis. If 5% of the inspected items show damage or serious deviations from the design criteria, the entire batch shall be unconditionally rejected without further sorting.

Dimensions, such as length and top diameter, shall be measured with a standard steel tape.

Tests

The following tests shall be carried out on samples drawn from each consignment of the poles:

i) Deflection Test/Permanent Set Test
ii) Drop Test.

All the samples subjected to above tests shall pass the tests. Should one or more number of poles fail in any of the test, a second set of samples, double in number shall be drawn and subjected to above tests. Should one or more number of poles from second set of poles fail in any of the tests, the entire consignment shall be rejected.

4. Inspection and Testing for Overhead Line, Switching Equipment, Surge Arresters, HV & LV Circuit Breakers

Tests to establish whether the performance guarantees in the Schedules have been met shall be carried out by the Contractor, to the satisfaction of the Purchaser.

Type and routine factory tests shall comprise the following:

- Insulation level tests, including withstand tests at power frequency voltages on auxiliary equipment.
- Temperature rise test.
- Rated peak withstand current and rated short-time withstand current tests.
- Tests to prove satisfactory operation and mechanical endurance.

5. Inspection and Testing for Distribution Pillar

The Distribution Pillar shall be subject to following tests:

- High voltage test (2000V for 1 minute)
- Megger test
- Electrical control, interlocking and sequential operation test.

6. Inspection and Testing for ACSR Conductor

Testing to be conducted in accordance with IS-398:

- Measurement of length, weight, diameter, lay ratio;
- Testing for breaking load, uniformity of zinc coating and resistance in Ω/km at 20°C.
- Ductility test and Wrapping test
- Dip Test – samples subjected to 40 nos. one minute dip in copper sulphate solution as per IS 2633 (no copper deposit should be found)

7. Inspection and Testing for PVC Cables

Following **acceptance test** in accordance with IS: 1554 (Part-1) 1988 should be conducted:

- Annealing test (for copper)
- Tensile test and Wrapping test (for Aluminium)
- High Voltage test

- Conductor resistance test and Insulation resistance test
- Insulation and sheath thickness
- Tensile strength and elongation test at insulation and sheath breakdown

8. Inspection and Testing for XLPE Cables

Following **acceptance test** in accordance with IS: 7098 (Part-1) 1988 should be conducted:

- High Voltage test – using HT voltage test equipment
- Conductor resistance test – using Kelvin bridge meter
- Insulation resistance test – using Megaohm meter
- Insulation and sheath thickness – using dial vernier calliper
- Tensile strength and elongation test at insulation and sheath breakdown – using tensile testing machine.

9. Inspection and Testing for Insulators

Insulators shall be tested in accordance to the requirements of the following standards in respect to type tests, unless certification is already available for the exact type being supplied, routine tests and sample tests.

• IEC	Radio Interference characteristics of overhead
• IEC 60	High Voltage Test Techniques
• IEC 120	Dimensions of ball and socket coupling string insulators units
• IEC 305	Characteristics of string insulators of the cap and pin type
• IEC 372	Locking devices for ball and socket couplings of string insulator units: dimensions and tests
• IEC 383	Tests on insulators of ceramic materials and glass
• IEC 437	Radio interference test on high voltage insulators
• IEC 506	Switching impulse tests on high voltage insulators
• IEC 507	Artificial pollution tests on high voltage insulators to be used on A.C. systems
• IEC 575	Thermal - mechanical performance tests and mechanical performance test on string insulator units
• IEC 591	Sampling rules and acceptance criteria when applying statistical control methods for mechanical and electromechanical tests on insulators
• CISPR 18-2	Power lines and high voltage equipment
• IEC 797	Residual strength test
• ANSI C29.2	Impact strength test
• ASTM C151	Autoclave expansion of Portland Cement test
• BS 729	Hot dip galvanized coating on iron and steel articles
• BS 443	Specification for testing zinc coatings on steel wire for quality requirement.

Tests shall be carried out on random insulators taken from batches offered for inspection. The number of samples shall be selected as per IEC 383 with a minimum

Procurement Services Department ★ Bhutan Power Corporation Limited ★ Thimphu : Bhutan

of five units. The samples shall be subjected to the following tests after having been subjected to routine tests in the same order:

(a) Verification of dimensions
(b) Temperature cycle test
(c) Electro-mechanical or mechanical failing load test in accordance with the type of insulator, including thermal-mechanical performance test to IEC 575.
(d) Puncture test
(e) Porosity test
(f) Galvanising test

In the event of one unit failing to pass any of the sample tests, a further quantity, double that of the first quantity shall be subject to retesting. In the event of two or more insulators or metal parts failing to pass any of the sample tests, or if any failure occurs on insulators or metal part subject to retesting, the complete batch will be rejected.

Type Tests

Bidders shall include with their offers type test certificates, including thermal, mechanical performance carried out in accordance with IEC575, which are issued by an approved, internationally acknowledged, reputed, independent testing laboratory. When type tests are called for by the Purchaser, they will comprise the following:

1.1 Dry lightning impulse withstand voltage test
1.2 Wet power frequency withstand voltage test

10. Inspection and Testing for RMUs

Type test and Routine tests shall be carried out as per relevant standards.

a) Type and routine tests

Type test certificates should be supplied for the following :

- Impulse withstand test;
- Temparature-rise test;
- Short-time withstand current test;
- Switch, circuit breaker breaking capacity;
- Internal arc withstand;
- Checking of partial discharge on complete unit;

b) In addition, for switches, test reports on rated breaking and making capacities shall be provided.

c) For earthing switches, test reports on making capacity, short-time withstand current and peak short-circuit current shall be provided.

d) The routine tests carried out by the manufacturer shall be backed by test reports signed by the factory's quality control department. They shall include the following:

- Conformity with drawings and diagrams;
- Measurement of closing and opening speeds;
- Measurement of operating torque;
- Checking of filling pressure;
- Checking of gas-tightness;
- Checking of partial discharges on individual components;
- Dielectric testing and main circuit resistance measurement;

Type test

The Bidder shall provide the above type test certificates in the bid that are done within last five (5) years. In case, if the valid type tests certificates are not available, then the bidder shall carryout the type test without any cost implication to the purchaser. Type Tests shall be as per standards.

11. Inspection and Testing for LV Switchboards

Tests and test reports

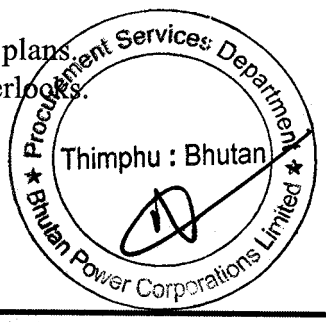
The meter shall pass the manufacturer's standard routine tests. The following type tests shall be in accordance with the latest relevant IEC or ANSI:

- Test of insulation properties:
  - impulse voltage test
  - A.C. voltage test
- Influence of short-time over currents
- Influence of heating:
  - windings, if any
  - external surface
- Electromagnetic compatibility (E.M.C.):
  - radio interference measurement
  - fast transient/burst test
  - immunity to electromagnetic HF field test
  - immunity to electrostatic discharge test
- Others according to manufacturer's standard
- Heating (permissible temperature rise) of:
  - windings, if any, in K
  - external surface in K

The acceptance inspection shall be according to the latest relevant IEC or ANSI

Routine factory testing, in accordance with IEC standards, shall be carried out and shall include the following:

- Check of conformity with wiring diagrams and plans.
- Mechanical operation tests and checking of interlocks.
- Low voltage dielectric tests.
- Low voltage functional checking.



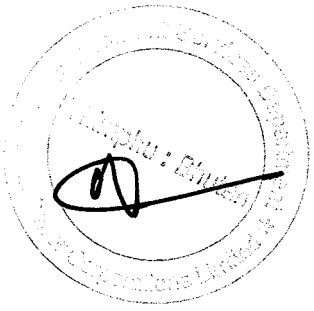
12. Inspection and Testing for Energy Meters

Tests and test reports

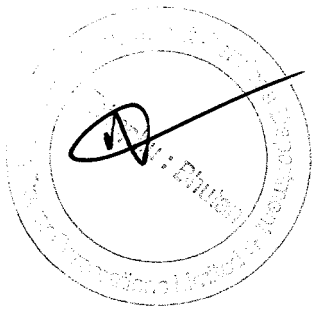
The meter shall pass the manufacturer's standard routine tests. The following type tests shall be in accordance with the latest relevant IEC or ANSI:

- Test of insulation properties:
  - impulse voltage test
  - A.C. voltage test
- Influence of short-time over currents
- Influence of heating:
  - windings, if any
  - external surface
- Electromagnetic compatibility (E.M.C.):
  - radio interference measurement
  - fast transient/burst test
  - immunity to electromagnetic HF field test
  - immunity to electrostatic discharge test
- Others according to manufacturer's standard
- Heating (permissible temperature rise) of:
  - windings, if any, in K
  - external surface in K

The acceptance inspection shall be according to the latest relevant IEC or ANSI



GTP-Bidders to fill up



Guarantee Technical Particular (GTP)				
Lot 1 (Distribution Board)				
Sl.#	**Parameters**	**Units**	**Bidders to fill up**	
			Item No. 1	**Item no.2**
			1P, 100A LVDB, 3W, I/C 100A MCCB, O/G 63A HRC (I/C=1 no. 100A MCCB; O/G= 3 nos. of 63 A HRC)with support clamp size of 165 mm with nuts, bolts-M16/185 mm and M16/55 mm	**1P, 160A LVDB, 3W, I/C 160 A MCCB, O/G 63A HRC (I/C=1no.160A MCCB; O/G=3 nos. 63A HRC) with support clamp size of 165 mm with nuts , bolts-M16/185mm and M16/55mm**
1	Name of Manufacturer and country			
2	Applicable standards			
3	Rated short time withstand current			
4	Rated Voltage	V		
5	No. of phases and rated frequency			
6	Clearances Phase to phase			
7	Clearances between live parts and earth			
8	Type and thickness of sheet steel (hot/ cold rolled) Frame/Doors/Covers			
9	HRC Cartridge fuse used			
10	Fuse rupturing capacity	kA		
11	Degree of protection of Enclosure			
12	Colour finish shade of Panel			
	Interior			
	Exterior			
	Bus Bars			
1	Material			
2	Cross section			
3	Rated normal current of busbars	A		
4	Rated short time withstand current and time	kA		
5	Material of the support insulators	mm		
6	Painting and shade			
7	Earth bus bar size and material			
8	Impulse withstand voltage	kVp		
	Moulded Case Circuit Braeker			
1	Make			
2	Rated Frequency			
3	Number of poles			
4	Breaking Capacity			
5	Rated Current			

Lot 1 (Distribution Board)				
Sl.#	**Parameters**	**Units**	**Item No. 3**	**Item no.4**
			3P LVDB 4W 250A MCCB with 12nos. of 100A HRC (I/C =1no. 250 A MCCB; O/G =12 nos.100A HRC) with support clamp size of 165 mm with nuts , bolts-M16/185mm and M16/55mm	**3P LVDB 4W 250A MCCB with 12nos. of 100A HRC (I/C =1no. 250 A MCCB; O/G =12 nos.100A HRC) with support clamp - Top clamp=324 mm and Bottom Clamp=337 mm with nuts , bolts-M16/185mm and M16/55mm.**
1	Name of Manufacturer and country			
2	Applicable standards			
3	Rated short time withstand current			
4	Rated Voltage	V		
5	No. of phases and rated frequency			
6	Clearances Phase to phase			
7	Clearances between live parts and earth			
8	Type and thickness of sheet steel (hot/ cold rolled) Frame/Doors/Covers			
9	HRC Cartridge fuse used			
10	Fuse rupturing capacity	kA		
11	Degree of protection of Enclosure			
12	Colour finish shade of Panel			
	Interior			
	Exterior			
	Bus Bars			

1	Material			
2	Cross section			
3	Rated normal current of busbars	A		
4	Rated short time withstand current and time	kA		
5	Material of the support insulators	mm		
6	Painting and shade			
7	Earth bus bar size and material			
8	Impulse withstand voltage	kVp		
	Moulded Case Circuit Braeker			
1	Make			
2	Rated Frequency			
3	Number of poles			
4	Breaking Capacity			
5	Rated Current			

Lot 1 (Distribution Board)

Sl.#	Parameters	Units	Item No. 5	Item no.6
			3P LVDB 4W, 100A MCCB with 12 nos. of 63A HRC (I/C =1no. 100 A MCCB; O/G =12 nos.63A HRC) with support clamp size of 165 mm with nuts , bolts-M16/185mm and M16/55mm	**3P LVDB 4W, 100A MCCB with 12 nos. of 63A HRC (I/C =1no. 100 A MCCB; O/G =12 nos.63A HRC) with support clamp -Top clamp=324 mm and Bottom Clamp=337 mm with nuts , bolts-M16/185mm and M16/55mm.**
1	Name of Manufacturer and country			
2	Applicable standards			
3	Rated short time withstand current			
4	Rated Voltage	V		
5	No. of phases and rated frequency			
6	Clearances Phase to phase			
7	Clearances between live parts and earth			
8	Type and thickness of sheet steel (hot/ cold rolled) Frame/Doors/Covers			
9	HRC Cartridge fuse used			
10	Fuse rupturing capacity	kA		
11	Degree of protection of Enclosure			
12	Colour finish shade of Panel			
	Interior			
	Exterior			
	Bus Bars			
1	Material			
2	Cross section			
3	Rated normal current of busbars	A		
4	Rated short time withstand current and time	kA		
5	Material of the support insulators	mm		
6	Painting and shade			
7	Earth bus bar size and material			
8	Impulse withstand voltage	kVp		
	Moulded Case Circuit Braeker			
1	Make			
2	Rated Frequency			
3	Number of poles			
4	Breaking Capacity			
5	Rated Current			

Lot 1 (Distribution Board)

Sl.#	Parameters	Units	Item no. 7	Item no. 8
			3P LVDB 4W, 63 A MCCB with 12 nos. of 32A HRC (I/C =1no. 63 A MCCB; O/G =12 nos.32A HRC)	**3P, 400A Distribution Pillar, 4 ways (I/C 400A HRC, O/G 400A HRC)**
1	Name of Manufacturer and country			
2	Applicable standards			
3	Rated short time withstand current			
4	Rated Voltage	V		
5	No. of phases and rated frequency			
6	Clearances Phase to phase			
7	Clearances between live parts and earth			
8	Type and thickness of sheet steel (hot/ cold rolled) Frame/Doors/Covers			
9	HRC Cartridge fuse used			
10	Fuse rupturing capacity	kA		
11	Degree of protection of Enclosure			
12	Colour finish shade of Panel			
	Interior			
	Exterior			
	Bus Bars			
1	Material			
2	Cross section			

Procurement Services Department ★ Bhutan Power Corporation Limited ★ Thimphu : Bhutan

3	Rated normal current of busbars	A		
4	Rated short time withstand current and time	kA		
5	Material of the support insulators	mm		
6	Painting and shade			
7	Earth bus bar size and material			
8	Impulse withstand voltage	kVp		
	Moulded Case Circuit Braeker			
1	Make			
2	Rated Frequency			
3	Number of poles			
4	Breaking Capacity			
5	Rated Current			

Lot 1 (Distribution Board)

Sl.#	Parameters	Units	Item no. 9	Item no. 10
			3P, 600A Distribution Pillar, 6 ways (I/C 600A HRC, O/G 500A HRC)	3P, 800A Distribution Pillar, 6 ways (I/C 800A HRC, O/G 800A HRC)
1	Name of Manufacturer and country			
2	Applicable standards			
3	Rated short time withstand current			
4	Rated Voltage	V		
5	No. of phases and rated frequency			
6	Clearances Phase to phase			
7	Clearances between live parts and earth			
8	Type and thickness of sheet steel (hot/ cold rolled) Frame/Doors/Covers			
9	HRC Cartridge fuse used			
10	Fuse rupturing capacity	kA		
11	Degree of protection of Enclosure			
12	Colour finish shade of Panel			
	Interior			
	Exterior			
	Bus Bars			
1	Material			
2	Cross section			
3	Rated normal current of busbars	A		
4	Rated short time withstand current and time	kA		
5	Material of the support insulators	mm		
6	Painting and shade			
7	Earth bus bar size and material			
8	Impulse withstand voltage	kVp		
	Moulded Case Circuit Braeker			
1	Make			
2	Rated Frequency			
3	Number of poles			
4	Breaking Capacity			
5	Rated Current			

Lot 1 (Distribution Board)

Sl.#	Parameters	Units	Item no. 11
			Mini fedder pillar 400A, 6W
1	Name of Manufacturer and country		
2	Applicable standards		
3	Rated short time withstand current		
4	Rated Voltage	V	
5	No. of phases and rated frequency		
6	Clearances Phase to phase		
7	Clearances between live parts and earth		
8	Type and thickness of sheet steel (hot/ cold rolled) Frame/Doors/Covers		
9	HRC Cartridge fuse used		
10	Fuse rupturing capacity	kA	
11	Degree of protection of Enclosure		
12	Colour finish shade of Panel		
	Interior		
	Exterior		
	Bus Bars		
1	Material		
2	Cross section		
3	Rated normal current of busbars	A	
4	Rated short time withstand current and time	kA	
5	Material of the support insulators	mm	
6	Painting and shade		
7	Earth bus bar size and material		
8	Impulse withstand voltage	kVp	
	Moulded Case Circuit Braeker		
1	Make		

2	Rated Frequency			
3	Number of poles			
4	Breaking Capacity			
5	Rated Current			

Lot 2 (Switching Equipment)

Item No. 1&2 (Drop Out Fuse two phase)

Sl. #	Parameters	Units	Bidders to fill up	
			11kV	33kV
1	Manufacturer			
2	Manufacturer's Type Designation			
3	Applicable Standards			
4	Type			
5	Rated Voltage	kV		
6	Rated normal current (rms)	A		
7	Rated current of the fuse base	A		
8	Rated load current breaking capacity	A		
9	Insulation level:			
	Dry Impulse withstand (1.2kV/50μs) voltage (positive & negative polarity) (peak)			
a	Across the isolating distance of the fuse base	kV		
b	To earth and between poles kV	kV		
10	Wet 1 min. Power frequency withstand voltage (rms)			
a	Across the isolating distance of the fuse base	kV		
b	To earth and between poles	kV		
11	Rated short time breaking capacity	kA		
12	Minimum creepage distance	mm		
13	Mounting Arrangement			
14	Weight	kg		

Lot 3 (Lightning Arrestors)

Sl.#	Parameters	Units	Bidders to fill up	
			Item No. 1	Item No. 2
			Lightning Arrestor 9 kV, 10 kA (Three Phase)	Lightning Arrestor 30 kV, 10 kA (Three Phase)
1	Manufacturer			
2	Manufacturer's Type Designation			
3	Applicable Standards			
4	Maximum continuous operating voltage (phase voltage)	kV rms		
5	Rated voltage	kV rms		
6	Rated nominal discharge current	kA		
7	Residual voltage for a 8/20 ms nominal discharge current (Clause 7.3.2 IEC 99-4)	kV peak		
8	Residual voltage for 1/20 ms, 10 kA lightning impulse current	kV peak		
9	Number of sections per Surge Arrester			
10	Type of dielectric that fills the space between the surge arrester and porcelain			
11	Maximum discharge current withstand capability			
12	Energy absorption capability	kJ/kV		
13	Material of main terminal			
14	Material of earthing terminal			
Surge Arresters Housing				
1	Manufacturer			
2	Manufacturer's Type Designation			
3	Applicable Standards			
4	Rated voltage	kV		
5	Full wave withstand test (impulse voltage)			
6	Positive	kVp		
7	Negative	kVp		
8	Wet withstand power frequency test voltage	kV rms		
9	Nominal insulator creepage distance mm/kV	mm		
10	Maximum permissible cantilever load	N		
11	Material			
12	Colour of bushing insulator			
13	Weight of complete arrester with bushing	kg		

Lot 4 (Outdoor Distribution Transformers)

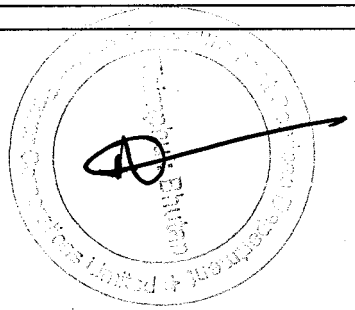
Sl.#	Particulars	Unit	Bidders fill up	
			Item no. 1	Item no. 3
			Dist. Transformer 500 kVA, 11/0.415 kV	Dist. Transformer 250 kVA, 33/0.415 kV
1	Country of Manufacture			
2	Manufacturer's Type No.			
3	Applicable Standards			
4	Rated Power Output	kVA		

Procurement Services Department ★ Bhutan Power Corporations Limited ★ Thimphu : Bhutan

5	Number of Phases			
6	Rated frequency	Hz		
7	Rated Primary Voltage	kV		
8	Rated Secondary Voltage	kV		
9	Vector Group			
10	Off-Load Tapings, Primary	%		
11	Ambient temperature	^{0}C		
12	Temperature Rise in - Winding - Top oil - Core	^{0}C		
13	Applied Test Voltage 1 min, 50Hz - Primary winding - Secondary winding	kV		
14	Impulse Test Voltage Full wave, primary winding	kV		
15	No Load Losses	kW		
16	Load Losses	kW		
17	Impedance Voltage			
18	No Load Current			
19	Terminal Bolts - material -diameter, primary side - diameter, secondary side	 mm mm		
20	Material of Windings High voltage Low voltage			
21	Mass of transformer Total mass Mass of oil Un-tanked mass	kg		

Lot 4 (Outdoor Distribution Transformers)

Sl.#	Particulars	Unit	Bidders fill up	
			Item no. 4	Item no. 5
			Dist. Transformer 500 kVA, 33/0.415 kV	1 phase Transformer 16 KVA 11/.240 kV
1	Country of Manufacture			
2	Manufacturer's Type No.			
3	Applicable Standards			
4	Rated Power Output	kVA		
5	Number of Phases			
6	Rated frequency	Hz		
7	Rated Primary Voltage	kV		
8	Rated Secondary Voltage	kV		
9	Vector Group			
10	Off-Load Tapings, Primary	%		
11	Ambient temperature	^{0}C		
12	Temperature Rise in - Winding - Top oil - Core	^{0}C		
13	Applied Test Voltage 1 min, 50Hz - Primary winding - Secondary winding	kV		
14	Impulse Test Voltage Full wave, primary winding	kV		
15	No Load Losses	kW		
16	Load Losses	kW		
17	Impedance Voltage			
18	No Load Current			
19	Terminal Bolts - material -diameter, primary side - diameter, secondary side	 mm mm		
20	Material of Windings High voltage Low voltage			
21	Mass of transformer Total mass Mass of oil Un-tanked mass	kg		



Lot 4 (Outdoor Distribution Transformers)

Sl.#	Particulars	Unit	Bidders fill up	
			Item no.6	Item no. 7
			1 Phase Transformer 25 kVA, 11/0.240 kV	1 Phase Transformer 25 kVA, 33/0.240 kV
1	Country of Manufacture			
2	Manufacturer's Type No.			
3	Applicable Standards			
4	Rated Power Output	kVA		
5	Number of Phases			
6	Rated frequency	Hz		
7	Rated Primary Voltage	kV		
8	Rated Secondary Voltage	kV		
9	Vector Group			
10	Off-Load Tapings, Primary	%		
11	Ambient temperature	^{0}C		
12	Temperature Rise in	^{0}C		
	- Winding			
	- Top oil			
	- Core			
13	Applied Test Voltage 1 min, 50Hz	kV		
	- Primary winding			
	- Secondary winding			
14	Impulse Test Voltage Full wave, primary winding	kV		
15	No Load Losses	kW		
16	Load Losses	kW		
17	Impedance Voltage			
18	No Load Current			
19	Terminal Bolts			
	- material			
	-diameter, primary side	mm		
	- diameter, secondary side	mm		
20	Material of Windings			
	High voltage			
	Low voltage			
21	Mass of transformer	kg		
	Total mass			
	Mass of oil			
	Un-tanked mass			

Lot 4 (Indoor Distribution Transformers)

Sl.#	Particulars	Unit	Bidders fill up	
			Item no. 2	
			Dist. Transformer 500 kVA, 11/0.415kV-(Indoor)	
1	Country of Manufacture			
2	Manufacturer's Type No.			
3	Applicable Standards			
4	Rated Power Output	kVA		
5	Number of Phases			
6	Rated frequency	Hz		
7	Rated Primary Voltage	kV		
8	Rated Secondary Voltage	kV		
9	Vector Group			
10	Off-Load Tapings, Primary	%		
11	Ambient temperature	^{0}C		
12	Temperature Rise in	^{0}C		
	- Winding			
	- Top oil			
	- Core			
13	Applied Test Voltage 1 min, 50Hz	kV		
	- Primary winding			
	- Secondary winding			
14	Impulse Test Voltage Full wave, primary winding	kV		
15	No Load Losses	kW		
16	Load Losses	kW		
17	Impedance Voltage			
18	No Load Current			
19	Terminal Bolts			
	- material			
	-diameter, primary side	mm		
	- diameter, secondary side	mm		
	Material of Windings			

Procurement Services Department ★ Bhutan Power Corporations Limited ★ Thimphu : Bhutan

20	High voltage			
	Low voltage			
21	Mass of transformer	kg		
	Total mass			
	Mass of oil			
	Un-tanked mass			

Lot 5 (Lubricant)

Guaranteed Technical Particulars (GTP) for Transformer Oil.

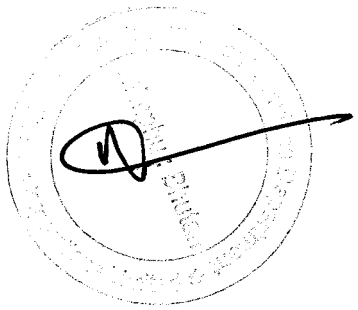
Sl.#	Parameters	Unit	Bidders to fill up
1	Appearance		
2	Viscosity at 40°C		
3	Viscosity at -30°C		
4	Water content (Max)		
5	Flash point (Min)		
6	Pour point (Max)		
7	Neutralization value (Total acidity) (Max)		
8	Corrosive Sulphur (In terms of class of Cu Strip)		
9	Electric Strength (Breakdown voltage) (Min)		
10	Dielectric dissipation factor (ten delta) at 90°C (Max)		
11	Sludge (Max)		
12	PCB Content		
13	PCA Content (Max)		

Guaranteed Technical Particulars (GTP) for Governor Oil.

Sl.#	Parameters	Unit	Bidders to fill up
1	Characteristic		
2	Viscosity at 40°C		
3	Viscosity index (Min)		
4	Flash Point (Min)		
5	Pour Point (Max)		
6	Neutralisation No. mg KOH/gm.		

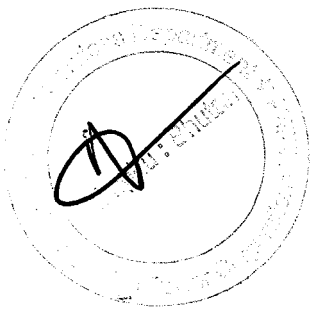
Lot No. 7 (Galvanized Steel Tubular Poles)

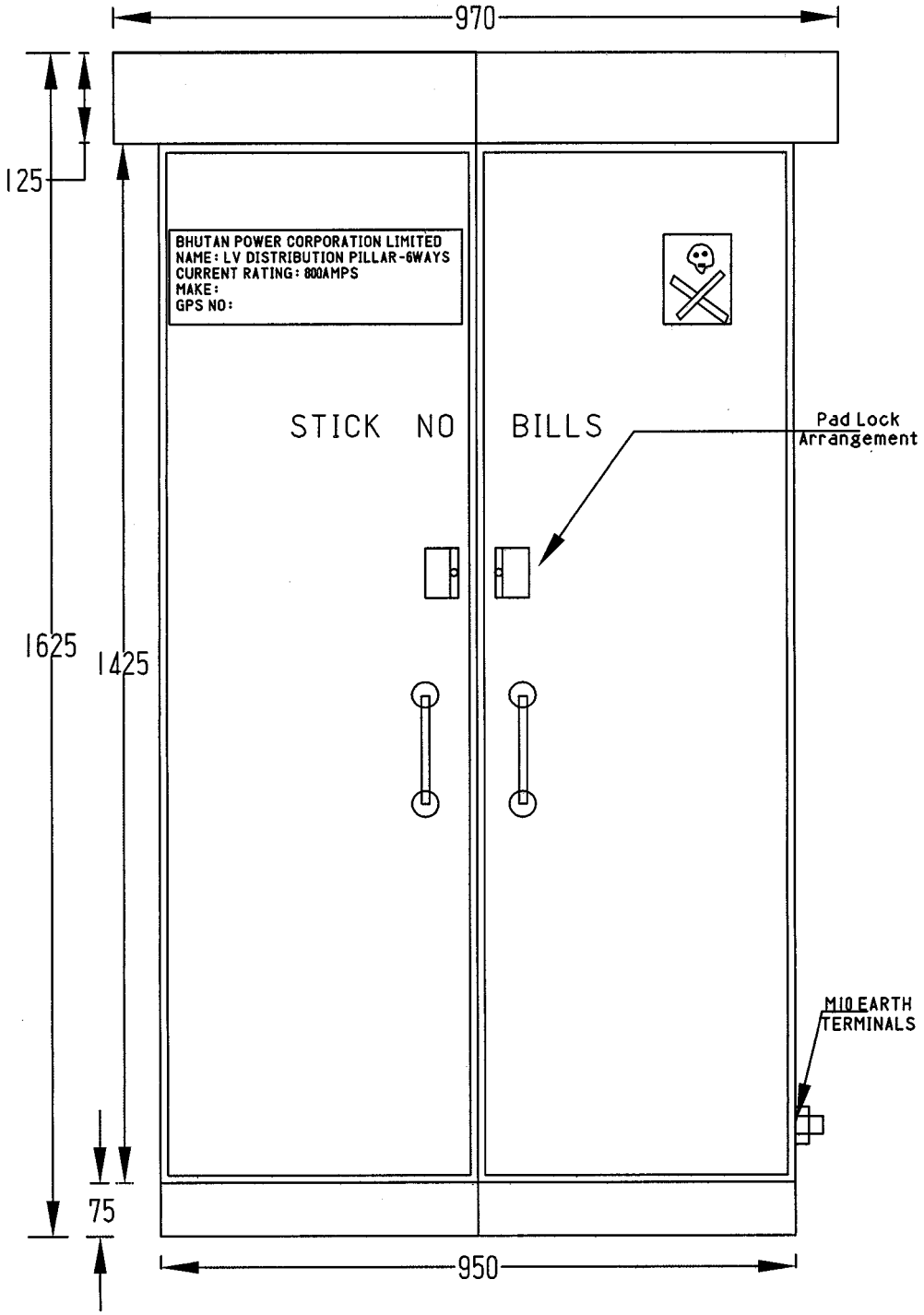
Sl.#	Parameters	Unit	Bidder to Fill Up	
			7.5m	10m
1	Manufacture			
2	Place & Country of Origin			
3	Manufacturer Type designation			
4	Applicable Standard			
5	Dimensions			
5.1	Bottom Section			
5.1.1	Outside Diameter	mm		
5.1.2	Thickness	mm		
5.1.3	Length	mm		
5.2	Middle Section			
5.2.1	Outside Diameter	mm		
5.2.2	Thickness	mm		
5.2.3	Length	mm		
5.3	Top Section			
5.3.1	Outside Diameter	mm		
5.3.2	Thickness	mm		
5.3.3	Length	mm		
6	Total Weight	kg		
7	Pole Strength	Mpa		
8	Zinc Coating	g/m2		



Drawings

Lot No.	Description of the Lot
1	Distribution Boards
2	Switching Equipment
3	Lightning Arrestors
6	Earthing Equipment
7	Poles
8	Steel Tubular Pole Fittings
9	Telescopic Pole Fittings





NOTES .

1. DIMENSIONS AS SHOWN ARE IN MM.
2. DRAWING NOT TO SCALE.

BHUTAN POWER CORPORATION LIMITED

ENGINEERING DESIGN & CONTRACTS DEPARTMENT

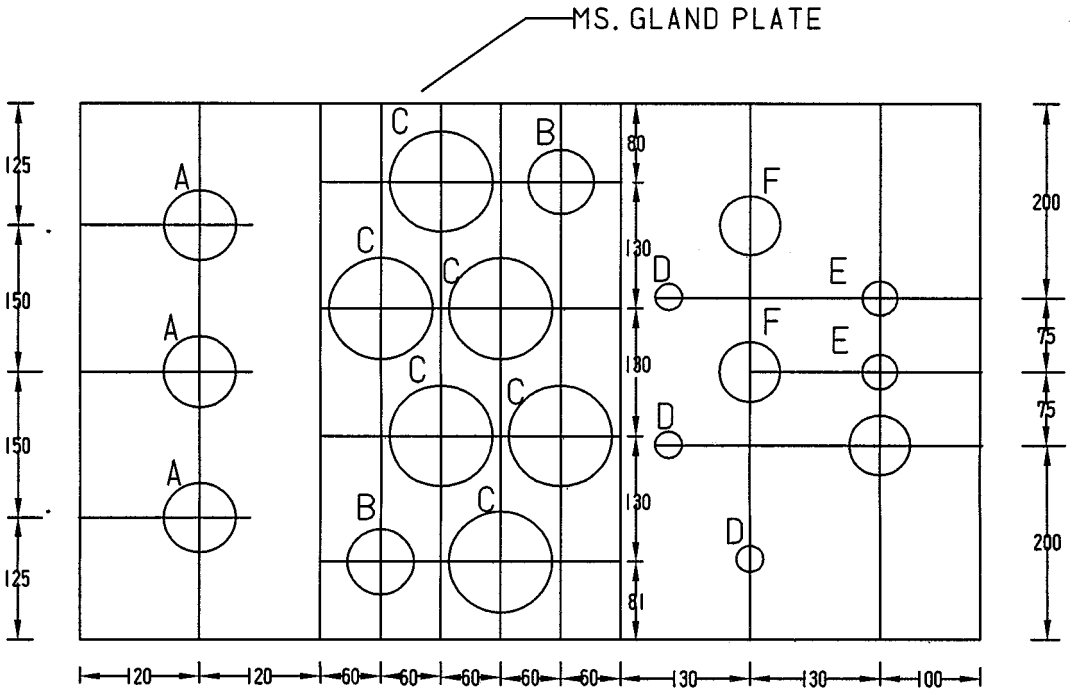
TITLE : DISTRIBUTION DESIGN & CONSTRUCTION STANDARD

800A, 6WAYS TRANSFORMER DISTRIBUTION PILLAR (FRONT ELEVATION)

DESIGNATION	NAME	DATE
DRAFTSMAN		
DESIGNER		
DESIGN CHECK		
PROJECT MANAGER		
PROJECT DIRECTOR		

DRAWING NO.
BPC-DDCS-2015-57/1(B)

REVISION
2019



MS. GLAND PLATE	HOLE SIZE
A - 1CX400SQ.MM - KNOCKOUT	3"
B - 4CX300SQ.MM - KNOCKOUT	2-3/4"
C - 4CX400SQ.MM - KNOCKOUT	3-1/8"
D - 1CX300SQ.MM - KNOCKOUT	1-1/2"
E - 4CX150SQ.MM - KNOCKOUT	2"
F - 4CX240SQ.MM - KNOCKOUT	2-1/2"
G - 4CX95SQ.MM - KNOCKOUT	1-3/4"
h - 2CX6SQ.MM	3/4"
I - 2CX10SQ.MM	1"

NOTES

1. DIMENSIONS AS SHOWN ARE IN MM.
2. DRAWING NOT TO SCALE.
3. CORRECT CABLE GLAND SIZE TO BE USED ACCORDINGLY WITH CABLE SIZE

BHUTAN POWER CORPORATION LIMITED

ENGINEERING DESIGN & CONTRACTS DEPARTMENT

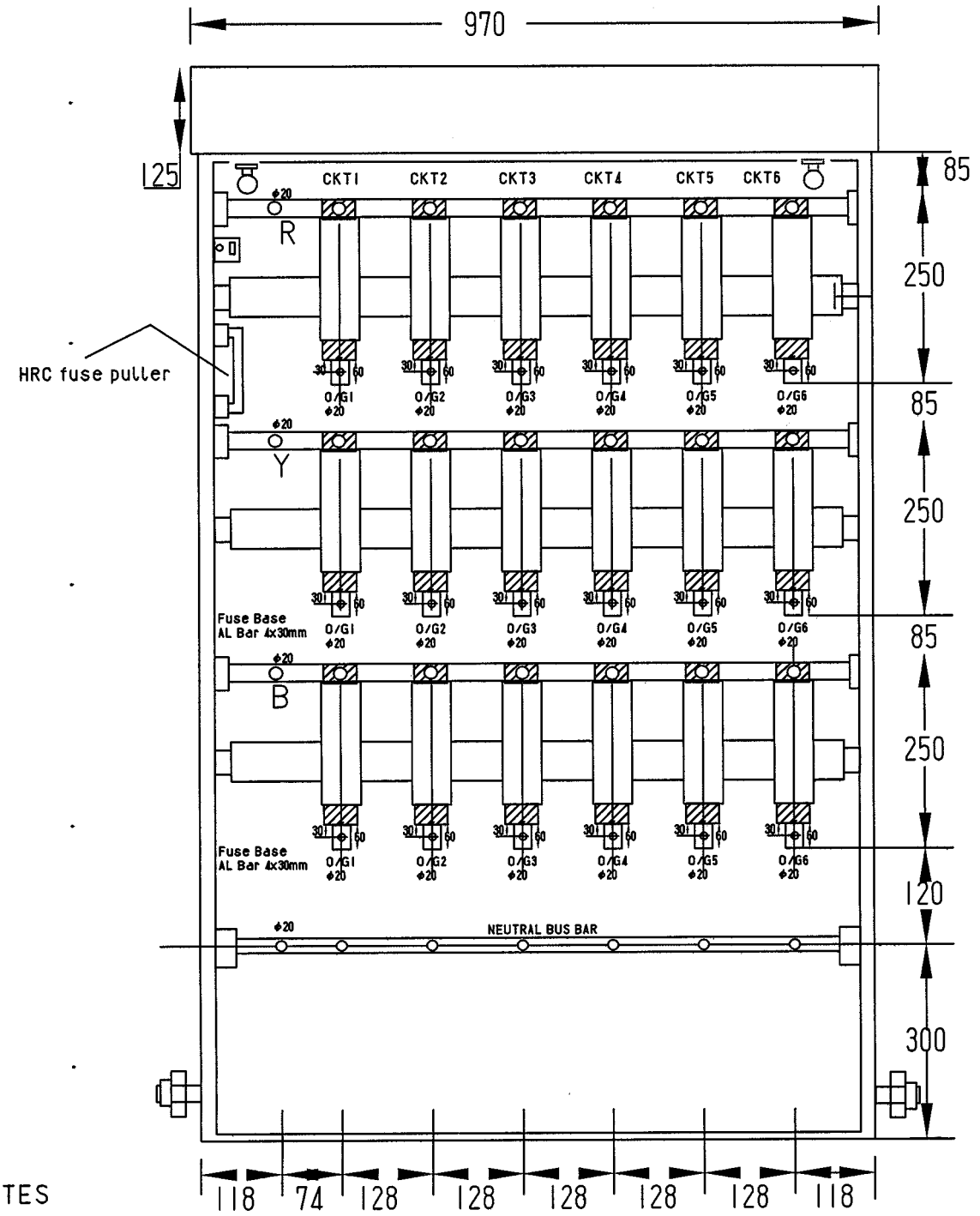
TITLE : DISTRIBUTION DESIGN & CONSTRUCTION STANDARDS

800A, 6WAYS TRANSFORMER DISTRIBUTION PILLAR (GLAND PLATE DETAILS)

DESIGNATION	NAME	DATE
DRAFTSMAN		
DESIGNER		
DESIGN CHECK		
PROJECT MANAGER		
PROJECT DIRECTOR		

DRAWING NO.
BPC-DDCS-2015-57/4(B)

REVISION
2019



NOTES

1. DIMENSIONS AS SHOWN ARE IN MM.
2. PROVIDE ONE NO. FUSE FULLER FOR EVERY DISTRIBUTION BOARD
3. HRC FUSE RATING :800 A

BHUTAN POWER CORPORATION LIMITED

ENGINEERING DESIGN & CONTRACTS DEPARTMENT

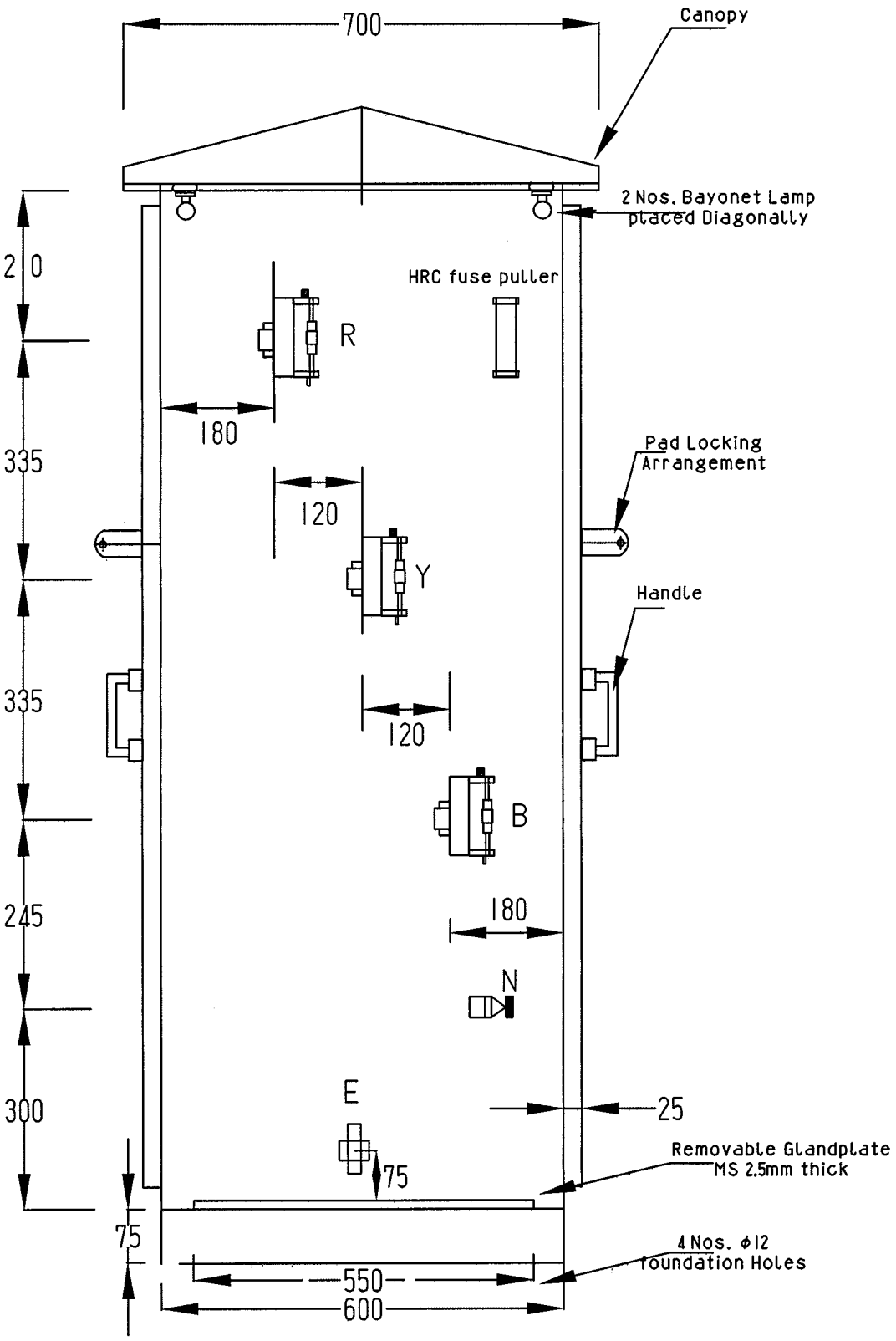
TITLE : DISTRIBUTION DESIGN & CONSTRUCTION STANDARD

800A, 6WAYS TRANSFORMER DISTRIBUTION PILLAR
(FRONT ELEVATIONWITHOUT DOOR)

DESIGNATION	NAME	DATE
DRAFTSMAN		
DESIGNER		
DESIGN CHECK		
PROJECT MANAGER		
PROJECT DIRECTOR		

DRAWING NO.
BPC-DDCS-2015-57/3 (B)

REVISION
2019



NOTES

1. DIMENSIONS AS SHOWN ARE IN MM.THE PILLAR SHALL BE TWO SIDED DOORS
2. DRAWING NOT TO SCALE.

BHUTAN POWER CORPORATION LIMITED

ENGINEERING DESIGN & CONTRACTS DEPARTMENT

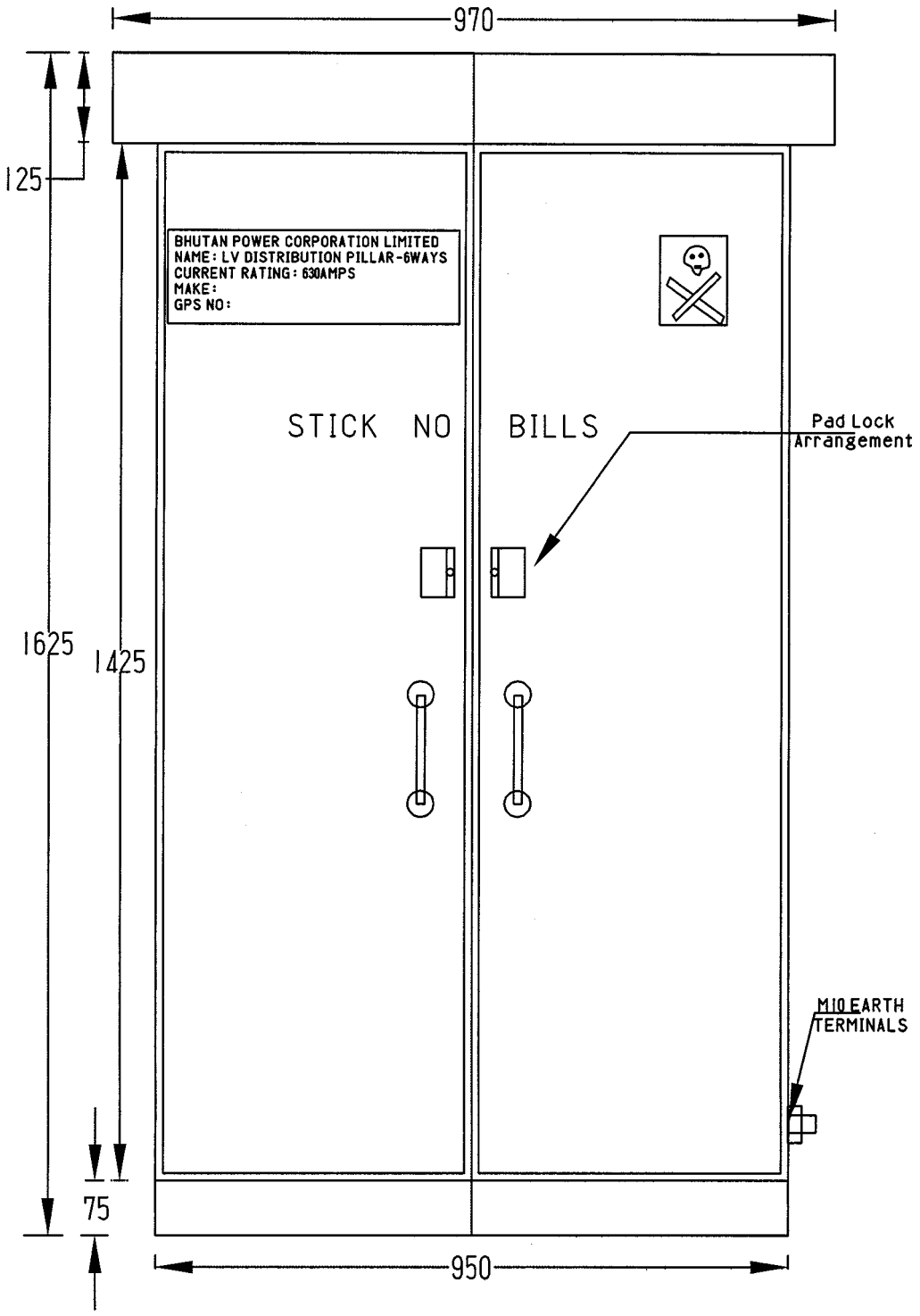
TITLE : DISTRIBUTION DESIGN & CONSTRUCTION STANDARD

800A, 6WAYS TRANSFORMER DISTRIBUTION PILLAR (SIDE ELEVATION)

DESIGNATION	NAME	DATE
DRAFTSMAN		
DESIGNER		
DESIGN CHECK		
PROJECT MANAGER		
PROJECT DIRECTOR		

DRAWING NO.
BPC-DDCS-2015-57/2 (B)

REVISION
2019



NOTES

1. DIMENSIONS AS SHOWN ARE IN MM.
2. DRAWING NOT TO SCALE.

BHUTAN POWER CORPORATION LIMITED

ENGINEERING DESIGN & CONTRACTS DEPARTMENT

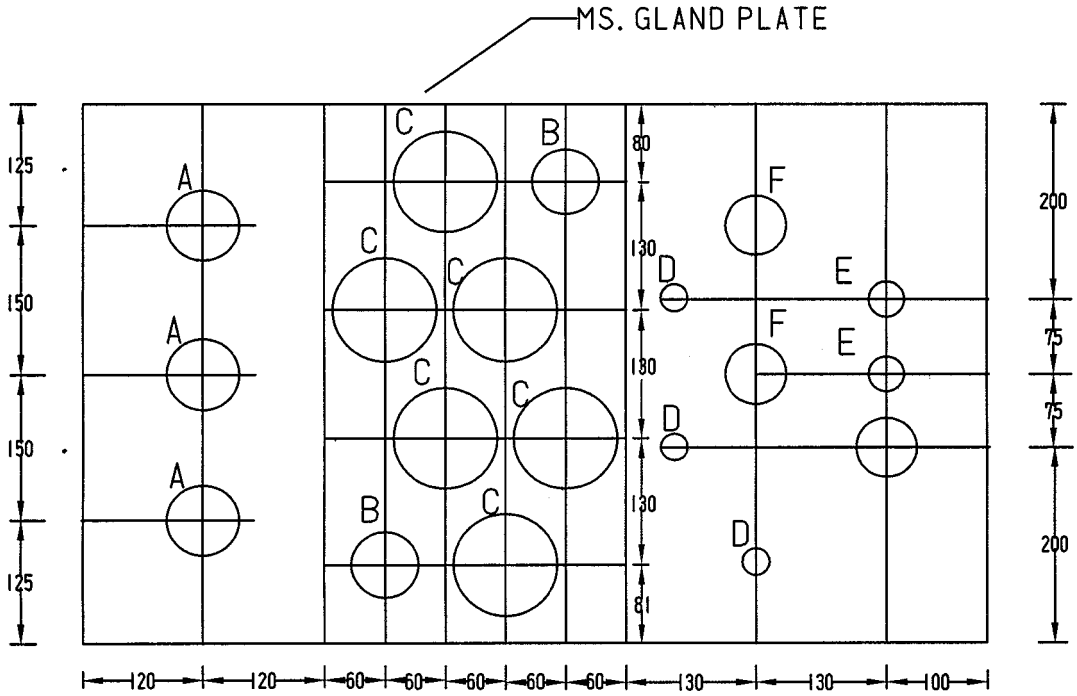
TITLE : DISTRIBUTION DESIGN & CONSTRUCTION STANDARD

600A, 6WAYS TRANSFORMER DISTRIBUTION PILLAR (FRONT ELEVATION)

DESIGNATION	NAME	DATE
DRAFTSMAN		
DESIGNER		
DESIGN CHECK		
PROJECT MANAGER		
PROJECT DIRECTOR		

DRAWING NO.
BPC-DDCS-2015-57/1(A)

REVISION
2019



MS. GLAND PLATE	HOLE SIZE
A - 1CX400SQ.MM - KNOCKOUT	3"
B - 4CX300SQ.MM - KNOCKOUT	2-3/4"
C - 4CX400SQ.MM - KNOCKOUT	3-1/8"
D - 1CX300SQ.MM - KNOCKOUT	1-1/2"
E - 4CX150SQ.MM - KNOCKOUT	2"
F - 4CX240SQ.MM - KNOCKOUT	2-1/2"
G - 4CX95SQ.MM - KNOCKOUT	1-3/4"
h - 2CX6SQ.MM	3/4"
I - 2CX10SQ.MM	1"

NOTES

1. DIMENSIONS AS SHOWN ARE IN MM.
2. DRAWING NOT TO SCALE.
3. CORRECT CABLE GLAND SIZE TO BE USED ACCORDINGLY WITH CABLE SIZE

BHUTAN POWER CORPORATION LIMITED

ENGINEERING DESIGN & CONTRACTS DEPARTMENT

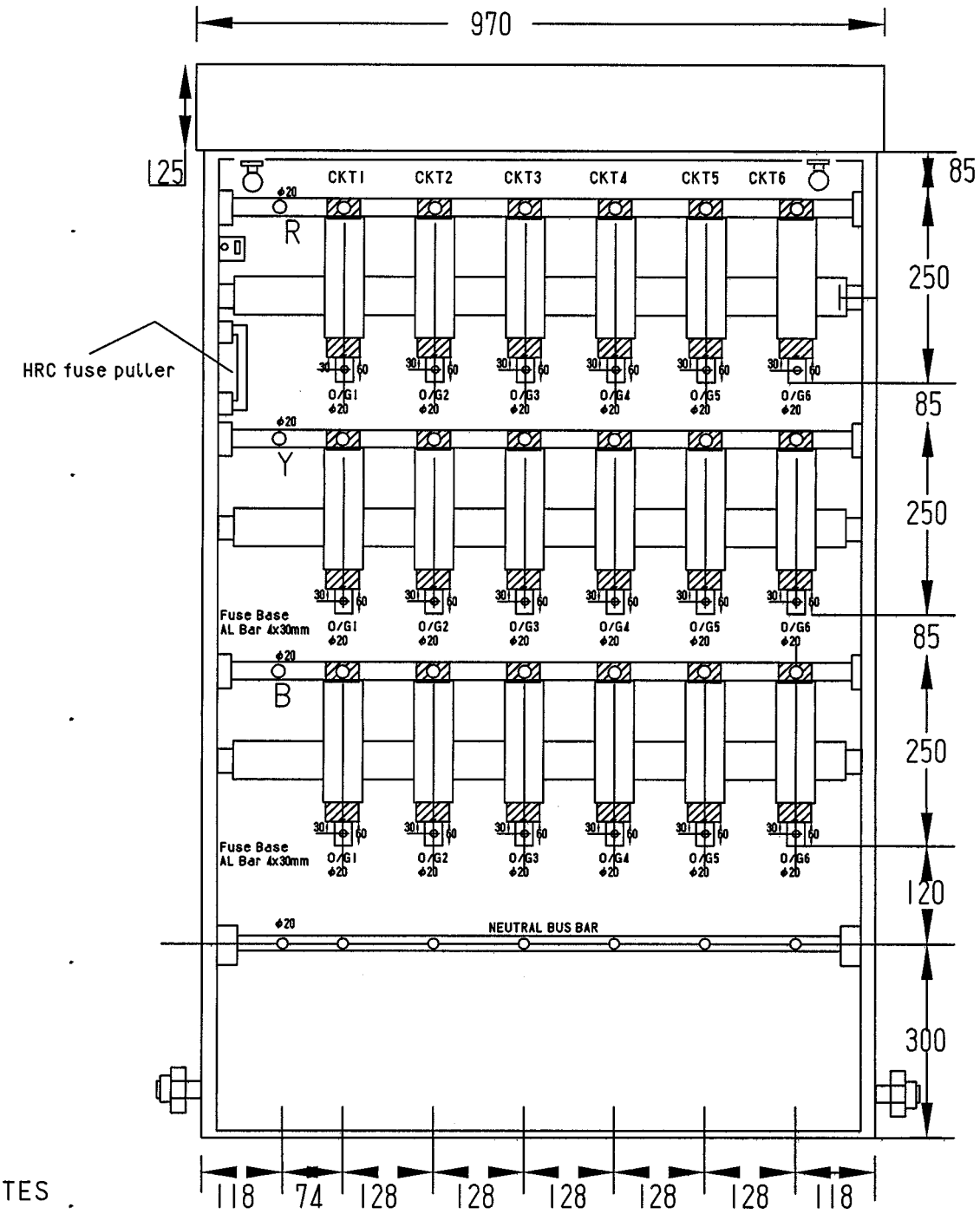
TITLE : DISTRIBUTION DESIGN & CONSTRUCTION STANDARD

600A, 6WAYS TRANSFORMER DISTRIBUTION PILLAR (GLAND PLATE DETAILS)

DESIGNATION	NAME	DATE
DRAFTSMAN		
DESIGNER		
DESIGN CHECK		
PROJECT MANAGER		
PROJECT DIRECTOR		

DRAWING NO.
BPC-DDCS-2015-57/4 (A)

REVISION
2019



NOTES

1. DIMENSIONS AS SHOWN ARE IN MM.
2. PROVIDE ONE NO. FUSE FULLER FOR EVERY DISTRIBUTION BOARD
3. HRC FUSE RATING :500 A

BHUTAN POWER CORPORATION LIMITED

ENGINEERING DESIGN & CONTRACTS DEPARTMENT

TITLE : DISTRIBUTION DESIGN & CONSTRUCTION STANDARD

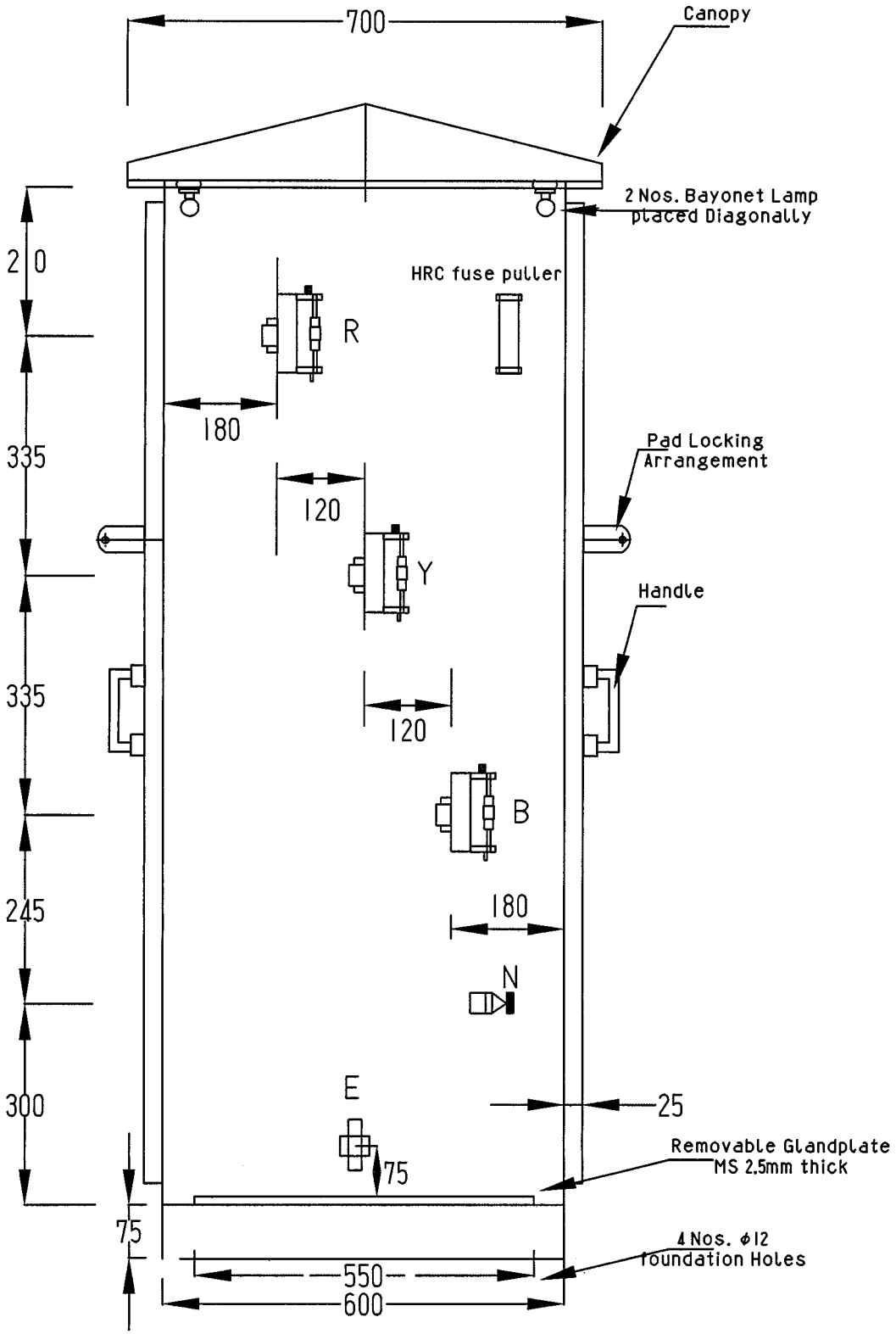
600A, 6WAYS TRANSFORMER DISTRIBUTION PILLAR
(FRONT ELEVATIONWITHOUT DOOR)

DESIGNATION	NAME	DATE
DRAFTSMAN		
DESIGNER		
DESIGN CHECK		
PROJECT MANAGER		
PROJECT DIRECTOR		

DRAWING NO.
BPC-DDCS-2015-57/3 (A)

REVISION
2019

Procurement Services Department
Thimphu, Bhutan
Bhutan Power Corporation Limited



NOTES

1. DIMENSIONS AS SHOWN ARE IN MM.THE PILLAR SHALL BE TWO SIDED DOORS
2. DRAWING NOT TO SCALE.

BHUTAN POWER CORPORATION LIMITED

ENGINEERING DESIGN & CONTRACTS DEPARTMENT

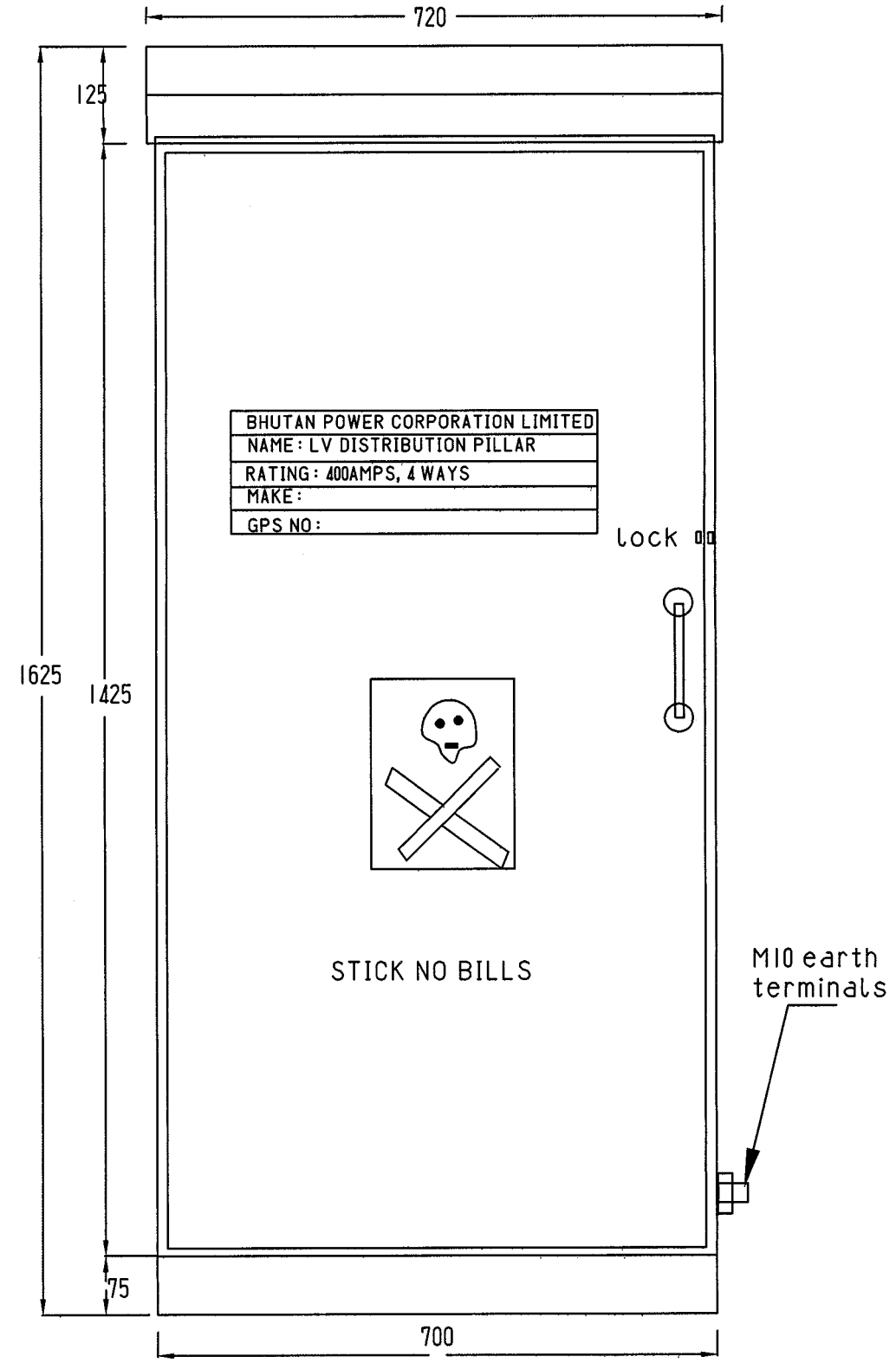
TITLE : DISTRIBUTION DESIGN & CONSTRUCTION STANDARDS

600A, 6WAYS TRANSFORMER DISTRIBUTION PILLAR (SIDE ELEVATION)

DESIGNATION	NAME	DATE
DRAFTSMAN		
DESIGNER		
DESIGN CHECK		
PROJECT MANAGER		
PROJECT DIRECTOR		

DRAWING NO.
BPC-DDCS-2015-57/2 (A)

REVISION
2019



NOTES

1. DIMENSIONS AS SHOWN ARE IN MM.
2. DRAWING NOT TO SCALE.

BHUTAN POWER CORPORATION LIMITED

ENGINEERING DESIGN & CONTRACTS DEPARTMENT

TITLE : DISTRIBUTION DESIGN & CONSTRUCTION STANDARD

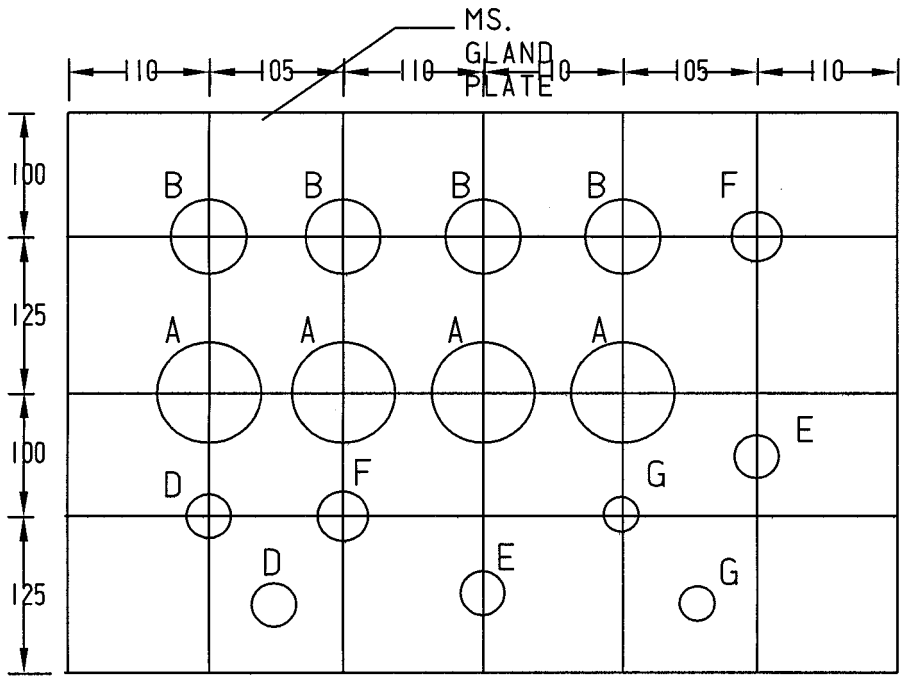
4WAYS TRANSFORMER DISTRIBUTION PILLAR (FRONT ELEVATION)

DESIGNATION	NAME	DATE
DRAFTSMAN		
DESIGNER		
DESIGN CHECK		
PROJECT MANAGER		
PROJECT DIRECTOR		

DRAWING NO. BPC-DDCS-2015-56/1

REVISION 2019 PSD

Procurement Services Department, Bhutan Power Corporation Limited, Thimphu, Bhutan



MS. GLAND PLATE	HOLE SIZE
A - 4CX400SQ.MM - KNOCKOUT	3-1/8"
B - 4CX300SQ.MM - KNOCKOUT	2-3/4"
C - 2CX16SQ.MM	1"
D - 4CX50SQ.MM - KNOCKOUT	1-1/2"
E - 4CX150SQ.MM - KNOCKOUT	2"
F - 4CX240SQ.MM - KNOCKOUT	2-1/2"
G - 4CX95SQ.MM - KNOCKOUT	1-3/4"
h - 2CX6SQ.MM	3/4"
I - 2CX10SQ.MM	1"

NOTES

1. DIMENSIONS AS SHOWN ARE IN MM.
2. DRAWING NOT TO SCALE.
3. CORRECT CABLE GLAND SIZE TO BE USED ACCORDINGLY WITH CABLE SIZE

BHUTAN POWER CORPORATION LIMITED

ENGINEERING DESIGN & CONTRACTS DEPARTMENT

TITLE : DISTRIBUTION DESIGN & CONSTRUCTION STANDARD

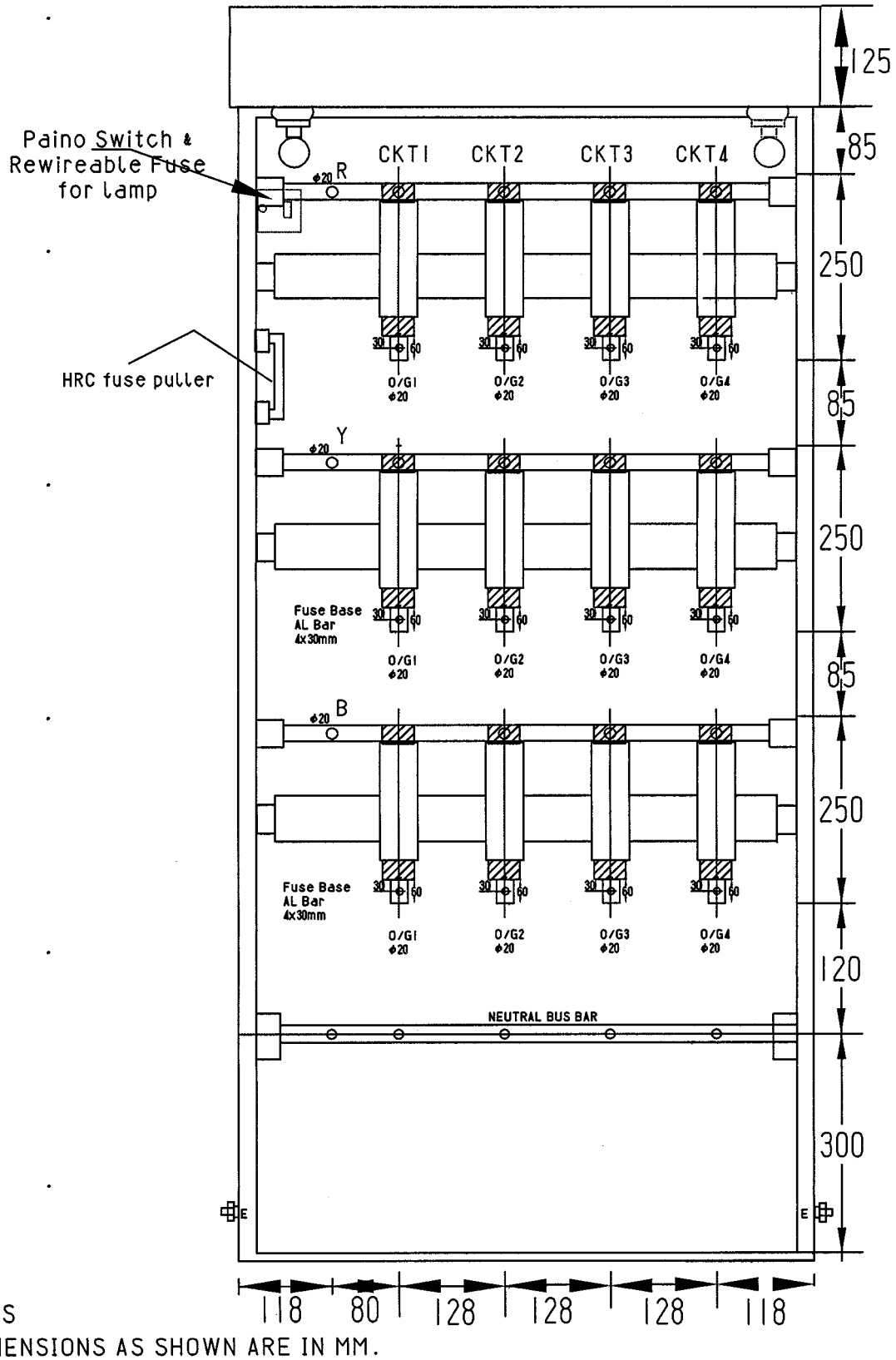
400A, 4WAYS TRANSFORMER DISTRIBUTION PILLAR (GLAND PLATE DETAIL)

DESIGNATION	NAME	DATE
DRAFTSMAN		
DESIGNER		
DESIGN CHECK		
PROJECT MANAGER		
PROJECT DIRECTOR		

DRAWING NO. BPC-DDCS-2015-56/4

REVISION 2019

Procurement Services Department, Thimphu, Bhutan, Bhutan Power Corporations Limited



NOTES

1. DIMENSIONS AS SHOWN ARE IN MM.
2. PROVIDE ONE NO. OF FUSE PULLER FOR EVERY DISTRIBUTION BOARD.

BHUTAN POWER CORPORATION LIMITED

ENGINEERING DESIGN & CONTRACTS DEPARTMENT

TITLE : DISTRIBUTION DESIGN & CONSTRUCTION STANDARDS

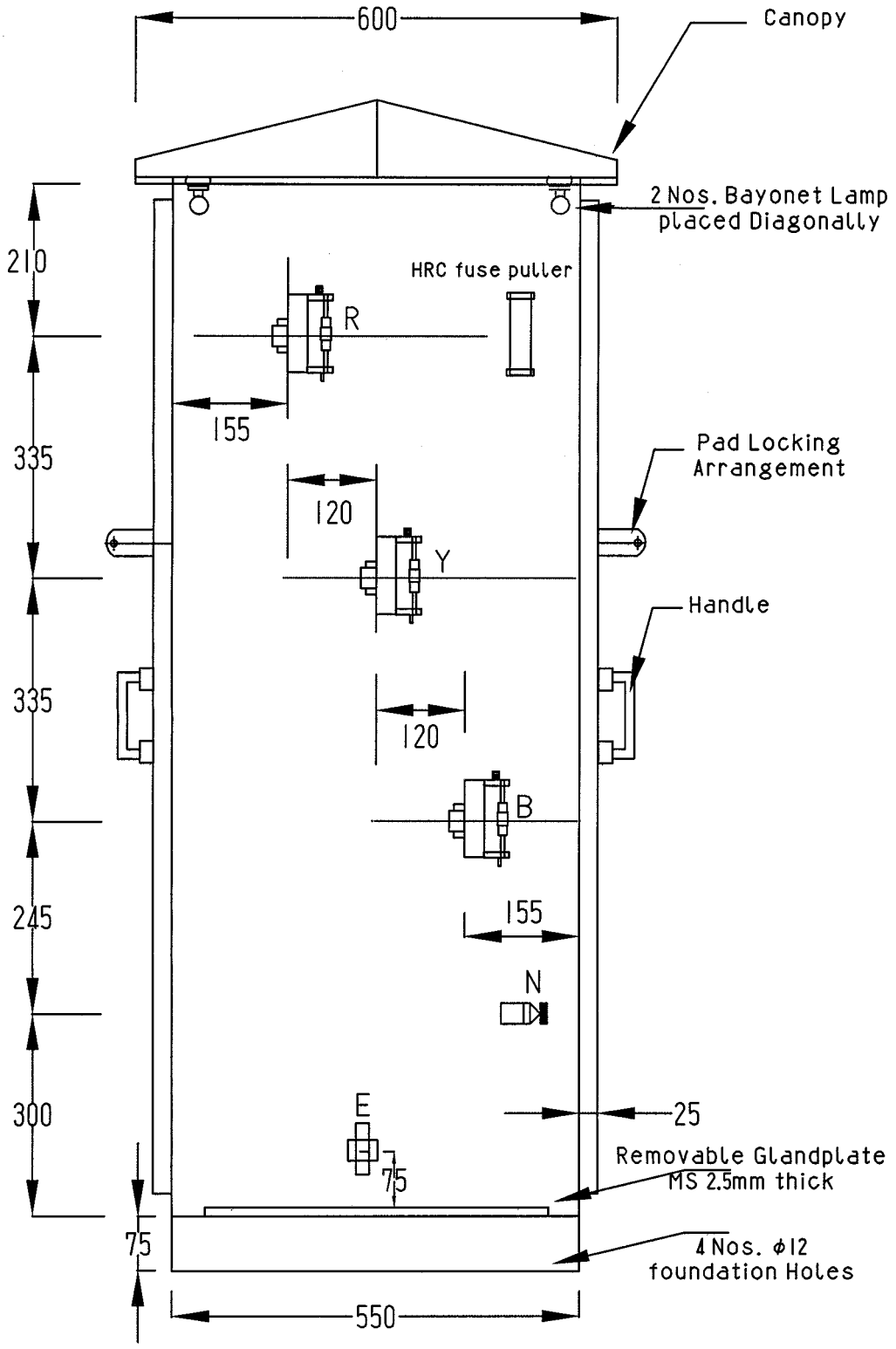
400A, 4WAYS TRANSFORMER DISTRIBUTION PILLAR (FRONT ELEVATION WITHOUT DOOR)

DESIGNATION	NAME	DATE
DRAFTSMAN		
DESIGNER		
DESIGN CHECK		
PROJECT MANAGER		
PROJECT DIRECTOR		

DRAWING NO. BPC-DDCS-2015-56/3

REVISIONS

2019



NOTES

1. DIMENSIONS AS SHOWN ARE IN MM. THE PILLAR SHALL BE TWO SIDED DOORS
2. DRAWING NOT TO SCALE.

BHUTAN POWER CORPORATION LIMITED

ENGINEERING DESIGN & CONTRACTS DEPARTMENT

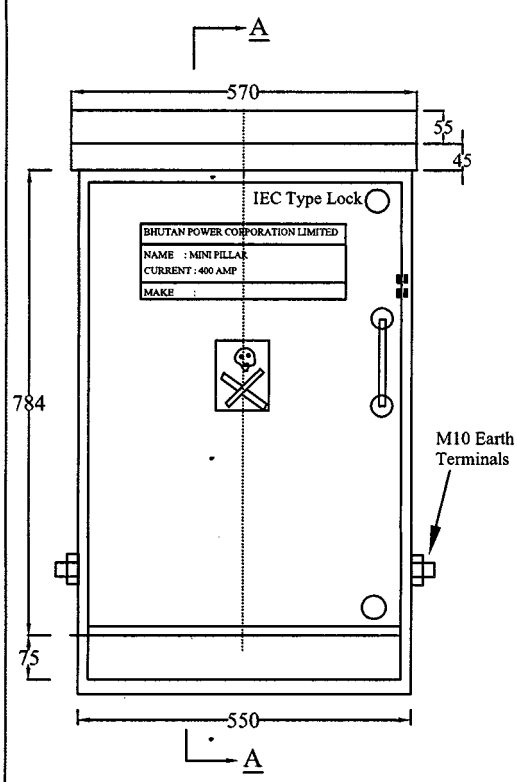
TITLE : DISTRIBUTION DESIGN & CONSTRUCTION STANDARD

400A, 4WAYS TRANSFORMER DISTRIBUTION PILLAR (SIDE ELEVATION)

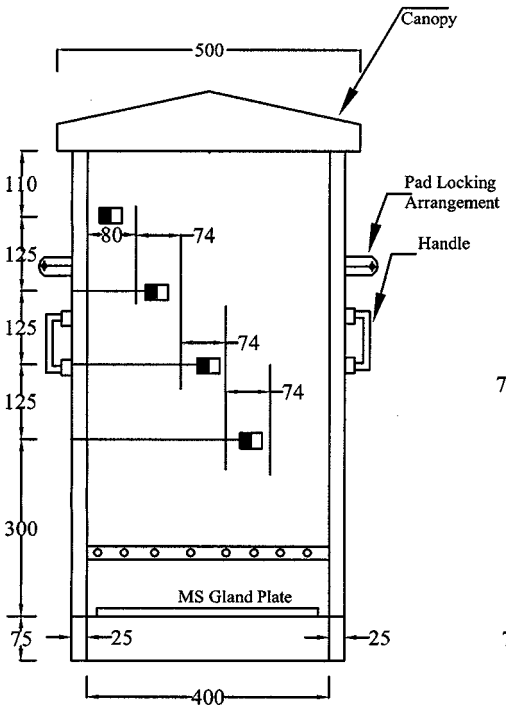
DESIGNATION	NAME	DATE
DRAFTSMAN		
DESIGNER		
DESIGN CHECK		
PROJECT MANAGER		
PROJECT DIRECTOR		

DRAWING NO. BPC-DDCS-2015-56/2

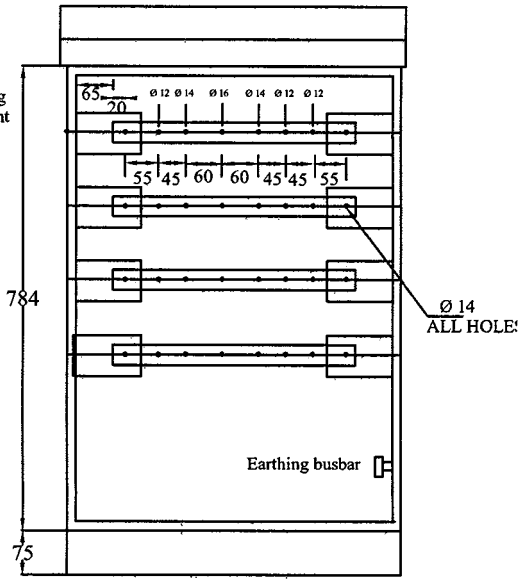
REVISION 2019



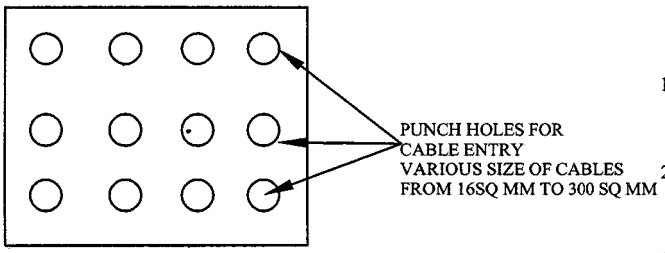
FRONT ELEVATION



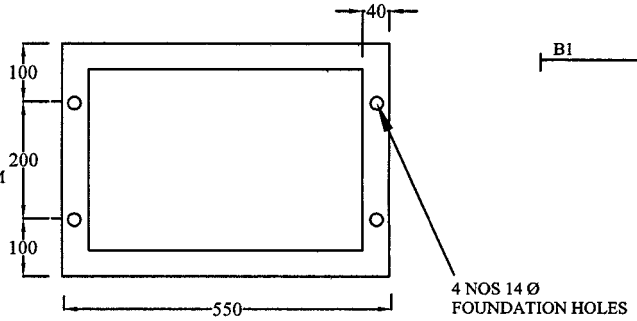
SIDE ELEVATION: (A-A)



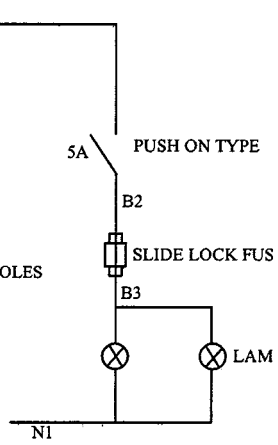
FRONT ELEVATION
WITHOUT DOOR



GLAND PLATE DETAILS



FOUNDATION PLAN



PHASE BUS BAR- 1 x 6 x 50 mm AL Alloy.

NEUTRAL - 1 x 6 x 50 mm AL Alloy.

MATERIAL - THE FEEDER PILLAR (INCLUDING BASE CHANNEL)
SHALL BE FABRICATED OUT OF 2.5mm MS SHEET

PAINT - SIEMENS GREY (OUTSIDE) & WHITE (INSIDE)

EARTH BUSBAR - 1 x 6 x 19 mm AL Alloy.

NOTES
1. DIMENSIONS AS SHOWN ARE IN MM
2. DRAWING NOT TO SCALE.

BHUTAN POWER CORPORATION

ENGINEERING DESIGN & CONTRACTS DEPARTMENT

TITLE : DISTRIBUTION DESIGN & CONSTRUCTION STANDARD

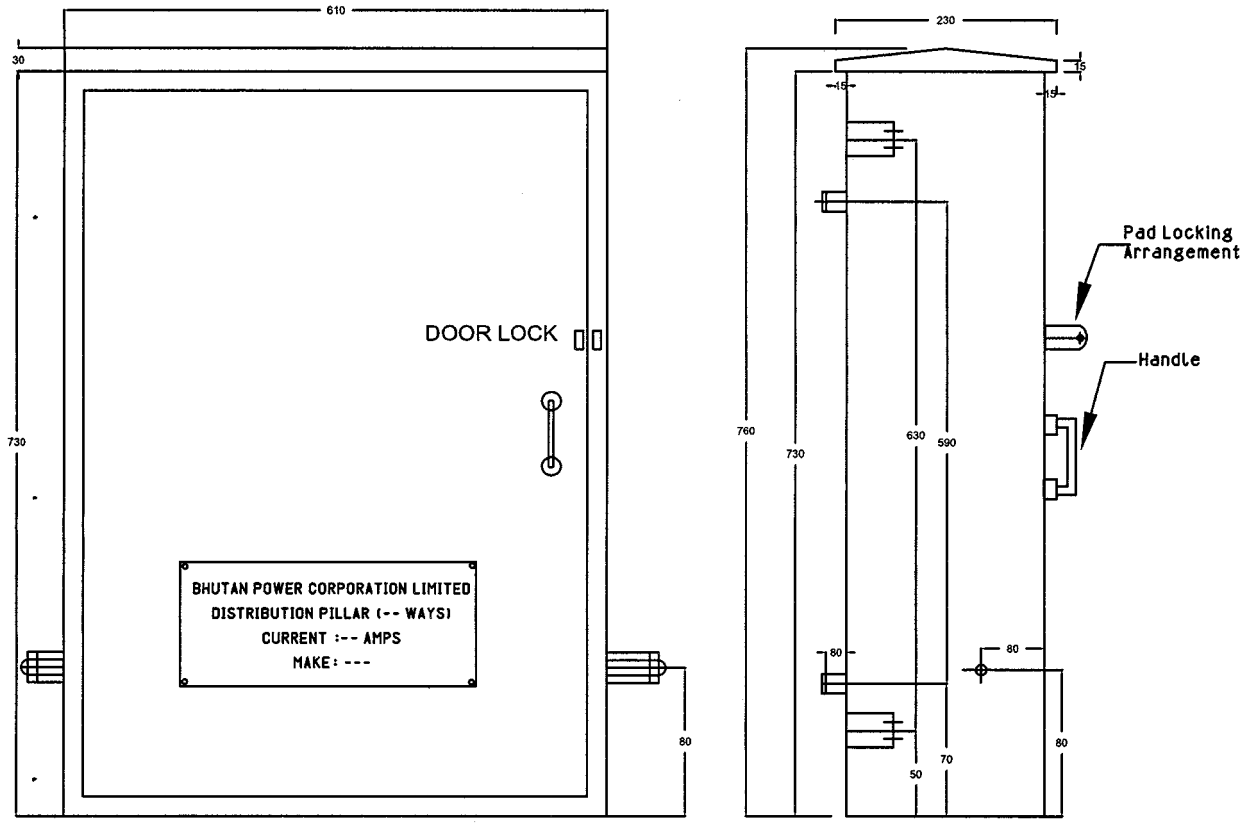
MINI PILLAR - 400 A

	NAME	DATE
DESIGNED BY	.	
CHECKED BY		
APPROVED BY		

DRAWING NO.

REVISION

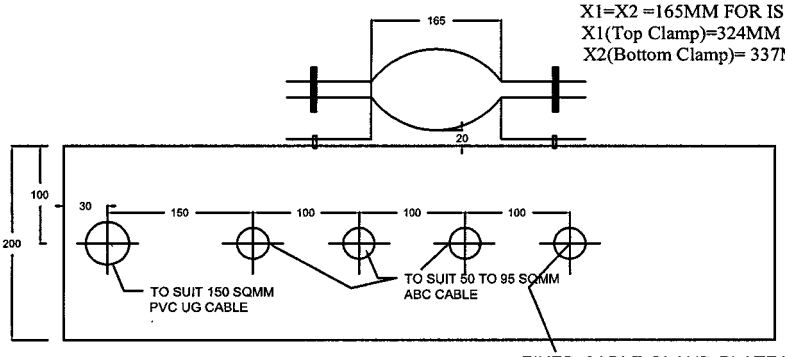
Procurement Services Department ★ Bhutan Power Corporations Limited ★ Thimphu : Bhutan



FRONT VIEW

SIDE VIEW

X1=X2 =165MM FOR IS TUBULAR POLE
X1(Top Clamp)=324MM FOR TELESCOPIC POLE
X2(Bottom Clamp)= 337MM FOR TELESCOPIC POLE



BOTTOM VIEW

FIXED CABLE GLAND PLATE WITH PUNCHED HOLES FOR CABLE ENTRY (OUTGOING 4 NOS) AND (INCOMING 1NO)

NOTE:

BUSBAR SIZE 25x10MM AL/ 20x3MM CU
NEUTRAL BUSBAR 25x5MM AL / 20x3MM CU
BAYONET LAMP (IND) TO BE PROVIDED

BHUTAN POWER CORPORATION LIMITED

ENGINEERING DESIGN & CONTRACTS DEPARTMENT

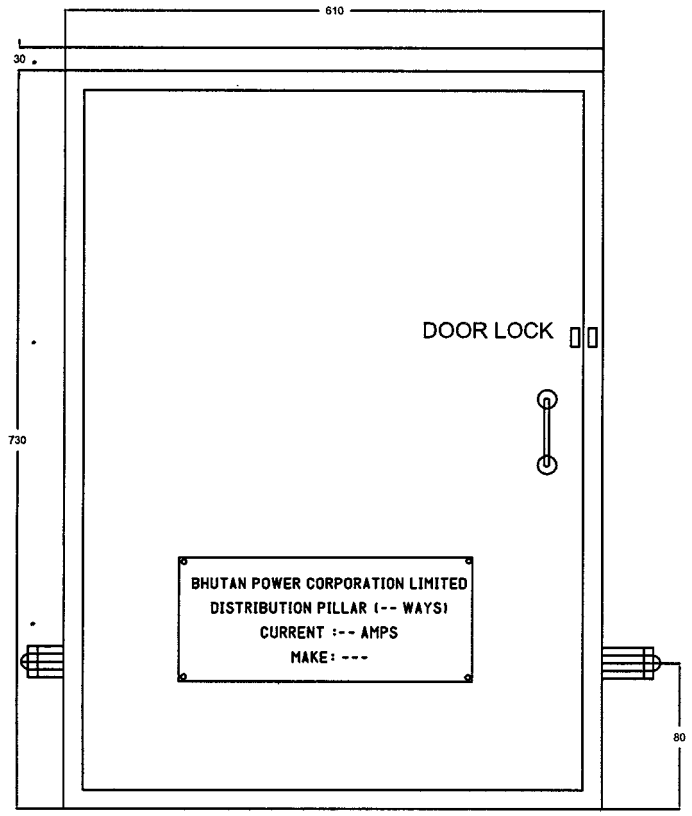
TITLE : DISTRIBUTION DESIGN & CONSTRUCTION STANDARD

THREE PHASE TRANSFORMER LVDB, 4 WAYS, INCOMER MCCB-UPTO 250A, OUTGOING HRC FUSE UPTO 125A (EXTERNAL VIEW)

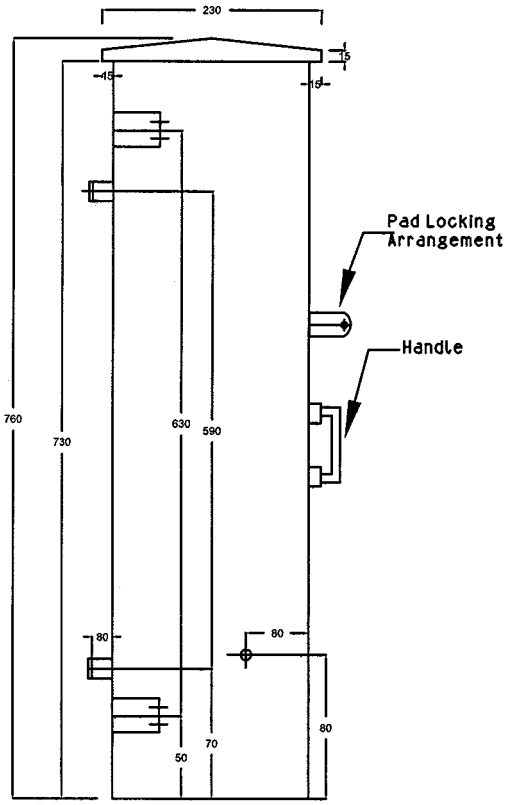
	Name	Date
DESIGNED BY		
CHECKED BY		
APPROVED BY		

DRAWING NO. BPC-DDCS-2015-54/2

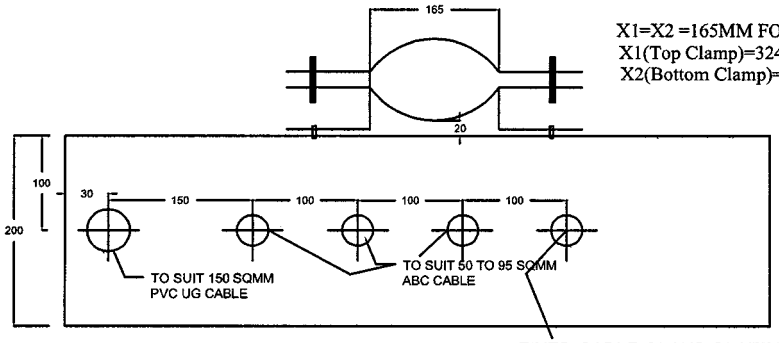
REVISION 2015



FRONT VIEW



SIDE VIEW



BOTTOM VIEW

X1=X2 =165MM FOR IS TUBULAR POLE
X1(Top Clamp)=324MM FOR TELESCOPIC POLE
X2(Bottom Clamp)= 337MM FOR TELESCOPIC POLE

FIXED CABLE GLAND PLATE WITH PUNCHED HOLES FOR CABLE ENTRY (OUTGOING 4 NOS) AND (INCOMING 1NO)

NOTE:

BUSBAR SIZE 25x10MM AL/ 20x3MM CU
NEUTRAL BUSBAR 25x5MM AL / 20x3MM CU
BAYONET LAMP (IND) TO BE PROVIDED

BHUTAN POWER CORPORATION LIMITED

ENGINEERING DESIGN & CONTRACTS DEPARTMENT

TITLE : DISTRIBUTION DESIGN & CONSTRUCTION STANDARD

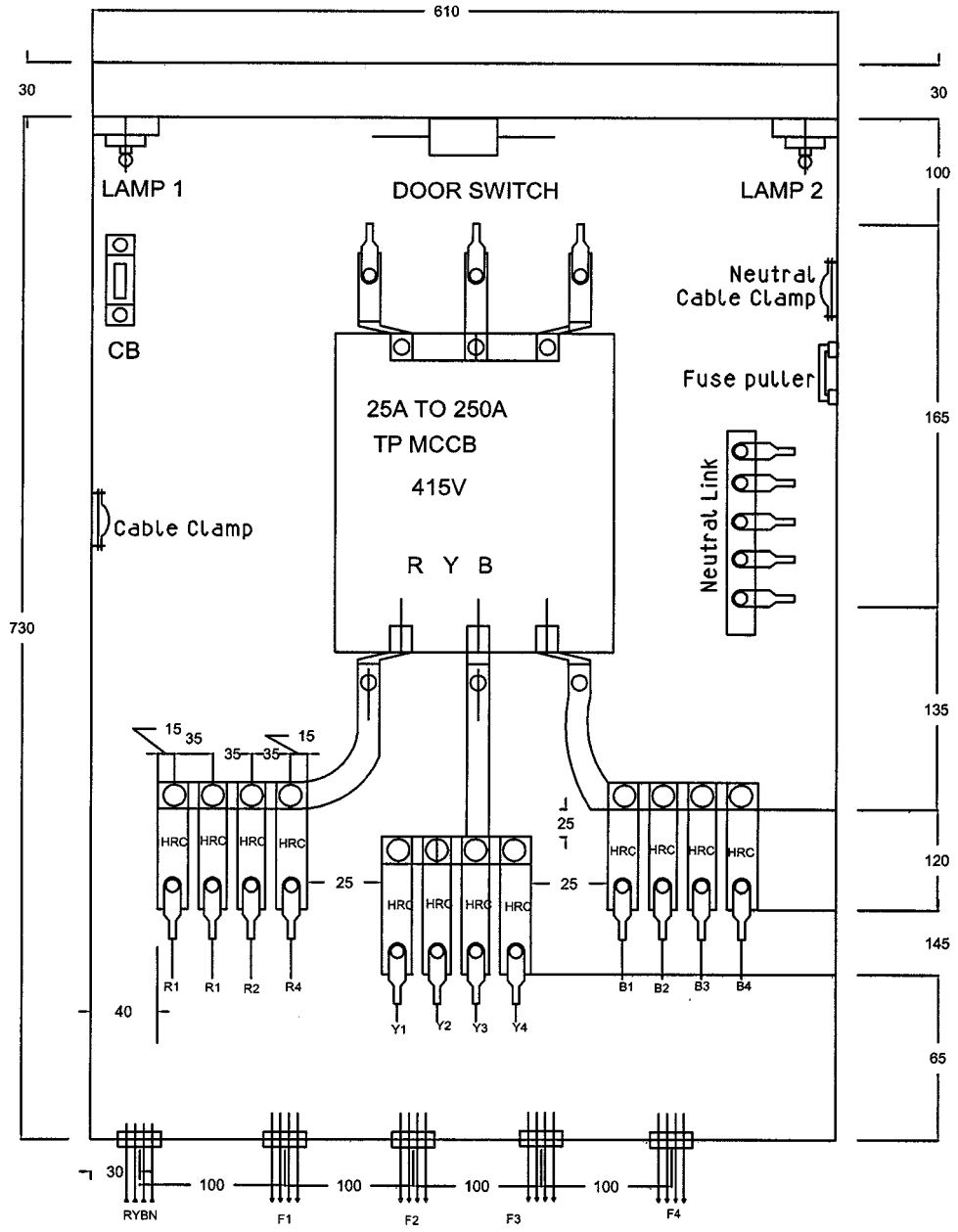
THREE PHASE TRANSFORMER LVDB, 4 WAYS, INCOMER MCCB -UPTO 250A, OUTGOING HRC FUSE UPTO 125A (EXTERNAL VIEW)

	Name	Date
DESIGNED BY		
CHECKED BY		
APPROVED BY		

DRAWING NO. BPC-DDCS-2015-54/2

REVISION A

2015



INCOMING CABLE (150 SQMM PVC ARMOURED UG)

OUTGOING CABLE (50 TO 120SQMM ABC - 4 FEEDERS)

NOTES

INTERNAL WIRING DIAGRAM OF DISTRIBUTION BOARD

INNER DEVICE:
MCCB UPTO 250A, 1NO. TPN-415V
HRC FUSES: UPTO 125A, 6 NOS/12NOS DEPENDING ON NUMBER OF WAYS

Provide one number of HRC fuse puller for every board.

TO BE USED WITH 16KVA, 25KVA, 63 kVA and 125 kVA 3PHASE TRANSFORMER RATINGS

CABLE LUG TO BE SUPPLIED FIXED WITH THE BOARD FOR APPROPRIATE CABLE SIZES.

BHUTAN POWER CORPORATION LIMITED

ENGINEERING DESIGN & CONTRACTS DEPARTMENT

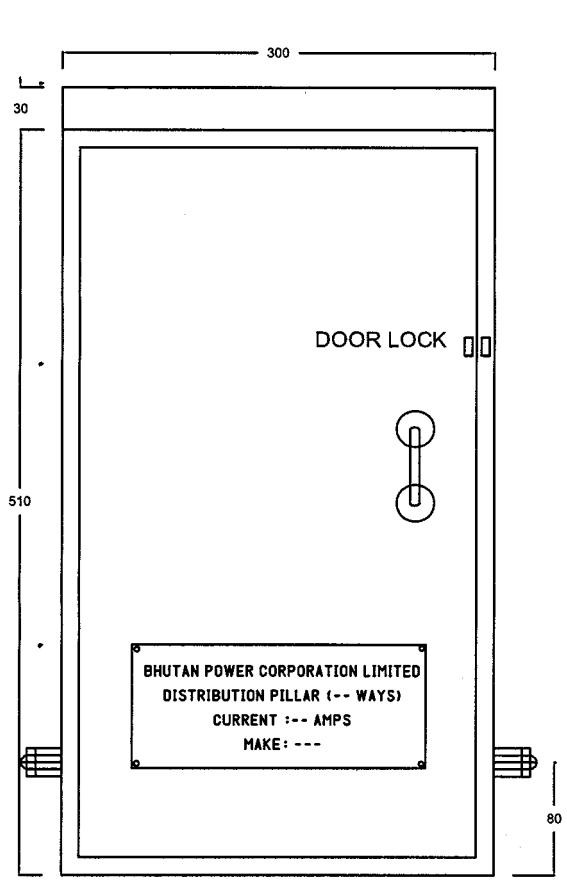
TITLE : DISTRIBUTION DESIGN & CONSTRUCTION STANDARD

THREE PHASE TRANSFORMER LT LVDB, 4 WAYS, INCOMER MCCB-UPTO 250A, OUTGOING HRC FUSE UPTO 125A(INTERNAL VIEW)

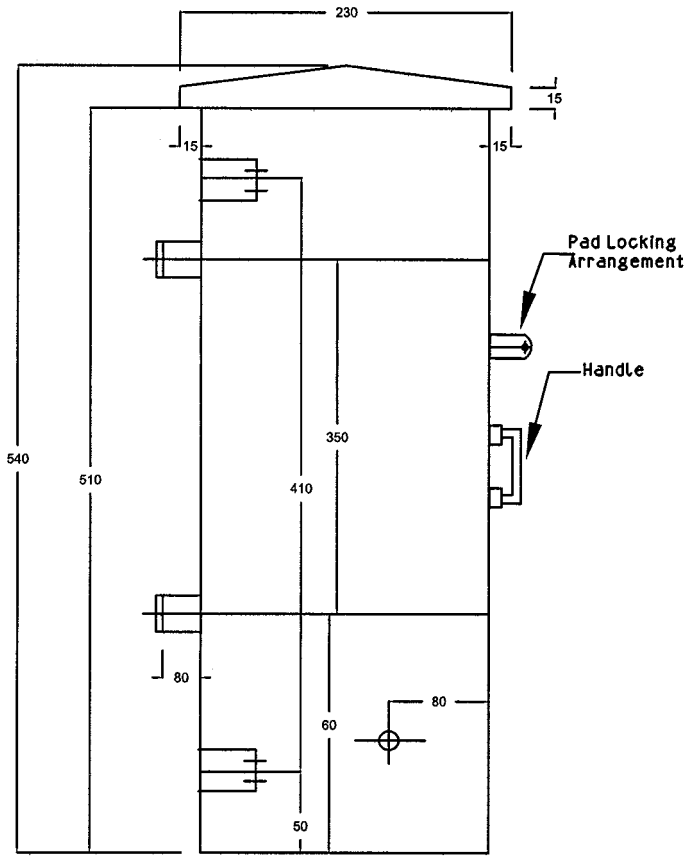
	Name	Date
DESIGNED BY		
CHECKED BY		
APPROVED BY		

DRAWING NO. BPC-DDCS-2015-54/1

REVISION 2015

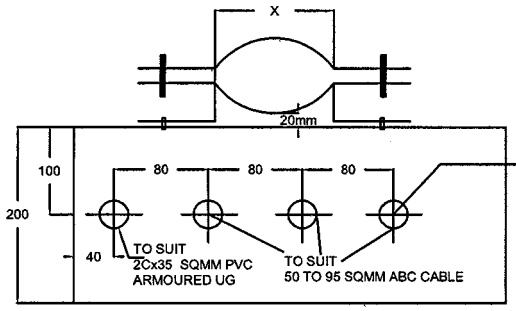


FRONT VIEW



SIDE VIEW

X1=X2 =165MM FOR IS TUBULAR POLE
X1(Top Clamp)=324MM FOR TELESCOPIC POLE
X2(Bottom Clamp)= 337MM FOR TELESCOPIC POLE



FIXED CABLE GLAND PLATE WITH PUNCHED HOLES FOR CABLE ENTRY (INCOMER 1 NO. OUTGOING 3 NOS.)

BOTTOM VIEW

NOTE:

MCCB RATING	PHASE BUSBAR SIZE	NEUTRAL BUSBAR SIZE
63A	12X6MM AL.ALLOY, GR-E91E	12X3MM AL.ALLOY, GR-E91E
100A	12X8MM AL.ALLOY, GR-E91E	12X4MM AL.ALLOY, GR-E91E
125A	19x6MM AL.ALLOY, GR-E91E	19X3MM AL.ALLOY, GR-E91E
160A	19x8MM AL.ALLOY, GR-E91E	19X4MM AL.ALLOY, GR-E91E

BAYONET LAMP (1 NO.) TO BE PROVIDED

BHUTAN POWER CORPORATION LIMITED

ENGINEERING DESIGN & CONTRACTS DEPARTMENT

TITLE : DISTRIBUTION DESIGN & CONSTRUCTION STANDARD

SINGLE PHASE TRANSFORMER LVDB, 3 WAYS, INCOMER MCCB -UPTO 160 A, OUTGOING HRC FUSE UPTO 100 A (EXTERNAL VIEW)

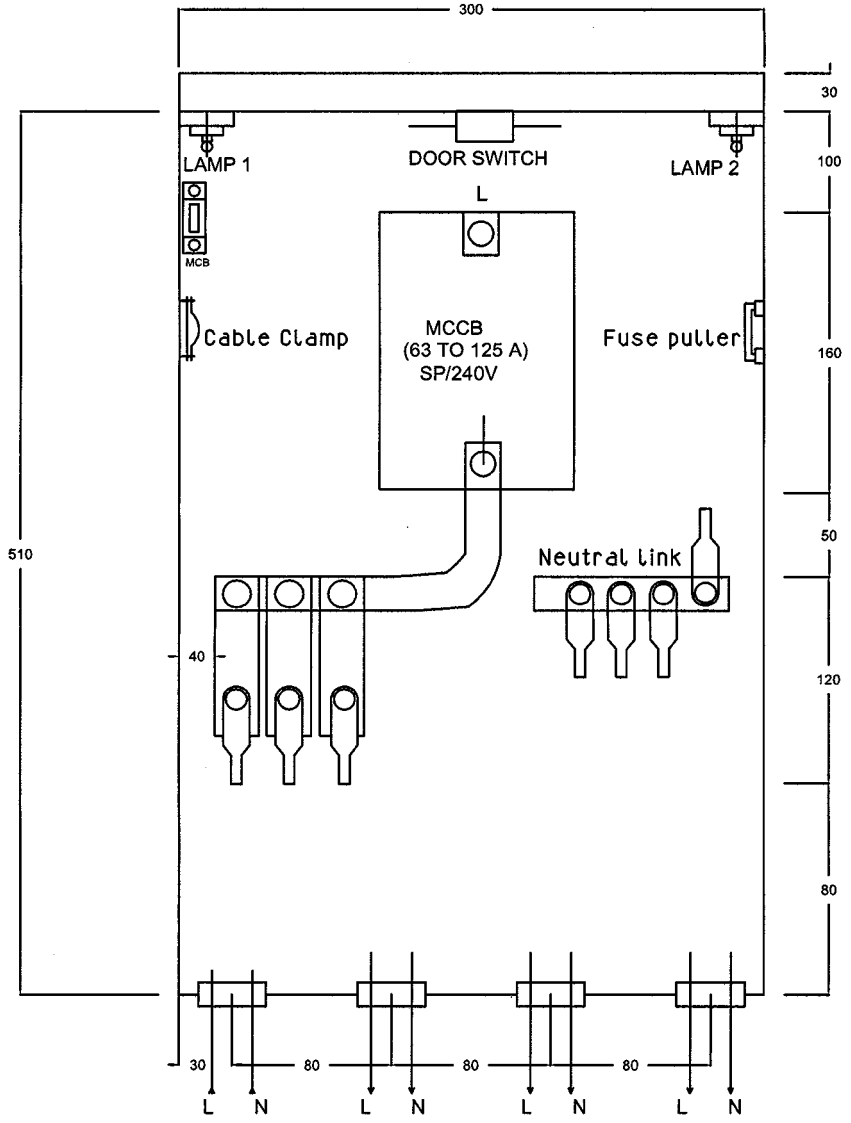
	Name	Date
DESIGNED BY		
CHECKED BY		
APPROVED BY		

DRAWING NO. BPC-DDCS-2015-53/2

REVISION

2015

Procurement Services: Department of Power Corporations Limited, Thimphu, Bhutan



INTERNAL WIRING DIAGRAM OF DISTRIBUTION BOARD

NOTES

INNER DEVICE:
MCCB: RATING UPTO 160 A, SPN,1 NO.
HRC FUSES: RATING UPTO 100 A-3 NOS/2NOS DEPENDING ON NUMBER OF WAYS.
Provide one number of HRC fuse puller for every board.
TO BE USED WITH 10 kVA, 16KVA AND 25KVA SINGLE PHASE TRANSFORMER RATINGS
CABLE LUG TO BE SUPPLIED FIXED WITH THE BOARD FOR APPROPRIATE CABLE SIZES.

BHUTAN POWER CORPORATION LIMITED

ENGINEERING DESIGN & CONTRACTS DEPARTMENT

TITLE : DISTRIBUTION DESIGN & CONSTRUCTION STANDARDS

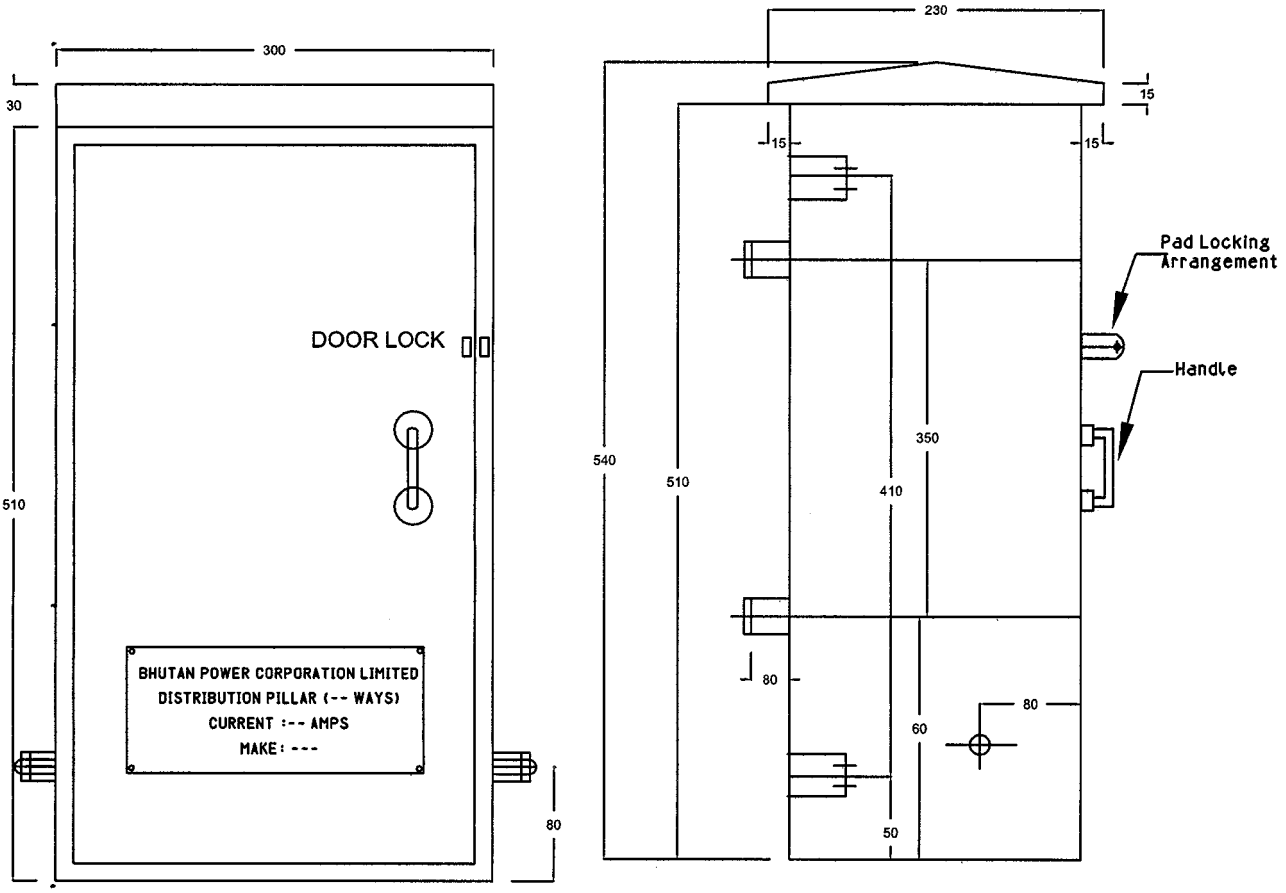
SINGLE PHASE TRANSFORMER LVDB, 3 WAYS, INCOMER MCCB - UPTO 160 A, OUTGOING HRC FUSE UPTO 100 A (INTERNAL VIEW)

	Name	Date
DESIGNED BY		
CHECKED BY		
APPROVED BY		

DRAWING NO. BPC-DDCS-2015-53/1

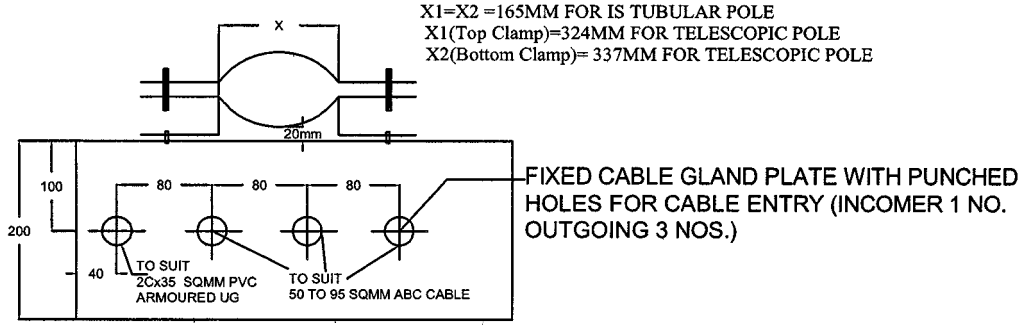
REVISION
2015

Procurement Services Department * Bhutan Power Corporations Limited * Thimphu : Bhutan



FRONT VIEW

SIDE VIEW



X1=X2 =165MM FOR IS TUBULAR POLE
X1(Top Clamp)=324MM FOR TELESCOPIC POLE
X2(Bottom Clamp)= 337MM FOR TELESCOPIC POLE

FIXED CABLE GLAND PLATE WITH PUNCHED HOLES FOR CABLE ENTRY (INCOMER 1 NO. OUTGOING 3 NOS.)

BOTTOM VIEW

NOTE:

MCCB RATING	PHASE BUSBAR SIZE	NEUTRAL BUSBAR SIZE
63A	12X6MM AL.ALLOY, GR-E91E	12X3MM AL.ALLOY, GR-E91E
100A	12X8MM AL.ALLOY, GR-E91E	12X4MM AL.ALLOY, GR-E91E
125A	19x6MM AL.ALLOY, GR-E91E	19X3MM AL.ALLOY, GR-E91E
160A	19x8MM AL.ALLOY, GR-E91E	19X4MM AL.ALLOY, GR-E91E

BAYONET LAMP (1 NO.) TO BE PROVIDED

BHUTAN POWER CORPORATION LIMITED

ENGINEERING DESIGN & CONTRACTS DEPARTMENT

TITLE : DISTRIBUTION DESIGN & CONSTRUCTION STANDARDS

SINGLE PHASE TRANSFORMER LVDB, 3 WAYS, INCOMER MCCB-UPTO 160 A, OUTGOING HRC FUSE UPTO100 A(EXTERNAL VIEW)

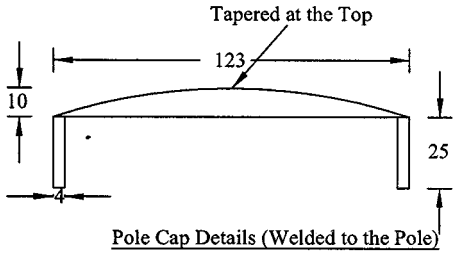
	Name	Date
DESIGNED BY		
CHECKED BY		
APPROVED BY		

DRAWING NO. BPC-DDCS-2015-53/2

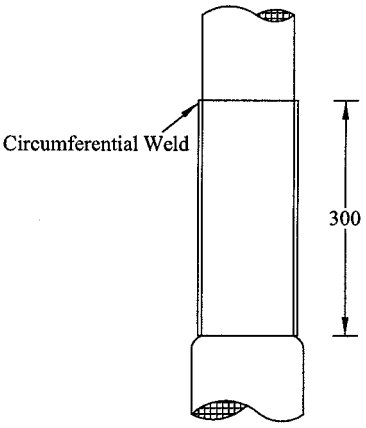
REVISIONS

2015

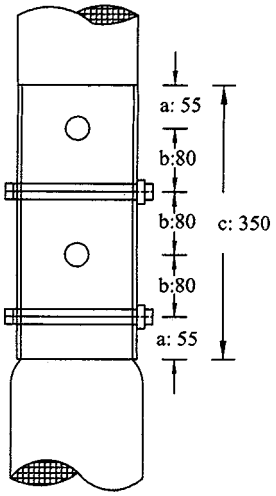
Bhutan Power Corporation Limited Procurement Services Department Thimphu Bhutan



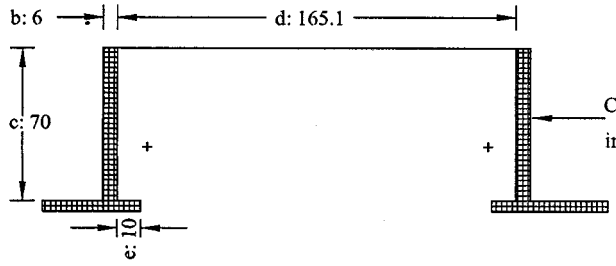
Pole Cap Details (Welded to the Pole)

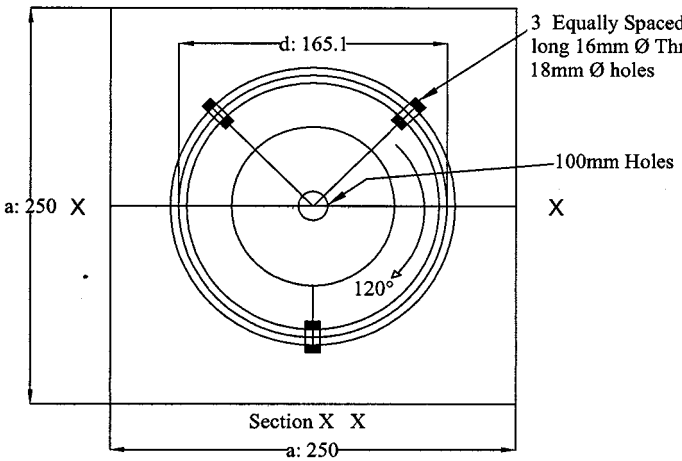


Welded Joint J1 Details



Bolted Joint J2 Details





Details of MS Base Plate (Packed Separately)

Pole Type		Units	10M (410-SP-45)
Length		mm	10000
Top Segment	Outer Diameter	mm	114.3
	Thickness	mm	3.65
	Length	mm	2400
Middle Segment	Outer Diameter	mm	139.7
	Thickness	mm	4.5
	Length	mm	2400
Bottom Segment	Outer Diameter	mm	165.1
	Thickness	mm	5.4
	Length	mm	5200
Joint J1	Welded Joint		
	d	mm	300
Joint J2	a	mm	55
	b	mm	80
	c	mm	350
	BL	mm	180
Planting Depth		mm	1800
Base Plate Details	a	mm	250
	b	mm	6
	c	mm	70
	d	mm	165.1
	e	mm	10

Notes

1. Dimensions as shown are in mm
2. Drawing not to Scale
3. Specification As Per IS:2713 (Part I To III : 1980)
4. Pole Top Cap -MS Plate would be Tag Welded to the Pole

BHUTAN POWER CORPORATION LIMITED (BPCL)

PROCUREMENT SERVICES DEPARTMENT

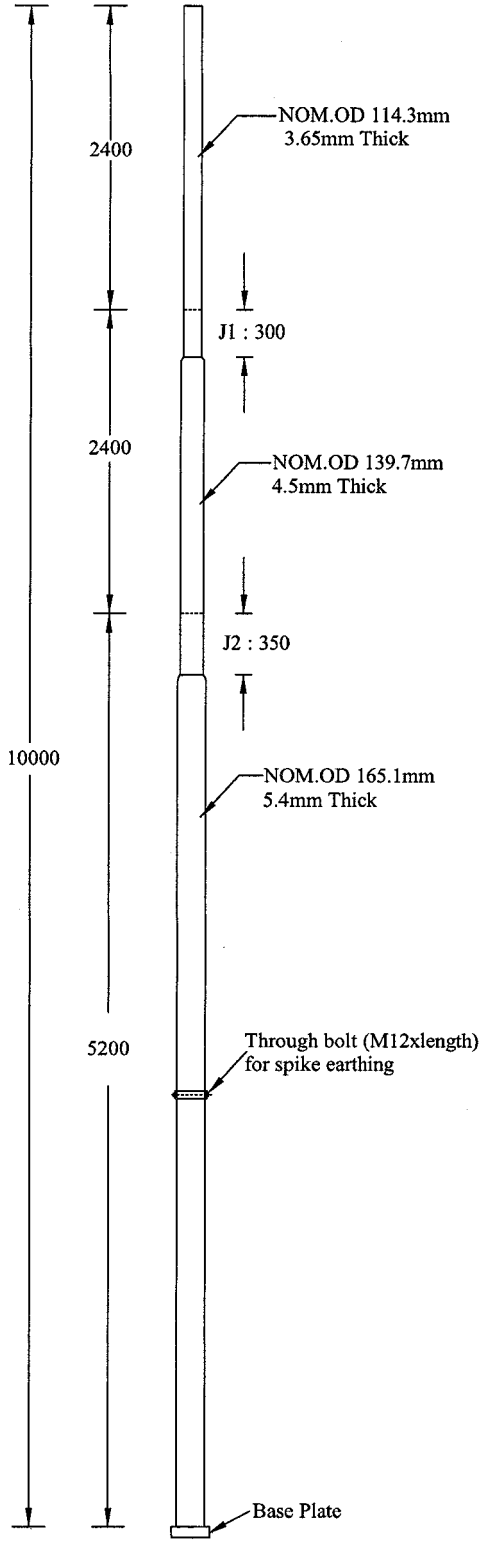
10 METERS GI STEEL TUBULAR POLE DETAILS

	NAME	DATE
DESIGNED BY	PSD	
CHECKED BY	R&DD	
APPROVED BY	DCSD	

DRAWING NO.

REVISION 2019

Bhutan Power Corporation Limited ★ Procurement Services Department ★ Thimphu : Bhutan



Pole Type		Units	10M (410-SP-45)
Length		mm	10000
Top Segment	Outer Diameter	mm	114.3
	Thickness	mm	3.65
	Length	mm	2400
Middle Segment	Outer Diameter	mm	139.7
	Thickness	mm	4.5
	Length	mm	2400
Bottom Segment	Outer Diameter	mm	165.1
	Thickness	mm	5.4
	Length	mm	5200
Joint J1	Welded Joint		
	d	mm	300
Joint J2	a	mm	55
	b	mm	80
	c	mm	350
	BL	mm	180
Planting Depth		mm	1800
Base Plate Details	a	mm	250
	b	mm	6
	c	mm	70
	d	mm	165.1
	e	mm	10

Notes

1. Dimensions as shown are in mm
2. Drawing not to Scale
3. Specification As Per IS:2713 (Part I To III : 1980)
4. Pole Top Cap -MS Plate would be Tag Welded to the Pole

BHUTAN POWER CORPORATION LIMITED (BPCL)

PROCUREMENT SERVICES DEPARTMENT

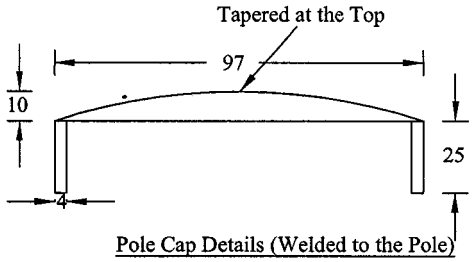
10 METERS GI STEEL TUBULAR POLE DETAILS

	NAME	DATE
DESIGNED BY	PSD	
CHECKED BY	R&DD	
APPROVED BY	DCSD	

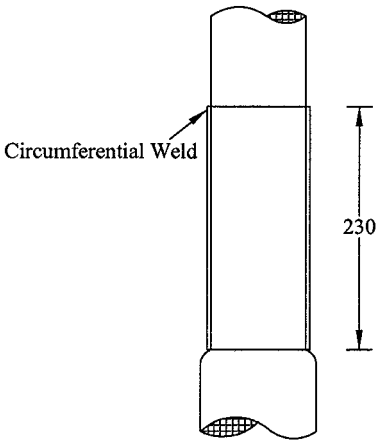
DRAWING NO.

REVISION 2019

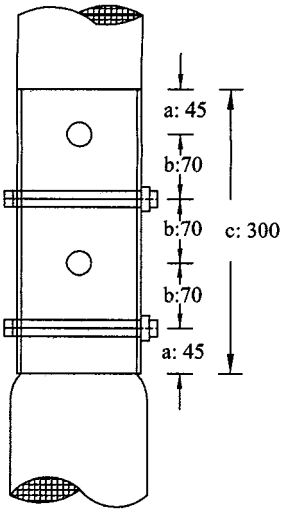
Procurement Services Department ★ Bhutan Power Corporation Limited ★ Thimphu : Bhutan



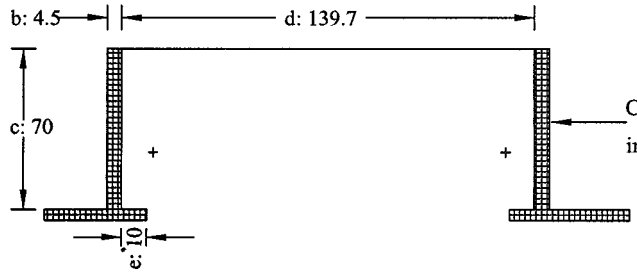
Pole Cap Details (Welded to the Pole)

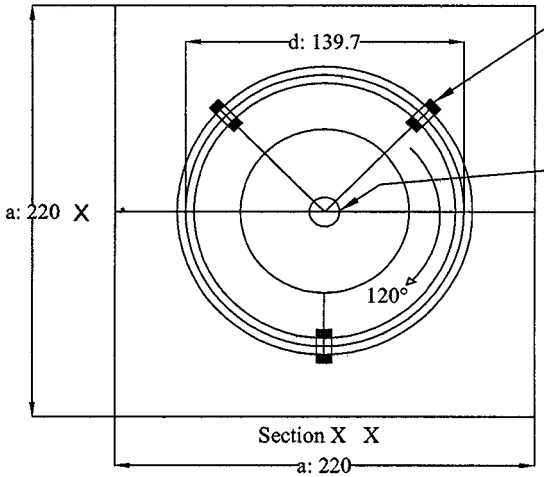


Welded Joint J1 Details

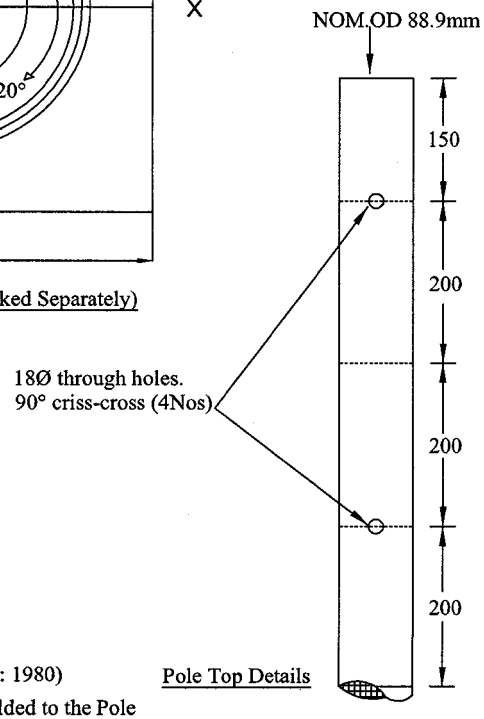


Bolted Joint J2 Details





Details of MS Base Plate (Packed Separately)



Pole Top Details

Pole Type		Units	7.5M (410-SP-9)
Length		mm	7500
Top Segment	Outer Diameter	mm	88.9
	Thickness	mm	3.25
	Length	mm	1500
Middle Segment	Outer Diameter	mm	114.3
	Thickness	mm	3.65
	Length	mm	1500
Bottom Segment	Outer Diameter	mm	139.7
	Thickness	mm	5.4
	Length	mm	4500
Joint J1	Welded Joint		
	d	mm	230
Joint J2	a	mm	45
	b	mm	70
	c	mm	300
	BL	mm	160
Planting Depth		mm	1250
Base Plate Details	a	mm	220
	b	mm	4.5
	c	mm	70
	d	mm	139.7
	e	mm	10

Notes

1. Dimensions as shown are in mm
2. Drawing not to Scale
3. Specification As Per IS:2713 (Part I To III : 1980)
4. Pole Top Cap -MS Plate would be Tag Welded to the Pole

BHUTAN POWER CORPORATION LIMITED (BPCL)

PROCUREMENT SERVICES DEPARTMENT

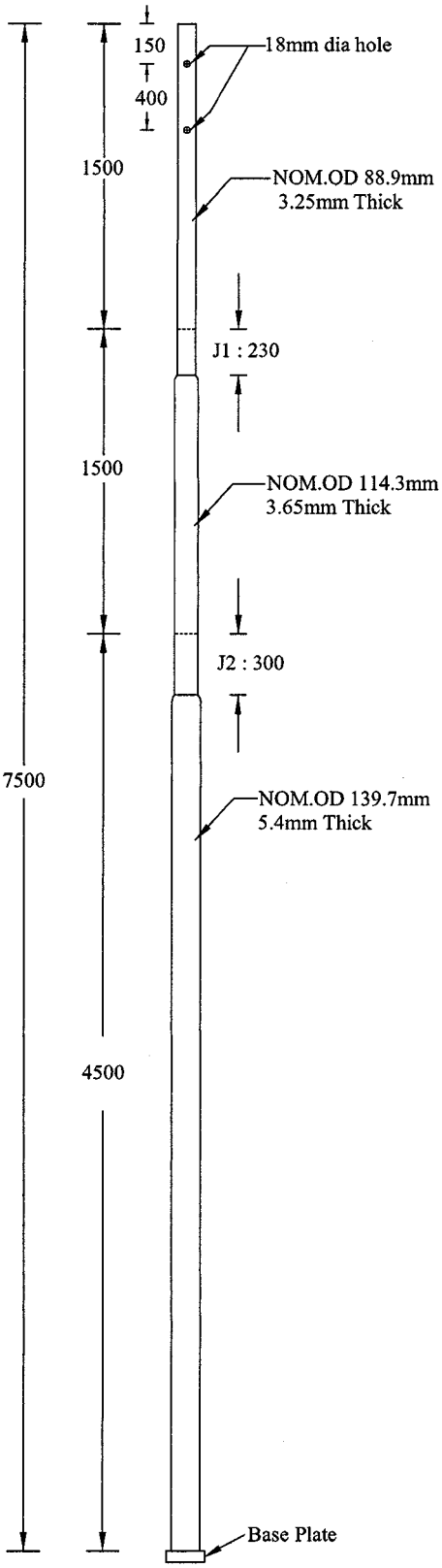
7.5 METERS GI STEEL TUBULAR POLE DETAILS

	NAME	DATE
DESIGNED BY	PSD	
CHECKED BY	R&DD	
APPROVED BY	DCSD	

DRAWING NO.

REVISION 2019

Bhutan Power Corporations Limited ★ Procurement Services Department ★ Thimphu : Bhutan



Pole Type		Units	7.5M (410-SP-9)
Length		mm	7500
Top Segment	Outer Diameter	mm	88.9
	Thickness	mm	3.25
	Length	mm	1500
Middle Segment	Outer Diameter	mm	114.3
	Thickness	mm	3.65
	Length	mm	1500
Bottom Segment	Outer Diameter	mm	139.7
	Thickness	mm	5.4
	Length	mm	4500
Joint J1	Welded Joint		
	d	mm	230
Joint J2	a	mm	45
	b	mm	70
	c	mm	300
	BL	mm	160
Planting Depth		mm	1250
Base Plate Details	a	mm	220
	b	mm	4.5
	c	mm	70
	d	mm	139.7
	e	mm	10

Notes

1. Dimensions as shown are in mm
2. Drawing not to Scale
3. Specification As Per IS:2713 (Part I To III : 1980)
4. Pole Top Cap -MS Plate would be Tag Welded to the Pole

BHUTAN POWER CORPORATION LIMITED (BPCL)

PROCUREMENT SERVICES DEPARTMENT

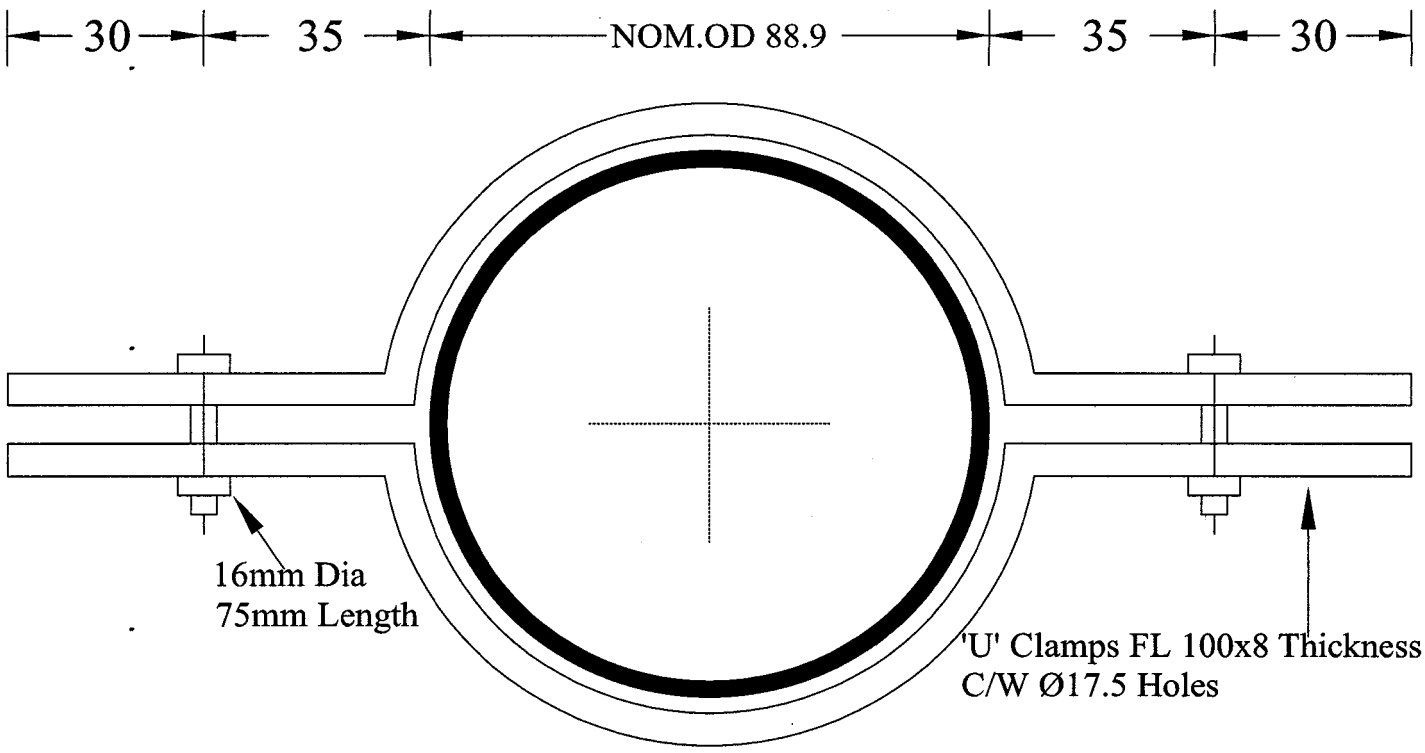
7.5 METERS GI STEEL TUBULAR POLE DETAILS

	NAME	DATE
DESIGNED BY	PSD	
CHECKED BY	R&DD	
APPROVED BY	DCSD	

DRAWING NO.

REVISION 2019

Procurement Services Department * Bhutan Power Corporations Limited * Thimphu : Bhutan



STAY CLAMP

Description	Quantity	Materials
Clamp -MS Flate (100x8)	2	GI
Hex Bolt M16X75	2	GI
Hex Nuts M16	2	GI
Plain Washer M16	2	GI

Bhutan Power Corporations Limited ★ Procurement Services Department ★ Thimphu : Bhutan

Notes
1. Dimensions as shown are in mm
2. Drawing not to Scale
3. All Bolts to be Ø16 C/W Nuts & Spring Washers
4. Nominal Diameter : 88.9 mm

BHUTAN POWER CORPORATION LIMITED (BPCL)

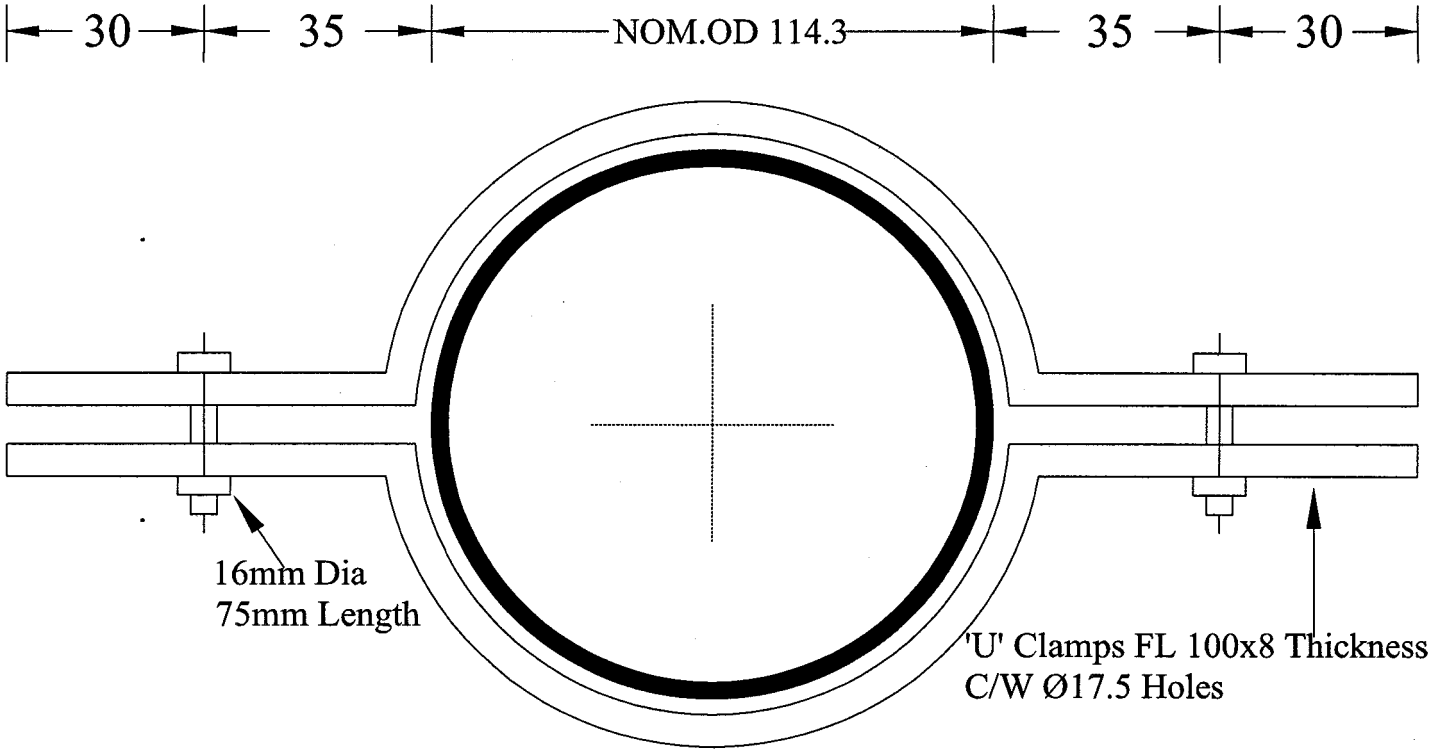
PROCUREMENT SERVICES DEPARTMENT

STAY CLAMP FOR 7.5M GI STEEL TUBULAR POLE

	NAME	DATE
PREPARED BY	PSD	
CHECKED BY	R&DD	

DRAWING NO. PSD000

REVISION : 2019



STAY CLAMP

Description	Quantity	Materials
Clamp -MS Flate (100x8)	2	GI
Hex Bolt M16X75	2	GI
Hex Nuts M16	2	GI
Plain Washer M16	2	GI

Bhutan Power Corporations Limited ★ Procurement Services Department ★ Thimphu, Bhutan

Notes
1. Dimensions as shown are in mm
2. Drawing not to Scale
3. All Bolts to be Ø16 C/W Nuts & Spring Washers
4. Nominal Diameter : 114.3 mm

BHUTAN POWER CORPORATION LIMITED (BPCL)

PROCUREMENT SERVICES DEPARTMENT

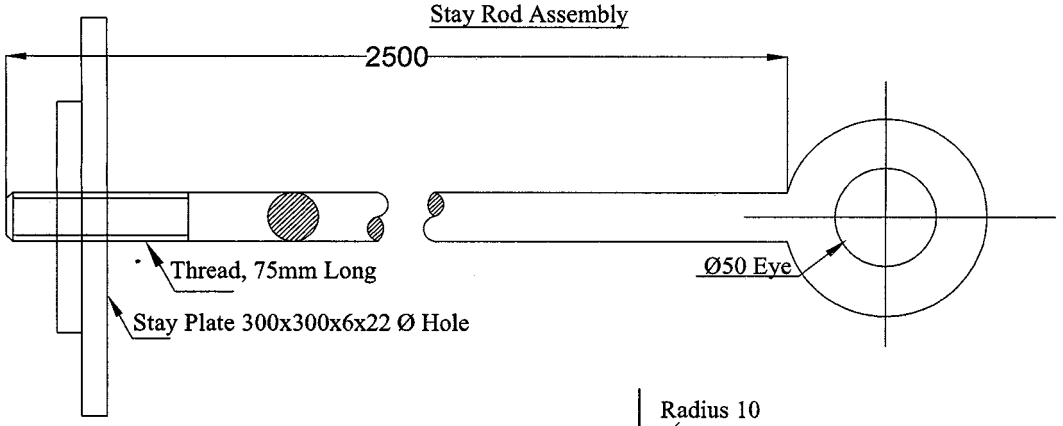
STAY CLAMP FOR GI STEEL TUBULAR POLE FOR 11 & 33kV

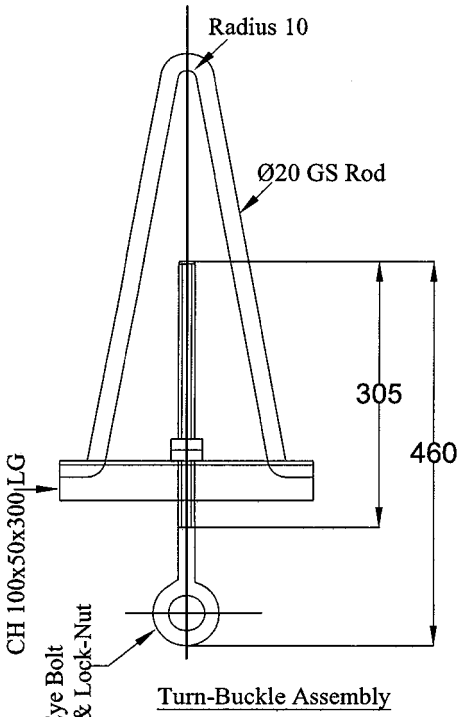
	NAME	DATE
PREPARED BY	PSD	
CHECKED BY	R&DD	

DRAWING NO. PSD000

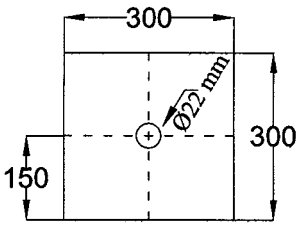
REVISION : 2019

Stay Rod Assembly

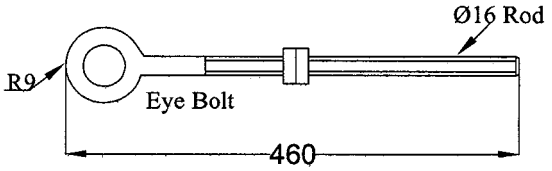




Turn-Buckle Assembly



Stay Plate



Eye Bolt

Description	Quantity	Materials
Turn Buckle Assembly with Thimble	1	Galvanized Steel
Stay Plate (300x300x6mm)	1	Galvanized Steel
Stay Rod (2.5m) with Thimble	1	Galvanized Steel

Materials : BS 4360 Grade 43A
Galvanizing : BS 729
Threads : ISO Metric
Nut : BS 4190 Grade 4.0

BHUTAN POWER CORPORATION LIMITED

PROCUREMENT SERVICE DEPARTMENT

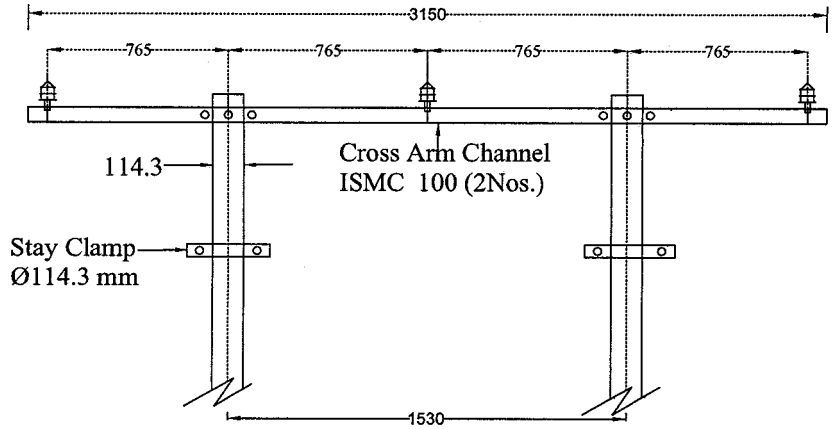
STAY SET ASSEMBLY OF STEEL TUBULAR POLE

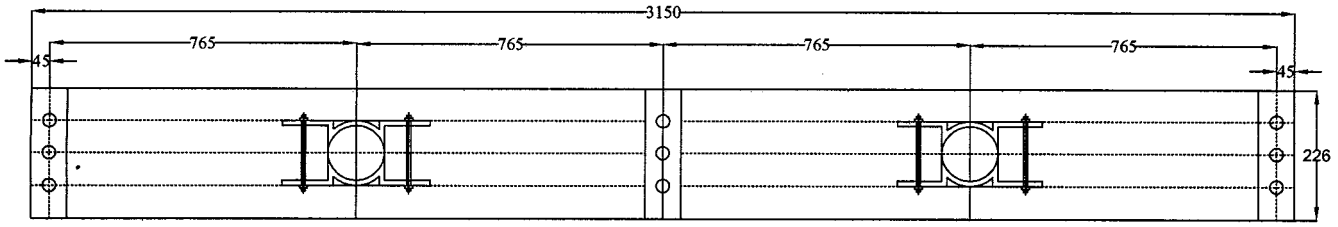
	NAME	DATE
PREPARED BY		
CHECKED BY		
APPROVED BY		

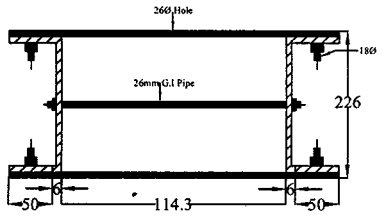
DRAWING NO.

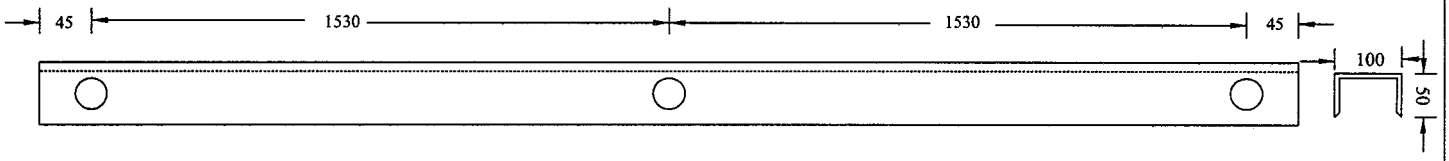
REVISION

Procurement Services: Department ★ Bhutan Power Corporation Limited ★ Thimphu, Bhutan

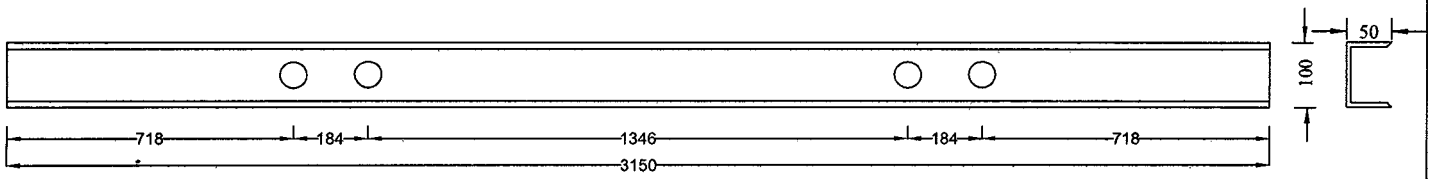








Top View of Cross-Arm -CHL ISMC 100x50 (2Nos.)



Front View of Cross-Arm -CHL ISMC 100x50 (2Nos.)

Notes

1. Dimensions as shown are in mm
2. Drawing not to Scale
3. Standards
   IS 2062-1992/IS 1161 or Equivalent Steel for General Structure Purposes
   IS 808-1964: Equivalent Dimension for Hot Rolled Steel Beam Column Channel & Angle Section
4. Minimum Tensile Strength - 420 MPA
5. All items shall be Mild Steel (MS) Painted with one Coat of Red Oxide Primer in accordance with ISO 12944-7 or any other Equivalent International Standard. However, Nuts & Bolts shall be Hot Dipped Galvanized with Zinc Coating 600 Gram per Square Meter
6. Disc Arrangement is shown for 33kV System, take One Disc Insulator for 11kV System

Bhutan Power Corporations Limited ★ Procurement Services: Department ★ Thimphu : Bhutan

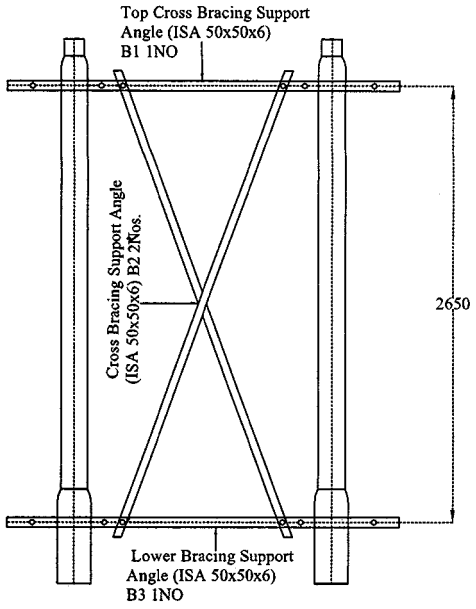
BHUTAN POWER CORPORATION LIMITED (BPCL)

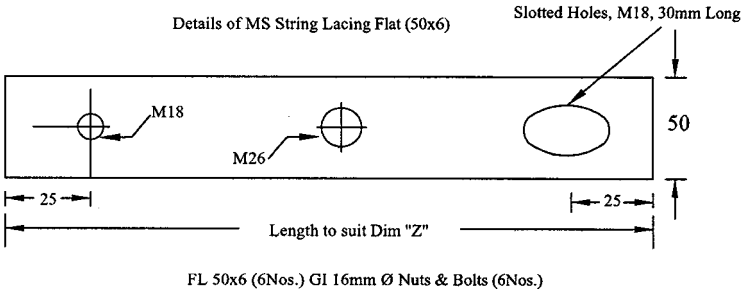
PROCUREMENT SERVICES DEPARTMENT

CROSS ARM ASSEMBLY DETAIL FOR 11 & 33 kV FOR STEEL TUBULAR POLE

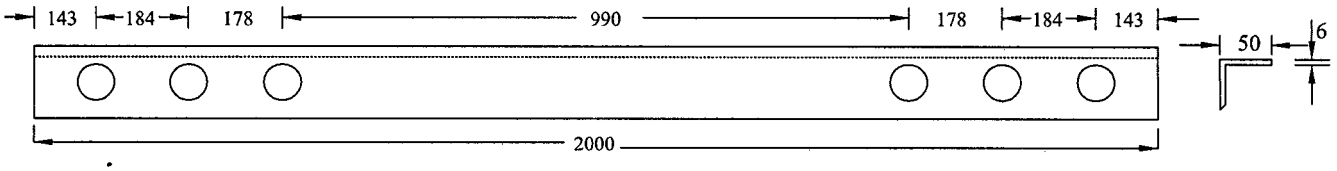
	NAME	DATE
PREPARED BY	PSD	
CHECKED BY	R&DD	

DRAWING NO. PSD000 REVISION : 2018

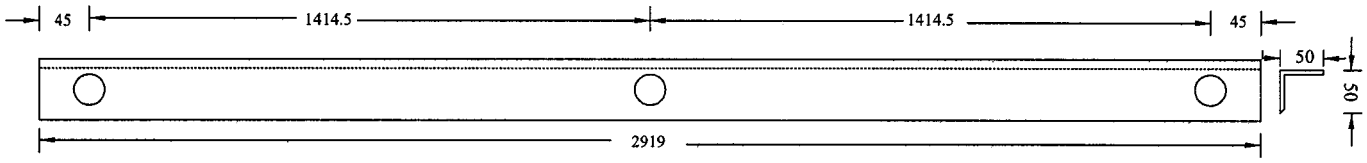




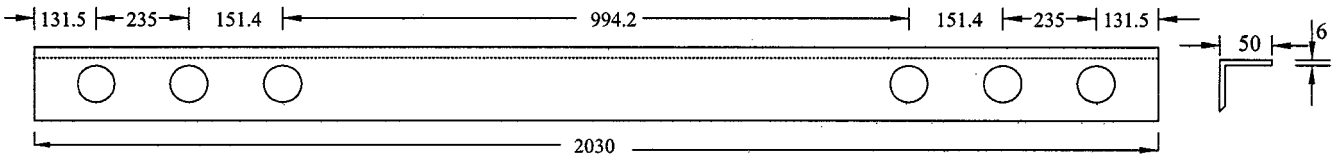
FL 50x6 (6Nos.) GI 16mm Ø Nuts & Bolts (6Nos.)



Detail of Bracing- B1 ISA 50x50x6 (1Nos.)

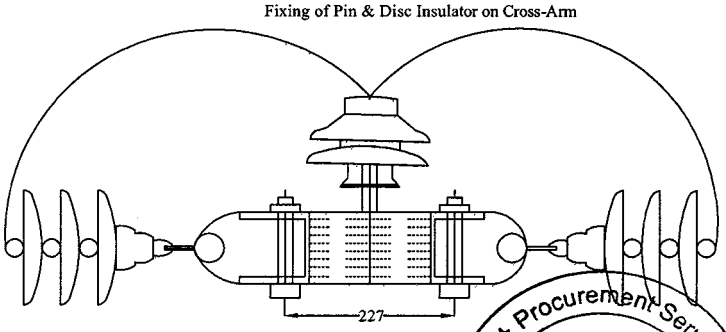


Detail of Bracing- B2 ISA 50x50x6 (2Nos.)



Detail of Bracing- B3 ISA 50x50x6 (1Nos.)

Fixing of Pin & Disc Insulator on Cross-Arm



Notes

1. Dimensions as shown are in mm
2. Drawing not to Scale
3. Standards
   IS 2062-1992/IS 1161 or Equivalent Steel for General Structure Purposes
   IS 808-1964: Equivalent Dimension for Hot Rolled Steel Beam Column Channel & Angle Section
4. Minimum Tensile Strength - 420 MPA
5. All items shall be Mild Steel (MS) Painted with one Coat of Red Oxide Primer in accordance with ISO 12944-7 or any other Equivalent International Standard. However, Nuts & Bolts shall be Hot Dipped Galvanized with Zinc Coating 600 Gram per Square Meter
6. Disc Arrangement is shown for 33kV System, take One Disc Insulator for 11kV System

Procurement Services Department ★ Bhutan Power Corporation Limited ★ Thimphu : Bhutan

BHUTAN POWER CORPORATION LIMITED (BPCL)

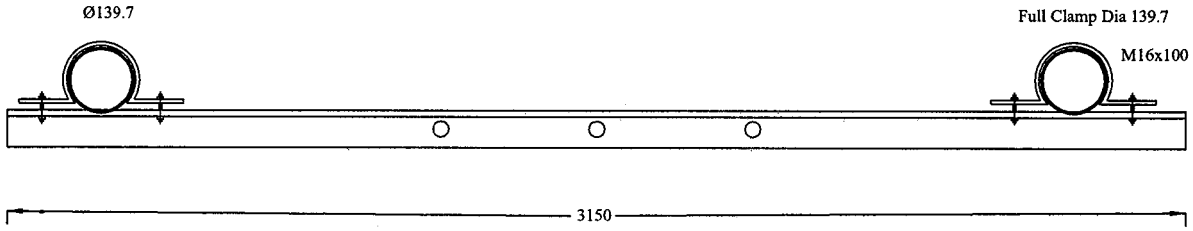
PROCUREMENT SERVICES DEPARTMENT

CROSS BRACING ASSEMBLY DETAIL FOR 11 & 33 kV STEEL TUBULAR POLE

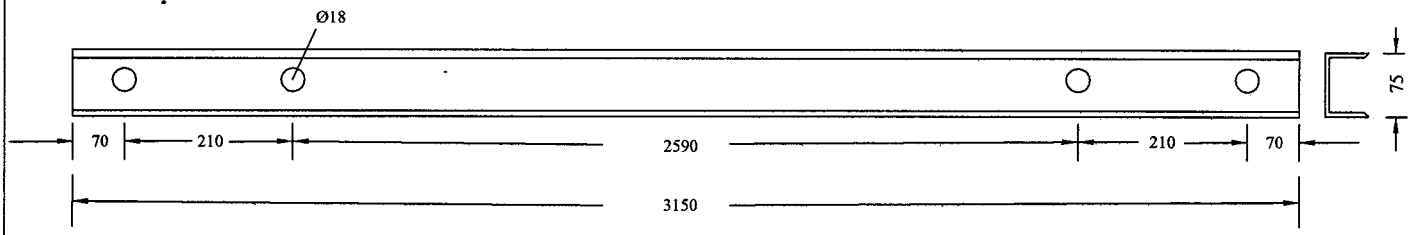
	NAME	DATE
PREPARED BY	PSD	
CHECKED BY	R&DD	
APPROVED BY	DCSD	

DRAWING NO. PSD000.

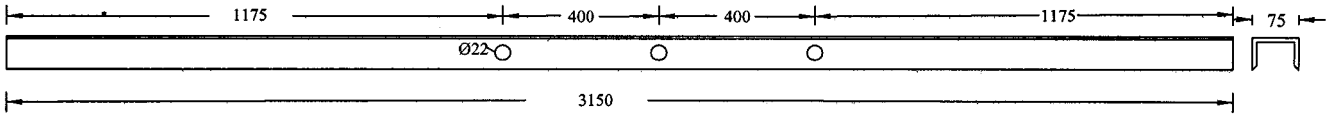
REVISION : 2019



Support for Lightning Arrestor (ISMC 75x40) -1No.



Front View Channel Support for Lightning Arrestor (ISMC 75x40) -1No.

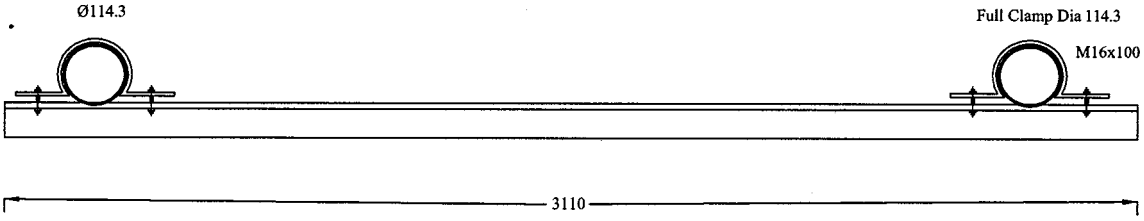


Top View channel Support for Lightning Arrestor (ISMC 75x40) -1No.

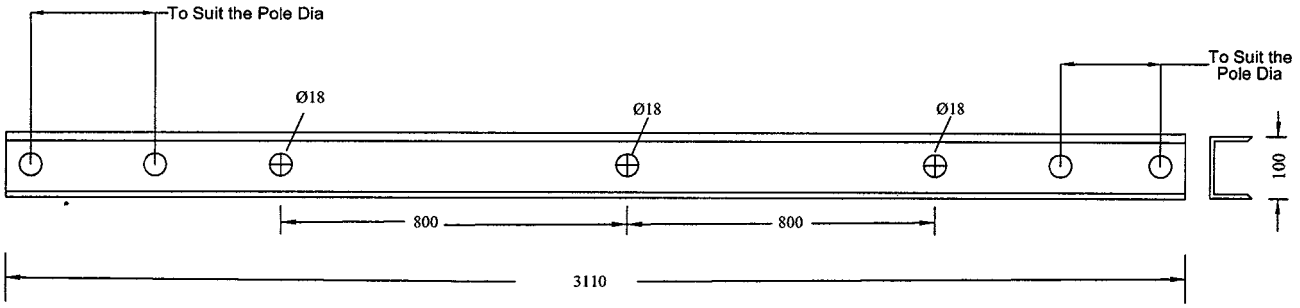
Notes
1. Dimensions as shown are in mm
2. Drawing not to Scale

Procurement Services Department ★ Bhutan Power Corporations Limited ★ Thimphu : Bhutan

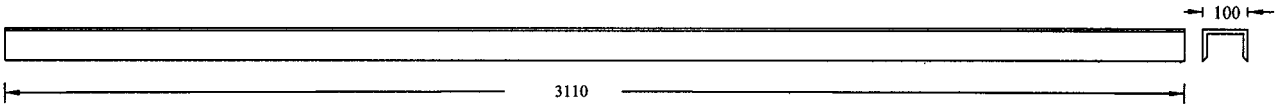
BHUTAN POWER CORPORATION LIMITED (BPCL)			PROCUREMENT SERVICES DEPARTMENT
			SUPPORT FOR LIGHTNING ARRESTER OF STEEL TUBULAR POLE
	NAME	DATE	
PREPARED BY	PSD		
CHECKED BY	R&DD		DRAWING NO. PSD000. / REVISION : 2019
APPROVED BY	DCSD		



GI ABS/LBS Support (ISMC 100X50) for GI Steel Tubular Pole - (1Set = 2Nos.)



Support for 11kV & 33kV ABS/LBS Front Views Channel (ISMC 100X50) -(1Set = 2Nos.)

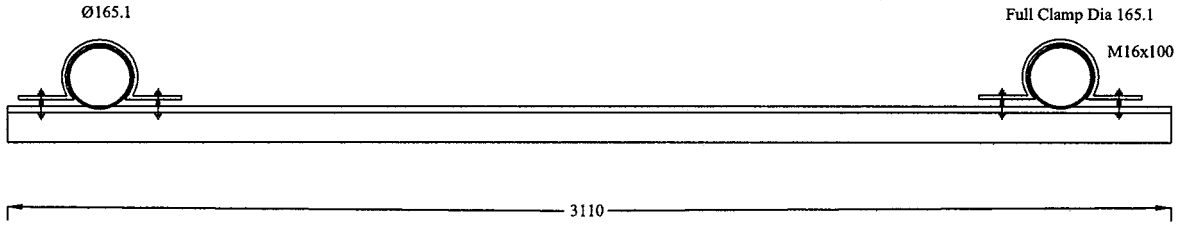


Support for 11kV & 33kV ABS/LBS Top Views Channel (ISMC 100X50) - (1Set = 2Nos.)

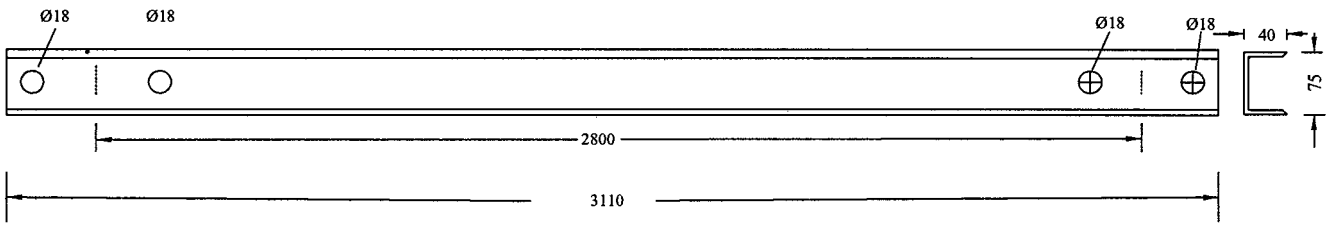
Procurement Services Department ★ Thimphu : Bhutan ★ Bhutan Power Corporations Limited

Notes
1. Dimensions as shown are in mm
2. Drawing not to Scale

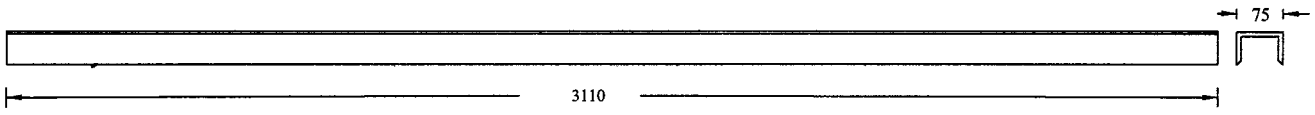
BHUTAN POWER CORPORATION LIMITED (BPCL)			PROCUREMENT SERVICES DEPARTMENT	
	NAME	DATE	GI SUPPORT FOR ABS/LBS OF STEEL TUBULAR POLE	
PREPARED BY	PSD			
CHECKED BY	R&DD		DRAWING NO. PSD000.	REVISION : 2019
APPROVED BY	DCSD			



GI ABS/LBS Handle Support (ISMC 75X40X6) for GI Steel Tubular Pole - (1Set = 2Nos.)



Handle Support for 11kV & 33kV ABS/LBS Front Views Channel (ISMC 75X40X6) - (1Set = 2Nos.)

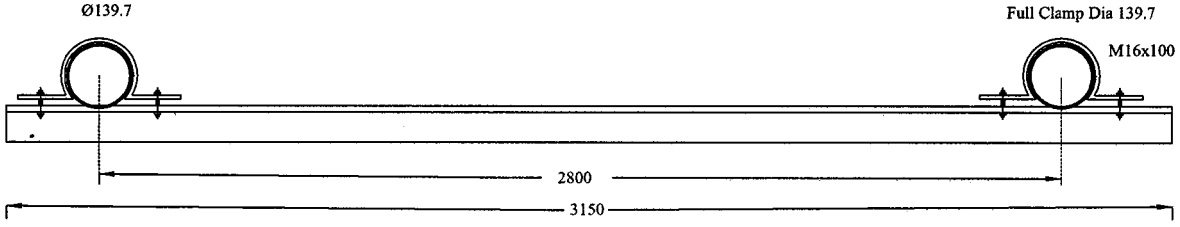


Handle Support for 11kV & 33kV ABS/LBS Top Views Channel (ISMC 75X40X6) - (1Set = 2Nos.)

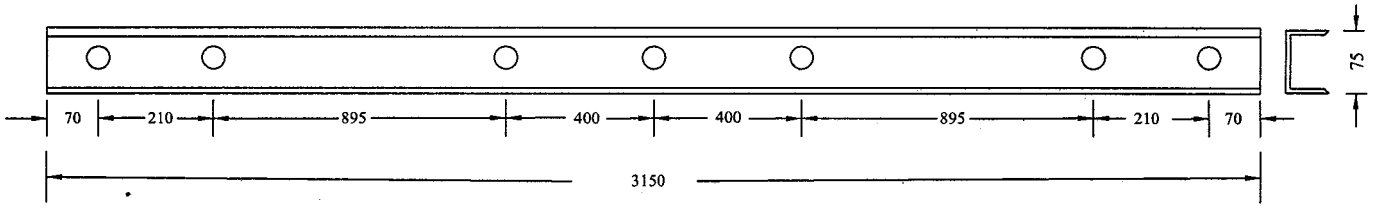
Procurement Services Department ★ Thimphu : Bhutan ★ Bhutan Power Corporations Limited

Notes
1. Dimensions as shown are in mm
2. Drawing not to Scale

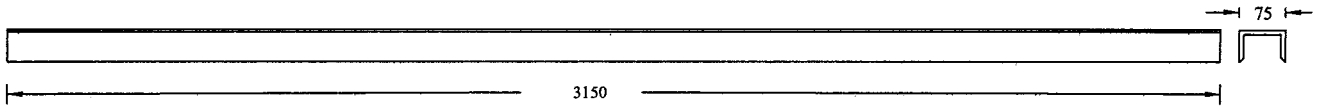
BHUTAN POWER CORPORATION LIMITED (BPCL)			PROCUREMENT SERVICES DEPARTMENT	
	NAME	DATE	GI HANDLE SUPPORT FOR ABS/LBS OF STEEL TUBULAR POLE	
PREPARED BY	PSD			
CHECKED BY	R&DD		DRAWING NO. PSD000.	REVISION : 2019
APPROVED BY	DCSD			



Support for DO Fuse (ISMC 75X40) -(1Set =2Nos.)



Front View Channel Support for DO Fuse (ISMC 75x40) -(1Set =2Nos.)

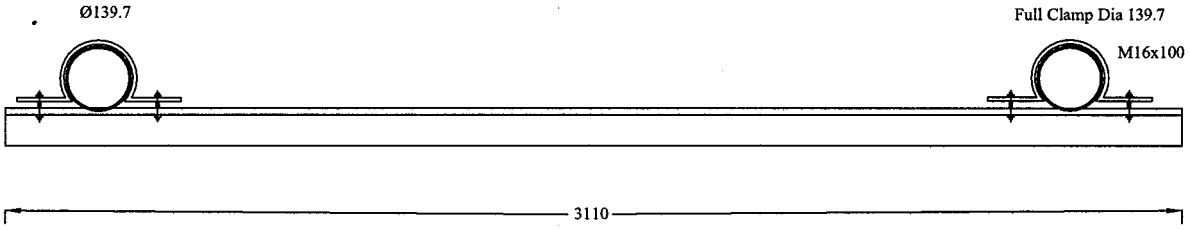


Top View Channel Support for DO Fuse (ISMC 75X40) -(1Set =2Nos.)

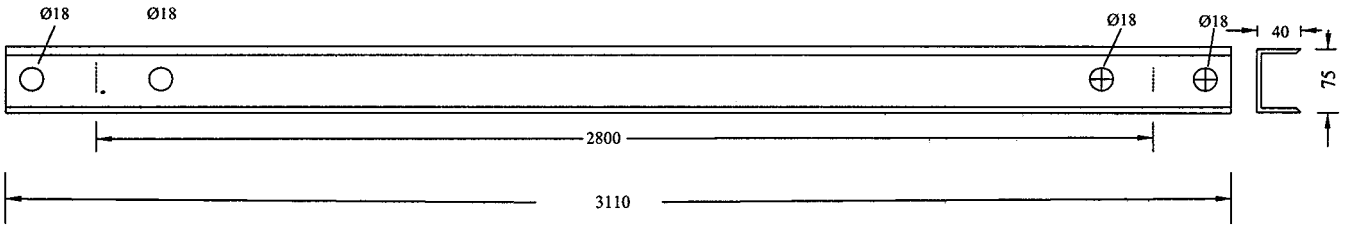
Procurement Services Department
Thimphu : Bhutan
Bhutan Power Corporations Limited

Notes
1. Dimensions as shown are in mm
2. Drawing not to Scale

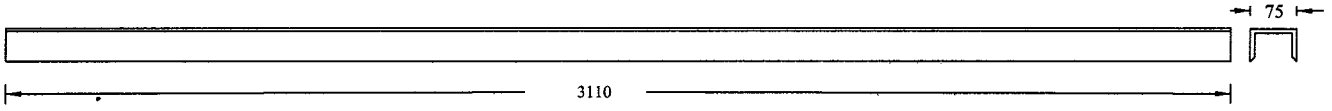
BHUTAN POWER CORPORATION LIMITED (BPCL)			PROCUREMENT SERVICES DEPARTMENT
			SUPPORT FOR DROP OUT FUSE OF STEEL TUBULAR POLE
	NAME	DATE	
PREPARED BY	PSD		
CHECKED BY	R&DD		DRAWING NO. PSD000. / REVISION : 2019
APPROVED BY	DCSD		



GI Support for Intermediate Channel for GI Steel Tubular Pole (ISMC 75X40) - 1No.



GI Support for Intermediate Channel Front Views (ISMC 75X40) -1No.



Top View of GI Support for Intermediate Channel (ISMC 75X40) -1No.

Procurement Services: Department ★ Thimphu : Bhutan ★ Bhutan Power Corporations Limited

Notes
1. Dimensions as shown are in mm
2. Drawing not to Scale

BHUTAN POWER CORPORATION LIMITED (BPCL)

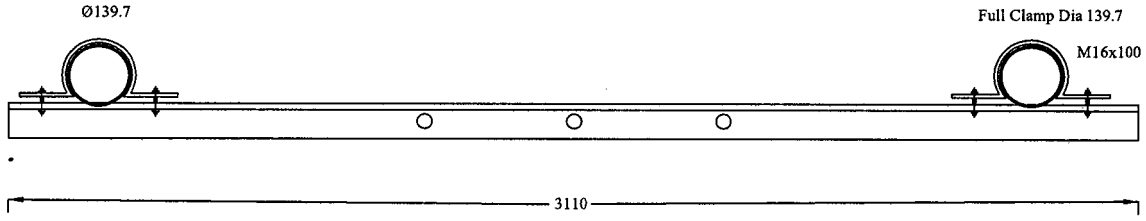
PROCUREMENT SERVICES DEPARTMENT

GI SUPPORT FOR INTERMEDIATE CHANNEL OF STEEL TUBULAR POLE

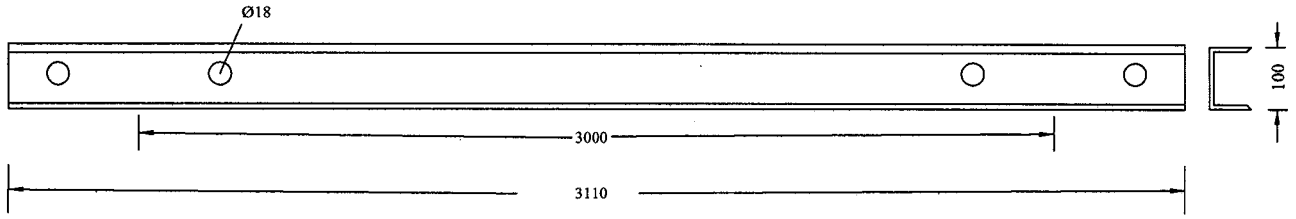
	NAME	DATE
PREPARED BY	PSD	
CHECKED BY	R&DD	
APPROVED BY	DCSD	

DRAWING NO. PSD000.

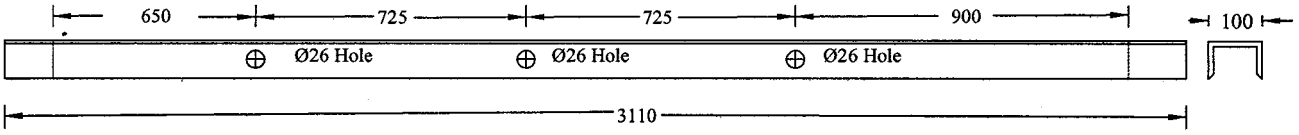
REVISION : 2019



GI Support for Intermediate Jumper (ISMC 100X50) -1No.



Front View of GI Support for Intermediate Jumper (ISMC 100X50) -1No.

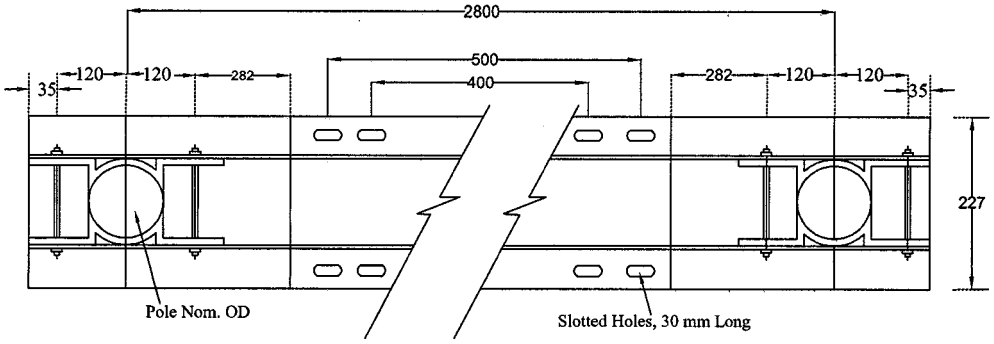


Top View Channel for GI Support for Intermediate Jumper (ISMC 100X50) -1No.

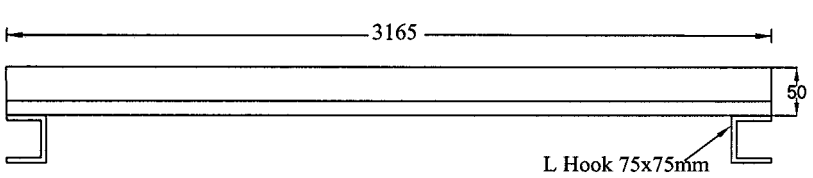
Procurement Services: Department ★ Bhutan Power Corporations Limited ★ Thimphu : Bhutan

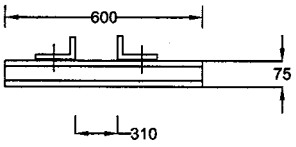
Notes
1. Dimensions as shown are in mm
2. Drawing not to Scale

BHUTAN POWER CORPORATION LIMITED (BPCL)			PROCUREMENT SERVICES DEPARTMENT
	NAME	DATE	GI SUPPORT FOR INTERMEDIATE JUMPER OF STEEL TUBULAR POLE
PREPARED BY	PSD		
CHECKED BY	R&DD		DRAWING NO. PSD000. / REVISION : 2019
APPROVED BY	DCSD		

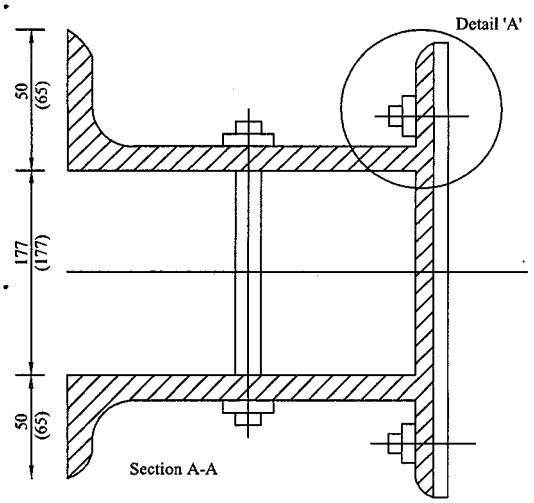


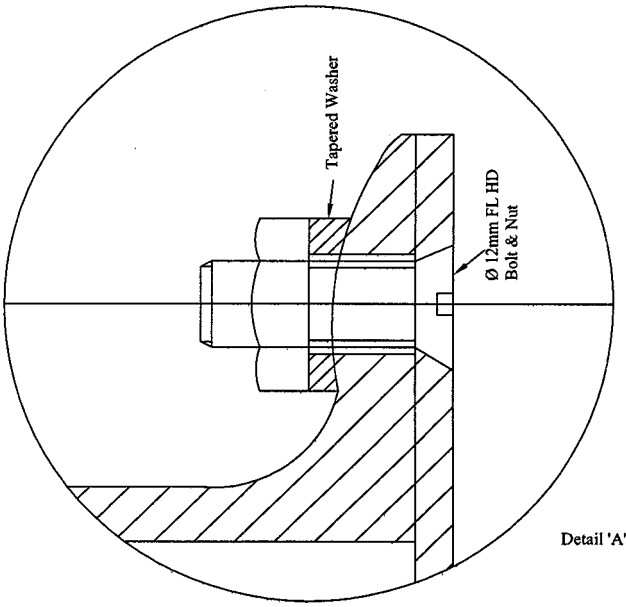
Transformer Platform (2Nos.) ISMC 125x65





Transformer Belting
(Angle 50x6 mm)





Notes
1. Dimensions as shown are in mm
2. Drawing not to Scale
3. 400 mm hole centre to centre length for 25 kVA & below
4. 500 mm hole centre to centre length for 63 kVA & above

Procurement Services Department
Thimphu : Bhutan
Bhutan Power Corporations Limited

BHUTAN POWER CORPORATION LIMITED (BPCL)

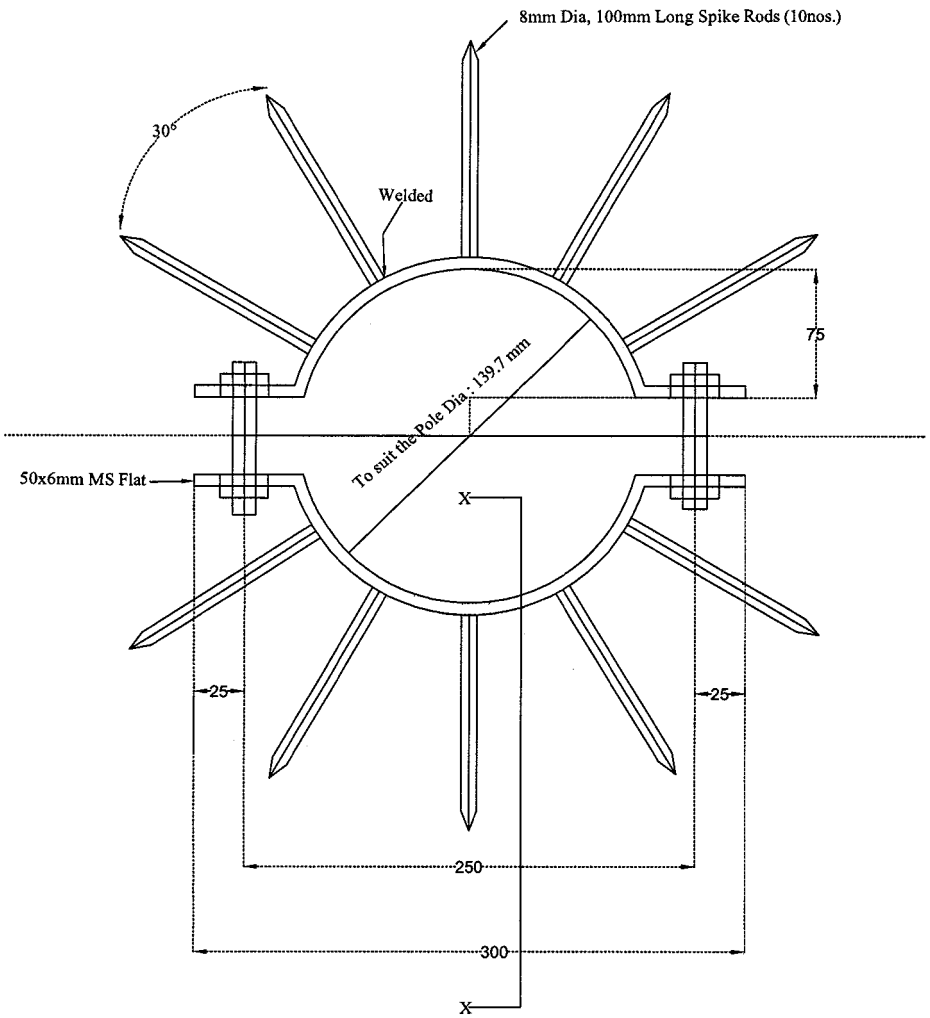
PROCUREMENT SERVICES DEPARTMENT

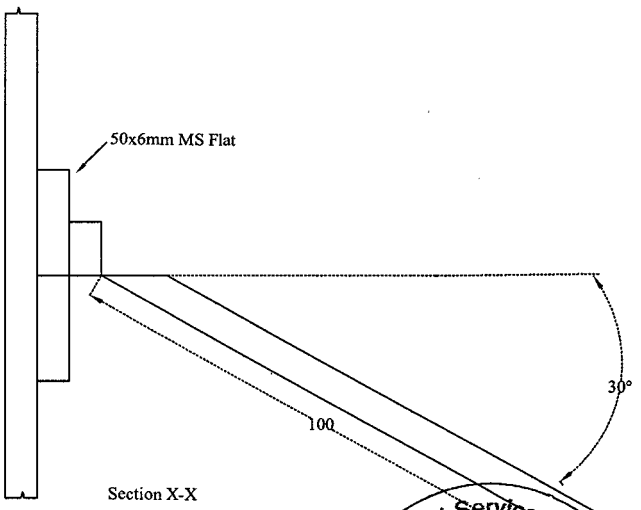
TRANSFORMER PLATFORM & TRANSFORMER BELTING FOR STEEL TUBULAR POLE

	NAME	DATE
PREPARED BY	PSD	
CHECKED BY	R&DD	
APPROVED BY	DCSD	

DRAWING NO.

REVISION : 2019



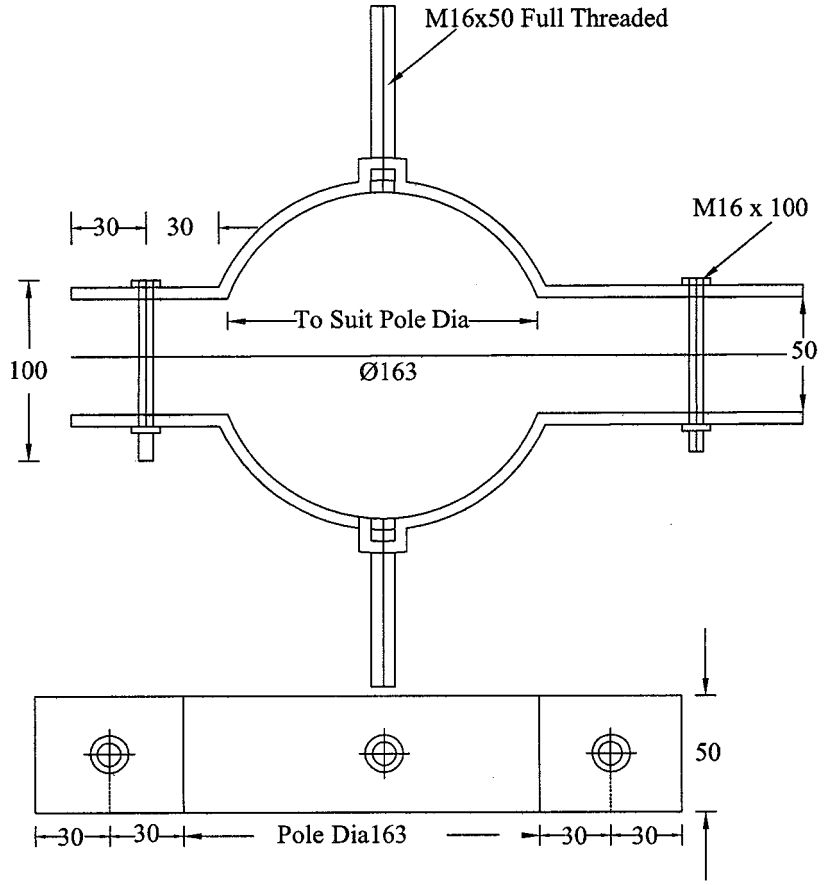


Notes

1. Dimensions as shown are in mm
2. Drawing not to Scale
3. Tolerance ± 5%
4. Four numbers per pole
5. Ferrous parts hot dip galvanized as per BS-729

Procurement Services Department ★ Bhutan Power Corporation Limited ★ Thimphu : Bhutan

BHUTAN POWER CORPORATION LIMITED (BPCL)		PROCUREMENT SERVICES DEPARTMENT
		ANTI-CLIMBING DEVICE
	NAME	DATE
PREPARED BY	PSD	
CHECKED BY	R&DD	
	DRAWING NO. PSD000	REVISION 2019

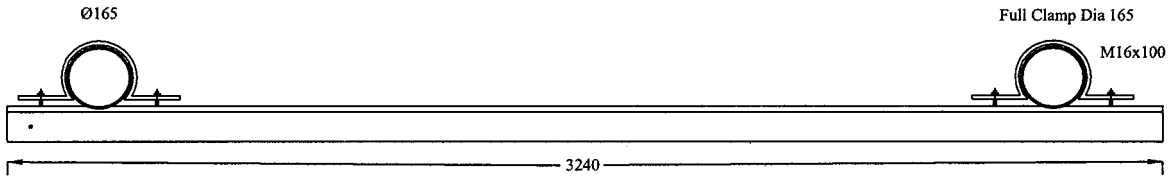


STAY CLAMP

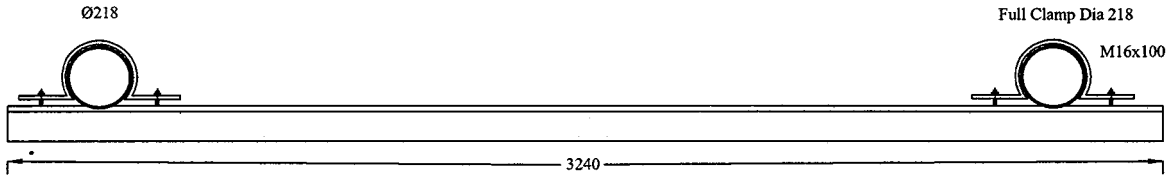
Notes
1. Dimensions as shown are in mm
2. Drawing not to Scale
3. All Materials shall be Galvanized
4. All the Bolts shall be Full Threaded Type

Procurement Services Department ★ Thimphu : Bhutan ★ Bhutan Power Corporations Limited

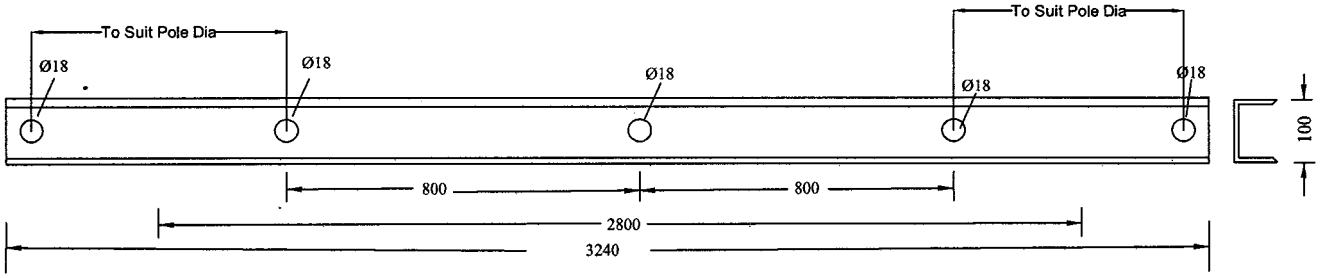
BHUTAN POWER CORPORATION LIMITED (BPCL)		PROCUREMENT SERVICES DEPARTMENT
		STAY CLAMP FOR TELESCOPIC POLE
	NAME	DATE
PREPARED BY	PSD	
CHECKED BY	R&DD	
	DRAWING NO.	REVISION 2019



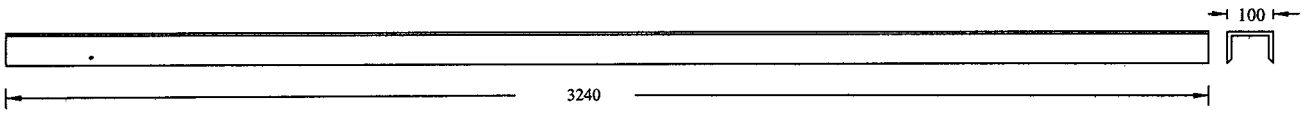
GI ABS/LBS Support (ISMC 100X50) for 11.2M Telescopic Pole -Upper Channel



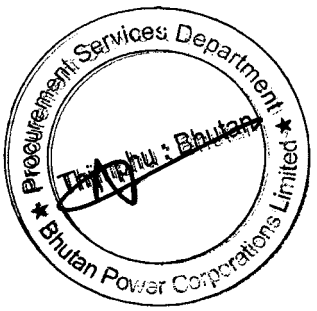
GI ABS/LBS Support (ISMC 100X50) for 11.2M Telescopic Pole -Lower Channel



GI Support for ABS/LBS Front Views Channel (ISMC 100X50) for 11.2M Telescopic Pole -(1Set = 2Nos.)

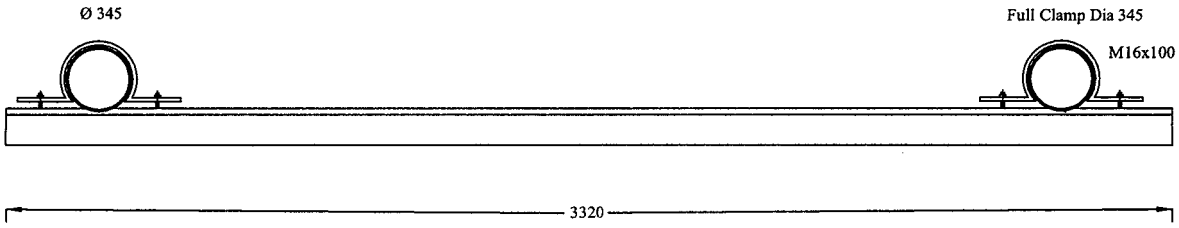


Support for ABS/LBS Top Views Channel (ISMC 100X50) for 11.2M Telescopic Pole-(1 Set = 2Nos.)

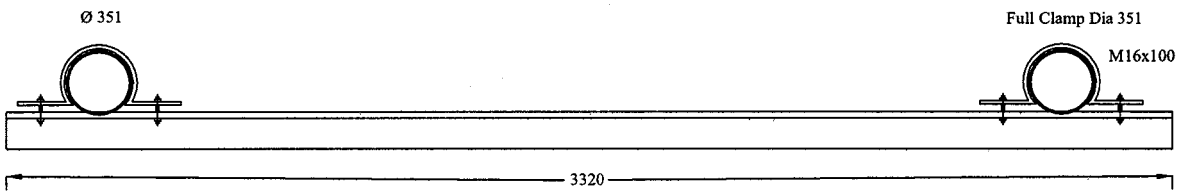


Notes
1. Dimensions as shown are in mm
2. Drawing not to Scale

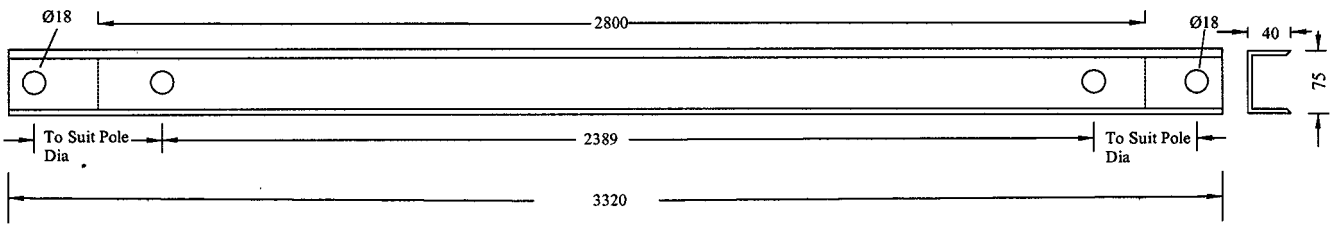
BHUTAN POWER CORPORATION LIMITED (BPCL)			PROCUREMENT SERVICES DEPARTMENT
			GI SUPPORT FOR ABS/LBS OF 11.2M TELESCOPIC POLE
	NAME	DATE	
PREPARED BY	PSD		
CHECKED BY	R&DD		DRAWING NO. PSD000. / REVISION : 2019
APPROVED BY	DCSD		



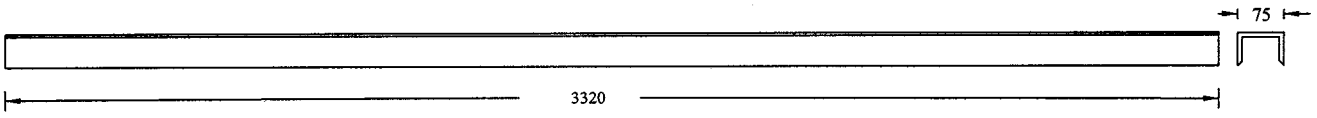
GI Handle Support (ISMC 75X40X6) for 11.2M Telescopic Pole - Upper Channel



GI Handle Support (ISMC 75X40X6) for 11.2M Telescopic Pole - Lower Channel



Handle Support of 11.2M Telescopic Pole for 11kV & 33kV Front Views Channel (ISMC 75X40X6) -(1Sets = 2Nos.)

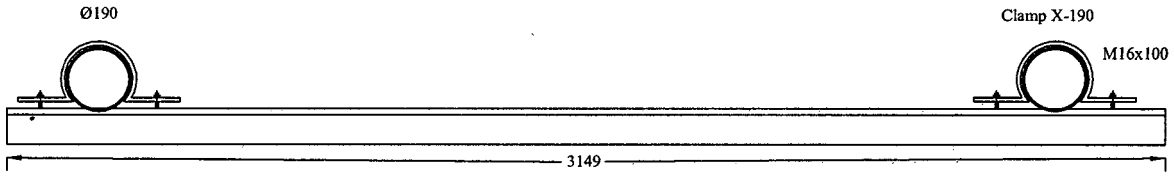


Handle Support for 11kV & 33kV Top Views Channel (ISMC 75X40X6) - (1Set =2Nos.)

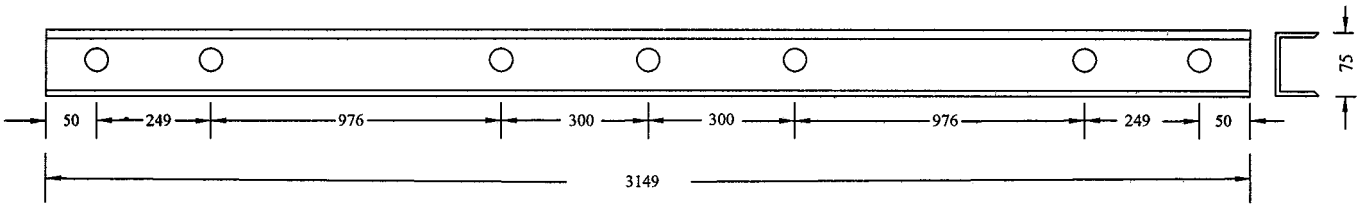
Procurement Services Department ★ Bhutan Power Corporation Limited ★ Thimphu : Bhutan

Notes
1. Dimensions as shown are in mm
2. Drawing not to Scale

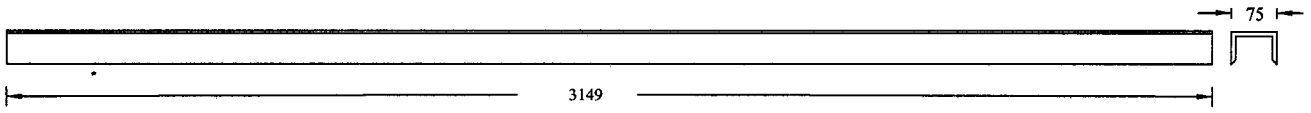
BHUTAN POWER CORPORATION LIMITED (BPCL)		PROCUREMENT SERVICES DEPARTMENT
		GI HANDLE SUPPORT FOR 11.2M TELESCOPIC POLE
	NAME	DATE
PREPARED BY	PSD	
CHECKED BY	R&DD	
APPROVED BY	DCSD	
	DRAWING NO. PSD000.	REVISION : 2019



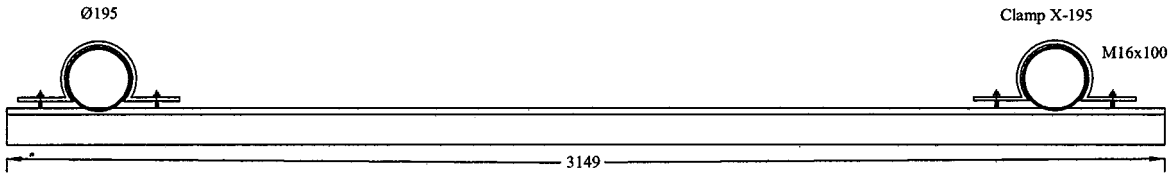
Support for DO Fuse (ISMC 75x40) -1No. Upper Assembly



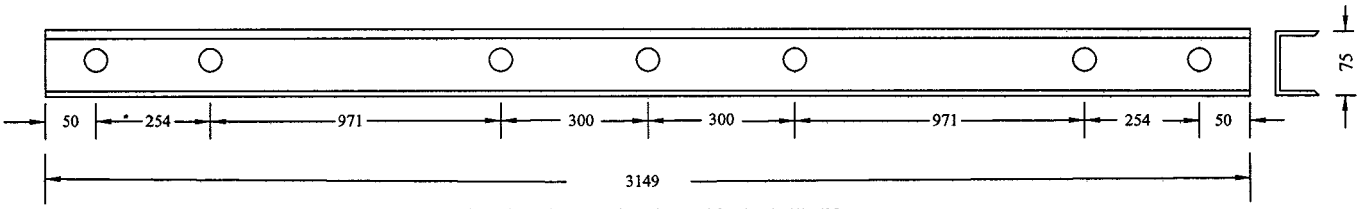
Front View Channel Support for DO Fuse (ISMC 75x40) -1No.



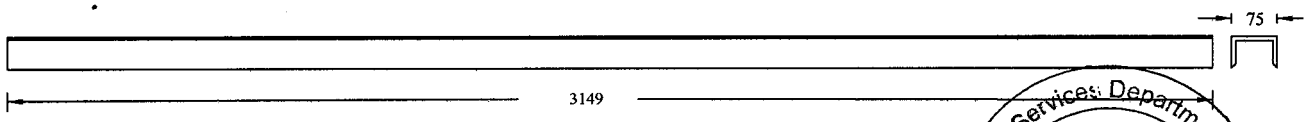
Top View Channel Support for DO Fuse (ISMC 75x40) -1No.



Support for DO Fuse (ISMC 75x40) -1No. Lower Assembly



Front View Channel Support for DO Fuse (ISMC 75x40) -1No.



Top View Channel Support for DO Fuse (ISMC 75x40) -1No.

Procurement Services Department
Thimphu : Bhutan
Bhutan Power Corporations Limited

Notes
1. Dimensions as shown are in mm
2. Drawing not to Scale

BHUTAN POWER CORPORATION LIMITED (BPCL)

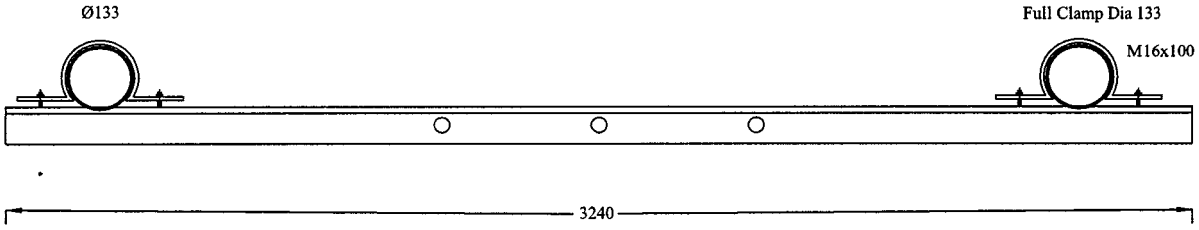
PROCUREMENT SERVICES DEPARTMENT

SUPPORT FOR DROP OUT FUSE OF 11.2M TELESCOPIC POLE

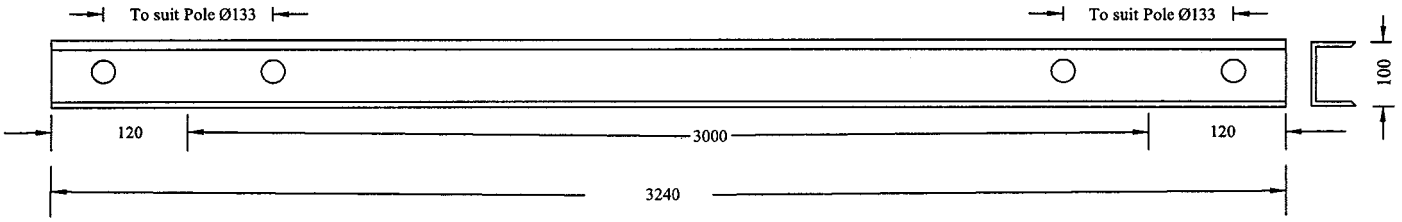
	NAME	DATE
PREPARED BY	PSD	
CHECKED BY	R&DD	
APPROVED BY	DCSD	

DRAWING NO. PSD000.

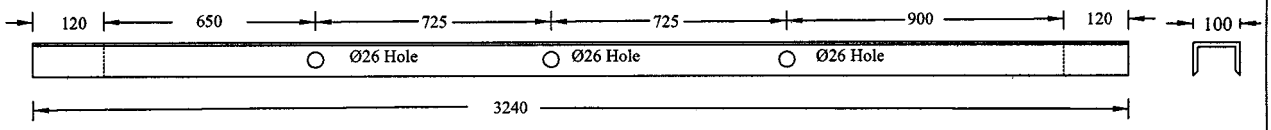
REVISION : 2019



GI Support for Jumper (ISMC 100X50) of 11.2M Telescopic Pole -1No.



Front View of GI Support for Jumper (ISMC 100X50) of 11.2M Telescopic Pole -1No.

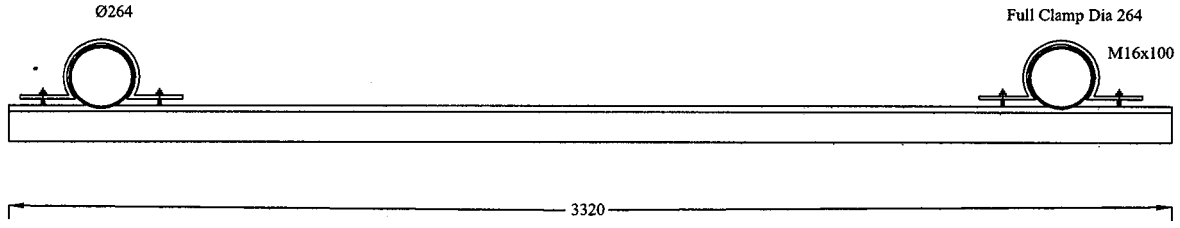


Top View Channel for GI Support for Jumper (ISMC 100X50) for 11.2M Telescopic Pole -1No.

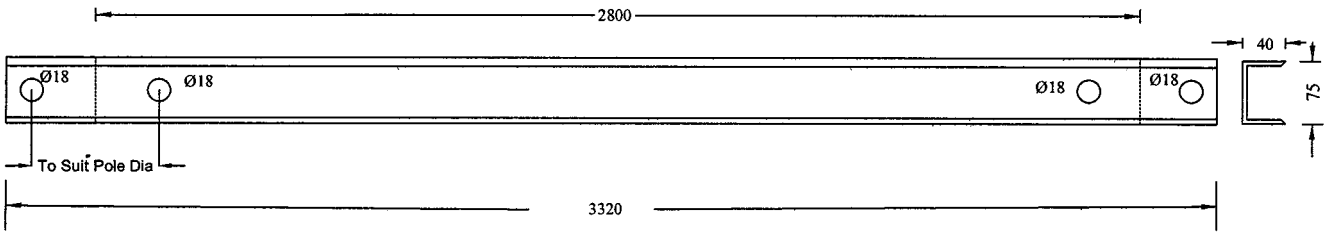
Procurement Services Department
Thimphu, Bhutan
Bhutan Power Corporation Limited

Notes
1. Dimensions as shown are in mm
2. Drawing not to Scale

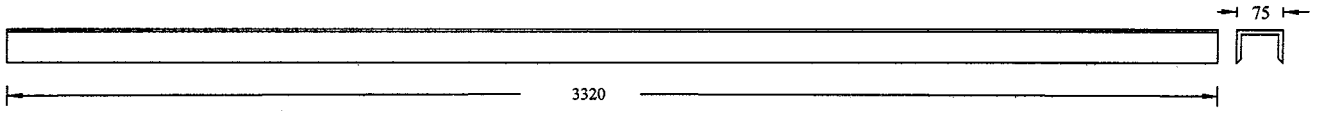
BHUTAN POWER CORPORATION LIMITED (BPCL)	PROCUREMENT SERVICES DEPARTMENT	
	GI SUPPORT FOR JUMPER OF 11.2M TELESCOPIC POLE	
	NAME	DATE
PREPARED BY	PSD	
CHECKED BY	R&DD	
APPROVED BY	DCSD	
	DRAWING NO. PSD000.	REVISION : 2019



GI Support for Intermediate Channel (ISMC 75X40) for 11.2M Telescopic Pole



GI Support for Intermediate Channel Front Views (ISMC 75X40) for 11.2M Telescopic Pole-1No.

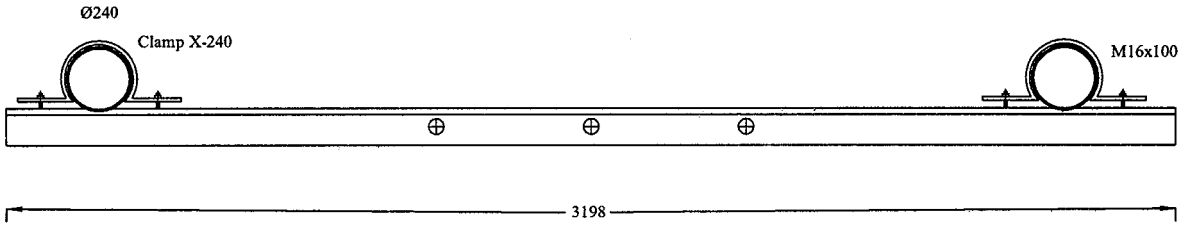


Top View of GI Support for Intermediate Channel (ISMC 75X40) for Telescopic Pole-1No.

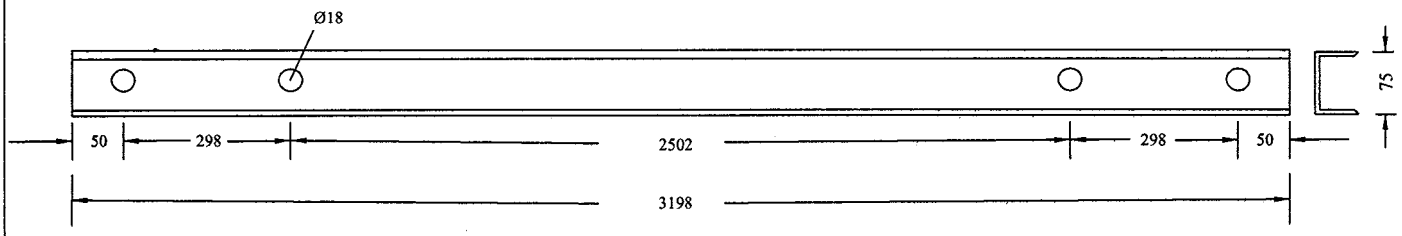
Procurement Services Department
Thimphu : Bhutan
Bhutan Power Corporation Limited

Notes
1. Dimensions as shown are in mm
2. Drawing not to Scale

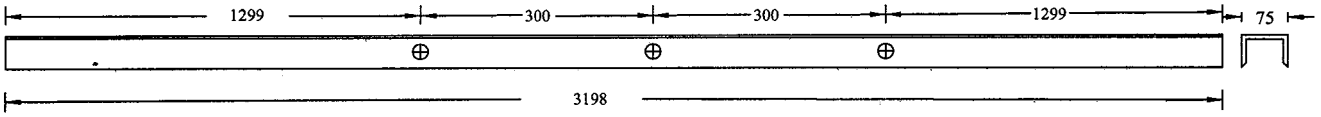
BHUTAN POWER CORPORATION LIMITED (BPCL)			PROCUREMENT SERVICES DEPARTMENT
	NAME	DATE	GI SUPPORT FOR INTERMEDIATE CHANNEL FOR 11.2M TELESCOPIC POLE
PREPARED BY	PSD		
CHECKED BY	R&DD		DRAWING NO. PSD000. / REVISION : 2019
APPROVED BY	DCSD		



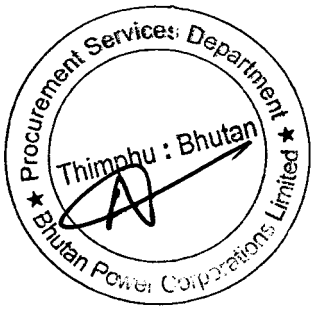
GI Support for LA (ISMC 75x40)



Front View of GI Support for LA (ISMC 75x40) -1No.

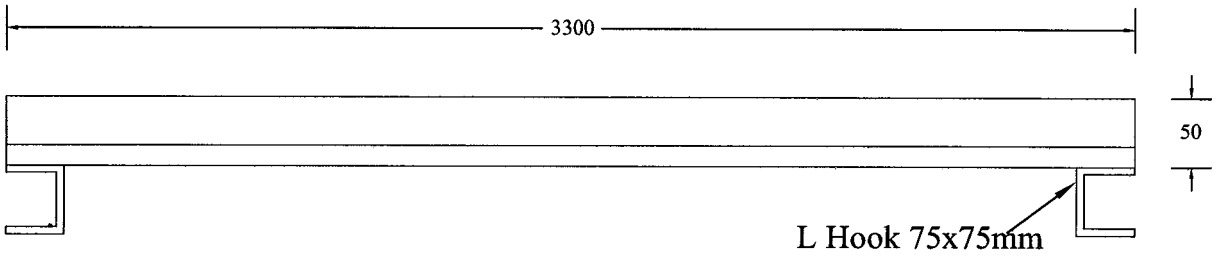


Top View Channel for GI Support for LA (ISMC 75x40) -1No.

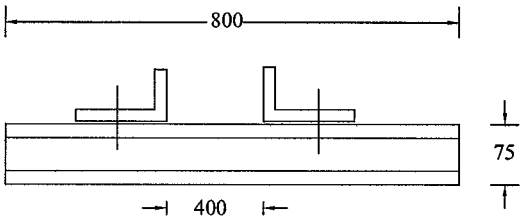


Notes
1. Dimensions as shown are in mm
2. Drawing not to Scale

BHUTAN POWER CORPORATION LIMITED (BPCL)			PROCUREMENT SERVICES DEPARTMENT	
			GI SUPPORT FOR LIGHTNING ARRESTER FOR 11.2M TELESCOPIC POLE	
	NAME	DATE		
PREPARED BY	PSD			
CHECKED BY	R&DD		DRAWING NO. PSD000.	REVISION : 2019
APPROVED BY	DCSD			



Transformer Belting
(Angle 50x6 mm)



Notes
1. Dimensions as shown are in mm
2. Drawing not to Scale
3. 400 mm hole centre to centre length for 25 kVA & below
4. 500 mm hole centre to centre length for 63 kVA & above

Procurement Services Department
Thimphu : Bhutan
Bhutan Power Corporations Limited

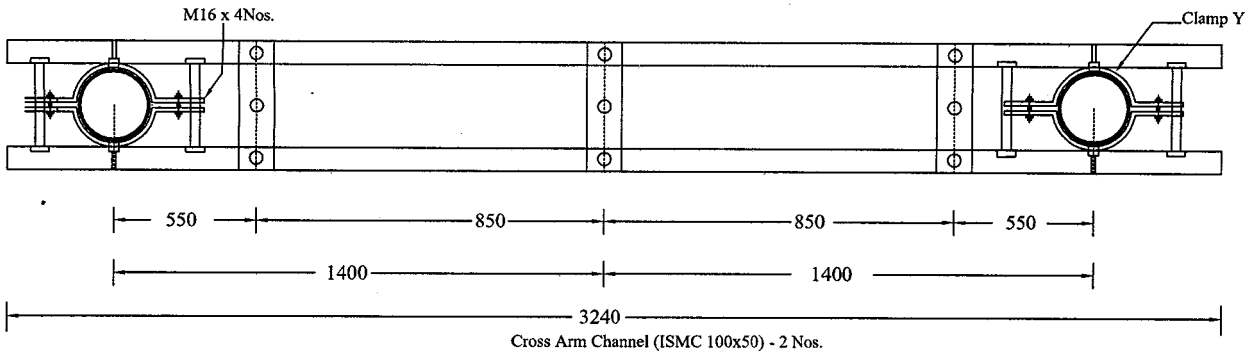
BHUTAN POWER CORPORATION LIMITED (BPCL)

PROCUREMENT SERVICES DEPARTMENT

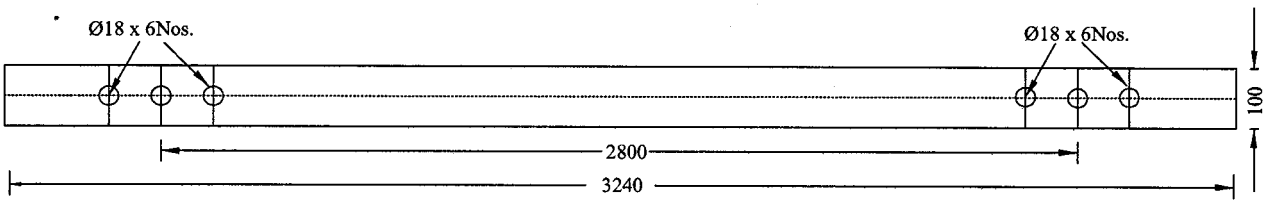
TRANSFORMER BELTING FOR 11.2 M TELESCOPIC POLE

	NAME	DATE
PREPARED BY	PSD	
CHECKED BY	R&DD	
APPROVED BY	DCSD	

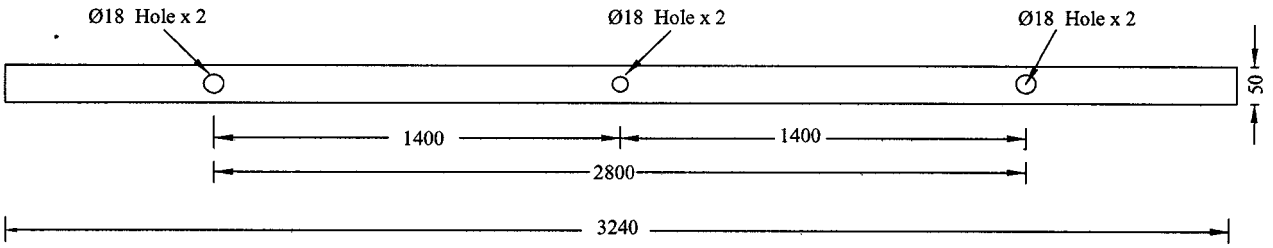
DRAWING NO.



Cross Arm Channel (ISMC 100x50) - 2 Nos.



Front View of Top/Bottom of Substation Cross Arm Channel (ISMC 100x50) : (1Set = 2Nos.)



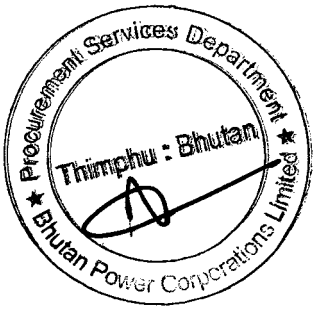
Top View of Substation Cross Arm Channel (ISMC 100x50) : (1Set = 2Nos.)

Procurement Services Department
Thimphu : Bhutan
Bhutan Power Corporation Limited

Notes
1. Dimensions as shown are in mm
2. Drawing not to Scale
3. Length of the bracing angle shall be designed by the supplier

BHUTAN POWER CORPORATION LIMITED (BPCL)			PROCUREMENT SERVICES DEPARTMENT	
	NAME	DATE	SUBSTATION CROSS ARM ASSEMBLY FOR 11.2 M TELESCOPIC POLE	
PREPARED BY	PSD			
CHECKED BY	R&DD		DRAWING NO. PSD000.	REVISION 2019
APPROVED BY	DCSD			

Price Schedule



Price Schedule for Lot 1 (Distribution Boards)

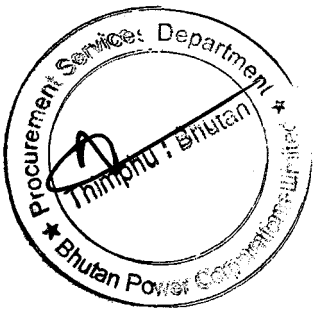
SL#	Item Description	UoM	Qty	Offered Brand and Origin of Country	Unit Price DDP (Nu.)	Total Pri DDP (Nu
1	1P, 100A LVDB, 3W, I/C 100A MCCB, O/G 63A HRC (I/C=1 no.100A MCCB, O/G= 3 nos. 63A HRC) with support clamp size of 165 mm with nuts , bolts-M16/185mm and M16/55mm	NO	44.00			
2	1P, 160A LVDB, 3W, I/C 160 A MCCB, O/G 63A HRC (I/C=1no.160A MCCB; O/G=3 nos. 63A HRC) with support clamp size of 165 mm with nuts , bolts-M16/185mm and M16/55mm	NO	10.00			
3	3P LVDB 4W 250A MCCB with 12nos. of 100A HRC (I/C =1no. 250 A MCCB; O/G =12 nos.100A HRC) with support clamp size of 165 mm with nuts , bolts-M16/185mm and M16/55mm	NO	35.00			
4	3P LVDB 4W 250A MCCB with 12nos. of 100A HRC (I/C =1no. 250 A MCCB; O/G =12 nos.100A HRC) with support clamp -Top clamp=324 mm and Bottom Clamp=337 mm with nuts , bolts-M16/185mm and M16/55mm.	NO	3.00			
5	3P LVDB 4W, 100A MCCB with 12 nos. of 63A HRC (I/C =1no. 100 A MCCB; O/G =12 nos.63A HRC) with support clamp size of 165 mm with nuts , bolts-M16/185mm and M16/55mm	NO	66.00			
6	3P LVDB 4W, 100A MCCB with 12 nos. of 63A HRC (I/C =1no. 100 A MCCB; O/G =12 nos.63A HRC) with support clamp -Top clamp=324 mm and Bottom Clamp=337 mm with nuts , bolts-M16/185mm and M16/55mm.	NO	2.00			

Procurement Services Department
Thimphu : Bhutan
Bhutan Power Corporation Limited

7	3P LVDB 4W, 63 A MCCB with 12 nos. of 32A HRC (I/C =1no. 63 A MCCB; O/G =12 nos.32A HRC) with support clamp size of 165 mm with nuts , bolts-M16/185mm and M16/55mm	NO	29.00			
8	3P, 400A Distribution Pillar, 4 ways (I/C 400A HRC, O/G 400A HRC) with	NO	80.00			
9	3P, 600A Distribution Pillar, 6 ways (I/C 600A HRC, O/G 500A HRC)	NO	66.00			
10	3P, 800A Distribution Pillar, 6 ways (I/C 800A HRC, O/G 800A HRC)	NO	36.00			
11	Mini fedder pillar 400A, 6W	NO	78.00			
Total Amount (Nu.)						

Price Schedule for Lot 2 (Switching Equipment's)

SL#	Description	UoM	Qty	Offered Brand and Origin of Country	Unit Price DDP (Nu.)	Total Pri DDP (Nu
1	11 kV DO fuse unit (1set=2 DO fuses)	SET	5.00			
2	33 kV DO fuse Unit (1set=2 DO Fuses)	SET	1.00			
3	11KV DO fuse unit (1set= 3DO fuses)	SET	103.00			
4	33KV DO fuse unit (1set= 3DO fuses)	SET	92.00			
5	LBS unit 11 kV (three phase); complete with supporting frame, operating pipe and handle (1set=3 nos.)	SET	87.00			
6	LBS unit 33 kV (three phase); complete with supporting frame, operating pipe and handle (1set=3 nos.)	SET	105.00			
Total Amount (Nu.)						



Price Schedule for Lot 3 (Lightning Arrestors)

SL#	Description	UoM	Qty	Offered Brand and Origin of Country	Unit Price DDP (Nu.)	Total Pric DDP (Nu.)
1	Lightning Arrestor 9 kV, 10 kA (Three Phase)	SET	870.00			
2	Lightning Arrestor 30 kV, 10 kA (Three Phase)	SET	585.00			
Total Amount (Nu.)						

Price Schedule for Lot 4 (Distribution Transformers)

SL#	Description	UoM	Qty	Offered Brand and Origin of Country	Unit Price DDP (Nu.)	Total Pric DDP (Nu.
1	Dist. Transformer 500 kVA, 11/0.415 kV	SET	8.00			
2	Dist. Transformer 500 kVA, 11/0.415kV-(Indoor)	SET	2.00			
3	Dist. Transformer 250 kVA, 33/0.415 kV	SET	5.00			
4	Dist. Transformer 500 kVA, 33/0.415 kV	SET	5.00			
7	1 Phase Transformer 25 kVA, 33/0.240 kV	SET	3.00			
5	1 phase Transformer 16 KVA 11/.240 kV	SET	3.00			
6	1 Phase Transformer 25 kVA, 11/0.240 kV	SET	1.00			
7	1 Phase Transformer 25 kVA, 33/0.240 kV	SET	3.00			
Total Amount (Nu.)						

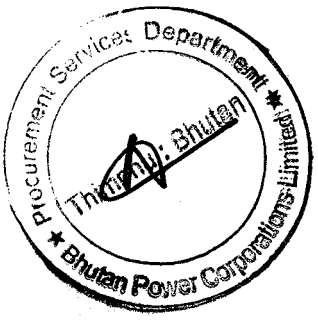
Procurement Services Department
Bhutan Power Corporation Limited
Thimphu, Bhutan

Price Schedule for Lot 5 (Lubricants)

SL#	Description	UoM	Qty	Offered Brand and Origin of Country	Unit Price DDP (Nu.)	Total Price DDP (Nu.)
1	Transformer oil	L	26,250.00			
2	Governor oil	L	420.00			
Total Amount (Nu.)						

Price Schedule for Lot 6 (Earthing Equipment)

SL#	Description	UoM	Qty	Offered Brand and Origin of Country	Unit Price DDP (Nu.)	Total Price DDP (Nu.)
1	Spike Earthing	SET	436.00			
2	GI Strip/Earth conductor 25X6 mm	KG	1,228.50			
3	G.I.Wire 8 SWG	KG	558.64			
4	G.I stay wire 7/8 SWG	KG	17,845.83			
Total Amount (Nu.)						



Price Schedule for Lot 7 (Galvanized Steel Tubular Poles)

Sl. No	Description	UoM	Qty	Offered Brand and Country of Origin	Unit Rate DDP (Nu.)	Amount DI (Nu.)
1	7.5M Galvanized Steel Tubular Poles with Base Plate, Pole Cap and Fixing Bolts - (410-SP-9)	NO	2,462.00			
2	10M Galvanized Steel Tubular Poles with Base Plate, Pole Cap and Fixing Bolts - (410-SP-45)	NO	200.00			
Total Amount (Nu.)						

Price Schedule for Lot 8 (Galvanized Steel Tubular Pole Fittings)

Sl. #	Description	UoM	Qty	Offered Brand and Country of Origin	Unit Rate DDP (Nu.)	Amount DDP (Nu.
1	GI Stay Clamp Assembly (Dia - 88.9 mm) Complete with Bolts, Nuts and Plain Washer	SET	1,728.00			
2	GI Stay clamp sssembly (Dia - 114.3 mm) Complete with Bolts, Nuts and Plain Washer	SET	1,025.00			
3	GI Stay Set Assembly (1Turn Buckle Assembly, 1Stay Rod Assembly, 1Stay Plate Assembly) with Complete sets	SET	2,524.00			
4	Eye Bolt for Turn Buckle Assembly with Complete set	SET	1,499.00			
5	GI Stay Rod Assembly with Complete set	SET	25.00			
6	GI Cross Arm Assembly (ISMC 100x50) for H-Frame Complete with Clamps, Bolts, Nuts, etc (1set = 2Nos.)	SET	212.00			

Procurement Services Department ★ Bhutan Power Corporation Limited ★ Thimphu : Bhutan

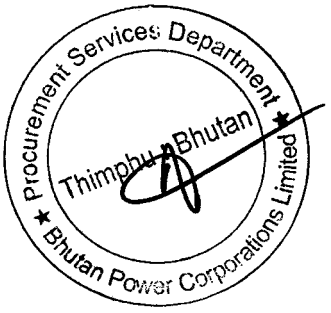
7	GI Cross Bracing Assembly (ISA 50x50x6) for Double Pole Complete with Clamps, Bolts, Nuts, etc	SET	260.00			
8	GI Support for LA (ISMC 75x40) Complete with Clamps, Bolts, Nuts, etc	SET	20.00			
9	GI ABS/LBS Support (ISMC 100 x 50) Complete with Clamps, Bolts, Nuts, etc (1Set = 2Nos.)	SET	146.00			
10	GI LBS Handle Support (ISMC 75X40X6) Complete with Clamps, Bolts, Nuts, etc (1Set = 2Nos.)	SET	74.00			
11	GI D.O.Fuse Support (ISMC 75X40) Complete with Clamps, Bolts, Nuts, etc (1Set = 2Nos.)	SET	38.00			
12	GI Support for Intermediate (ISMC 75X40X6) Complete with Clamps, Bolts, Nuts, etc	SET	26.00			
13	GI Support for Intermediate Jumper (ISMC 100 x 50) Complete with Clamps, Bolts, Nuts, etc	SET	27.00			
14	GI Transformer Platform Assembly (ISMC 125X65) for Double Pole (1set =2Nos.)	SET	29.00			
15	GI Transformer Belting (ISMC 50x6)	SET	7.00			
16	GI Anti- Climbing Device (139.7 mm)	SET	429.00			
Total Amount (Nu.)						

Price Schedule for Lot 9 (Galvanized 11.2M Telescopic Pole Fittings)

Sl. #	Description	UoM	Qty	Offered Brand and Country of Origin	Unit Rate DDP (Nu.)	Amoun DDP (Nu.)
1	GI ABS/LBS Support Channel (ISMC 100x50) Complete with Clamps, Bolts, Nuts, etc (1Set = 2Nos.)	SET	10.00			

Procurement Services Department * Thimphu : Bhutan * Bhutan Power Corporation Limited

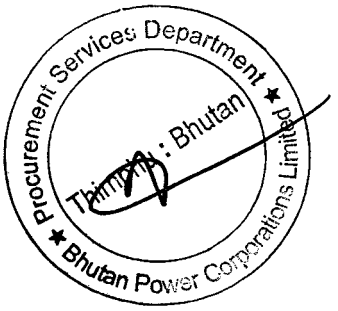
2	GI LBS Handle Support (ISMC 75X40X6) Complete with Clamps, Bolts, Nuts, etc (1Set = 2Nos.)	SET	10.00			
3	GI Support for DO Fuse (ISMC 75X40) Complete with Clamps, Bolts, Nuts, etc (1Set = 2Nos.)	SET	4.00			
4	GI Support for Jumper (ISMC 100X50) Complete with Clamps, Bolts, Nuts, etc	SET	8.00			
5	GI Support for Intermediate (ISMC 75X40X6) Complete with Clamps, Bolts, Nuts, etc	SET	8.00			
6	GI Support for LA (ISMC 75x40) Complete with Clamps, Bolts, Nuts, etc	SET	4.00			
7	GI Transformer Belting (ISMC 50X50X6) Complete with Clamps, Bolts, Nuts, etc (1Set = 2Nos.)	SET	10.00			
8	GI Substation Crossarm (ISMC 100X50) Complete with Clamps, Bolts, Nuts, etc (1Set = 2Nos.)	SET	12.00			
Total Amount (Nu.)						
Note: Above Telescopic Pole Fittings are required for 11.2M Telescopic Pole						



PART 3- Contract

Section VI. General Conditions of Contract

Table of Contents



Section VI. General Conditions of Contract (GCC)

1.	**Definitions**	
1.1	In this Contract, unless the contract otherwise requires, the term:	
	(a)	"The Contract" means any lawful agreement entered into between the Purchaser and the Supplier, as recorded in the Contract Agreement signed by the parties, including all attachments and appendices thereto and all documents incorporated by reference therein.
	(b)	"Contract Documents" means the documents listed in the Agreement, including any amendments thereto.
	(c)	"The Contract Price" means the price payable to the Supplier as specified in the Contract Agreement, subject to such additions and adjustments thereto or deductions there from as may be made pursuant to the Contract.
	(d)	"The Goods" means all the equipment, machinery, and/or other materials, which the Supplier is required to supply to the Purchaser under the Contract.
	(e)	"The Services" means those services ancillary to the supply of the Goods, such as transportation and Insurance, provision of technical assistance, training, and other such obligations of the Supplier covered under the Contract.
	(f)	"The Purchaser" means the entity purchasing the Goods and Related Services, as specified in the SCC.
	(h)	"The Supplier" means the individual or firm supplying the Goods and Services under the Contract.
	(i)	"Day" means calendar day.
	(j)	"Delivery" means the transfer of the Goods from the Supplier to the Purchaser in accordance with the terms and conditions set forth in the Contract Documents.
	(k)	"SCC" means Special Conditions of Contract.
	(l)	"Subcontractor" means any natural person, private or government entity, or a combination thereof, including its legal successors and permitted assigns, to whom any part of the Goods to be supplied or execution of any part of the Related Services is subcontracted by the Supplier.
	(m)	"Incoterms' means a series of international sales terms, published by the International Chamber of Commerce (ICC) in Paris, France.
2.	**Use of Contract Documents and Information**	
2.1	The Supplier shall not, without the Purchaser's prior written consent, disclose the	

	Contract, or any provision thereof, or any specification, drawings, pattern, sample or information furnished by or on behalf of the Purchaser in connection therewith, to any person other than a person employed by the Supplier in the Performance of the Contract. Disclosure to any such employed person shall be made in confidence and shall extend only so far as may be necessary for purposes of such performance.	
2.2	The supplier shall not, without the Purchaser's prior written consent, make use of any document or information specified in GCC Clause 2.1 above, except for purposes of performing the Contract.	
2.3	Any document, other than the Contract itself, specified in GCC Clause 2.1 above, shall remain the property of the Purchaser and shall be returned (in all copies) to the Purchaser, on completion of the Supplier's performance under the Contract, if so required by the Purchaser.	
3.	**Change Orders**	
3.1	The Purchaser may at any time, by a written notice to the Supplier, make changes within the general scope of the Contract in any one or more of the following:	
	(a)	Decrease or increase in quantity within the delivery period.
	(b)	Drawings, designs or specifications, where Goods to be furnished under the Contract are to be specifically manufactured for the Purchaser; or
	(c)	The method of shipment or packing; or
	(d)	The place of delivery.
	(e)	The Related Services to be provided by the Supplier.
3.2	If any such change causes an increase or decreases in the cost of, or the time required for, the Supplier's performance of any provisions under the Contract, an equitable adjustment shall be made in the Contract Price or in the Delivery/Completion Schedule, or both, and the Contract shall accordingly be amended. Any claims by the Supplier for adjustment under this Clause must be asserted within Twenty-eight (28) days from date of the Supplier's receipt of the Purchaser's change order.	
3.3	Prices to be charged by the Supplier for any Related Services that might be needed but which were no included in the Contract shall be agreed upon in advance by the parties and shall not exceed the prevailing rates charged to other parties by the Supplier for similar services.	
3.4	The Supplier shall not perform changes in accordance with GCC Clause 3.1 above until the Purchaser has authorized a change order in writing on the basis of the estimate provided by the Supplier as described in GCC Clause 3.2 above.	
3.5	Changes mutually agreed upon as a Change shall constitute a part of the work under this Contract, and the provisions and conditions of the Contract shall apply to the said	

	change.
4.	**Contract Amendments**
4.1	Subject to Clause 3, no variation in or modification of the contract shall be made except by written amendment agreed and signed by the parties.
5.	**Subcontracting**
5.1	The Supplier shall not subcontract all or any part of the Contract without first obtaining the Purchaser's approval in writing of the subcontracting.
5.2	The supplier guarantees that any and all subcontractors of the Supplier to performance of any part of the work under the Contract will comply fully with the terms of the Contract applicable to such part of the work under the Contract and shall not relieve the Supplier of any of its obligations, duties, responsibilities or liabilities under the Contract.
6.	**Country of Origin**
6.1	All Goods supplied under the Contract shall have their origin in eligible countries if these eligible countries are specified in the Special Conditions of Contract. For purposes of this Clause, "origin" shall be considered to be the place where the Goods were mined, grown or produced. Goods are produced when, through manufacturing, processing or substantial and major assembling of components, a commercially recognized new product results that is substantially different in basic characteristics or in purpose or utility form its components.
7.	**Inspection and Tests**
7.1	The Purchaser or its representative shall have the right to inspect and /or to test the Goods to confirm their conformity to the Specifications. At its own expense and at no cost to the Purchaser, the Supplier shall carry out all such tests and/or inspections of the Goods and Related Services as specified in Section V, Schedule of Supply. The Purchaser shall notify the Supplier in writing of the identity of representatives nominated for these purposes.
7.2	The inspections and tests may be conducted on the premises of the Supplier or its subcontractor(s), at point of delivery, and/or at the Goods' final destination, or in a place in Bhutan as specified in SCC. Where conducted on the premises of the Supplier or its subcontractor(s), all reasonable facilities and assistance, including access to drawings and production data, shall be furnished to the inspectors at no charge to the Purchaser. The supplier shall also furnish copies of relevant reference IS documents or other relevant standards and test certificates for electrical equipment if specified in Section V, Schedule of Supply.
7.3	As specified in SCC, whenever the Supplier is ready to carry out any such test and inspection, it shall give reasonable advance notice, including the place and time, to the Purchaser. The Supplier shall obtain from any relevant third party or

	manufacturer any necessary permission or consent to enable the Purchaser or it's designated representative to attend the test and/or inspection.
7.4.	The Purchaser shall reject any Goods or any part thereof that fail to conform to the Specifications. The Supplier shall either rectify or replace such rejected Goods or parts thereof or make all alterations necessary to meet the Specifications at no cost to the Purchaser, and shall repeat the test and/or inspection, at no cost to the Purchaser, upon giving a notice pursuant to Clause 7.3 above.
7.5	The Purchaser's right to inspect, test and, where necessary, reject the Goods after the Goods' arrival in the Bhutan shall in no way be limited or waived by reason of the Goods' having previously been inspected, tested and passed by the Purchaser or its representatives prior to the Goods' shipment from the country of origin.
7.6	The Supplier shall ensure that all the materials are ready during the time of inspection. In case the materials are to be re-inspected due to reasons which are attributable to the supplier, the same shall be done at the cost of the supplier.
7.7	Nothing in this Clause 7 shall in any way release the Supplier from any Warranty or other obligations under the Contract.
8.	**Packing and Documents**
8.1	The Supplier shall provide such packing of the Goods as is required to prevent their damage or deterioration during transit to their final destination, as per the Contract. 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.
8.2	The packing, marking, and documentation within and outside the packages shall comply strictly with such special requirements as shall be expressly provided for in the Contract, including additional requirements, if any, specified in Section V, Schedule of Supply and in any subsequent instructions ordered by the Purchaser.
9.	**Delivery and Documents**
9.1	Delivery of the Goods shall be made by the Supplier in accordance with the Section V, Schedule of Supply. The details of shipping and/or other documents to be furnished by the Supplier are specified in the SCC.
9.2	Unless inconsistent with any provision of the Contract or otherwise specified in the SCC, the meaning of any trade term and the rights and obligations of parties there under shall be as prescribed by Incoterms.
9.3	The terms EXW,CIP, CIF, DDP, and other trade terms used to describe the obligations of the parties shall be governed by the rules prescribed in the current edition of Incoterms specified in the SCC and published by the International

	Chamber of Commerce, Paris..	
10. Indemnity against infringement of Intellectual Property Rights		
10.1	The Supplier shall, subject to the Purchaser's compliance with GCC Sub-Clause 10.2, indemnify and hold harmless the Purchaser and its employee(s) or representative(s) from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs and expenses of any nature, including attorney's fees and expenses, which the Purchaser may suffer as a result of any infringement or alleged infringement of any patent, utility model, registered design, trademark, copyright or other intellectual property right registered or otherwise existing at the date of the Contract by reason of:	
	(a)	The installation of the Goods by the Supplier or the use of the Goods in Bhutan; and
	(b)	The sale in any country of the products produced by the Goods.
	Such indemnity shall not cover any use of the Goods or any part thereof other than for the purpose indicated by or reasonably to be inferred from the Contract, neither any infringement resulting from the use of the Goods or any part thereof, or any products produced thereby in association or combination with any other equipment, plant or materials not supplied by the Supplier, pursuant to the Contract.	
10.2	If any proceedings are brought or any claim is made against the Purchaser arising out of the matters referred to in GCC Sub-Clause 10.1, the Purchaser shall promptly give the Supplier notice thereof, and the Supplier may at its own expense conduct such proceedings or claim and any negotiations for the settlement of any such proceedings or claim.	
10.3	The Purchaser may, at the Supplier's request, afford all available assistance to the Supplier in conducting such proceedings or claim, and shall be reimbursed by the Supplier for all reasonable expenses incurred in so doing.	
10.4	The Purchaser shall indemnify and hold harmless the Supplier and its employees, officers and Subcontractors from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs and expenses of any nature, including attorney's fees and expenses, which the Supplier may suffer as a result of any infringement or alleged infringement of any patent, utility model, registered design, trademark, copyright or other intellectual property right registered or otherwise existing at the date of the Contract arising out of or in connection with any design, data, drawing, specification or other documents or materials provided or designed by or on behalf of the Purchaser.	
11. Performance Security		
11.1	The Supplier shall within fifteen (15) working days of notification of contract award , provide Performance Security in the amount and currency specified in the SCC.	

11.2	The proceeds of the Performance Security shall be payable to the Purchaser as compensation from the Supplier's failure to complete its obligations under the Contract. The Performance Security is a security taken by the purchaser for due performance of the Contract and shall be forfeited if the Supplier fails without any legal excuse, to perform any promises that form the whole or part of a Contract or any agreement without need of establishing any loss incurred by the Purchaser. The Supplier shall cause the validity period of the Performance Security to be extended for such period(s) as the contract performance may be extended pursuant to GCC Clause 16.2.	
11.3	The Performance Security shall be denominated in a currency (ies) of the Contract, or in a freely convertible currency acceptable to the Purchaser and shall be in one of the following forms:	
	(a)	Unconditional bank guarantee issued by a reputable financial institution acceptable to the Purchaser, in the form provided for in the Contract or in any other form acceptable to the Purchaser; or
	(b)	Banker's Cheque/Cash Warrant; or
	(c)	Demand Draft.
11.4	If the institution issuing the Performance Security furnished by the Bidder is located outside the Purchaser's country, the Performance Security shall be counter guaranteed by a correspondent financial institutions located in the Purchaser's country to make it enforceable.	
11.5	The Performance Security shall be discharged by the Purchaser and returned to the Supplier not later than thirty (30) days following the date of completion of the Supplier's performance obligations or any pending contractual issues arising under the Contract, or any warranty obligations, unless specified otherwise in the SCC.	
12. Insurance		
12.1	All Goods supplied under the Contract shall be fully insured in the currency of Contract against loss or damage incidental to manufacture or acquisition, transportation, storage and delivery, in accordance with the applicable Incoterms or in the manner specified in the SCC.	
13. Warranty		
13.1	The Supplier warrants to the Purchaser that the Goods supplied under the Contract will comply strictly with Contract and shall be free from defects arising from any act or omission of the Supplier or arising from design, materials, and workmanship under normal use in the conditions prevailing in the country of final destinations.	
13.2	Unless otherwise specified in the SCC, the warranty shall remain valid for twelve (12) months after the Goods, or any portion thereof, as the case may be, have been delivered to and accepted at the final destination indicated in SCC.	
13.3	The Purchaser shall notify the Supplier in writing stating the nature of any such	

	defects together with all available evidence thereof, promptly following the discovery thereof. The Purchaser shall afford all reasonable opportunity for the Supplier to inspect such defects.
13.4	Upon receipt of such notice, the Supplier shall, within the period specified in the SCC repair or replace the defective Goods or parts thereof, at no cost to the Purchaser.
13.5	If the Supplier, having been notified, fails to remedy the defect(s) within the period specified in SCC, the Purchaser may proceed to take within a reasonable period such remedial action as may be necessary, at the Supplier's risk and expense and without prejudice to any other rights or remedies, which the Purchaser may have against the Supplier under the Contract.
14. Payment	
14.1	The method and conditions of payment to be made to the Supplier under the Contract shall be as specified in the SCC.
14.2	The Supplier's request(s) for payment shall be made to the Purchaser in writing accompanied by an invoice describing, as appropriate, the Goods delivered and services performed, and by documents submitted pursuant to GCC Clause 9 and upon fulfilment of other obligations stipulated in the Contract.
14.3	Payment shall be made by the Purchaser, but in no case later than 30 (thirty) days after submission of invoice or request for payment by the Supplier and the Purchaser has accepted it.
14.4	The currency or currencies in which payment is made to the Supplier under the Contract will be made in the currency or currencies specified in SCC.
15. Contract Prices	
15.1	The Contract Price shall be as specified in the Contract Agreement subject to any additions and adjustments thereto or deductions there from as may be made pursuant to the Contract.
15.2	Prices charged by the Supplier for Goods delivered and Services performed under the Contract shall not vary from the prices quoted by the Supplier in its bid, which the exception of any change in price resulting from a Change Order issued in accordance with GCC Clause 3, or if applicable, adjustments authorized in accordance with the price adjustment provisions specified in the SCC.
16. Contract Execution Schedule and Extensions in the Supplier's Performance	
16.1	Delivery of the Goods shall be made by the Supplier in accordance with the Contract Execution Schedule, pursuant to SCC.
16.2	The Supplier may claim extension of the time limits as set forth in the Contract

	Execution Schedule in case of:	
	(a)	Change in the Goods ordered by the Purchaser pursuant to GCC Clause 3;
	(b)	Delay of any materials, drawings or services, which are to be provided by the Purchaser; services provided by the Purchaser shall be interpreted to include all approvals by the Purchaser under the Contract;
	(c)	Force Majeure pursuant to GCC Clause 23; and
	(d)	Delay in performance of work caused by change order or amendment(s) issued by the Purchaser.
16.3	The Supplier shall demonstrate to the Purchaser's satisfaction that it has used its best endeavours or overcome such causes for delay, and the parties will mutually agree upon remedies to mitigate or overcome such causes for delay.	
16.4	Notwithstanding GCC Clause 16.2 above, the Supplier shall not be entitled to an extension of time for completion unless the Supplier, at the time of such circumstances arising, has notified the Purchaser in writing within 10 (Ten) days of any delay that it may claim as caused by circumstances pursuant to GCC Clause 16.2 above; and upon request of the Purchaser, the Supplier shall substantiate that the delay is due to the circumstances referred to by the Supplier.	
17. Liquidated Damages		
17.1	Subject to GCC Clause 16, if the Supplier fails to deliver any or all of the Goods or to perform the Services within the period(s) specified in the Contract, the Purchaser may without prejudice to its other remedies under the Contract, deduct from the Contract Price, as liquidated damages, a sum equivalent to the percentage specified in the SCC of the delivered price of the delayed goods or unperformed services for each week or part thereof of delay until actual delivery or performance, up to a maximum deduction of the percentage specified in the SCC. Once the maximum is reached, the Purchaser may consider termination of the Contract pursuant to GCC Clause 18, Termination for Default.	
18. Termination for Default		
18.1	The Purchaser may, without prejudice to any other remedy for breach of Contract, by written notice of default sent to the Supplier, terminate the Contract in whole or in part:	
	(a)	If the Supplier fails to deliver any or all of the Goods within the Contract delivery period(s) specified in the Contract, or any extension thereof granted by the Purchaser, pursuant to GCC Clause 16 without the need of waiting maximum deduction of percentage specified in GCC Clause 17.1 after serving 10 (ten) days notice in writing; or

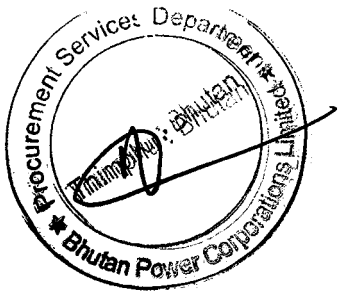
	(b)	If the Supplier, in either of the above circumstances, does not cure its failure within a period of 10 (ten) days (or such longer period as the Purchaser may authorize in writing) after receipt of a notice of default from the Purchaser specifying the nature of the default(s); and
	(c)	If the supplier fails to perform any other obligation(s) under the Contract.
18.2	Subject to Clause 18.1 above, when the Contract is terminated for default, the Purchaser shall forfeit the Performance Security and deduct from the contract price, as liquidated damages, a sum equivalent to the percentage specified in the SCC of the delayed delivered price of the goods accepted by the Purchaser.	
19.	**Termination for insolvency**	
19.1	The Purchaser may at any time terminate the Contract by giving written notice to the Supplier, without compensation to the Supplier, if the Supplier becomes bankrupt or otherwise insolvent. Notwithstanding the above, such termination will not prejudice or affect any right of action or remedy, which has accrued or will accrue thereafter to the Purchaser.	
20.	**Termination for Convenience**	
20.1	The Purchaser may, by written notice sent to the Supplier, terminate the Contract, in whole or in part, at any time for its convenience. The notice of termination shall specify that termination is for the Purchaser's convenience, the extent to which performance of work under the Contract is terminated, and the date upon which such termination becomes effective.	
20.2	The Goods that are complete and ready for shipment within 30 (thirty) days after the Supplier's receipt of notice of termination shall be purchased by the Purchaser at the Contract prices and on the other Contract terms. For the remaining Goods, the Purchaser may elect:	
	(a)	To have any portion thereof completed and delivered at the contract prices and as per the Contract terms; and/or
	(b)	To cancel the remainder and pay to the Supplier an agreed amount for partially completed Goods and for materials and part previously procured by the Supplier.
21.	**Resolution of Disputes**	
21.1	The Purchaser and the Supplier shall make every effort to resolve amicably by direct informal negotiation any disagreement or dispute arising between them under or in connection with the Contract.	
21.2	If, after 30 (thirty) days from the commencement of such informal negotiations, the Purchaser and the Supplier have been unable to resolve amicably a Contract dispute, either party may require that the dispute be referred for resolution by arbitration as described in Clause 21.3.	

21.3	If the dispute is to be settled by arbitration, the Purchaser and the Supplier shall be entitled to appoint one member each, and third arbitrator will be appointed by both of them by mutual consent. If either the Purchaser or the Supplier fails to appoint a representative, or both of them cannot agree on the appointment of a third member within thirty (30) days from the date of agreement to refer the matter for arbitration, then the case will be referred to the proper court in Bhutan for adjudication. The award shall be final and binding on the parties if not appealed within 10 (Ten) working days. If the disputes are settled by Arbitration, the cost of Arbitration shall be borne by both parties equally.
21.4	The arbitrations proceedings shall be conducted in accordance with the rules of procedures specified in SCC.
22.	**Applicable Law**
22.1	The Contract shall be governed by and interpreted in accordance with the laws of the Bhutan.
23.	**Force Majeure**
23.1	The Supplier shall not be liable for forfeiture of its Performance Security, liquidated damages or termination for default if and to the extent that it's delay in performance or other failure to perform its obligations under the Contract is the result of an event of Force Majeure. Such delay may be excused as provided in GCC Clause 16, and the period of such delay may be added to the time of performance of the obligation delayed.
23.2	For purposes of this Clause, "Force Majeure" means an event or situation beyond the control of the Supplier that is not foreseeable, unavoidable, and its origin is not due to negligence or lack of care or other malfeasance on the part of the Supplier. Such events may include, but not be limited to, acts of the Purchaser in its sovereign capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions, strikes, riot, and freight embargoes.
23.2	If a Force Majeure situation arises, the Supplier shall notify the Purchaser in writing of such condition and the cause thereof within 10 (ten) days. Unless otherwise directed by the Purchaser in writing, the Supplier shall continue to perform its obligations under the Contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event.
24.	**Assignment**
24.1	The Supplier shall not assign, in whole or in part, its obligations to perform under the Contract, except with the Purchaser's prior written consent.
25.	**Contract Language**
25.1	The Contract, as well as all correspondence and documents relating to the Contract exchanged by the Supplier and the Purchaser, shall be written in the language specified in the SCC. Supporting documents and printed literature that are part of the Contract

	may be in another language provided they are accompanied by an accurate translation of the relevant passages in the language specified in the SCC, in which case, for purposes of interpretation of the Contract, the translation shall govern.	
25.2	The Supplier shall bear all costs of translation to the governing language and all risks of the accuracy of such translation, for documents provided by the Supplier.	
26.	**Taxes and Duties**	
26.1	The Supplier shall bear and pay all applicable taxes, stamp duties, license fees and other similar levies imposed both outside and inside Bhutan, as specified in SCC.	
27.	**Waiver**	
27.1	Failure of either party to insist upon strict performance by the other party of any provision of the Contract shall in no way be deemed or construed to effect in any way the right of that party to require such performance.	
28.	**Limitation of Liability**	
28.1	Except in cases of gross negligence or willful misconduct:	
	(a)	Neither party shall be liable to the other party, whether in contract, tort or otherwise, for any indirect or consequential loss or damage, loss of use, loss of production, or loss of profits or interest costs, provided that this exclusion shall not apply to any obligation of the Supplier to pay liquidated damages to the Purchaser; and
	(b)	The aggregate liability of the Supplier to the Purchaser, whether under the Contract, in tort or otherwise, shall not exceed the total Contract Price, provided that this limitation shall not apply to the cost of repairing or replacing defective equipment, or to any obligation of the Supplier to indemnify the Purchaser with respect to patent infringement.
29.	**Export Restriction**	
29.1	Notwithstanding any obligation under the Contract to complete all export formalities, any export restrictions attributable to the Purchaser, to Bhutan, or to the use of the products/Goods, systems or services to be supplied, which arise from trade regulations from a country supplying those products/Goods, systems or services, and which substantially impede the Supplier from meeting its obligations under the Contract, shall release the Supplier from the obligation to provide deliveries or services, always provided, however, that the Supplier can demonstrate to the satisfaction of the Purchaser that it has completed all formalities in a timely manner, including applying for permits, authorizations and licenses necessary for the export of the products/Goods, systems or services under the terms of the Contract. Termination of the Contract on this basis shall be for the Purchaser's convenience pursuant to Clause 20.	

Section VII. Special Conditions of Contract

Table of Contents



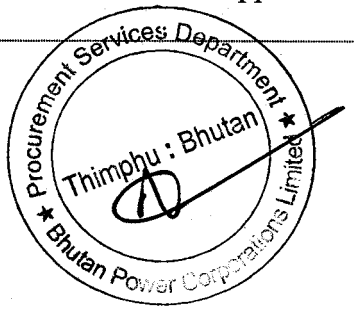
Section VII. Special Conditions of Contract (SCC)

The following Special Conditions of Contract (SCC) shall supplement the General Conditions of Contract (GCC). Whenever there is a conflict, the provisions herein shall prevail over those in the General Conditions of Contract (GCC).	
1. Definitions	
GCC 1.1 (f)	The Purchaser is: *Procurement Services Department, Bhutan Power Corporation Limited, Yarden Lam, Post Box No. 580, Thimphu, Bhutan.* The consignee is: *The Chief Manager, Regional Store Division, Regional Stores Division, Bhutan Power Corporation Limited, Phuentsholing, Bhutan.*
2. Inspection and Test	
GCC 7.1	The inspections and tests shall be: *Applicable*
GCC 7.2	Inspections and tests shall be conducted at: *Manufacturer's premises.*
GCC 7.3	All materials shall be inspected and tested as specified in the relevant IEC or BS or IS standards. The supplier must notify the purchaser in writing (and by fax to be confirmed with a mailed copy) within twenty (20) days in advance once the goods are ready for dispatch. This should be notified to purchaser at the following address: Attention: *The General Manager* Address: *Procurement Services Department* *Bhutan Power Corporation Limited* *Thimphu: Bhutan* Telephone: *00975-2-336046/325095, Extn: 717* *E-mail address: nim.dorji@bpc.bt* *Copy to : kinzangwangmo@bpc.bt manikumargurung@bpc.bt* The period indicated is for deputing an inspector and has no connection with the stipulated delivery schedule. If the delay in the delivery of all or part of materials has been caused due to delay beyond the maximum allowable period in nominating inspectors by the purchaser after the inspection call has been received in writing by the purchaser, the delivery period shall be extended by the period equivalent to such delay in sending inspectors by the purchaser for the whole or part of the materials.
GCC 7.5	To ensure that the goods are delivered in good condition, suppliers/supplier's representatives need to be present for the joint inspection of the goods at the BPC warehouse and sign the joint inspection report.
3. Packing and Documents	
GCC 8.2	The supplier shall pack all the Goods as is required to prevent damage or deterioration in transit to the final destination. The packing should be sufficient to withstand rough handling and exposure to extreme temperatures, salt and precipitation during transit and/or storage as per GCC Clause 8.

4. Delivery and Documents	
GCC 9.1	a. The good need to be delivered at the designated place as specified in Section V, Schedule of Supply. The schedule for delivery of the material at the place of delivery as per contract stipulations shall be met and any delay in meeting the schedule will be dealt with as per contract stipulation including but not limited to Liquidated Damages. b. Details of Shipping and other Documents to be furnished by the Supplier after the delivery of goods are: *(i) Copies of the Supplier's invoice showing Goods description, quantity, unit price, and total amount;* *(ii) Suppliers Good Issues Note (Challan);* *(iii) Copy of import declaration form (B-Form)in Bhutan;* *(iv) Original tax paid receipt in Bhutan.* *(v) Manufacturer's or Supplier's warranty certificate;* *(vi) Packing List;* *(vii) Inspection report/Test Certificate;*
GCC 9.2	The meaning of the trade terms shall be as prescribed by Incoterms 2010, read in conjunction with any specific explanation of the tender.
GCC 9.3	The version of Incoterms shall be: *2010,* read in conjunction with any specific explanation of the tender.
5. Performance Security	
GCC 11.1	The amount of Performance Security shall be: *10% of the contract value.*
GCC 11.5	Discharge of Performance Security shall take place: *As indicated in GCC Sub-Clause 11.5*
6. Insurance	
GCC 12.1	The insurance coverage shall be as specified in the Incoterms 2010.
7. Warranty	
GCC 13.2	The period of validity of the Warranty shall be: *Twelve (12) months from the date of acceptance of goods at the place of destination, Regional Store Division, Pasakha/Malbase, PSD, BPC, Phuentsholing, Bhutan.* *As a proof of performance warranty, the supplier have to deposit 10% of the supplied value in the form of Bank Guarantee acceptable to the Purchaser which shall be valid for a period not less than twelve (12) months after delivery of last consignment.* *Or* *As a proof of performance warranty, the purchaser will not release the 10% retention money to cover the defects liability period which shall be minimum of twelve months after the delivery of the last consignment. However, the payment for the retention amount shall be made provided the Supplier presents request for payment accompanied by a Retention Security in the form of Bank Guarantee issued by a reputable financial institution acceptable to the purchaser for an amount equal to the amount of retention payment and the validity of the Bank Guarantee shall be not less than twelve (12) months after the delivery of last consignment.*

Bhutan Power Corporation Limited ★ Procurement Services Department ★ Thimphu : Bhutan

	If the Financial institution issuing the performance warranty bank guarantee/retention security bank guarantee furnished by the Bidder is located outside the Purchaser's country, the bank guarantee shall be counter guaranteed by a correspondent financial institution located in the Purchaser's country to make it enforceable.
8. Payment	
GCC 14.1	Payments shall be made in equivalent Ngultrum to the currency quoted amount but the payment shall be made through proper banking channels and the responsibilities of payment transfer and transfer charges lie on the Suppliers. Undertaking letter from routing of payment through the Banks (if the payment is not through Letter of Credit) shall not be issued. a. Advance Payment: Maximum of ten percent (10%) of the Contract Price as advance payment shall be paid after the signing of the Contract. Payment shall be made provided the Supplier presents a request for payment accompanied by an Advance Payment Security in the form of Bank Guarantee issued by a reputable financial institution acceptable to the purchaser for an amount equal to the amount of the advance payment, and shall be valid until the goods are delivered. b. On Acceptance: Eighty percent (80%) of the Contract Price of the goods received shall be paid within Thirty (30) days of receipt of the goods upon the submission of a claim supported by the Acceptance Certificate issued by the Purchaser. c. Retention Payment: Ten percent (10%) of the Contract Price will be payable after the expiry of defects liability period (for a period not exceeding twelve months after the delivery of all materials). However, payment shall be made provided the Supplier presents a request for payment accompanied by a Retention Security in the form of Bank Guarantee issued by a reputable financial institution acceptable to the purchaser for an amount equal to the amount of retention payment and shall be valid for a period not less than twelve (12) months after delivery of all materials. If the Financial institution issuing the advance payment bank guarantee/retention security bank guarantee furnished by the Bidder is located outside the Purchaser's country, the bank guarantee shall be counter guaranteed by a correspondent financial institution located in the Purchaser's country to make it enforceable.
9. Contract Prices	
GCC 15.2	The prices charged for the Goods supplied and the related Services performed *shall not* be adjustable.



10. Contract Execution Schedule and Extension in the Supplier's Performance	
GCC 16.1	The contract shall be executed as per Contract Execution Schedule given below: *a) The commencement of the contract period shall be assumed from the date of signing of the contract agreement if an agreement is executed; otherwise the notification of award is an acceptance and shall constitute a contract between the parties.* ***Days*** | ***Activity*** | ***Remarks*** | | *b) The Supplier shall be responsible for supplying three (3) copies of correct drawings to BPC for approval in the template provided in Section V, Schedule of Supply. Any errors or omission shall be to the Suppliers account and delays caused due to the need to rectify unclear/unacceptable drawings shall not be justification for time extension. BPC will take three (3) working days for the drawing approval from the receipt date.* *c) The Supplier shall submit a detailed program covering the manufacturing, testing and delivery of the materials and equipment within the time stated in the bid documents. The program shall be in the form of bar chart. The Supplier shall submit progress reports detailing progress and explaining any variations if any.*
11. Liquidated Damages	
GCC 17.1	The liquidated damages shall be: *1 % per week.*
GCC 17.1	The maximum amount of liquidated damages shall be: *10 % of the contract value.*
12. Resolution of Disputes	
GCC 21.2	The rules of procedure for arbitration proceedings pursuant to GCC Sub-Clause 21.2 shall be as per the Alternative Dispute Resolution Act of Bhutan 2013.
13. Taxes and Duties	
GCC 26.1	Pursuant to GCC 26.1 a. Price quoted shall be inclusive of all taxes (both inside and outside the purchaser's country) and Purchaser shall not be responsible and liable for the reimbursement/payment of taxes and duties. Further, for the clarity of applicable taxes, the Bidders may check with Department of Revenue and Custom, Ministry of Finance, Thimphu Bhutan / for exact Tax Rates in Bhutan for goods offered from India/Third Countries that are payable in Bhutan; b. The manufacturer(s) in Bhutan are to pay the taxes in accordance with the rules of the Government without any liability to the Purchaser. Purchaser shall not be responsible for reimbursement/processing exemptions/payments of taxes, duties, levies, royalties etc. for raw materials; and c. Tax Deducted at Source (TDS) shall be deducted as per the regulations of Ministry of Finance, RGoB, Bhutan.

Procurement Services Department ★ Bhutan Power Corporation Limited ★ Thimphu : Bhutan

Section VIII. Contract Forms

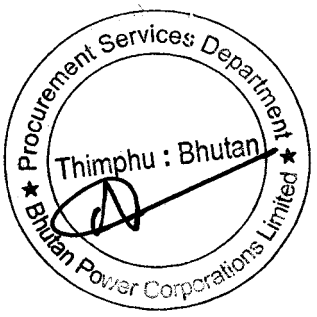
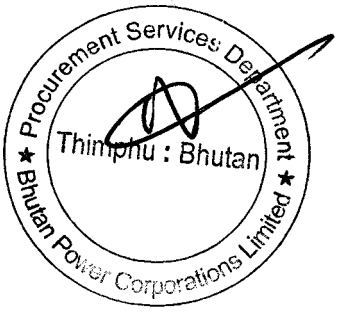


Table of Contents



Contract Agreement

THIS CONTRACT AGREEMENT made on the _____ [*insert number*] day of_____ [*insert month*], [*insert year*],

BETWEEN

[insert complete n*ame of Purchaser]*of Bhutan Power Corporation and having its principal place of business at _____ *[insert address of Purchaser* (hereinafter "the Purchaser") of the one part and

_____[insert n*ame of Supplier], a corporation_incorporated under the laws of* _____ *[insert: country of Supplier] and having its principal place of business at* _____*[insert address of Supplier]*(hereinafter "the Supplier") of the other part.

WHEREAS the Purchaser is desirous that certain goods be provided by the Supplier, viz.,

_____
[insert Brief Description of Goods, as identified in the Bid Form and Price Schedule](hereinafter "the Goods") and has accepted a Bid by the Supplier for the provision of those Goods in the sum of _____[*insert Contract Price in Words and Figures)*(hereinafter "the Contract Price").

NOW THIS CONTRACT AGREEMENT WITNESSETH AS FOLLOWS:

1. In this Agreement words and expression shall have the same meaning as are respectively assigned to them in the Conditions of Contract referred to.

2. The following documents shall constitute the Contract between the Purchaser and the Supplier, and each shall be read and construed as an integral part of the Contract:

   a) This Contract Agreement;
   b) Minutes of Contract Negotiation Meeting;
   c) Special Conditions of Contract;
   d) General Conditions of Contract;
   e) Technical Requirements;
   f) The Supplier's Bid and original Price Schedule;
   g) The Purchaser's Notification of Award;
   h) Integrity Pact;
   i) VPMS Acceptance Form

3. This Contract shall prevail over all other Contract documents. In the event of

Procurement Services: Department of Thimphu, Bhutan — Bhutan Power Corporations Limited

any discrepancy or inconsistency within the Contract documents, then the documents shall prevail in the order listed above.

4. In consideration of the payments to be made by the Purchaser to the Supplier as hereinafter mentioned, the Supplier hereby covenants with the Purchaser to provide the Goods and to remedy defects therein in conformity in all respects with the provisions of the Contract.

5. The Purchaser hereby covenants to pay the Supplier, in consideration of the provision of the Goods and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the Contract, at the times and in the manner prescribed by the Contract.

IN WITNESS WHEREOF, the parties hereto have caused this Contract Agreement to be executed in accordance with the laws of Bhutan on the day, month and year indicated above

For and on behalf of the Purchaser:

Signed: _____ *[insert signature]*

In the capacity of _____*[insert title or other appropriate designation*]

In the presence of _____ *[insert signature]*

_____*[insert identification of official witness]*

For and on behalf of the Supplier

Signed: _____*[insert signature of authorized representative(s) of the Supplier]*

In the capacity of_____*[insert title or other appropriate designation]*

In the presence of_____ *[insert signature]*

_____*[insert identification of official witness]*

Procurement Services Department * Thimphu : Bhutan * Bhutan Power Corporations Limited

Performance Security

[The bank, as requested by the successful Bidder, shall fill in this form in accordance with the instructions indicated]

Date:_____ *[insert date (as day, month, and year) of Bid submission]*

IFB No. and title:_____ *[insert no. and title of bidding process]*

Bank's Branch or Office:_____ *[insert complete name of Guarantor]*

Beneficiary: _____*[insert complete name of Purchaser]*

PERFORMANCE GUARANTEE No.: _____
[insert Performance Guarantee number]

We have been informed that _____ *[insert complete name of Supplier]* (hereinafter called "the Supplier") has entered into Contract No._____ *[insert number]* dated _____*[insert day and month], [insert year]* with you, for the supply of

_____
[description of Goods and related Services] (hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, a Performance Guarantee is required.

At the request of the Supplier, we hereby irrevocably undertake to pay you any sum(s) not exceeding _____*[insert amount(s)[1] in figures and words]* upon receipt by us of your first demand in writing declaring the Supplier to be in default under the Contract, without cavil or argument, or you needing to prove or to show grounds or reasons for your demand or the sum specified therein.

This Guarantee shall expire no later than the_____*[insert number]* day of _____*[insert month] [insert year]*,[2] and any demand for payment under it must be received by us at this office on or before that date. We agree to a one-time extension of this Guarantee for a period not to exceed *[six months] [one year]*, in response to the Purchaser's written request for such extension, such request to be presented to us before the expiry of the Guarantee.

Procurement Department ★ Bhutan Power Corporation Limited ★ Thimphu : Bhutan

[1] *The Bank shall insert the amount(s) specified in the SCC and denominated, as specified in the SCC, either in the currency(ies) of the Contract or a freely convertible currency acceptable to the Purchaser.*

[2] *Date established in accordance with General Conditions of Contract ("GCC"). The Purchaser should note that in the event of an extension of the time to perform the Contract, the Purchaser would need to request an extension of this Guarantee from the Bank. Such request must be in writing and must be made prior to the expiration date established in the Guarantee.*

[Signatures of authorized representatives of the bank]

Bank Guarantee for Advance Payment

[The bank, as requested by the successful Bidder, shall fill in this form in accordance with the instructions indicated.]

Date:_____ *[insert date (as day, month, and year) of Bid submission]*
IFB No. and title: _____*[insert number and title of bidding process]*

[bank's letterhead]

Beneficiary:_____*[insert legal name and address of Purchaser]*

ADVANCE PAYMENT GUARANTEE No.: _____
[insert Advance Payment Guarantee no.]

We, _____ *[insert legal name and address of bank]*, have been informed that_____ *[insert complete name and address of Supplier]* (hereinafter called "the Supplier") has entered into Contract No. _____*[insert number]* dated_____ *[insert date of Contract]* with you, for the supply of _____ *[insert types of Goods to be delivered]* (hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, an advance payment is to be made against an advance payment guarantee.

At the request of the Supplier, we hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of _____ *[insert amount(s)[3] in figures and words]* upon receipt by us of your first demand in writing declaring that the Supplier is in breach of its obligation under the Contract because the Supplier used the advance payment for purposes other than toward delivery of the Goods.

It is a condition for any claim and payment under this Guarantee to be made that the advance payment referred to above must have been received by the Supplier in its account _____ *[insert number and domicile of the account]*

This Guarantee shall remain valid and in full effect from the date of the advance payment received by the Supplier under the Contract until _____ *[insert date[4]]*. We agree to a one-time extension of this Guarantee for a period not to exceed_____ *[six months][one year]*, in response to the Purchaser's written request for such extension, such request to be presented to us before the expiry of the Guarantee.

---

[3] *The bank shall insert the amount(s) specified in the SCC and denominated, as specified in the SCC, either in the currency(ies) of the Contract or a freely convertible currency acceptable to the Purchaser.*

[4] *Insert the Delivery date stipulated in the Contract Delivery Schedule. The Purchaser should note that in the event of an extension of the time to perform the Contract, the Purchaser would need to request an extension of this Guarantee from the bank. Such request must be in writing and must be made prior to the expiration date established in the Guarantee*

Section IV. Bidding Forms

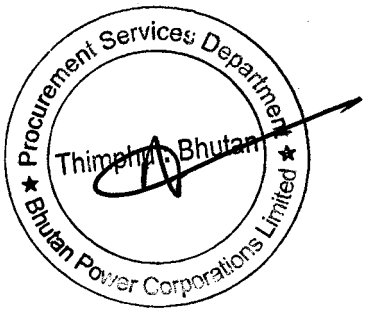
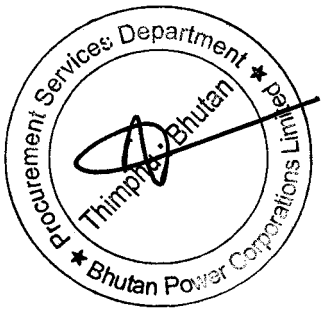


Table of Contents



Bidder Information Form

[The Bidder shall fill in this Form in accordance with the instructions indicated below. No alterations to its format shall be permitted and no substitutions shall be accepted.]

Date: *[insert date of Bid submission: .....]*
Bid No.: *[.....]*

Page _____ of_ _____ pages

1. Bidder's Legal Name: .....
2. In the case of a Joint Venture, Consortium or Association (JV/C/A) legal name of each party: .....
3. Bidder's actual or intended Country of Registration: .....
4. Bidder's Year of Registration: .....
5. Bidder's Legal Address in Country of Registration: ....
6. Bidder's Authorized Representative Information Name: ..... Address: ..... Telephone/Fax numbers: ..... E-mail Address: .....
7. Attached are copies of the following original documents: *[check the box(es) of the attached original documents]* ☐ Registration of firm named in 1 above, in accordance with ITB 3.1. ☐ In the case of a JV, letter of intent to form the JV, or the JV agreement, in accordance with ITB 6.1 (e). ☐ Power of attorney authorizing the signatory of the Bid to sign on behalf of the Bidder.

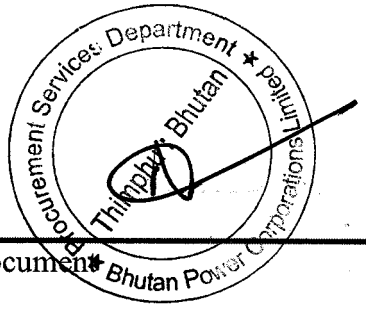
Procurement Services Department Thimphu : Bhutan Bhutan Power Corporation Limited

Joint Venture (JV) Partner Information Form

[The Bidder shall fill in this Form in accordance with the instructions indicated below].
Date: *[insert date (as day, month and year) of Bid submission]*
Bid No.: *[insert number of bidding process]*

Page _____ of_ _____ pages

1. Bidder's Legal Name: *[insert Bidder's legal name]*
2. JV Party's legal name: *[insert JV Party's legal name]*
3. JV Party's Country of Registration: *[insert JV Party's country of registration]*
4. JV Party's Year of Registration: *[insert JV Party's year of registration]*
5. JV Party's Legal Address in Country of Registration: *[insert JV Party's legal address in country of registration]*
6. JV Party's Authorized Representative Information Name: *[insert name of JV Party's authorized representative]* Address: *[insert address of JV Party's authorized representative]* Telephone/Fax numbers: *[insert telephone/fax numbers of JV Party's authorized representative]* E-mail Address: *[insert e-mail address of JV Party's authorized representative]*
7. Attached are copies of the following original documents: *[check the box(es) of the attached original documents]* ☐ Articles of Incorporation or Registration of firm named in 2 above, in accordance with ITB 3.1. ☐ Copy of Agreement between JV Partners.



Bid Form

[The Bidder shall fill in this form in accordance with the instructions indicated. No alterations to its format shall be permitted and no substitutions shall be accepted.]

Date:..... *[insert date of Bid submission]*
Invitation for Bid No.:..... *[insert number of IFB]*

To: ..... *[insert complete name of the Purchaser]*

.....

We, the undersigned, declare that:

(a) We have examined and have no reservations to the Bidding Documents, including Addenda No.:.....
.....*[insert the number and date of issue of each addendum]*;

(b) We offer to supply in conformity with the Bidding Documents and in accordance with the Delivery Schedules specified in the Schedule of Supply the following Goods and Related Services:.....
..... *[insert a brief description of the Goods and Related Services]*;

(c) The total price of our Bid, excluding any discounts offered in item (d) below is:
.....
.....*[insert the Bid Price in words and figures, indicating the various amounts and their respective currencies]*;

(d) The discounts offered and the methodology for their application are:

Discounts. If our Bid is accepted, the following discounts shall apply:.....
[Specify in detail each discount offered and the specific item of the Schedule of Supply to which it applies.]

Methodology of Application of the Discounts. The discounts shall be applied using the following methodology:.....
[Specify in detail the methodology that shall be used to apply the discounts];

(e) Our Bid shall be valid for a period of ***90 days*** from the date fixed for the Bid submission deadline in accordance with ITB (insert Sub-Clause 24.1), and it shall remain binding upon us and may be accepted at any time before expiry of that period;

(f) If our Bid is accepted, we commit to provide a Performance Security in accordance with ITB (insert Clause 48 and GCC Clause 11) for the due performance of the Contract;

(g) We are not participating, as Bidders, in more than one Bid in this bidding process, other than any alternative offers submitted in accordance with ITB (insert Clause 15);

(h) We, including any subcontractors or suppliers for any part of the Contract, have nationality from eligible countries, viz:..... *[insert the nationality of the Bidder, including that of all parties that comprise the Bidder if the Bidder is a JV/C/A, and the nationality each subcontractor and supplier]*

(i) We have no conflict of interest pursuant to ITB (Insert Sub-Clause 3.2);

(j) Our firm, its affiliates or subsidiaries - including any subcontractors or suppliers for any part of the contract - has not been declared ineligible by the Purchaser under the laws or official regulations of Bhutan, in accordance with ITB (insert Sub-Clause 4.1);

(k) The following commissions, gratuities or fees have been paid or are to be paid with respect to the bidding process or execution of the Contract:..... *[insert complete name of each Recipient, its full address, the reason for which each commission or gratuity was paid and the amount and currency of each such commission or gratuity]*

Name of Recipient	Address	Reason	Amount
_____	_____	_____	_____
_____	_____	_____	_____

(If none has been paid or is to be paid, indicate "none.")

(l) We understand that this Bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal contract is prepared and executed.

(m) We understand that you are not bound to accept the lowest evaluated Bid or any other Bid that you may receive.

Signed: .....*[insert signature of person whose name and capacity are shown]*

In the capacity of ..... *[insert legal capacity of person signing the Bid Form]*

Name: .....*[insert complete name of person signing the Bid Form]*

Duly authorized to sign the bid for and on behalf of: ..... *[insert complete name of Bidder]*

Dated on ..... day of ....., ...*[insert date of signing*

Procurement Services Department Thimphu : Bhutan Bhutan Power Corporations Limited

Deviation Schedule

Bidder shall specify below, in detail, all deviations from and exceptions to the Bid Document. Any entry shall be referenced to the Bid Document Clause No. to which they refer.

The Bidder shall be deemed to be complaint with the content and intent of the Bid Document except in respect of deviations and exception listed in this Schedule.

No deviation from and exception to the Bid Document shall be made subsequently to the Contract without the written approval of the Employer.

Clause No.	Details of Deviation/ Exception	Reasons for Deviation/ Exception

Declaration: This page and attached.....Pages of deviation from the Bid Document is a complete record of such deviation.

Signature of Bidder _____

Place & Date _____

Bhutan Power Corporations Limited ★ Procurement Services Department ★ Thimphu Bhutan

Bid Security (Bank Guarantee)

[The Bank shall fill in this Bank Guarantee Form in accordance with the instructions indicated.]

_____

[insert Bank's Name, and Address of Issuing Branch or Office]

Beneficiary: _____ *[Name and Address of Purchaser]*

Date: _____

BID GUARANTEE No.: _____

We have been informed that *[insert name of the Bidder]* (hereinafter called "the Bidder") has submitted to you its Bid dated (hereinafter called "the Bid") for the execution of *[insert name of Tender]* under Invitation for Bids No. *[insert IFB number]* ("the IFB").

Furthermore, we understand that, according to your conditions, Bids must be supported by a Bid Guarantee.

At the request of the Bidder, we *[insert name of Bank]* hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of *[insert amount in figures]* (*[insert amount in words]*) upon receipt by us of your first demand in writing accompanied by a written statement stating that the Bidder is in breach of its obligation(s) under the Bid conditions, because the Bidder:

(a) has withdrawn its Bid during the period of Bid validity specified by the Bidder in the Form of Bid; or

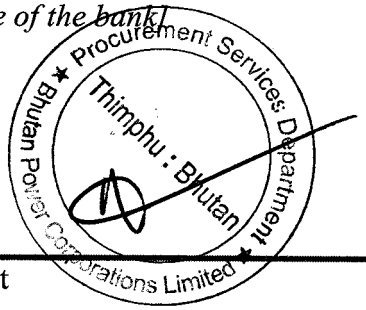
(b) having been notified of the acceptance of its Bid by the Purchaser during the period of Bid validity, (i) fails or refuses to execute the Contract ; or (ii) fails or refuses to furnish the Performance Security, if required, in accordance with the Instructions to Bidders.

This guarantee will expire: (a) if the Bidder is the successful Bidder, upon our receipt of copies of the contract signed by the Bidder and the Performance Security issued to you upon the instruction of the Bidder; or (b) if the Bidder is not the successful Bidder, upon the earlier of (i) our receipt of a copy of your notification to the Bidder of the name of the successful Bidder; or (ii) Thirty days after the expiration of the Bidder's Bid.

Consequently, any demand for payment under this guarantee must be received by us at this office on or before that date.

_____

[signature of authorized representative of the bank]



Manufacturer's Authorization

*[The Bidder shall require the Manufacturer to fill in this Form in accordance with the instructions indicated. This letter of authorization should be on the letterhead of the Manufacturer and be signed by a person with the proper authority to sign documents that are binding on the Manufacturer. The Bidder shall include it in its bid, if so indicated in the **BDS.**]*

Date: *[insert date of Bid Submission]*

Invitation for Bid No.: *[insert IFB number]*
Alternative No.: *[insert identification No if this is a Bid for an alternative]*

To: *[insert complete name of the Purchaser]*

WHEREAS

We *[insert complete name of the Manufacturer]*, who are official manufacturers of *[insert type of Goods manufactured]*, having factories at *[insert full address(es) of the Manufacturer's factory/ies]*, do hereby authorize *[insert complete name of Bidder]* to submit a Bid in relation to the Invitation for Bids indicated above, the purpose of which is to provide the following Goods, manufactured by us, namely *[insert name and/or brief description of the Goods]*, and subsequently to negotiate and sign the Contract.

We hereby extend our full guarantee and warranty in accordance with the General Conditions of Contract, with respect to the Goods offered by the above firm.

Signed: *[insert signature(s) of authorized representative(s) of the Manufacturer]*

Name: *[insert complete name(s) of the authorized representative(s) of the Manufacturer]*

Title: *[insert title(s) of the authorized representative(s) of the Manufacturer]*

Duly authorized to sign this Authorization for and on behalf of *[insert complete name of the Bidder]*

Dated on the *[insert number]* day of *[insert month]*, *[insert year]*.

Procurement Services Department ★ Bhutan Power Corporations Limited ★ Thimphu, Bhutan

INTEGRITY PACT

1 General:

Whereas *Nim Dorji, General Manager, Procurement Services Department* representing the *Bhutan Power Corporation Limited*, Royal Government of Bhutan, hereinafter referred to as the **"Employer"** on one part, and …… representing ……., hereinafter referred to as the **"Bidder"** on the other part hereby execute this agreement as follows:

This agreement shall be a part of the standard bidding document, which shall be signed by both the parties at the time of purchase of bidding documents and submitted along with the tender document. This IP is applicable only to "**large**" scale works, goods and services, the threshold of which will be announced by the government from time to time. The signing of the IP shall not apply to framework contracting such as annual office supplies etc.

2 Objectives:

Whereas, the Employer and the Bidder agree to enter into this agreement, hereinafter referred to as IP, to avoid all forms of corruption or deceptive practice by following a system that is fair, transparent and free from any influence/unprejudiced dealings in the **bidding process**[1] and **contract administration**[2], with a view to:

2.1 Enabling the Employer to obtain the desired contract at a reasonable and competitive price in conformity to the defined specifications of the works or goods or services; and

2.2 Enabling bidders to abstain from bribing or any corrupt practice in order to secure the contract by providing assurance to them that their competitors will also refrain from bribing and other corrupt practices.

3. Scope:

The validity of this IP shall cover the bidding process and contract administration period.

4. Commitments of the Employer:

The Employer Commits itself to the following:-

4.1 The Employer hereby undertakes that no officials of the Employer, connected directly or indirectly with the contract, will demand, take a promise for or accept, directly or through intermediaries, any bribe, consideration, gift, reward, favor or any material or

[1] Bidding process, for the purpose of this IP, shall mean the procedures covering tendering process starting from bid preparation, bid submission, bid processing, and bid evaluation.
[2] Contract administration, for the purpose of this IP, shall mean contract award, contract implementation, un-authorized sub-contracting and contract handing/taking over.

Procurement Services Department * Bhutan Power Corporation Limited * Thimphu : Bhutan

immaterial benefit or any other advantage from the Bidder, either for themselves or for any person, organization or third party related to the contract in exchange for an advantage in the bidding process and contract administration.

4.2 The Employer further confirms that its officials shall not favor any prospective bidder in any form that could afford an undue advantage to that particular bidder in the bidding process and contract administration and will treat all Bidders alike.

4.3 Officials of the Employer, who may have observed or noticed or have reasonable suspicion shall report to the head of the employing agency or an appropriate government office any violation or attempted violation of clauses 4.1 and 4.2.

4.4 Following report on violation of clauses 4.1 and 4.2 by official (s), through any source, necessary disciplinary proceedings, or any other action as deemed fit, including criminal proceedings shall be initiated by the Employer and such a person shall be debarred from further dealings related to the bidding process and contract administration.

5. Commitments of Bidders

The Bidder commits himself/herself to take all measures necessary to prevent corrupt practices, unfair means and illegal activities during any stage of the bidding process and contract administration in order to secure the contract or in furtherance to secure it and in particular commits himself/herself to the following :-

5.1 The Bidder shall not offer, directly or through intermediaries, any bribe, gift, consideration, reward, favor, any material or immaterial benefit or other advantage, commission, fees, brokerage or inducement to any official of the Employer, connected directly or indirectly with the bidding process and contract administration, or to any person, organization or third party related to the contract in exchange for any advantage in the bidding process and contract administration.

5.2 The Bidder shall not collude with other parties interested in the contract to manipulate in whatsoever form or manner, the bidding process and contract administration.

5.3 If the bidder(s) have observed or noticed or have reasonable suspicion that the provisions of the IP have been violated by the procuring agency or other bidders, the bidder shall report such violations to the head of the procuring agency.

6. Sanctions for Violation:

The breach of any of the aforesaid provisions shall result in administrative charges or penal actions as per the relevant rules and laws.

6.1 The breach of the IP or commission of any offence (forgery, providing false information, mis-representation, providing false/fake documents, bid rigging, bid steering or coercion) by the Bidder, or any one employed by him, or acting on his/her behalf (whether with or without the knowledge of the Bidder), shall be dealt with as per the terms and conditions of the contract and other provisions of the relevant laws, including De-barment Rules.

6.2 The breach of the IP or commission of any offence by the officials of the procuring agency shall be dealt with as per the rules and laws of the land in vogue.

7. Monitoring and Administration:

7.1 The respective procuring agency shall be responsible for administration and monitoring of the IP as per the relevant laws.

7.2 The bidder shall have the right to appeal as per the arbitration mechanism contained in the relevant rules.

We, hereby declare that we have read and understood the clauses of this agreement and shall abide by it.

The parties hereby sign this Integrity Pact at _____ on _____.

Affix Legal Stamp

EMPLOYER

CID : 1 1 9 0 4 0 0 1 6 5 4

Witness: _____

Name: Kinzang Wangmo

CID : 1 1 5 0 6 0 0 3 1 9 1

BIDDER/REPRESENTATIVE

CID : | | | | | | | | | | | |

Witness: _____

Name:

CID : | | | | | | | | | | | |

VPMS Acceptance Form

[The Bidder shall fill in this form in accordance with the instructions indicated. No alterations to its format shall be permitted and no substitutions shall be accepted.]

WHEREAS MESSRS (Insert the name of bidder)_____--
_____ (hereinafter called "the Bidder") License No.
having our registered office at_____ has submitted its bid dated
_____.

We hereby agree to abide by the Vendor Performance Management System of BPC or do affirm as follows.

1. We have read and understood all provisions set in the Vendor Performance Management System (VPMS) and we have no reservations to the VPMS document included in the Bidding Documents.

2. We agree to abide by all the provision of VPMS.

3. If our bid is accepted, we agree to be assessed as per the vendor rating methodology adopted by Bhutan Power Corporation Limited.

4. Depending on our performance, we accept the rating of Vendor Performance Index issued and any action taken by Bhutan Power Corporation Limited pursuant to the VPMS.

5. We shall be liable for any breach of this undertaking and non- compliance to the provisions of VPMS.

(Signature of Bidder)

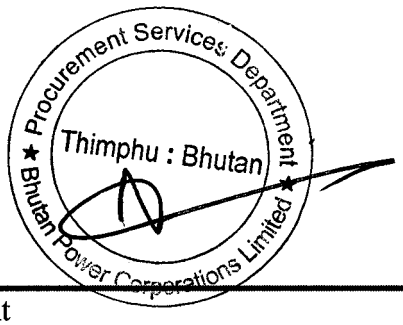
Date:

(Signature of witness)

Date:

Address:

Contact No.:



འབྲུག་གློག་མེ་ལས་འཛིན།།

Bhutan Power Corporation Limited

(An ISO 9001:2015, ISO 14001:2015 & OHSAS 18001:2007 Certified Company)

Registered Office, Thimphu

Procurement Services Department

Thimphu: Bhutan

BPC/PSD/2021 Materials/2020/10/ August 25, 2020

.....

.....

.....

Subject: Addendum No. I

Tender Title: Supply and Delivery of Electrical line and substation materials (Package B)

Reference: BPC/PSD/2021 Materials/2020/10 dated August 15, 2020

Dear Sir(s),

This is with reference to above mentioned tender whereby PSD, BPC would like to issue an addendum no. I as given below:

1. The Technical Specifications of the lots are attached here as *Annexure-1*. Kindly refer the technical specifications of the lots.

2. The additional GTP forms for the items under Lot 2- Switching Equipment is attached here as Annexure-II. Kindly refer the additional GTP forms to be filled up by the bidders.

3. The technical drawing samples for Switching equipment (lot 2), Lightning arrestor (lot 3) and Earthing Equipment (lot 6) are attached here as Annexure-III for your reference. Kindly refer the sample drawings of the mentioned lots.

4. The price schedule for Distribution Transformer (lot-4) has been amended. Kindly refer the revised price schedule attached here as Annexure-IV.

However, due to the above inclusion and additional information, no time extension shall be granted and the submission date and time shall remain the same.

Thanking you.

Yours sincerely,

(Nim Dorji)
General Manager

Procurement Services Department * Thimphu : Bhutan * Bhutan Power Corporation Limited

Phone: +975-2-326289; Box 580; E-mail: psdbpc@gmail.com; psd@bpc.bt; web: www.bpc.bt

Annexure-I

Lot 1: Distribution Board

1.0 Scope:

This specification covers the design, manufacture, testing at manufacture's work before dispatch, packing and transportation to BPC stores.

2.0 Code and Standard:

The construction, inspection and testing of the feeder pillar shall comply with all currently applicable status, regulations and safety codes in the locality where the feeder pillar will be installed. The feeder pillar drawing is attached herewith. Nothing in this drawing shall be responsibility. Supply items which are brought out by manufacturers shall be procured from the approved manufacturers acceptable to the Procurement Services Department, BPC.

3.0 Construction Features:

3.1 The Distribution Pillar shall be sheet steel enclosed and should be robust, dust, weather and vermin proof providing a degree of protection of IP 52 for indoor use and IP 54 for outdoor use. Sheet steel used shall be cold rolled grain oriented (CRGO) and at least 2.5 mm thick smooth finished, leveled and free from flaws and properly braced to prevent wobbling.

3.2 The Distribution pillar shall be provided with hinged doors openable from the centre. It should be also provided with IEC standard type lock and pad locking arrangement.

3.3 Doors, removable covers, if any and plate shall be gasketed all around with neoprene gaskets, and this is essential to prevent ingress of dust and vermin.

3.4 All live parts shall be provided with at least phase to phase and phase to earth clearance in air of 25 mm and 20 mm respectively.

3.5 The suitable removable cable gland plate of 2.5 mm cold rolled sheet steel should be provided. The interior cabling space should be strictly as per drawing attached.

3.6 The external earthing terminal with M1O and 19 mm x 6 mm Aluminum alloy of E91E grade earthing strip inside should be provided.

4.0 Painting:

4.1 All parts shall be cleaned in a six stage surface prep machine prior coating, including:

- Heated alkaline wash;
- Fresh Water rinse;
- Heated iron phosphate coat;
- Fresh water rinse;
- Recirculated deionised water rinse;
- Fresh deionised water mist

Procurement Services Department ★ Bhutan Power Corporations Limited ★ Thimphu : Bhutan

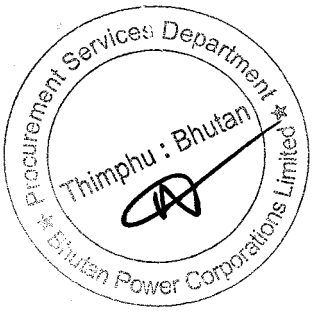
4.2 After prepping, the equipment shall be dried at 250 degrees for 5-1/2 minutes.

4.3 Epoxy polyester hybrid power plant shall be electrostatically applied.

4.4 The coated parts are then oven cured for 20 minutes at up to 450 degrees to provide a furniture quality finish. The hot parts are cooled to ambient temperature prior to packaging.

4.5 After curing, the paint finish is inert and no volatile emissions are present. There are no fugitive (stray) emissions in the finished product.

4.6 Gloss: 50 – 60 degrees
Impact Resistance: 18.07 Nm
Flexibility: 180 degrees, ¼ "mandrel
Pencil hardness: 2H
Cross hatch adhesion: 100%
Salt spray: 200 hours minimum
Humidity resistance: 200 hours minimum
Micron thickness: 80 microns



5 Main Busbar:

5.1 Main busbar shall be of Aluminum alloy of grade E91E, and as specified in drawing and conforming to relevant standard IS: 5082.

5.2 Busbar shall be located in horizontal formation but with gradual gradient as indicated in drawing.

5.3 All busbar shall be a solid strip without joints and shall be rated continuously. The maximum temperature of the busbar under operating conditions when carrying rated normal current at rated frequency should not exceed 85°C.

5.4 Busbar shall be adequately supported on insulators to withstand dynamic stresses due to short circuit current. Busbar support insulators shall conform to relevant standard IS: 2544.

5.5 Busbar should not be painted and all performance characteristics specified shall be obtained with unpainted busbars.

6.0 Fuses

6.1 Generally, fuses shall be of HRC cartridge fuse link (Blade contact type), mounted on different sizes of fuse bases required for different sizes of HRC fuses as per requirement under the Price Schedule having a rupturing capacity of 80 kA at 415 V, A.C. 50 Hz.

7.0 Interior Lighting

7.1 The Distribution Pillar shall be provided with a 230V, single phase, 50 Hz, 40W, preferably incandescent lamp fixture placed diagonally opposite for interior illumination and controlled by a piano switch and HRC fuse link HF of 2 Amps for lamp.

7.2 The Distribution Pillar should be supplied completely wired, ready for the Bhutan Power Corporation Limited's external connections at the terminal blocks. All wiring should be carried out with 650 V grade, PVC insulated, 7/20 standard copper wire.

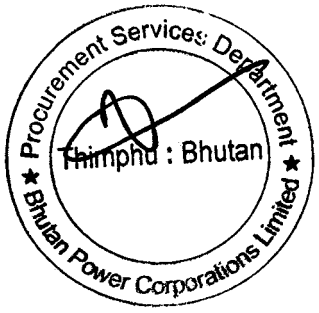
8.0 Labels and Danger Plate:

8.1 The Distribution Pillar shall be provided with individual component labels with pillar designation or rating. The danger sign as indicated in drawing should be drawn on every pillar. Both external-earthing terminals shall be levelled.

9.0 Submission of Test Certificate & Drawings

The supplier shall provide the type test certificates for the boxes done within Five (5) years from the reputed testing laboratory

The Supplier shall provide to the Purchaser the drawings if the contract is awarded for the final approval.



Lot 2: Switching Equipment

1.0 Air Break Switches

Load Break Switch / Air Break switch is a manually operated switch used for breaking and making the circuit on load without damage to the switching equipment. This switch is supplied fitted with load break arc interrupters to allow the switch to be used to interrupt load currents in accordance with IEC 60265-1. Air break switches are generally used outdoor for circuits of medium capacity such as long lines supplying a village/industrial /commercial loads from main line/feeder for isolation and switching.

Standard Specification for Medium Voltage Load Break Switches.

Parameter	**33 kV**	**11 kV**
Applicable standard	IEC 60271-102 and IEC 60265-1	
Rated normal current (A)	630	630
Rated 1 sec withstand current (kA)	16	16
Rated peak withstand current (kA)	40	40
Rated power frequency withstand voltage 1. Across open contacts (kV) 2. To Earth and Between poles (kV)	 80 70	 32 28
Rated impulse withstand voltage 1. Across open contacts (kV) 2. To Earth and Between poles (kV)	 195 170	 85 75

2.0 MV Drop-Out Fuses

Medium voltage drop out fuses are needed to protect distribution transformers and also to protect lightly loaded spur lines. Fuse bases shall conform to the requirements of table shown below. The medium voltage fuse barrel carrying fuse links shall be of the disconnecting type suitable for opening, closing and removal when energised using an insulated operating stick.

Standard Specification for Medium Voltage Drop Out Fuse Bases

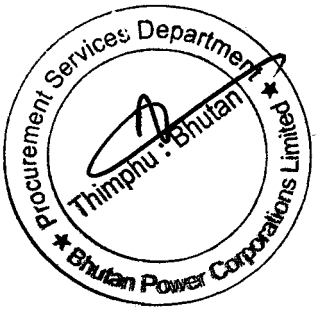
Parameter	**33 kV**	**11 kV**
Applicable standard	IEC 60282-2,IS 9385 I-III	
Type	Explusion drop out type for outdoor use	
Rated current of the fuse base (A)	100	100
Rated load breaking capacity (A)	6	20
Insulation level: Dry Impulse withstand (1.2 kV/50 μs) voltage (positive & negative polarity) (peak) • Across the isolating distance of the fuse base kV	 195	 85

Procurement Services Department * Thimphu : Bhutan * Bhutan Power Corporations Limited

Parameter	33 kV	11 kV
• To earth and between poles kV	170	75
Wet 1 min. Power frequency withstand voltage (rms.)		
• Across the isolating distance of the fuse base kV.	80	32
• To earth and between poles kV	70	28
Rated short time breaking capacity (kA)	8	10
Minimum Creepage Distance	900	300
Mounting Arrangement	Vertical Mounting on two Channels	

Note: When fuses are require to be used above 1000 m, the rated insulation levels to be specified should be determined by appropriate correction factors.

Each cutout unit shall be supplied complete with connection terminals suitable for conductors ranging in size from 16 mm^2 to 120 mm^2.



Lot 3: Lightning Arrestor

The surge arresters shall be of the metal oxide, gapless, single pole type, suitable for outdoor use on a three-phase 50 Hz system and shall have the following parameters:

Table 1: Specification of Surge Arrestors

Parameter	33 kV	11 kV
Applicable standard	IS 3070, IEC 60099-4	
Rated Voltage (rms)	30 kV	9 kV
Nominal discharge current (kA)	10 kA	10 kA
MCOV	24.4 kV	7.65 kV
Maximum Residual Voltages for:		
Steep Current impulse (1/20 micro sec.)	85 kV	26.5 kV
Lightning Impulse protection level (8/20 micro sec.)	71.8 kV	21.7 kV
Switching impulse protection level (30/60 micro sec.)	60 kV	18 kV
Type of Housing Insulator	Polymer with alternating sheds	
Moisture sealing system	Housing directly molded onto the arrester. Housing pressed on arrester with caps at the end not acceptable.	
Colour	Grey/Brown	

Note: Ground and line lead of the arrester is important. The lead voltage can contribute as much as the arrester protective level for long length. Therefore, arrester lead length shall be as short and straight as possible.

1.0 Arrester Fittings

Surge arresters will be connected between phase and earth to protect distribution transformers and switchgear. It shall be complete with the following:

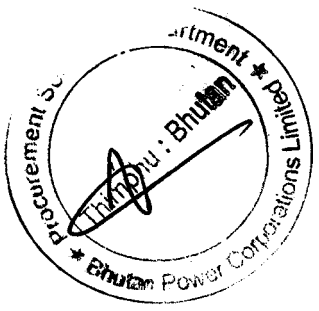
- Arrester terminal shall be nut and bolt (M12), suitable for connecting lugs with 14 mm dia hole or clamp type to accommodate standard conductor sizes used by BPC.
- Earth connection lead or earthing clamp terminals.
- The surge arresters shall be provided with mounting brackets complete with bolts, nuts and washers, suitable for mounting either vertically or horizontally on cross-arm channel (ISMC 75x40) bearing 18 mm dia holes.
- Disconnector device for disconnecting it from the system in the event of arrester failure to prevent a persistent fault in the system and it shall give a visible indication when the arrester has failed. The arrester disconnector shall be tested as per IEC 60099-4.
- Over pressure relief device shall be provided for relieving internal pressure in an arrester and preventing explosive shattering of the housing following prolonged passage of flow current or internal flashover of the arrester.

Procurement Services Department ★ Bhutan Power Corporations Limited ★ Thimphu: Bhutan

2.0 Consideration at High Altitude

If low altitude designed arrester is used at high altitude, possibility exists that the internal pressure of the arrester will be sufficiently high to cause a leak in the seal arrester allowing moisture to enter it causing failure. Therefore due attention must be given to moisture sealing system employed by the manufacturer.

A second potential problem exists with the new metal oxide arresters in which the overall length of the housing is decreased substantially. Attention must be given to assure that an adequate margin exists between the arrester protective characteristics and the external flashover of the housing at high altitude.



Lot 4: Distribution Transformer

1. Scope

This Specification covers the design, manufacture, testing and inspection, packing, shipping, delivery, and performance requirements of indoor/outdoor 33 kV and 11kV three phase and single phase (two wires) distribution transformers.

Any departure from the provisions of this Specification shall be disclosed in the Schedule of Non-Compliance of this document.

2. Transformer Weights and Special Bracing of Windings

a) Transformer winding shall be so braced / fitted internally to protect the windings against excessive movement and vibration during transportation and particularly during hand cartage to site.

3. Standards

The transformers shall conform to the latest version of the following IEC Standards:

- IEC 60076 Power Transformers.
- IEC 60137 Insulating bushings for alternating voltages above 1000 V.
- IEC 60296 Specification for unused mineral insulating oils for transformers and switchgear.
- IEC 60354 Loading guide for oil-immersed power transformers.
- IEC 60529 Degrees of protection provided by enclosures (IP Code).
- IEC/TR 60616 Terminal and tapping markings for power transformers.

4. Packing

Transformers shall be crated at the manufacturer's works in a manner entirely suitable for international transport and delivery to the Purchaser's warehouse. Bushings and other parts liable to damage shall be additionally protected. The transformers shall be securely bolted to pallets suitable for handling by forklift. In addition the normal lifting eyes shall be accessible with the crating and pallet in place for handling by slings from a crane.

Each crate shall be clearly marked with the rating and voltage of the transformer, and the total transport weight.

5. Losses

The fixed (iron) and running (copper) losses shall be as low as possible, consistent with reliability and economical use of materials. The supplier shall provide the guaranteed values of losses in the Schedule of Technical Particulars enclosed with the Bid document.

Bhutan Power Corporation ★ Procurement Services Department ★ Limited
Thimphu Bhutan

Maximum losses of the transformer should be as follows:

SL#	DESCRIPTION	Max losses	
		No Load Losses	Load Losses
(A)	**11/0.415 kV System**		
1	500 kVA Transformer	0.850	5.5
2	250 kVA Transformer	0.450	3.0
3	125 kVA Transformer	0.300	1.7
4	63 kVA Transformer	0.175	1.3
5	25 kVA Transformer	0.07	0.425
(B)	**33/0.415 kV System**		
1	500 kVA Transformer	0.850	5.50
2	250 kVA Transformer	0.55	3.50
3	125 kVA Transformer	0.30	1.70
4	63 kVA Transformer	0.175	1.30
5	25 kVA Transformer	0.125	0.425
(C)	**33/0.240 kV System**		
1	25 kVA Transformer	0.125	0.425
(D)	**11/0.240 kV System**		
1	16 kVA Transformer	0.075	0.350

Bidders are to design the transformer based on the above losses only and no tolerance will be permitted beyond the above values. Those bidders who do not meet the above losses will be rejected.

6. Quality Assurance

The manufacturer must operate a quality assurance system that complies with ISO Series 9000. The Supplier shall provide current certification showing the manufacturers' compliance with ISO Series 9000 or equivalent national standard. The certificate must be issued by an independent, accredited issuing authority.

7. TECHNICAL SPECIFICATIONS

7.1 General

This specification represents the minimum requirements for the works. The Supplier shall provide equipment, which meets or exceeds these minimum requirements. These items are being sought as additions to existing networks; it is essential to maintain compatibility with existing hardware and line design, as well as with established local work practices and methods.

7.2 Tests and Test Certificates

All tests shall be carried out in accordance with IEC 76; routine tests, type tests, if certificates unavailable, as well as any agreed special tests. A satisfactory service history of approximately 5 years is preferred, for all plant items.

Procurement Services Department Thimphu : Bhutan Bhutan Power Corporation Limited

7.3 Technical Parameters

Ratings: The distribution transformers shall have the following ratings:

Three Phase: 11 kV – 500 kVA.
33 kV – 250 & 500 kVA

Single Phase: 11 kV – 16 & 25 kVA
33 kV – 25 kVA

7.4 Operating Characteristics

In addition to the common technical requirements specified, the following minimum operating characteristics shall apply to all the distribution transformers covered in this Specification:

Parameter	Requirement
Applicable standard	IS 2026, IEC 60076
Type	Oil filled / two winding
Winding material	Copper
Core Material	CRGO silicon steel
Cooling	Oil natural air natural (ONAN)
Altitude	2400 m
Terminations	
• Primary	Outdoor Bushing or cable box[1]
• Secondary	Outdoor Bushing or Cable box
Rated no load voltage	
• Primary	33 kV or 11 kV
• Secondary	415 V
% Impedance	
10kVA-24kVA (1 phase/3 phase)	3%
25 kVA-630 kVA (1 phase/3 phase)	4%
Vector group	Dyn11
Tap changer	
• Type	Off load
• Range	+5% to -5%
• Step value	2.5%
Insulation Class (IEC-76)	A
Permissible Temperature rise	
• Maximum winding temperature	55°C
• Max. Top oil temperature	50°C
Insulation levels	
• Primary	170 kVp-70 kV/75 kVp-28 kV
• Secondary	7500 Vp-3000 V

Procurement Services Department Thimphu Bhutan Bhutan Power Corporations Limited

Min. Clearances between Bushing (Outdoor) • HV phase to phase/phase to earth • LV phase to Phase/phase to earth	 350/320 mm (33 kV), 280/140 mm (11 kV) 25/20 mm
Min. Clearances between Bushing (Indoor) • HV phase to phase/phase to earth • LV phase to Phase/phase to earth	 350/222 mm (33 kV), 130/80 mm (11 kV) 25/20 mm
H.T Bushings • 12 kV bushings • 36 kV bushings	 Conforms to I.S: 3347 Part III(Sec 1&2) Conforms to I.S: 3347 Part V(sec 1&2)
Maximum allowable noise level	As per IEC 551

Note 1: Bushing for pole mount and cable for pad mount as per the specific requirement at site.

8. Construction

The transformers shall be double-wound, oil immersed, naturally cooled (ONAN), oil types either hermetically sealed, or conventional type with tank breathers.

The core shall be constructed from M4 grade cold rolled, non-ageing, grain oriented silicon sheet steel having maximum of 1.11watt/kg. The primary and secondary windings shall be constructed from super enamelled insulated high conductivity copper. All turns of windings shall be adequately supported top and bottom, to prevent movement. In cases where turns are spaced out, a suitable inter-turn packing shall be provided. The insulation between core and bolts and core and clamps shall withstand 2,000V for one minute.

No material which can be deleteriously affected by the action of oil under the operating conditions of the transformers shall be used in the transformers or leads or bushings.

9. Transformer Tank and Covers

The transformer tank and covers shall be fabricated from sheet steel and shall be of robust construction. All welds shall be made by the electric arc process. With the exception of radiator elements, all external joints shall be seam welded. Cooling radiators shall be of robust and simple construction.

All matching faces of joints to be made oil tight shall be finished with a smooth surface to ensure that the gasket material will make a satisfactory joint. Bolts shall be spaced at sufficiently close intervals to avoid buckling of either flange or covers and provide reasonably uniform compression of the gasket.

Each transformer shall be provided with a minimum of two closed lifting lugs. The minimum diameter of the hole or width of the slot shall be 25 mm. The two lifting lugs shall be so located that there will be a minimum clearance of 100 mm between the lifting chain and the nearest part of the bushings. Oil conservators are not mandatory, but the bidder must state whether his bid includes or

excludes oil conservators. Transformers, other than hermetically sealed types, shall be fitted with oil draining and oil filling gate valves, plus a breather. An oil level sight glass shall be fitted marking the cold oil level.

Transformers 160kVA and below will be mounted on pole platform structures with four 12.5 mm dia bolts spaced 400 mm centre-centre for transformers up to and including 25kVA and spaced 500 mm centre- centre for transformers above 25kVA capacity.

The transformer tank base shall be provided with two steel channels having 14mm dia. holes to allow bolting to pole platforms. The 2 holes on the same channel should be spaced 227 mm centre-centre for transformers up to and including 25kVA and spaced 242 mm centre- centre for transformers above 25kVA capacity.

10. Transformer Sealing

For sealed units, a satisfactory lid sealing gasket shall be provided on each of these transformers to maintain the seal at extremes of operating temperature. A cold oil level mark shall be provided inside each transformer marked C.O.L.

11. Internal and External Finish

Internal and external tank and radiator surfaces shall be thoroughly cleaned by shot blasting or be given an acid and phosphate dip treatment to remove rust and scale and to provide an adherent, moisture resistant coating. Due care shall be given to avoid over pickling, resulting in pitting or unduly heavy deposit of phosphate. This resultant coating shall provide a surface, which shall offer good paint adhesion and a resistance to corrosion. The interior surfaces of the tank and cover, or conservator; above the lowest oil level shall be given one coat of oil and acid resisting paint, after cleaning.

The exterior surfaces of the complete transformer shall, where appropriate, be protected by a paint system which shall be applied strictly in accordance with the paint manufacturer's instructions. The system shall consist of not less than two priming coats and two finishing coats of oil and weather resisting paint.

The total thickness of the paint shall be not less than 0.120 mm with a minimum total thickness of priming and finishing paint of 0.06 mm each. Attention shall be paid to the need to achieve adequate coverage at metal edges, where breakdown of the paint film often begins. The paint system and the colour of the final coat shall be dark grey colour.

Attention shall be paid to the need to achieve adequate coverage at metal edges, where breakdown of the paint film often begins.

The paint system and the color of the final coat shall be subject to the approval of the Purchaser and preferably be a dark grey color.

12. Rating Plate

A stainless steel rating plate, of at least 1 mm thickness, shall be fitted to each transformer and shall carry all the information as specified in the Standards. The rating plate shall be fitted below the LV terminals.

13. Terminal Markings

All transformers shall have the primary and secondary terminal markings plainly and indelibly marked on the transformer adjacent to the relevant terminal.

14. Tank Marking

Each transformer shall have the kVA rating stencilled on the outside of the tank. The numerals shall be black, 75mm high, and positioned centrally below the HV bushings so as to be readily visible from the ground.

15. Terminal Leads

Outgoing leads shall be brought out through bushings. The leads shall be such that the core and coils may be removed with the least possible interference with these leads, and they shall be specially supported inside the transformer, to withstand the effects of vibration and handling during transport, hand cartage and short circuits.

16. Bushings

All bushings shall be porcelain clad, and shall be sealed to prevent ingress of moisture and to facilitate removal. The neutral bushings and stems shall be identical to those provided for phase terminations. Bushing palms shall be made of brass and have one 14 mm dia. hole.

In case of outdoor bushings, the HV terminals shall be fitted with moulded heat shrinkable insulating covers suitable for 50 mm ACSR 'Rabbit' conductor to provide protection of the bushing palm. The LV bushings shall be in a cable box with suitable glands for cable sizes from 16-150 mm2.

17. Arching horns

All the transformers shall be equipped with arching horns on HT outdoor bushings.

18. Earthing Connections

Two earthing connections shall be provided with connection facilities for 25 x 6 mm GI strip. The bolts shall be located on the lower side of the transformer and be of M12 size. Each connection shall be indicated clearly with an engraved 'earth' symbol.

Procurement Services Department Thimphu : Bhutan Bhutan Power Corporations Limited

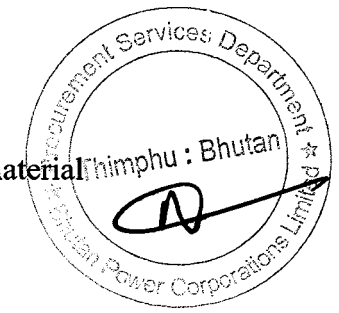
19. Gaskets

Gaskets provided with the transformers shall be suitable for making oil tight joints, and there shall be no deleterious effects on either gaskets or oil when the gaskets are continuously in contact with hot oil. Exterior gaskets shall be weatherproof and shall not be affected by strong sunlight/UV. The material for gaskets shall be cork, neoprene or equivalent.

20. Drying Out, Filling, Transformer Oil

All transformers shall be thoroughly dried out at the manufacturer's works. Oil immersed type transformers shall be delivered filled with oil to normal level, ready for service, except that conservators may be removed for transport.
All transformers shall be filled to the required level with new, unused, clean, standard mineral oil in compliance with BS148/IEC-60296 and shall be free from all traces of polychlorinated biphenyl (PCB) compounds.

21. Fittings



The following standard fittings shall be provided:

- Rating and terminal marking plates non-detachable of aluminium material
- Earthing terminals with lugs - 2 Nos.
- Lifting lugs for main tank & top cover
- Pulling lugs - 4 Nos
- HV bushings with arching horns
- LV bushings inside the cable box as per site requirement and neutral bushings (for high rating transformers).
- Metallic conservator tank (mandatory for 50 kVA and above for rated voltage 11 kV and below, and all ratings above 11 kV) with oil gauge
- Terminal connectors on the HV/LV bushings
- Thermometer pocket with cap.
- Air release device (bolted type) for all transformers fitted with conservator tank
- Radiators
- Prismatic oil level gauge
- Drain cum sampling valve
- Oil filling hole having M30 thread with plug and drain valve on the conservator
- Silica gel breather (25 kVA and above for rated voltage 11 kV and below and all ratings above 11 kV). Type of breather (Bolted type is preferred).
- Pressure relief device or explosion vent.
- Metallic off-load tap changer
- Base channel ISMC 75 x 40 mm with M16 bolts and nuts to fix on mounting platform (for pole mounted stations, spacing of the holes to be decided base on pole type (steel tubular / telescopic pole).
- MCCB at LT side inside a cable box for transformers rated 250 kVA and below.

- ACB at LT side inside a cable box for Transformer rated 500kVA.
  Transformers 125 kVA and below will be mounted on pole platform structures with four 16 mm dia bolts. The bolts spacing shall be 400 mm centre-centre for transformers up to and including 25 kVA and 500 mm centre- centre for transformers above 25 kVA capacity. The transformer tank base shall be provided with two steel channels to allow bolting to pole platforms. The 2 holes on the same channel should be spaced 227 mm centre-centre for transformers up to and including 25 kVA and spaced 242 mm centre- centre for transformers above 25 kVA capacity.
  Pad mounted transformers below 500 kVA shall have skid type under base channels having towing holes for pulling & mounting holes for foundation of transformer. For heavy transformers of 500kVA and above, the under base shall be equipped with rollers allowing the unit to be manoeuvred into final position and then anchored.

22. Radio Interference

When operated at voltages up to 10% in excess of the normal system rating, transformers shall be substantially free from partial discharges; i.e., corona discharges in either internal or external insulation, which are likely to cause interference with radio or telephone communications.

23. Packing

Wooden pallets shall be provided for each transformers suitable for international transport and delivery to the Purchaser's warehouse. Bushings and other parts liable to damage shall be additionally protected. The transformers shall be securely bolted to pallets suitable for handling by forklift. In addition, the normal lifting eyes shall be accessible with handling by slings from a crane.

Providing of crate shall be at the discretion of the supplier. In case, if the crate is provided for protection, then each crate shall be clearly marked with the rating and voltage of the transformer, and the total transport weight.

24. TEST STANDARDS

24.1 Inspection and Testing

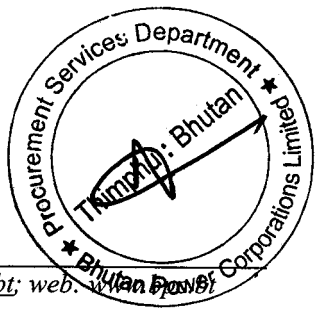
The supplier shall carry out a comprehensive inspection and testing program during manufacture of the equipment. An indication of inspection envisaged by the purchaser is given under Clause 3.1.1. This is however not intended to form a comprehensive program as it is supplier's responsibility to draw up and carry out such a program in the form of detailed quality plan duly approved by purchaser for necessary implementation.

24.2 Inspection

Tank and Conservator

a) Certification of chemical analysis and material tests of plates.

b) Check for flatness.



c) Electrical interconnection of top and bottom by braided tinned copper flexible.

d) Welder's qualification and weld procedure.

e) Testing of electrodes for quality of base materials and coatings.

f) Inspection of major weld preparation.

g) Crack detection of major strength weld seams by dye penetration test.

h) Measurement of film thickness of:

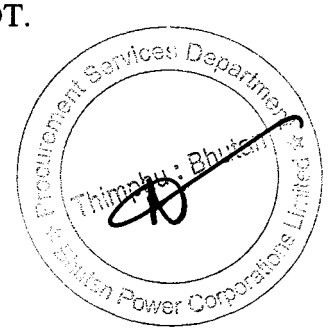
- Oil insoluble varnish.
- Zinc chromate paint.
- Finished coat.

i) Check correct dimensions between wheels, demonstrate turning of wheels through 90°C and further dimensional check.

j) Check for physical properties of materials for lifting lugs, jacking pads, etc. All load bearing welds including lifting lug welds shall be subjected to NDT.

k) Leakage test of the conservator.

l) Certification of all test results.



24.3 Core

a) Sample testing of core materials for checking specific loss, bend properties, magnetisation characteristics and thickness.

b) Check on the quality of varnish if used on the stampings :

- Measurement of thickness and hardness of varnish on stampings.
- Solvent resistance test to check that varnish does not react in hot oil.
- Check overall quality of varnish by sampling to ensure uniform shining colour, no bare spots, no over burnt varnish layer and no bubbles on varnished surface.

c) Check on the amount of burrs.

d) Bow check on stampings.

e) Check for the overlapping of stampings. Corners of the sheet are to be part.

f) Visual and dimensional check during assembly stage.

g) Check for interlaminar insulation between core sectors before and after pressing.

h) Check on completed core for measurement of iron loss and check for any hot spot by exciting the core so as to induce the designed value of flux density in the core.

i) Visual and dimensional checks for straightness and roundness of core, thickness of limbs and suitability of clamps.

j) High voltage test (2 kV for one minute) between core and clamps.

k) Certification of all test results.

24.4 Insulation Material

a) Sample check for physical properties of materials.

b) Check for dielectric strength.

c) Visual and dimensional checks.

d) Check for the reaction of hot oil on insulating materials.

e) Dimension stability test at high temperature for insulating material.

f) Tracking resistance test on insulating material.

g) Certification of all test results.

24.5 Winding

a) Sample check on winding conductor for mechanical properties and electrical conductivity.

b) Visual and dimensional checks on conductor for scratches, dent marks etc.

c) Sample check on insulating paper for pH value, bursting strength and electric strength.

d) Check for the reaction of hot oil on insulating paper.

e) Check for the bonding of the insulating paper with conductor.

f) Check and ensure that physical condition of all materials taken for windings is satisfactory and free of dust.

g) Check for absence of short circuit between parallel strands.

Procurement Services Department * Bhutan Power Corporations Limited * Thimphu : Bhutan

h) Check for brazed joints wherever applicable.

i) Measurement of voltage ratio to be carried out when core/yoke is completely restacked and all connections are ready.

j) Conductor enamel test for checking of cracks, leakage and pin holes.

k) Conductor flexibility test.

l) Heat shrink test for enamelled wire.

m) Certification of all test results.

24.6 Checks before Drying Process

a) Check condition of insulation on the conductor and between the windings.

b) Check insulation distance between high voltage connections, cables and earth and other live parts.

c) Check insulating distances between low voltage connections and earth and other parts.

d) Insulation of core shall be tested at 2 kV/minute between core to bolts and core to clamp plates.

e) Check for proper cleanliness and absence of dust etc.

f) Certification of all test results.

24.7 Checks during Drying Process

a) Measurement and recording of temperature, vacuum and drying time during vacuum treatment.

b) Check for completeness of drying by periodic monitoring of IR and Tan delta.

c) Certification of all test results.

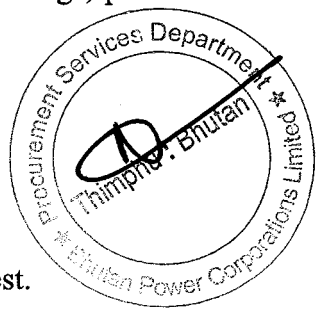
24.8 Assembled Transformer

a) Check completed transformer against approved outline drawings, provision for all fittings, finish level etc.

b) Test to check effective shielding of the tank.

c) Jacking test with oil on all the assembled transformers.

d) Dye penetration test shall be carried out after the jacking test.



24.9 Bought Out Items

a) The makes of all major bought out items shall be subject to Purchaser's approval.

b) The Contractor shall also prepare a comprehensive inspection and testing programme for all bought out/sub-contracted items and shall submit the same to the Employer for approval. Such programme shall include the following components:

- Buchholz Relay.
- Axles and wheels.
- Winding temperature indicators for local and remote mounting.
- Oil temperature indicators.
- Bushings.
- Bushing current transformers.
- Cooler control cabinet.
- Cooling equipment.
- Oil pumps.
- Fans/Air Blowers
- Tap change gear.
- Terminal connectors.

The above list is not exhaustive and the supplier shall also include other bought out items in his programme.

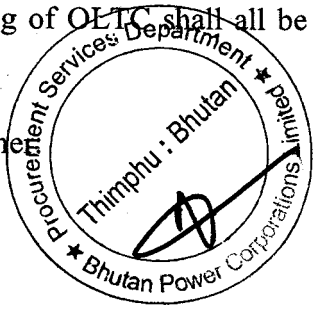
24.10 Factory Tests

Routine Tests

All standard routine tests in accordance with IS: 2026 with dielectric tests corresponding to Method 2 shall be carried out on each transformer. Operation and dielectric testing of OLTC shall all be carried out as per IS: 2026.

Following additional routine tests shall also be carried out on each transformer.

a) Magnetic Circuit Test



After assembly each core shall be tested for 1 minute at 2000 Volts between all bolts, side plates and structural steel work.

b) Oil leakage test on transformer tank
c) Magnetic balance test

d) Measurement of no-load current with 415V, 50 Hz AC supply on LV side.

e) Frequency response analysis (FRA)

f) Noise level test

g) Heat run test

g) Pressure test

Type Tests

Following type tests shall be conducted on one Transformer of each rating:

a) Temp. Rise Test as per IS: 2026 (Part-II)

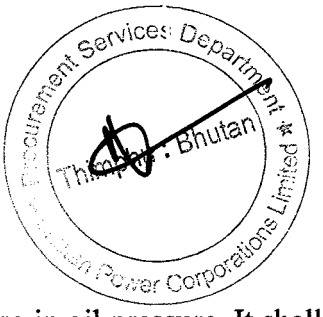
Gas chromatographic analysis on oil shall also be conducted before and after this test and the values shall be recorded in the test report. The sampling shall be in accordance with IEC 567. For the evaluation of the gas analysis in temperature rise test the procedure shall be as per IS: 9434 (based on IEC: 567) and results will be interpreted as per IS: 10593 (based on IEC -599).

The temperature rise test shall be conducted at a tap for the worst combination of loading on the three windings of the transformer. The supplier before carrying out such test shall submit detailed calculations showing alternatives possible, on various taps and for the three types of ratings of the transformer and shall recommend the combination that results in highest temperature rise for the test.

b) Tank vacuum Test

c) Tank pressure Test

d) Pressure Relief Device Test.



The pressure relief device of each size shall be subjected to increase in oil pressure. It shall operate before reaching the test pressure specified in transformer tank pressure test. The operating pressure shall be recorded. The device shall seal off after excess pressure has been released.

e) Measurement of capacitance and tan delta to determine capacitance between winding and earth.

f) Lightning Impulse withstand test in all phases as per IS: 2026 (As type test, only for 220 kV class & below)

Additional type tests

Following additional type tests other than type and routine tests shall also be carried out on one unit of each type:

a) Measurement of zero Seq. reactance (As per IS: 2026, for 3-phase transformer only.)

b) Measurement of acoustic noise level.

c) Measurement of power taken by fans and oil pumps.

d) Measurement of harmonic level in no load current.

e) One cooler control cabinet of each type shall be tested for IP: 55 protection in accordance with IS: 13947.

f) Measurement of transferred surge on LV (tertiary) winding due to HV lightning impulse and IV lightning impulse.

g) High voltage withstand test shall be performed on auxiliary equipment and wiring after complete assembly.

Routine tests on bushings

The following tests shall be conducted on bushings

a) Test for leakage on internal fillings.

b) Measurement of creepage distance, dielectric dissipation factor and capacitance.

c) Dry power frequency test on terminal and tapping.

d) Partial discharge test followed by dielectric dissipation factor and capacitance measurement.

Tank Tests

a) Routine Tests

Oil Leakage Test

All tanks and oil filled compartments shall be tested for oil tightness by being completely filled with air or oil of a viscosity not greater than that of insulating oil conforming to IS: 335 at the ambient temperature and applying a pressure equal to the normal pressure plus 35

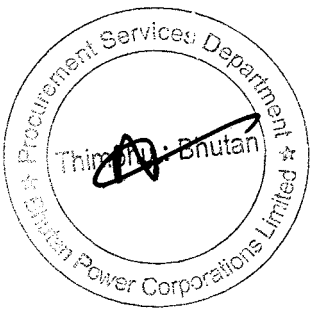
KN/Sq.m (5 psi) measured at the base of the tank. The pressure shall be maintained for a period of not less than 12 hours for oil and one hour for air during which time no leak shall occur.

b) Type Tests

i. Vacuum Test

Where required by the purchaser one transformer tank of each size shall be subjected to the specified vacuum. The tank designed for full vacuum shall be tested at an internal pressure of 3.33 KN/Sq.m absolute (25 torr) for one hour. The permanent deflection of flat plate after the vacuum has been released shall not exceed the values specified below:

Horizontal Length of flat plate (in mm)	Permanent deflection (in mm)
Up to and including 750	5.0
751 to 1250	6.5
1251 to 1750	8.0
1751 to 2000	9.5
2001 to 2250	11.0
2251 to 2500	12.5
2501 to 3000	16.0
Above 3000	19.0



ii. Pressure Test

One transformer tank of each size, its radiator, conservator vessel and other fittings together or separately shall be subjected to a pressure corresponding to twice the normal head of oil or to the normal pressure plus 35 KN/m2 whichever is lower measured at the base of the tank and maintained for one hour. The permanent deflection of flat plates after the excess pressure has been released shall not exceed the figure specified above for vacuum test.

24.11 Pre-Shipment Checks at Manufacturer's Works

a) Check for interchangeability of components of similar transformers for mounting dimensions.

b) Check for proper packing and preservation of accessories like radiators, bushings, dehydrating breather, rollers, buchholz relay, fans, control cubicle, connecting pipes, conservator etc.

e) Check for proper provision for bracing to arrest the movement of core and winding assembly inside the tank.

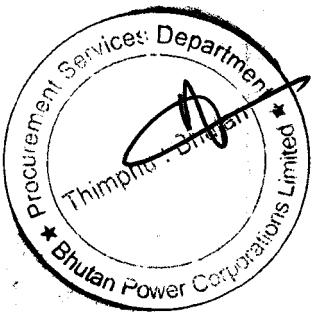
f) Gas tightness test to confirm tightness.

e) Derivation of leakage rate and ensure the adequate reserve gas capacity.

i. Note

a) Accuracy class PS as per IS:20705

b) Class (for the relevant protection and duties) as per IEC 185.



Lot 5: Lubricants

The insulating oil shall conform to all parameters either as per IEC-60296 or as specified below, while tested at supplier's premises. No inhibitors shall be used in oil. The supplier shall furnish test certificates from the supplier against their acceptance norms as mentioned below, prior to despatch of oil from refinery to site.

Sl#	Characteristics	Requirements	Method of Test
1	Appearance	The oil shall be clear and transparent and free from suspended matter or sediment	A representative sample of the oil shall be examined in a 100 mm thick layer, at ambient
2	Density at 29.5°C (max.)	0.89 gm/cm3	IS: 1448
3	Kinematic Viscocity at27°C (Max.)	27 cSt	IS: 1448
4	Interfacial Tension at27°C (Min.)	0.04 N/m	IS: 6104
5	Flash point Penskey-Marten (closed) (Min.)	140°C	IS: 1448
6	Pour point (Max.)	-30°C	IS: 1448
7	Neutralization value (total acidity) (Max.)	0.03 mg KOH/gm	IS: 335 Appendix-1
8	Corrosive sulphur (in terms of Classification Of copper strip)	Non-Corrosive	IS: 335 Appendix-1
9	Electric strength (Breakdown voltage) (Min.)		
a)	New untreated oil	30 kV (rms) (if this value is not attained the oil shall be treated)	IS: 6792
b)	After Treatment	60 kV (rms)	-
Sl#	**Characteristics**	**Requirements**	**Method of Test**
10	Resistivity (Min.) (ohm cm)		IS: 6103

b)	at 27°C	$1500x10^{12}$	
11	Oxidation stability		
a)	Neutralization value after oxidation (Max.)	0.40 mg KOH/gm	
b)	Total sludge after oxidation (Max)	0.10 percent by weight	
12	Presence of oxidation inhibitor	The oil shall not contain anti-oxidant additives	IS: 335 Appendix-D
13	Water content (Max.)		
a)	New untreated oil	50ppm	IS: 2362
b)	After treatment	15ppm	IS: 1866
14	Aging Characteristics after 96hrs as per ASTM-D1934/IS: 12177 with catalyst (Copper)		
a)	Resistivity(Min) (ohm cm) at 27°C at 90°C	 $2.5x10^{12}$ $0.2x10^{12}$	
b)	Tan delta at 90°C (Max.)	0.2	
c)	Total acidity (Max.)	0.05 mg KOH/gm	
d)	Sludge content wt. (Max.)	0.05 %(By weight)	
15	PCB Content	Less than 2 ppm	

1.2 Subsequently oil samples shall be drawn

(i) Prior to filling in main tank at site and shall be tested for:

(1) BDV.
(2) Moisture content.

(ii) Prior to energisation at site and shall be tested for following properties & acceptance norms:

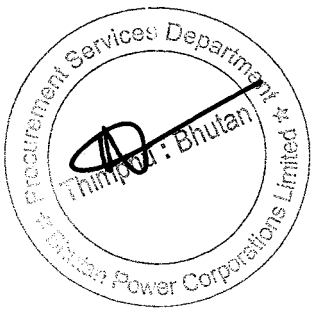
(1)	BDV (kV rms)	60 kV (min.)
(2)	Moisture content	15 ppm (max.)
(3)	Tan-delta at 90°C	0.05 (max.)
(4)	Resistivity at 90°C	1 x 10^{12} ohm-cm (min.)
(5)	Interfacial Tension	0.03 N/m (min.)

Procurement Services Department * Thimphu : Bhutan * Bhutan Power Corporation Limited

. 1.3 At manufacturer's works oil sample shall be drawn before and after heat run test and shall be tested for following:

(1)	BDV	60 kV (min.)
(2)	Moisture content	15 ppm
(3)	Dissolved gas analysis (DGA):	

· Samples for DGA shall be taken from sampling device within 24 hours prior to commencement of temperature rise test and immediately after this test. The acceptance norms with reference to various gas generation rates during the temperature rise test shall be as per IS: 10593 (based on IEC-599).



Lot 6: Earthing Equipment

Spike Earthing

Spike earthing is used for 11 kV & 33 kV pole earthing. Spike Earthing consist of 25x6 mm, 1.5 meter long GI flat, 2.5 meter long spike earthing electrode with necessary holes as indicated on the drawing.

GI Strip

GI strip/earth conductor of 25 x 6 mm shall be supplied for connection from LV neutral, transformer earth and lightning arrestor to the earthing electrode.

GI Wire

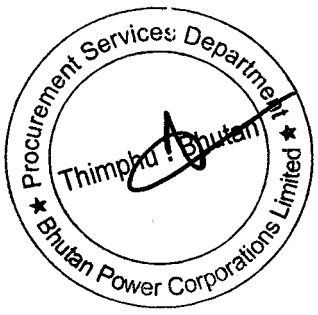
Earthing connection of 8 SWG GI wires shall be supplied, for connection from the pole to the spike earthing electrode

Stay Wire

Utilities grade galvanised steel strand shall be used for guy wire as shown in the table: Galvanised Steel Stay Wires

Designation	No Strands	Strand SWG[1]	Strand Diameter (mm)	Overall dia	Appro. Wt. Per meter (kg)	Minimum breaking load (kN)
7/8	7	8	4.04	12	0.72	90

Care must be taken in procuring guy wire to ensure that the wire has the minimum breaking load specified in the table. Galvanised steel wire is available is a range of steel grades and only utilities grade wire, manufactured using a high tensile steel, should be used.



Lot 7: Galvanized Steel Tubular Poles

Scope

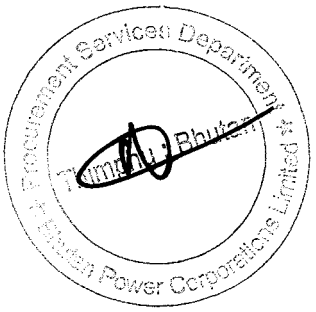
This specification covers the design, manufacture, testing, supply, delivery and performance requirements of Galvanized Steel Tubular Poles.

Standards

The equipment shall comply with the latest editions of and amendments to Indian standards listed below. Where any provision of this specification differs from those of the standards listed hereafter, the provision of this specification shall govern.

IS - Indian Standards

- IS 2713: Specification for steel poles for overhead power lines
- IS 2062: Steel for general structural purposes



Note:

In case of conflict, the order of precedence shall be:

- This Specification
- IS Standards
- Other Standards

Alternative Standards may be approved, provided the Supplier demonstrates that they give a degree of quality and performance equivalent to that of the referenced Standards. Acceptability of any alternative Standard is at the discretion of the Purchaser.

The manufacturer must operate a quality assurance system that complies with ISO 9000. The Supplier shall provide current certification showing the manufacturers' compliance with ISO 9000 or equivalent national standard. The certificate must be issued by an independent, accredited issuing authority.

Pole Lengths

Poles are required in two sections. Refer table below and drawings enclosed. The poles shall be of steel swaged type, conforming to the appropriate Standard. Refer Drawing enclosed.

Pole Length	Pole Strength / Working Load	Equivalent to Indian Standard Specification reference	Equivalent to IS Pole Designation	Weight per pole
7.5M	410Mpa	IS 2713	410-SP-9	110 kg.
10M	410Mpa	IS 2713	410-SP-45	178 kg.
12M	410Mpa	IS 2713	410-SP-62	259 kg.

Construction of Poles

Material

The poles shall be made from longitudinally welded tube sections of hot rolled structural carbon steel having the mechanical strength properties as follows:

(a) Tensile strength: 410 MPa

(b) Yield strength: 240 MPa

Or from steels having similar mechanical properties, manufactured under Standards, approved by the Purchaser.

Galvanising

Galvanising of the steel poles shall be in accordance with ISO 1459 and ISO 1461. The zinc coating shall not be less than 600 g/m^2 of steel surface area.

The zinc coating shall be smooth, continuous and uniform. It shall be free from acid spots and shall not scale, blister or be removable by handling or packing. There shall be no impurities in the zinc or additives to the smelter bath, which could have a deleterious effect on the durability of the zinc coating.

Before pickling, all welding, drilling, cutting, grinding must be completed and all grease, paint, varnish, oil and welding slag completely removed. All protuberances, which would affect the life of galvanising, should also be removed.

To avoid the danger of white rust, galvanised material shall be stacked during transport and stored in such a manner as to permit adequate ventilation.

Galvanised steel items shall be thoroughly checked for damage before transport to the work site.

Any material found to be damaged shall be returned to its source. Cracked, flaked or scratched surfaces shall not be acceptable.

Galvanised steel shall be handled carefully during loading, transporting and unloading, and shall not be dropped on the ground, or dragged or scraped along the ground or any surface.

Shape, Assembly of Poles

Poles are to be manufactured in swaged form.

Swaged poles shall be manufactured from tubes worked while hot. Swaged poles shall consist of two tube sections with tapering diameters, the bottom section having the largest diameter. The length of the overlap shall be at least three times the diameter of the smaller tube, in each case. The Supplier shall state the length of overlap. The upper edge of the tube at each joint shall be chamfered at an angle of 45°.

★ Procurement Services Department ★ Bhutan Power Corporation Limited ★ Thimphu : Bhutan

The poles shall be supplied in two sections for assembly at site by bolting. Galvanised bolts of adequate strength, required for joining the poles at site, shall also be supplied, with manufacturer's instructions for the pole assembly.

Transportation of full-length poles is avoided in Bhutan, due to hand cartage in the mountainous terrain.

Cost of bolts, nuts and washers for joining pole sections shall be deemed included in the schedule rates for pole supply.

Bolts, Nuts and Washers

All bolts, nuts and washers, supplied under this Specification shall comply with the following:

The bolts and nuts shall comply with ISO 4016. Mechanical properties shall be in accordance with ISO 898.

The dimensions and characteristics in this Specification are intended to describe typical ISO metric bolts, nuts, and washers, such as are commonly used in the construction of electrical distribution lines, plant and equipment.

The safe working shear stress of bolts is taken as 120 MPa, with the area of the bolt measured at the root of the thread. The table below shows the ultimate tensile strength, the tensile stress areas, the safe working tensile loads and the safe working shear loads for the bolts covered by this Specification. The ultimate shear strength has been assumed to be 75% of the ultimate tensile load and a factor of safety of 2.5 has been applied:

Bolt Size	Ultimate Tensile Stress (N/mm^2)	Tensile Stress Area (mm^2)	Ultimate Tensile Strength (kN)	Working Tensile Load (kN)	Safe Working Shear Load (kN)
M16	400	157.0	62	25	18
M18	400	204.0	81	32	24
M20	400	245.0	98	39	29

Screw threads shall be parallel throughout their length. They shall be so formed that, after galvanising, the nut can be easily screwed by hand over the whole length of thread, without excessive play. Before despatch from the works, one washer shall be fitted to each bolt and a nut shall be screwed on the whole threaded length and left in that position. Washers shall be round, flat, of mild steel, unless where otherwise specified.

Identification Marks

The following identification marks shall be legibly engraved/ punched/ embossed on each pole at a height of 3m from bottom end of the pole, before painting:

(a) Manufacturer's name/Trade mark

(b) Year of manufacture

(c) Batch Number

The size of the letters shall be at least 5mm and the depth of engraving/height of embossing shall be such that the text remains legible after painting.

Quality Control

All poles shall be inspected by an inspector appointed by the Purchaser. The Supplier shall assist the work of the Purchaser's inspector by providing copies of all relevant Standards, and allowing the inspector full use of the necessary tapes, measures and laboratory equipment, together with ample space and assistance in the handling of poles for inspection. Any costs incurred by the Supplier in aiding the inspector shall be deemed to be included in the contract.

Poles as delivered to the designated stores shall be free of all damage to protective paint coating, and shall not be out of straight by more than one thousandth of the length of the pole.

The inspector shall examine the poles for, among other things, the following characteristics:

- General appearance;
- Finish;
- Dimensions; and
- Straightness.

At least the following dimensional checks shall be made by the inspector:

- Length;
- Butt diameter and circumference;
- Top diameter and circumference;
- Non-circularity;
- Accuracy of drillings;
- Suitability of pole sections to overlap and bolt together;
- Straightness, where appropriate;
- Internal dimensions.

The group of poles or fittings offered at any one time shall constitute a batch. Within a batch, poles and fittings presented for inspection shall be segregated on a size basis. If 5% of the inspected items show damage or serious deviations from the design criteria, the entire batch shall be unconditionally rejected without further sorting.

Dimensions, such as length and top diameter, shall be measured with a standard steel tape.

List of Tests

The following tests shall be carried out on samples drawn from each consignment of the poles:

i) Deflection Test/Permanent Set Test
ii) Drop Test.

Number of Samples to be Tested

The number of samples to be drawn from each consignment for testing shall be determined using the following formula:

$$S = 4 + \frac{1.5\,N}{1000}$$ where: S = Number of samples
N = Quantity in consignment

The value of S obtained is subject to an absolute minimum of 4.

The test procedure for the above tests shall be mutually discussed and agreed between the Purchaser and the Supplier.

Rejection

All the samples subjected to above tests shall pass the tests. Should one or more number of poles fail in any of the test, a second set of samples, double in number shall be drawn and subjected to above tests. Should one or more number of poles from second set of poles fail in any of the tests, the entire consignment shall be rejected.

Tolerances

The poles shall meet the requirements of relevant standards IS 2713 in all respects. In case of weight of the pole, though the standard allows negative tolerance on the weight of the pole (for individual pole as well as for the LOT), while the acceptance of the poles will be based on their conformity to the standards (in case of weight within the specified tolerance limits), the payment will, however, be prorated for any reduction in weight from the standard weight based on to the actual weight of the LOT (within the specified limits) compared to the calculated weight for the LOT based on standard weight indicated in the standard.

For example,

IS 2713 allows 10% below the standard weight for individual poles, subject to 7.5% below the calculated standard weight for the LOT. If the pole and LOT weights are within the specified limits, the LOT will be considered as having met the requirement for acceptance, as far as weight is concerned, and will be accepted subject to its having met all other tests / requirements. However, the actual payment will be based on the following.

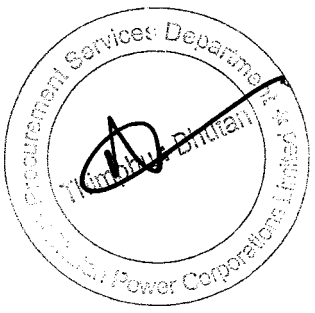
Payment as per contract rates = R x N

Less reduction for lower weight = R x N x{(W_s-W_a)/ W_s }

i.e Actual Eligible Payment = R x N x (W_a / W_s)

where,

R is the rate per pole in the contract
N is the no. of poles in the LOT
W_s = N x W, where W is the standard weight per pole.



Lot 8: Pole Fittings

The Supplier shall provide the goods in complete form (which includes assembly at PSD's warehouse), which meets or exceeds these minimum requirements. The fittings need to be assembled at the factory and delivered. The bidders are advised to refer drawings for the details and sample shall be taken from PSD warehouse before mass fabrication. Stay Clamp

Galvanized Stay Set Assembly (88.9mm)

Sl. No	Parameters	UoM	Qty
1	Galvanized Stay Clamp (100x8)	No.	2
2	Galvanized Hexagonal Bolt M16X75	No.	2
3	Galvanized Hexagonal Nut M16	No.	2
4	Galvanized plain washer M16	No.	2

Galvanized Stay Set Assembly (114.3mm)

Sl. No	Parameters	UoM	Qty
1	Galvanized Stay Clamp (100x8)	No.	2
2	Galvanized Hexagonal Bolt M16X75	No.	2
3	Galvanized Hexagonal Nut M16	No.	2
4	Galvanized plain washer M16	No.	2

Galvanized Stay Set Assembly

Sl. No	Parameters	UoM	Qty
1	Galvanized Stay Plate (300x300x6) with 22 dia hole at its centre	No.	1
2	Stay Rod of 2.5m long with dia 20mm gi rod	Set	1
3	Turn Buckle (20mm dia GS Rod, CH 100X50X300 LG)	Set	1
4	Eye Bolt with Nuts, 16mm dia GI Rod , 460mm long	Set	1
5	Thimble 1.5mm thick gi sheet into a size of 75x22x40mm shaper as per standard	No.	1

Galvanized Stay Rod

Sl. No	Parameters	UoM	Qty
1	Galvanized Stay Rod of 2.5m long with dia 20mm gi rod	Set	1

Galvanized Eye Bolt

Sl. No	Parameters	UoM	Qty
1	Eye Bolt with Nuts, 16mm dia GI Rod , 460mm long	Set	1

Procurement Services Department Thimphu Bhutan Bhutan Power Corporation Limited

Galvanized Cross Arm Assembly for H-Frame

Sl.#	Parameters	UoM	Qty
1	ISMC 100X50, 3150 mm length complete with necessary holes	Nos.	2
2	"M" Clamp	Nos.	4
3	Sets of GI Nuts and Bolts, 16 mm dia, 175 mm long, complete with one Flat Washer and Spring Washer with Clamps	Set	4
4	MS Flat String Bracing, 50x6 mm, 227 mm length complete with necessary holes for fixing insulators	Nos.	6
5	Sets of GI Nuts and Bolts, 16 mm dia, 150 mm long, complete with one Flat Washer and Spring Washer for Bolting MS Flat	Sets	6

Galvanized Cross Bracing Assembly for H-Frame

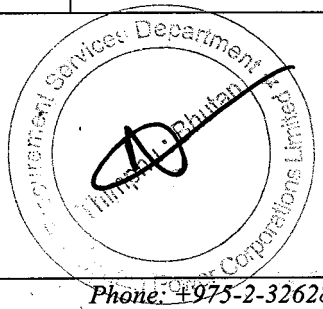
Sl.#	Parameters	UoM	Qty
1	MS Angle 50x50x6 mm, 2030 mm length complete with necessary holes	No.	1
2	MS Angle 50x50x6 mm, 2000 mm length complete with necessary holes	No.	1
3	MS Angle 50x50x6 mm, 2919 mm length complete with necessary holes	Nos.	2
4	Full Clamp (Pole dia 114.3 mm outer diameter)	Nos.	2
5	Full Clamp (Pole dia 165.1 mm outer diameter)	Nos.	2
6	Sets of GI Nuts and Bolts, 16 mm dia, 100 mm long, complete with one Flat Washer and one Spring Washer	Sets	8
7	Sets of GI Nuts and Bolts, 16 mm dia, 35 mm long, complete with one Flat Washer and one Spring Washer	sets	5

Support for Lightning Arrestor

Sl.#	Parameters	UoM	Qty
1	ISMC 75X40, 3150 mm length complete with necessary holes	No.	1
2	Full Clamp (Pole dia 139.7 mm outer diameter)	Nos.	2
3	Sets of GI Nuts and Bolts, 16 mm dia, 100 mm long, complete with one Flat Washer and one Spring Washer	Set	4

Galvanized support for ABS/LBS of steel tubular poles

Sl. #	Parameters	UoM	Qty
1	ISMC 100X50, 3110 mm length complete with necessary holes	No.	2
2	Full Clamp (Pole dia 114.3 mm outer diameter)	Nos.	4
3	Sets of GI Nuts and Bolts, 16 mm dia, 100 mm long, complete with one Flat Washer and one Spring Washer	Sets	8



Galvanized Handle support for ABS/LBS of Steel Tubular Poles

Sl.#	Parameters	UoM	Qty
1	ISMC 70X40x6, 3110 mm length complete with necessary holes	Nos.	2
2	Full Clamp (Pole dia 165.1 mm outer diameter)	Nos.	4
3	Sets of GI Nuts and Bolts, 16 mm dia, 100 mm long, complete with one Flat Washer and one Spring Washer	Sets	8

Galvanized Support for Drop Out Fuse of Steel Tubular Poles

Sl.#	Parameters	UoM	Qty
1	ISMC 70X40, 3150 mm length complete with necessary holes	Nos.	2
2	Full Clamp (Pole dia 139.7 mm outer diameter)	Nos.	4
3	Sets of GI Nuts and Bolts, 16 mm dia, 100 mm long, complete with one Flat Washer and one Spring Washer	Sets	8

Galvanized Support for Intermediate Channel of Steel Tubular Poles

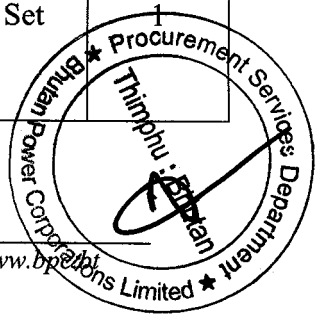
Sl.#	Parameters	UoM	Qty
1	ISMC 70X40, 3110 mm length complete with necessary holes	No.	1
2	Full Clamp (Pole dia 165.1 mm outer diameter)	Nos.	2
3	Sets of GI Nuts and Bolts, 16 mm dia, 100 mm long, complete with one Flat Washer and one Spring Washer	Sets	4

Galvanized Support for Intermediate Jumper of Steel Tubular Poles

Sl.#	Parameters	UoM	Qty
1	ISMC 100X50, 3110 mm length complete with necessary holes	No.	1
2	Full Clamp (Pole dia 139.7 mm outer diameter)	Nos.	2
3	Sets of GI Nuts and Bolts, 16 mm dia, 100 mm long, complete with one Flat Washer and one Spring Washer	Sets	4

Galvanized Transformer Platform for Steel Tubular Poles

Sl.#	Parameters	UoM	Qty
1	ISMC 100X50 (125x65), 3110 mm length complete with necessary holes	Nos.	2
2	"M" Clamp	Nos.	4
3	Sets of GI Nuts and Bolts, 16 mm dia, 240 mm long, complete with one Flat Washer and one Spring Washer	Sets	4
	Sets of MS Plate 310x5 mm, 2000 mm length complete with 8 Nos. flat full threaded GI nuts and countersunk bolts, 12 mm dia, 25mm length and trapezoid washer	Set	1

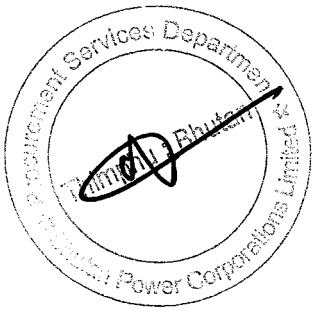


Transformer Belting for Steel Tubular Poles

Sl. #	Parameters	UoM	Qty
1	ISA 50x50x6 mm , 3165 mm length complete with necessary holes	Nos.	2
2	ISMC 75x40x6 mm , 600 mm length complete with necessary holes	Nos.	2
3	GI "L" hook suitable to hold the ISMC 75x40 mm and MS angle together to suit the size of the transformer	Nos.	4
4.	Full Clamp	Nos.	2
5	Sets of GI Nuts and Bolts, 16 mm dia, 50 mm long, complete with one Flat Washer and one Spring Washer	Sets	4

Anti-climbing Device (Dia 139.7mm)

In order to prevent unauthorized person from climbing any of the supports of HT lines and substations, anti-climbing device are provided to each poles. Anti-climbing device shall be a clamp with protruding spikes installed at height of 3.5m -4m above the ground level for line and below 3m for substation.



Lot 9: Telescopic Pole Fittings

Galvanized Stay Clamp (Dia 163 mm) for Telescopic Pole

Sl.#	Parameters	UoM	Qty
1	Galvanized Stay Clamp (100x16)	No.	2
2	Galvanized Hexagonal Bolt M16X150	No.	2
3	Galvanized Hexagonal Nut M16	No.	2
4	Galvanized plain washer M16	No.	2

Galvanized Support for ABS/LBS of Telescopic Poles

Sl. #	Parameters	UoM	Qty
1	ISMC 100X50, 3240 mm length complete with necessary holes	Nos.	2
2	Full Clamp (Pole dia 165 mm outer diameter)	Nos.	2
3	Full Clamp (Pole dia 218 mm outer diameter)	Nos.	2
4	Sets of GI Nuts and Bolts, 16 mm dia, 100 mm long, complete with one Flat Washer and one Spring Washer	Sets	8

Galvanized Handle Support for ABS/LBS of Telescopic Poles

Sl. #	Parameters	UoM	Qty
1	ISMC 70X40x6, 3320 mm length complete with necessary holes	Nos.	2
2	Full Clamp (Pole dia 345 mm outer diameter)	Nos.	2
3	Full Clamp (Pole dia 351 mm outer diameter)	Nos.	2
4	Sets of GI Nuts and Bolts, 16 mm dia, 100 mm long, complete with one Flat Washer and one Spring Washer	Sets	8

Galvanized Support for Drop out Fuse of Telescopic Poles

Sl. #	Parameters	UoM	Qty
1	ISMC 70X40, 3149 mm length complete with necessary holes	Nos.	2
2	Full Clamp (Pole dia 190 mm outer diameter)	Nos.	2
3	Full Clamp (Pole dia 195 mm outer diameter)	Nos.	2
4	Sets of GI Nuts and Bolts, 16 mm dia, 100 mm long, complete with one Flat Washer and one Spring Washer	Sets	8

Galvanized Support for Intermediate Channel of Telescopic Poles

Sl. #	Parameters	UoM	Qty
1	ISMC 70X40, 3320 mm length complete with necessary holes	No.	1
2	Full Clamp (Pole dia 264 mm outer diameter)	Nos.	2
3	Sets of GI Nuts and Bolts, 16 mm dia, 100 mm long, complete with one Flat Washer and one Spring Washer	Sets	4

Bhutan Power Corporation Limited ★ Procurement Services Department ★ Thimphu : Bhutan

Galvanized Support for Jumper of Telescopic Poles

Sl. #	Parameters	UoM	Qty
1	ISMC 100X50, 3240 mm length complete with necessary holes	No.	1
2	Full Clamp (Pole dia 133 mm outer diameter)	Nos.	2
3	Sets of GI Nuts and Bolts, 16 mm dia, 100 mm long, complete with one Flat Washer and one Spring Washer	Sets	4

Support for Lightning Arrestor of Telescopic Poles

Sl. #	Parameters	UoM	Qty
1	ISMC 75X40, 3198 mm length complete with necessary holes	No.	1
2	Full Clamp (Pole dia 240 mm outer diameter)	Nos.	2
3	Sets of GI Nuts and Bolts, 16 mm dia, 100 mm long, complete with one Flat Washer and one Spring Washer	Set	4

Substation Cross Arm Assembly of Telescopic Poles

Sl. #	Parameters	UoM	Qty
1	ISMC 100X50, 3240 mm length complete with necessary holes	Nos.	2
2	"M" Clamp	Nos.	4
3	Sets of GI Nuts and Bolts, 16 mm dia, 175 mm long, complete with one Flat Washer and one Spring Washer	Sets	4
4	Sets of MS flat string bracing, 50x6 mm, 227mm length complete with necessary holes	Sets	6
5	Sets of GI Nuts and Bolts, 16 mm dia, 150 mm long, complete with one Flat Washer and one Spring Washer	Sets	6

Transformer Belting for Telescopic Poles

Sl. #	Parameters	UoM	Qty
1	ISA 50x50x6 mm , 3300 mm length complete with necessary holes	Nos.	2
2	ISMC 75x40x6 mm , 800 mm length complete with necessary holes	Nos.	2
3	GI "L" hook suitable to hold the ISMC 75x75 mm and MS angle together to suit the size of the transformer	Nos.	4
4	Full Clamp	Nos.	2
5	Sets of GI Nuts and Bolts, 16 mm dia, 50 mm long, complete with one Flat Washer and one Spring Washer	Sets	4

Bolts, Nuts and Washers

All bolts, nuts and washers, supplied under this Specification shall comply with the following:

The bolts and nuts shall comply with ISO 4016. Mechanical properties shall be in accordance with ISO 898.The dimensions and characteristics in this Specification are intended to describe typical ISO metric bolts, nuts, and washers, such as are commonly used in the construction of electrical

distribution lines, plant and equipment. The safe working shear stress of bolts is taken as 120 MPa, with the area of the bolt measured at the root of the thread. The table below shows the ultimate tensile strength, the tensile stress areas, the safe working tensile loads and the safe working shear loads for the bolts covered by this Specification. The ultimate shear strength has been assumed to be 75% of the ultimate tensile load and a factor of safety of 2.5 has been applied:

Bolt Size	Ultimate Tensile Stress (N/mm^2)	Tensile Stress Area (mm^2)	Ultimate Tensile Strength (kN)	Working Tensile Load (kN)	Safe Working Shear Load (kN)
M16	400	157.0	62	25	18
M18	400	204.0	81	32	24
M20	400	245.0	98	39	29

Screw threads shall be parallel throughout their length. They shall be so formed that, after galvanising, the nut can be easily screwed by hand over the whole length of thread, without excessive play. Before despatch from the works, one washer shall be fitted to each bolt and a nut shall be screwed on the whole threaded length and left in that position. Washers shall be round, flat, of mild steel, unless where otherwise specified.

Galvanising

Galvanising shall be in accordance with ISO 1459 and ISO 1461. The zinc coating shall not be less than 600 g/m^2 of steel surface area.

The zinc coating shall be smooth, continuous and uniform. It shall be free from acid spots and shall not scale, blister or be removable by handling or packing. There shall be no impurities in the zinc or additives to the smelter bath, which could have a deleterious effect on the durability of the zinc coating.

Before pickling, all welding, drilling, cutting, grinding must be completed and all grease, paint, varnish, oil and welding slag completely removed. All protuberances, which would affect the life of galvanising, should also be removed.

To avoid the danger of white rust, galvanised material shall be stacked during transport and stored in such a manner as to permit adequate ventilation.

Galvanised steel items shall be thoroughly checked for damage before transport to the work site.

Any material found to be damaged shall be returned to its source. Cracked, flaked or scratched surfaces shall not be acceptable.

Galvanised steel shall be handled carefully during loading, transporting and unloading, and shall not be dropped on the ground, or dragged or scraped along the ground or any surface.

Painting

After manufacture, all items shall be painted for protection against corrosion.

The fittings shall be thoroughly cleaned by wire brush and the weld flux, if any, shall be removed. Phosphate treatment shall then be given, followed by light wiping by wet cloth. In accordance to the preparation of steel substrates before application of paints and related products ISO8502-4:1999
After drying, fittings shall be coated with bituminous preservative paint on the inside as well as on the outside surface over the length of pole, which is buried in the pole foundation; i.e. below ground. The ground line position shall be at approximately 1/6 of the total pole length.

The remaining exposed outside surface shall be painted with one coat of red oxide anti-rust primer with a dry film thickness of 40 Micrometres, prior to delivery, in accordance with ISO 12944-7 Paints and Varnishes - Corrosion protection of steel structures by protective paint systems - Part 7: Execution and supervision of paint work - ISO 12944-7:1998.

Identification Marks

The following identification marks shall be legibly engraved/ punched/ embossed on each pole at a height of 3m from bottom end of the pole, before painting:

1. Manufacturer's name/Trade mark
2. Year of manufacture
3. Batch Number

The size of the letters shall be at least 5mm and the depth of engraving/height of embossing shall be such that the text remains legible after painting.

Quality Control

All fittings shall be inspected by an inspector appointed by the Purchaser. The Supplier shall assist the work of the Purchaser's inspector by providing copies of all relevant Standards, and allowing the inspector full use of the necessary tapes, measures and laboratory equipment, together with ample space and assistance in the handling of poles for inspection. Any costs incurred by the Supplier in aiding the inspector shall be deemed to be included in the individual pole price.
Fittings as delivered to the designated stores shall be free of all damage to protective paint coating, and shall not be out of straight by more than one thousandth of the length of the pole.

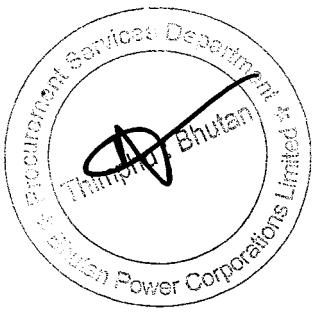
Annexure-II

Lot 2: Switching Equipment

Item No. 3&4 (Drop Out Fuse three phase)				
Sl. #	**Parameters**	**Units**	**Bidders to fill up**	
			11kV	**33kV**
1	Manufacturer			
2	Manufacturer's Type Designation			
3	Applicable Standards			
4	Type			
5	Rated Voltage	kV		
6	Rated normal current (rms)	A		
7	Rated current of the fuse base	A		
8	Rated load current breaking capacity	A		
9	Insulation level:			
	Dry Impulse withstand (1.2kV/50μs) voltage (positive & negative polarity) (peak)			
a	Across the isolating distance of the fuse base	kV		
b	To earth and between poles kV	kV		
10	Wet 1 min. Power frequency withstand voltage (rms)			
a	Across the isolating distance of the fuse base	kV		
b	To earth and between poles	kV		
11	Rated short time breaking capacity	kA		
12	Minimum creepage distance	mm		
13	Mounting Arrangement			
17	Weight	kg		

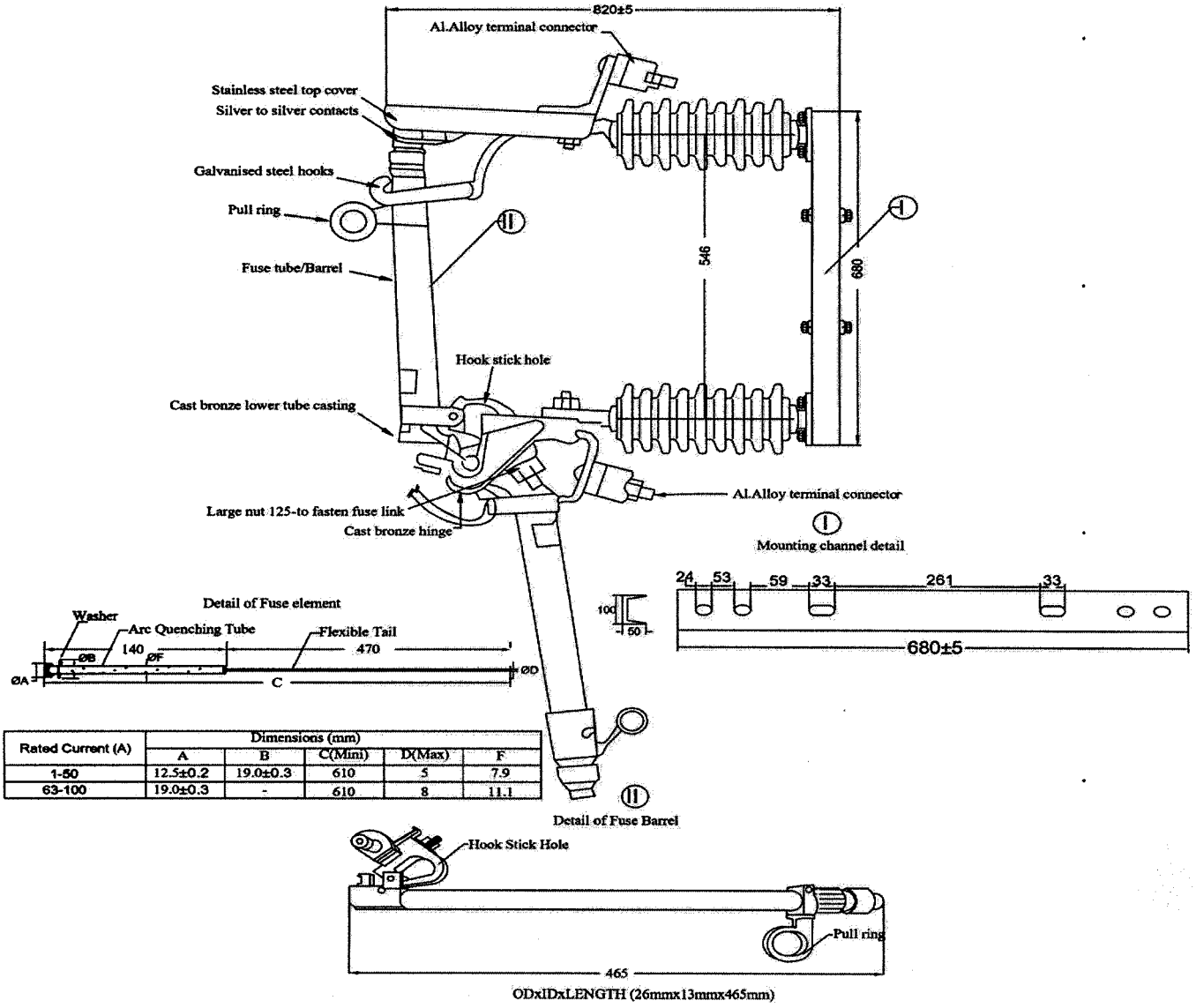
Procurement Services Department * Bhutan Power Corporations Limited * Thimphu, Bhutan

Item No. 5&6 (LBS)				
SL#	**Parameters**	**Unit**	**Bidders to fill up**	
			11 kV	**33 kV**
1	Applicable Standard			
2	Rated normal current	A		
3	Rated 1 sec. withstand current	kA		
4	Rated peak withstand current	kA		
5	Rated Power frequency withstand voltage			
a	Across open contacts	kV		
b	To Earth and Between poles	kV		
6	Rated impulse withstand voltage			
a	1. Across open contacts	kV		
b	2. To Earth and Between poles	kV		



Annexure III

Lot 2: Switching Equipment

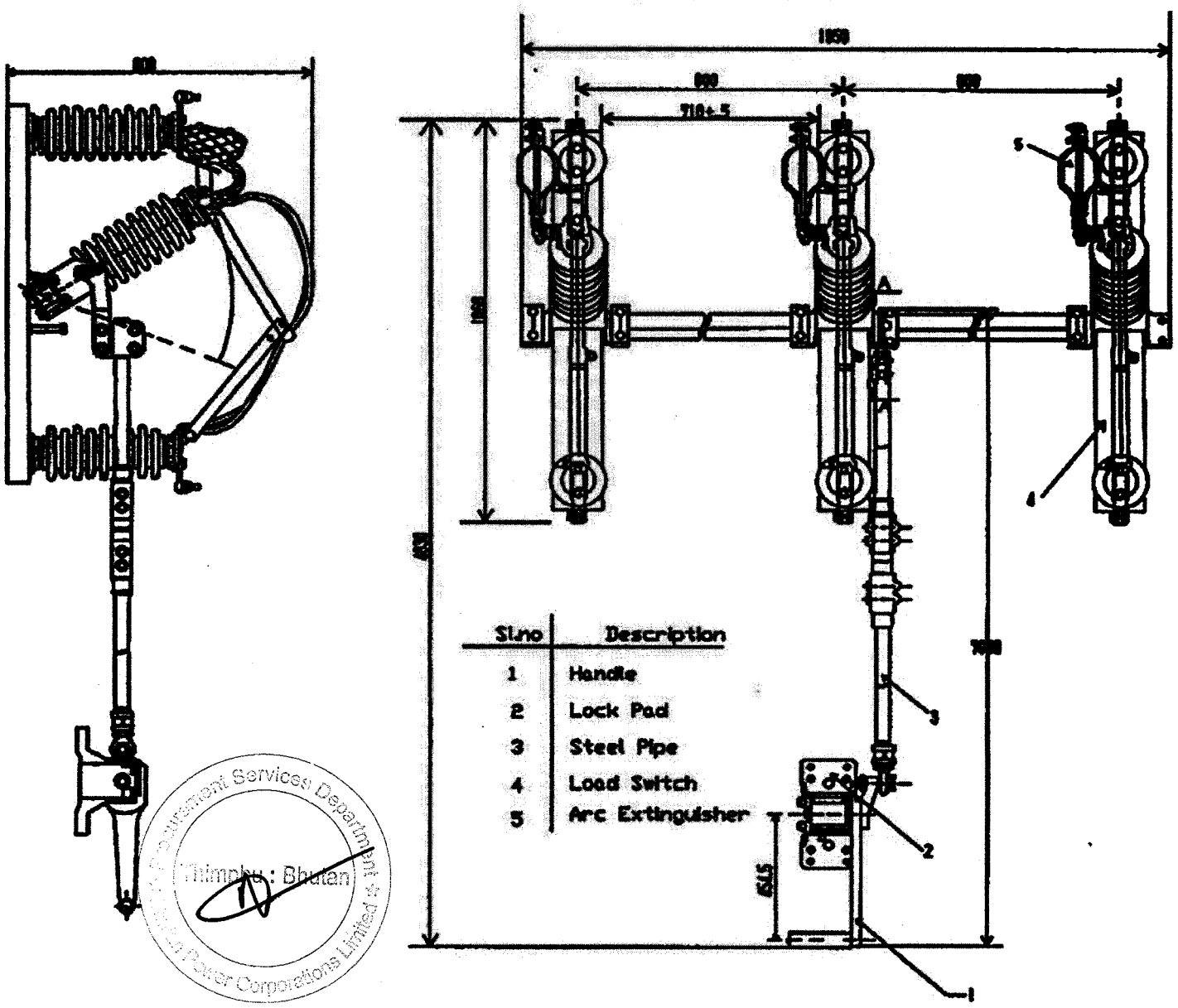


Rated Current (A)	Dimensions (mm)				
	A	B	C(Mini)	D(Max)	F
1-50	12.5±0.2	19.0±0.3	610	5	7.9
63-100	19.0±0.3	-	610	8	11.1

Notes
1. Dimensions as shown are in mm
2. Drawing not to Scale
3. ØF-The size and shape should be such that the fuse-link will freely enter a fuse barrel having the inside diameters as shown.

BHUTAN POWER CORPORATION LIMITED (BPCL)			PROCUREMENT SERVICES DEPARTMENT	
	NAME	DATE	DETAIL OF 11 & 33kV FUSE CUT-OUT/DROP OUT FUSE	
PREPARED BY	PSD			
CHECKED BY	R&DD		DRAWING NO.	REVISION 2019
APPROVED BY	DCSD			

Procurement Services Department ★ Thimphu : Bhutan ★ Bhutan Power Corporations Limited

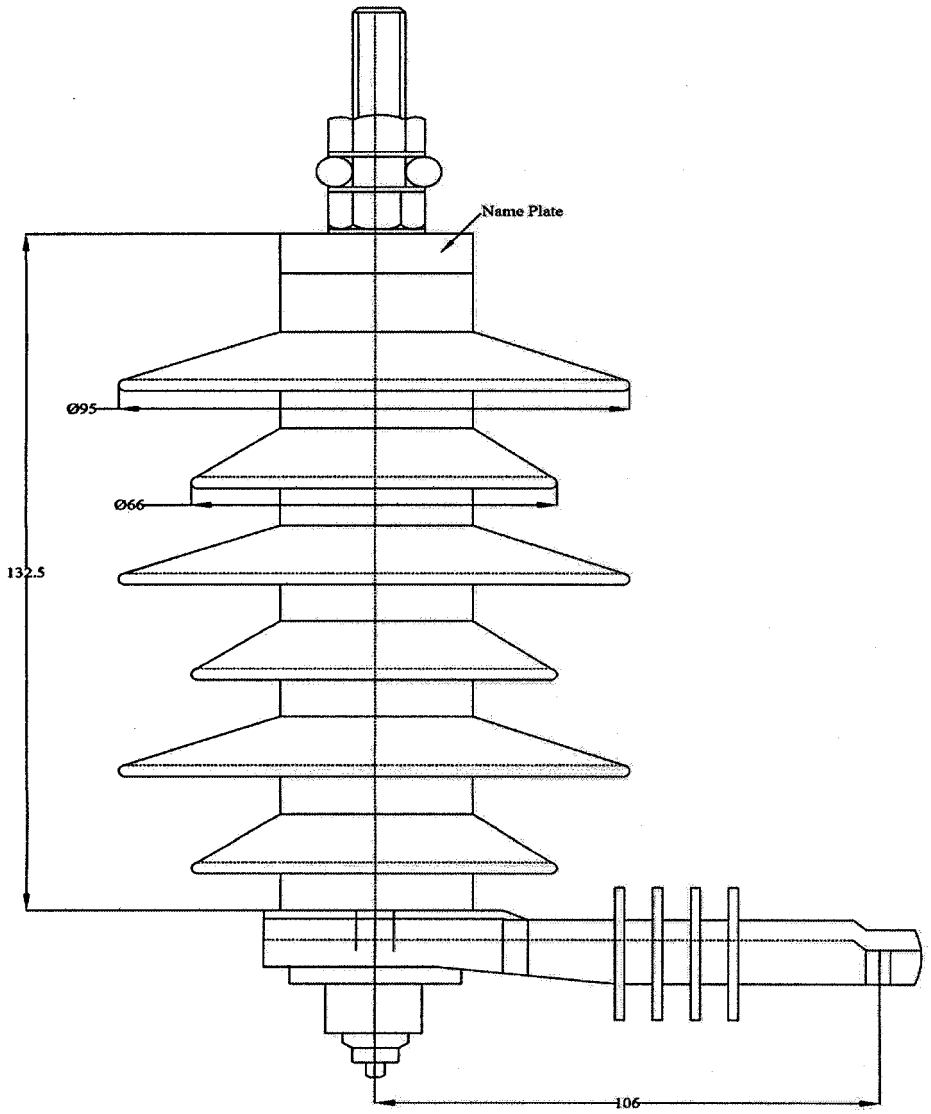


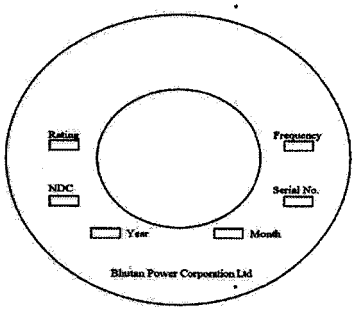
Rated Voltage:	11kV	33kV
Rated short time Withstand current for 1 sec.	25kA	16kA
Current Rating:	630A	630A
Diameter and Length of the GI operating Pipe	25mm NBx6 mtr. Length	32mmx7 mtr. Length
Size & Length of the channel for mounting	75mmx40mmx50mm Long	75mmx40mmx50mm Long
Minimum clearances between phases	500mm	800mm
Type of mounting	vertical	vertical
Power frequency withstand Voltage		
1) Across Isolating Distance	32kV	80kV
2) To earth and between poles	28kV	70kV
Lightning Impulse withstand Voltage		
1) Across Isolating Distance	85kV	195kV
2) To earth and between poles	75kV	170kV
Type of Insulator	Post Type with alternating shed	Post type with alternating shed

	BHUTAN POWER CORPORATION LIMITED	ENGINEERING DESIGN & CONTRACTS DEPARTMENT
		TITLE : DISTRIBUTION DESIGN & CONSTRUCTION STANDARD
		Typical Arrangement of 11kV & 33 KV LBS/ABS

SIGNATION	NAME	DATE
RAFTSMAN		

Lot 3: Lightning Arrestor





	Lightning Arrester, 9kV , 10kA		
Sl.no	Parameter	Unit	Particular
1	Rated Voltage (rms)	kV	9
2	Nominal Discharge Current	kA	10
3	Maximum continuous operating voltage	kV	7.65
4	Maximum Residual Voltage for :		
5	Steep Current Impulse (1/20 micro sec)	kV	26.5
6	Lightning Impulse protection level (8/20 micro sec)	kV	21.7
7	Switching Impulse Protection level (30/60 micro sec)	kV	18
8	Rated Frequency	Hz	50

Notes
1. Dimensions as shown are in mm
2. Drawing not to Scale
3. Applicable Standard IS: 3070, IEC 60099-4
4. Dimension of Lightning Arrester shall be as per manufacturer standard

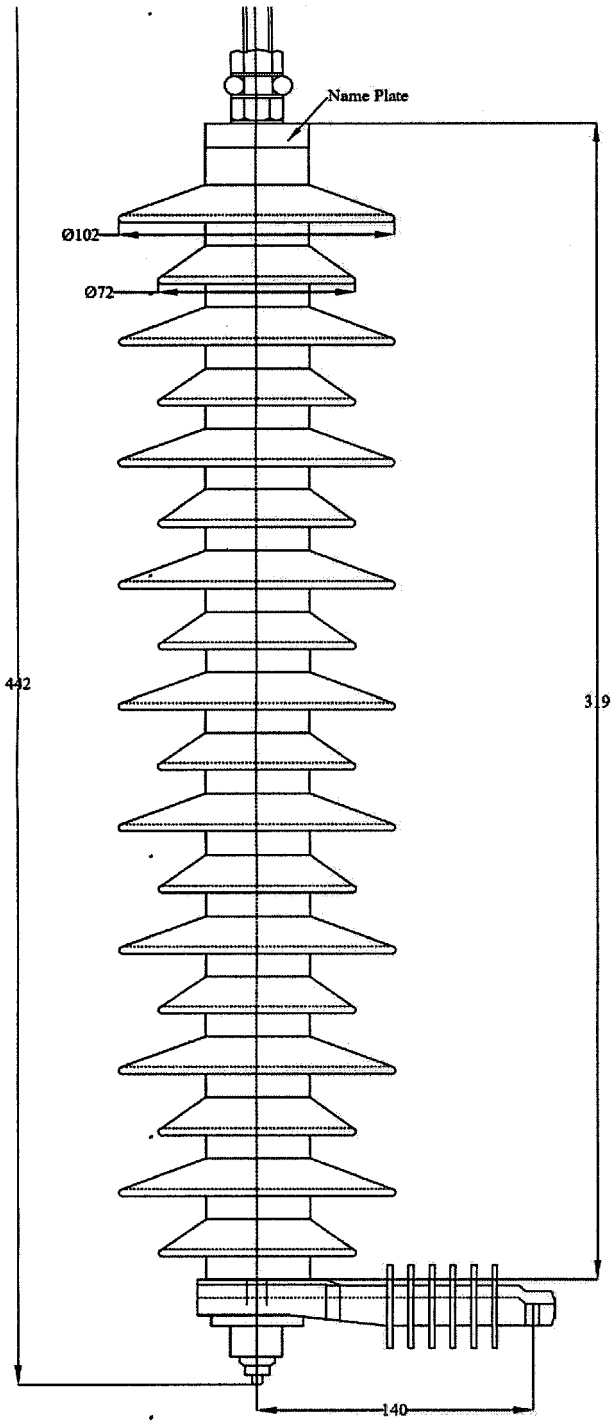
BHUTAN POWER CORPORATION LIMITED (BPCL)

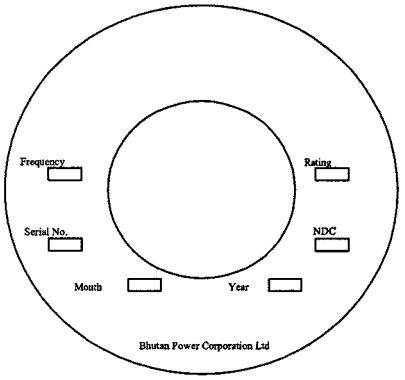
PROCUREMENT SERVICES DEPARTMENT

LIGHTNING ARRESTER 9kV, 10kA

	NAME	DATE
PREPARED BY	PSD	

Procurement Services Department ★ Thimphu : Bhutan ★ Bhutan Power Corporation Limited





	Lightning Arrester, 30kV , 10kA		
Sl.no	Parameter	Unit	Particular
1	Rated Voltage (rms)	kV	30
2	Nominal Discharge Current	kA	10
3	Maximum continuous operating voltage	kV	24.4
4	Maximum Residual Voltage for :		
5	Steep Current Impulse (1/20 micro sec)	kV	85
6	Lightning Impulse protection level (8/20 micro sec)	kV	71.8
7	Switching Impulse Protection level (30/60 micro sec)	kV	60
8	Rated Frequency	Hz	50

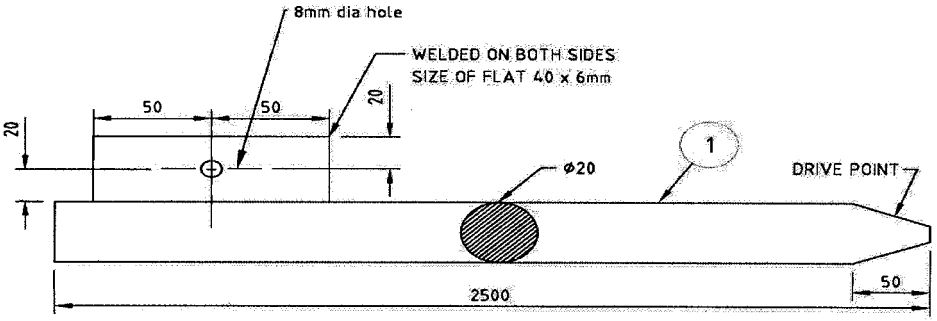
Notes

1. Dimensions as shown are in mm
2. Drawing not to Scale
3. Applicable Standard IS: 3070, IEC 60099-4
4. Dimension of Lightning Arrester shall be as per manufacturer standard

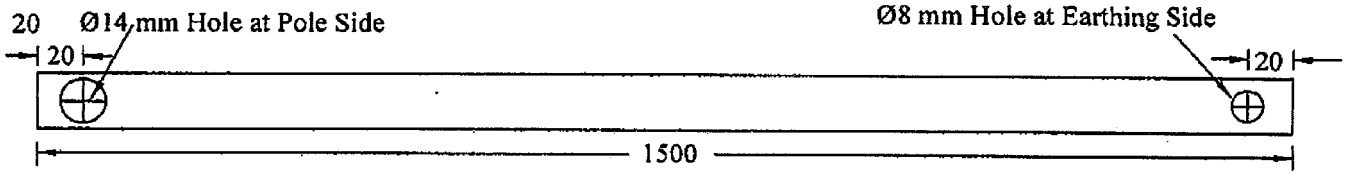
BHUTAN POWER CORPORATION LIMITED (BPC)	PROCUREMENT SERVICES DEPARTMENT
	LIGHTNING ARRESTER 30kV, 10kA

Procurement Services Department · Bhutan · Bhutan Power Corporation Limited

Lot 6: Earthing Equipment



Earthing Rod



Earthing Flat 25x6 mm

Description	Quantity	Materials	Size
Earthing Rod	1	HDG Steel	M20 x 2500
Bolt Hex.	4	HDG Steel	M6 x 25 x FT
Earthing Flat 25x6 mm	1	HDG Steel	1.5 Meter
Nut Hex.	4	HDG Steel	M6
Spring Washer	4	HDG Steel	M6

Grade of Steel: BS 4360 Grade 43A or Equivalent

Galvanized: BS 729 or Equivalent

BHUTAN POWER CORPORATION LIMITED		PROCUREMENT SERVICES DEPARTMENT
		SPIKE EARTHING SET
	NAME	DATE
PREPARED BY	PSD	

Procurement Services Department ★ Bhutan Power Corporations Limited ★ Thimphu : Bhutan

Phone: +975-2-326289; Box 580; E-mail: psdbpc@gmail.com; psd@bpc.bt; web: www.bpc.bt

Annexure-IV

Price Schedule for Lot 4: Distribution Transformers

SL#	Description	UoM	Qty	Restricted Brands	Offered Brand and Origin of Country	Unit Price DDP (Nu.)	Total Price DDP (Nu.)
1	Dist. Transformer 500 kVA, 11/0.415 kV	SET	8.00	• Kanohar Electrical Ltd., India • Nucon Switchgear (P) Ltd., India • Kotsons Pvt. Ltd., India • NEEK, Nepal • Uttam Bharat, India • Universal Power Transformers, India • Kirloskar Electric company, India • PT Trafindo, Indonesia • Truvolt Engineering, India • Technical Associate Ltd., India • Trafo Power and Electrical Pvt. Ltd. India.			
2	Dist. Transformer 500 kVA, 11/0.415kV-(Indoor)	SET	2.00				
3	Dist. Transformer 250 kVA, 33/0.415 kV	SET	5.00				
4	Dist. Transformer 500 kVA, 33/0.415 kV	SET	5.00				
5	1 phase Transformer 16 KVA 11/.240 kV	SET	3.00				
6	1 Phase Transformer 25 kVA, 11/0.240 kV	SET	1.00				
7	1 Phase Transformer 25 kVA, 33/0.240 kV	SET	3.00				
Total Amount (Nu.)							

Procurement Services Department
Thimphu Bhutan
Bhutan Power Corporation Limited

འབྲུག་གློག་མེ་ལས་འཛིན།།

Bhutan Power Corporation Limited

(An ISO 9001:2015, ISO 14001:2015 & OHSAS 18001:2007 Certified Company)

Registered Office, Thimphu

Procurement Services Department

Thimphu: Bhutan

BPC/PSD/2021 Materials/2020/10/ 326 September 09, 2020

.....

.....

.....

Subject: Addendum No. II

Tender Title: Supply and Delivery of Electrical line and substation materials (Package B)

Reference: BPC/PSD/2021 Materials/2020/10 dated August 15, 2020

Dear Sir(s),

This is to inform all the bidders that PSD, BPC would like to make the following amendments in response to the queries received for the above referred bid document.

A. Test Standards

The standards for Testing and Inspection provided for the materials which are not included in the above tender is deleted. The revised standard for Testing and Inspection for the tender lots is attached here as *Annexure-1*.

B. Technical Specification

For **lot-4 Distribution Transformer (item 6# 1 phase transformer 25kVA, 11/.240kV):** The losses for the item is missed out. The detail Maximum losses for the item is as follows;

- No load losses: 0.07 kW
- Load losses: 0.425 kW

For **lot-1 Distribution Boards**: The Breaking capacity of MCCB of the LVDB shall be 35 kA.

For **lot-5 Lubricant (Item 2# Governor Oil):** Oil shall be use in mini hydro governors.

For **lot-8 Galvanized Pole fittings:** The detail M-Clamp drawing for steel tubular pole fittings is attached here as *Annexure -2* for your reference.

- The detail M-Clamp drawing for item no. **14 (Transformer platform assembly)** is attached as *Annexure -3* for your reference.

For **lot-9 Galvanized telescopic pole fittings:** The Detail Drawing for Y-Clamp for telescopic pole fitting is attached here as *Annexure-4* for your reference.

C: Bid Data Sheet (BDS)

ITB Clause 25.1: The deadline for bid submission has been extended till September 24, 2020 at 14:30 hours.

ITB Clause 29.1: The Bid shall open on September 24, 2020 at 15:00 hours.

Procurement Services Department ★ Thimphu : Bhutan ★ Bhutan Power Corporations Limited

Phone: +975-2326289; Box 580; E-mail: psdbpc@gmail.com; psd@bpc.bt; web: www.bpc.bt

This is also to inform that the EMD shall be drawn in favor of Director, Finance & Accounts Services, BPC, Thimphu, Bhutan.

Bidders are advised to note the above changes and quote accordingly. All other terms and conditions shall remain same.

Thanking you.

Yours sincerely,

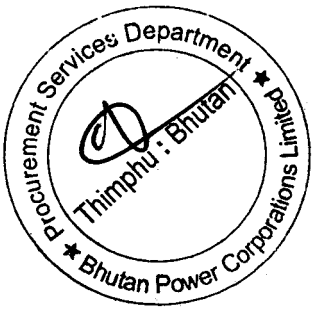
09/09/2020

(Nim Dorji)
General Manager

Procurement Services Department
Thimphu : Bhutan
Bhutan Power Corporations Limited

Phone: +975-2-326289; Box 580; E-mail: psdbpc@gmail.com; psd@bpc.bt; web: www.bpc.bt

Annexure-1


Procurement Services Department
Thimphu : Bhutan
Bhutan Power Corporations Limited

2. Test Standards

1. Standards

The design material, construction, manufacture, inspection and testing of all equipment supplied under this Specification shall conform to the latest editions of the International Electrotechnical Commission (IEC) Specifications and other international standards where the material is not covered by IEC. Other national or international standards are accepted if they promise to confer equal or superior quality and performance than IEC or the specified standards.

2. Testing

The tests shall be divided into the categories described below.

2.1 Routine Tests

All the routine tests specified by the standards shall be carried out. If the tests are not witnessed by the Purchaser's representatives, test certificates shall be submitted to the Purchaser for approval. The test certificates must show the actual values obtained from the tests, in the units used in this Specification, and not merely confirm that the requirements have been met. No materials shall be dispatched until the test certificates have been received by the Purchaser and the Supplier has been informed that they are acceptable.

Despatch clearance will be given only if the test results are approved.

2.2 Type Tests

Bidder shall include with his bid type test certificates, issued by an approved, reputed, independent testing laboratory. The type tests should have been carried out in the last five years. Type tests shall be carried out at an independent testing laboratory or be witnessed by a representative of such laboratory or some other representative acceptable to the Purchaser. Type tests may be dispensed with at the Purchaser's discretion, if the Supplier furnishes evidence to the Purchaser's satisfaction, that the relevant tests have already been performed on identical materials and equipment.

In addition, the Purchaser may call for type tests to be carried out at the Manufacturer's Works and to be witnessed by the Purchaser or his representatives. Type testing shall only be performed if the manufacturer is unable to provide type test certificates issued by an independent test laboratory of international repute. Such tests will be on random samples at the discretion of the Purchaser and failure to meet the conditions of test could result in the rejection of a complete batch of equipment.

3. Inspection and Testing of Pole Fittings

The inspector shall examine the poles for, among other things, the following characteristics:

- general appearance;
- finish;

- dimensions; and
- Straightness.

At least the following dimensional checks shall be made by the inspector:

- length;
- butt diameter and circumference;
- top diameter and circumference;
- non-circularity;
- accuracy of drillings;
- suitability of pole sections to overlap and bolt together;
- straightness, where appropriate;
- Internal dimensions.

All cross-arms, clamps and fittings shall be examined by the inspector for, among other things, the following characteristics:

- general appearance;
- finish;
- dimensions;
- straightness;
- appropriate markings; and
- Accuracy of drillings.

At least the following dimensional checks shall be made by the inspector:

- length;
- cross section of cross arm
- dimensions of clamp;
- position and size of holes;
- Vertical alignment of all through holes.

The group of poles or fittings offered at any one time shall constitute a batch. Within a batch, poles and fittings presented for inspection shall be segregated on a size basis. If 5% of the inspected items show damage or serious deviations from the design criteria, the entire batch shall be unconditionally rejected without further sorting.

Dimensions, such as length and top diameter, shall be measured with a standard steel tape.

Tests

The following tests shall be carried out on samples drawn from each consignment of the poles:

i) Deflection Test/Permanent Set Test
ii) Drop Test.

All the samples subjected to above tests shall pass the tests. Should one or more number of poles fail in any of the test, a second set of samples, double in number shall be drawn and subjected to above tests. Should one or more number of poles from second set of poles fail in any of the tests, the entire consignment shall be rejected.

4. Inspection and Testing for Switching Equipment and Surge Arresters

Tests to establish whether the performance guarantees in the Schedules have been met shall be carried out by the Contractor, to the satisfaction of the Purchaser.

Type and routine factory tests shall comprise the following:

- Insulation level tests, including withstand tests at power frequency voltages on auxiliary equipment.
- Temperature rise test.
- Rated peak withstand current and rated short-time withstand current tests.
- Tests to prove satisfactory operation and mechanical endurance.

5. Inspection and Testing for Distribution Pillar

The Distribution Pillar shall be subject to following tests:

- High voltage test (2000V for 1 minute)
- Megger test
- Electrical control, interlocking and sequential operation test.

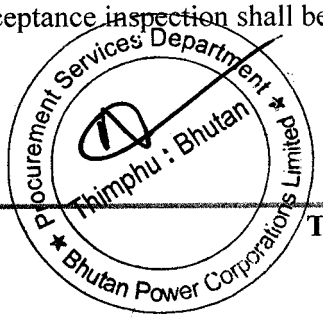
6. Inspection and Testing for LV Switchboards

Tests and test reports

The meter shall pass the manufacturer's standard routine tests. The following type tests shall be in accordance with the latest relevant IEC or ANSI:

- Test of insulation properties:
  - impulse voltage test
  - A.C. voltage test
- Influence of short-time over currents
- Influence of heating:
  - windings, if any
  - external surface
- Electromagnetic compatibility (E.M.C.):
  - radio interference measurement
  - fast transient/burst test
  - immunity to electromagnetic HF field test
  - immunity to electrostatic discharge test
- Others according to manufacturer's standard
- Heating (permissible temperature rise) of:
  - windings, if any, in K
  - external surface in K

The acceptance inspection shall be according to the latest relevant IEC or ANSI



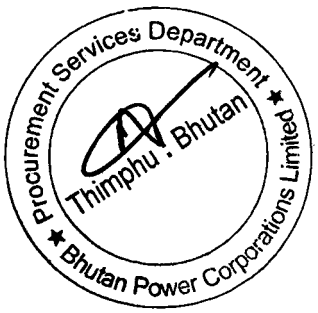
Routine factory testing, in accordance with IEC standards, shall be carried out and shall include the following:

- Check of conformity with wiring diagrams and plans.
- Mechanical operation tests and checking of interlocks.
- Low voltage dielectric tests.
- Low voltage functional checking.

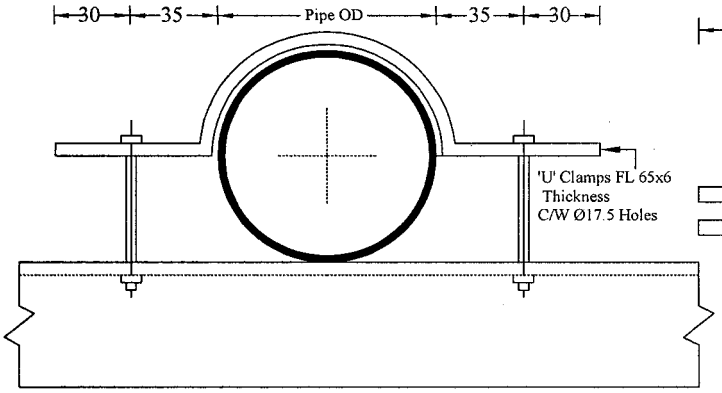
7. Inspection and Testing for Earthing Equipment

The Earthing Equipment shall subject to following tests as per the International Standards:

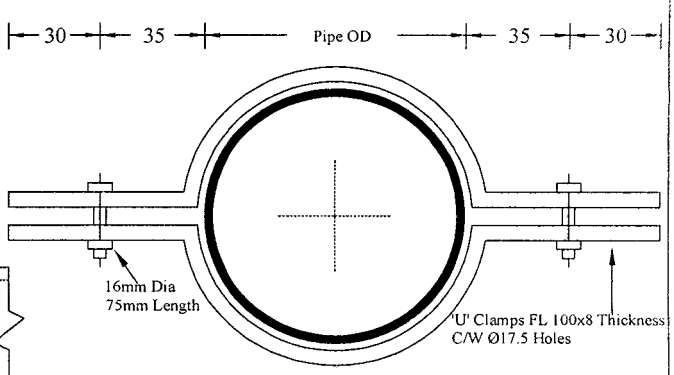
- Uniformity of zinc coating
- Mass of zinc coating
- Wrapping test
- Dip Test
- Adhesion test



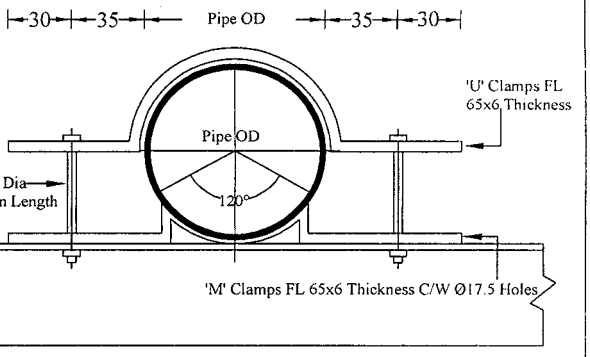
Annexure - 2



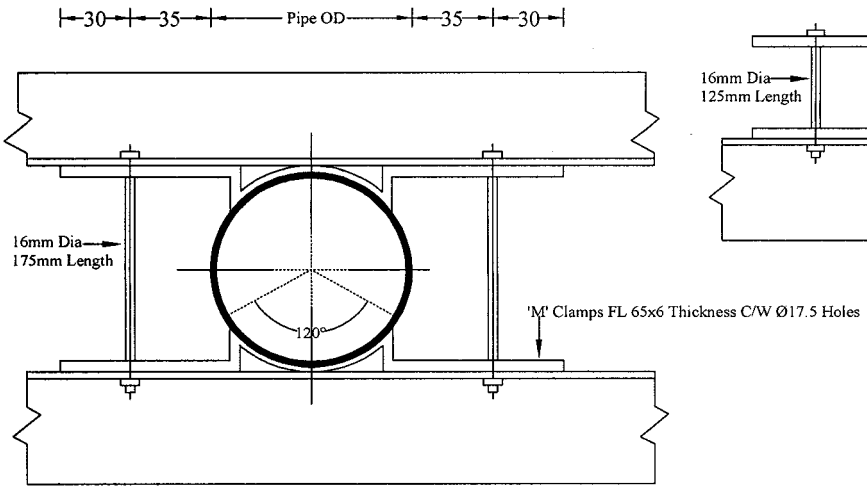
'U' CLAMP



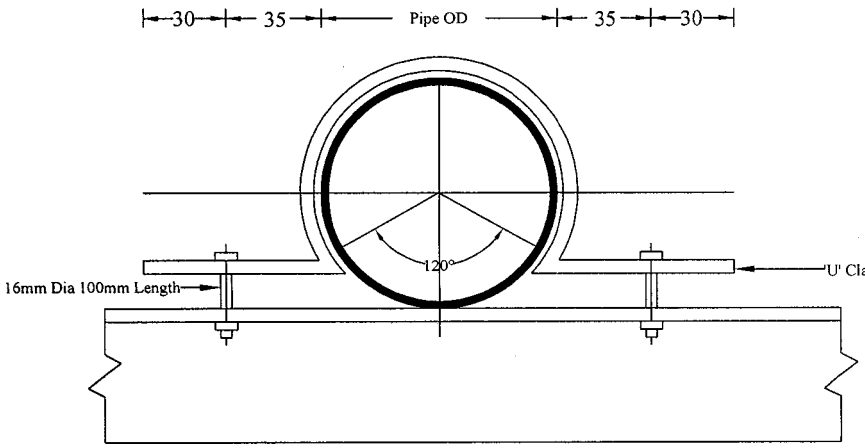
STAY CLAMP



CROSS ARM CLAMP (U+M)



'M' CLAMP



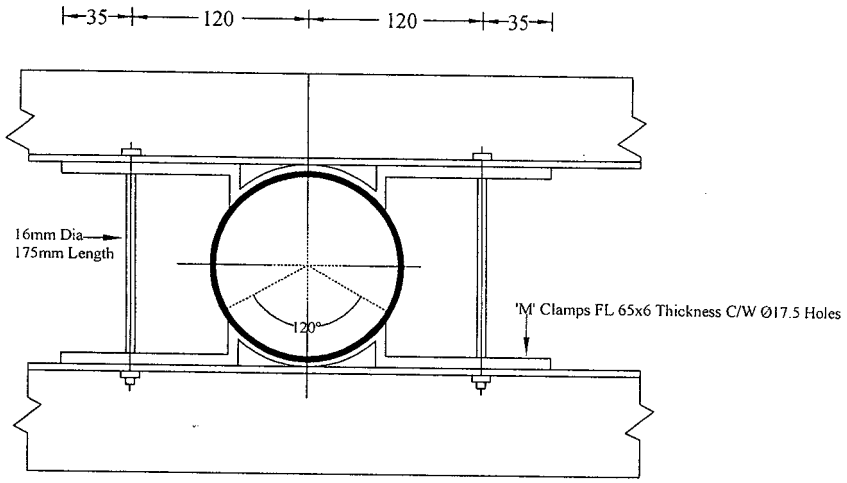
FULL CLAMP

Notes
1. Dimensions as shown are in mm
2. Drawing not to Scale
3. All Bolts to be Ø16 C/W Nuts & Spring Washers

Procurement Services Department
Thimphu : Bhutan
Bhutan Power Corporation Limited

BHUTAN POWER CORPORATION LIMITED (BPCL)		PROCUREMENT SERVICES DEPARTMENT
		CLAMP OF STEEL TUBULAR POLE FOR 11 & 33kV
	NAME	DATE
PREPARED BY	PSD	
CHECKED BY	R&DD	
APPROVED BY	DCSD	
	DRAWING NO. PSD000	REVISION : 2019

Annexure: 3



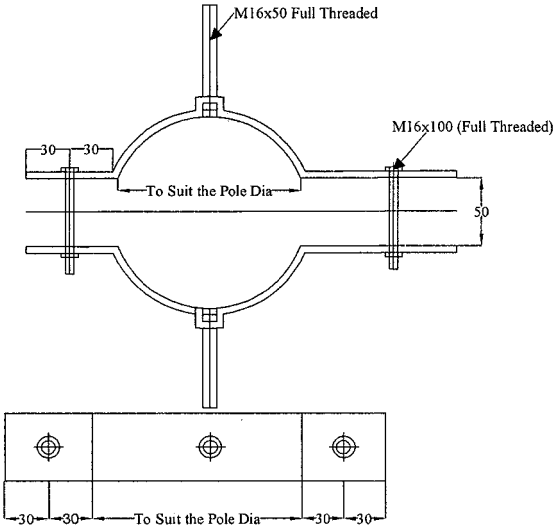
'M' CLAMP FOR TRANSFORMER PLATFORM

Procurement Services Department
Thimphu : Bhutan
Bhutan Power Corporations Limited

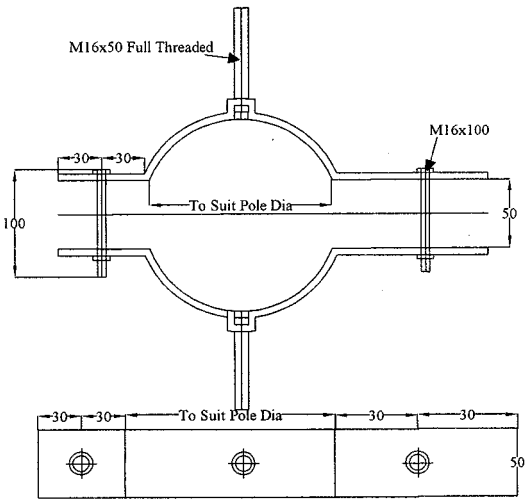
Notes
1. Dimensions as shown are in mm
2. Drawing not to Scale
3. All Bolts to be Ø16 C/W Nuts & Spring Washers

BHUTAN POWER CORPORATION LIMITED (BPCL)			PROCUREMENT SERVICES DEPARTMENT	
			CLAMP OF TRANSFORMER PLATFORM	
	NAME	DATE		
PREPARED BY	PSD			
CHECKED BY	R&DD		DRAWING NO. PSD000	REVISION : 2019
APPROVED BY	DCSD			

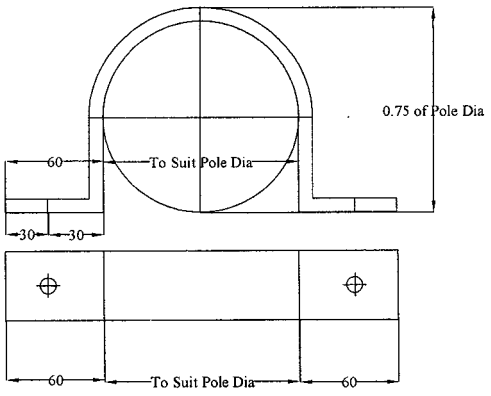
Annexure: 4



Y TYPE-CLAMP (FULL CLAMP)



STAY CLAMP



X Type -Clamp (Half Clamp)

Notes
1. Dimensions as shown are in mm
2. Drawing not to Scale
3. All Materials shall be Galvanized
4. All the Bolts shall be Full Threaded Type

Procurement Services Department ★ Thimphu : Bhutan ★ Bhutan Power Corporations Limited

BHUTAN POWER CORPORATION LIMITED (BPCL)			PROCUREMENT SERVICES DEPARTMENT
			CLAMP FOR TELESCOPIC POLE
	NAME	DATE	
PREPARED BY	PSD		
CHECKED BY	R&DD		DRAWING NO. / REVISION 2019
APPROVED BY	DCSD		