



North Bihar Power Distribution Company Limited

Regd. Office-Vidyut Bhawan, Balley Road, Patna.

CIN No:U40109BR2012SGC018920

(Department of Project II)

Letter No. 482

NB/P-II/RDSS/Saharsa/DI/94/2023

dated 04/9/23

Contact No - 09264437179

Email - cerdssnbpdc1@gmail.com

From,

Pranav Kumar
Chief Engineer (Project-II)

To,

M/s Vindhya Telelinks Ltd
Club 125, 6th Floor, Tower A, Plot No- 3, 4 & 5, Sector 125,
Noida, UP-201301

Sub:

Approval of GTP of 25 KVA Distribution Transformer of M/s Nucon Switchgears Pvt. Ltd.,
Ludhiana, Punjab against NIT No.- 32/PR/NBPDCL/2022 for Development of Distribution
Infrastructure at Saharsa Electric Supply Circle under RDSS scheme

Ref:

- (i) NIT No: 32/PR/NBPDCL/2022
(ii) NOA No.-17 & 18 dated 06.03.2023
(iii) Your Office Letter No.-VTL/NBPDCL/RDSS/Approval/Saharsa/29 dated 13.07.2023

Dear Sir,

With reference to the subject noted above, kindly find enclosed herewith the copy of approved GTP of 25 KVA Distribution Transformer for Development of Distribution Infrastructure at Saharsa Electric Supply Circle against NIT No.- 32/PR/NBPDCL/2022 under RDSS scheme .

Sl. No.	Name of Item	Vendor Name
1	25 KVA Distribution Transformer	M/s Nucon Switchgears Pvt. Ltd., Ludhiana, Punjab

Corrections wherever required in GTP submitted by you has been done in ink. However, these GTP shall be subject to correctness as per technical specifications of the tender document and the entire responsibility of the correctness of the GTP as per the specifications as well as supply of material according to the technical specifications of the contract agreement shall be responsibility of the contractor.

In case of any conflict or contradiction between GTP / Drawings & Technical Specifications, the decision of C.E. (Project-II) shall be final and binding on both the parties. Contractor shall have to replace the material to the entire satisfaction of the owner in case the material is found unsuitable for use in the project, at any stage. This approval is up to validity of valid type test certificate. In case any problem/issue arises with regard to material/vendor at any stage , NBPDCL reserves the right to withdraw the approval of vendor as well as ask you to replace the materials at your own cost.

Please carry out the works immediately under conditions stated above.

Encl:-As above

Yours Faithfully,

Pranav Kumar
(Pranav Kumar) 04.9.2023
Chief Engineer(Project-II)

Memo no.- 482

dated- 04/9/23

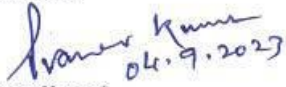
Copy forwarded to M/s NCC Ltd. Hyderabad/M/s Polycab India Ltd, Mumbai/ M/s Ashoka Buildcon Ltd.,Nashik for information and necessary action.

Pranav Kumar
(Pranav Kumar) 04.9.2023
Chief Engineer (Project-II)

Memo No.: 482...../

Dated : 4/9/23...../

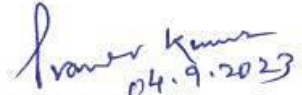
Copy forwarded to Chief Engineer (Project-I/Urban), NBPDCCL for kind information ..


(Pranav Kumar) 04.9.2023
Chief Engineer, Project-II

Memo No.: 482...../

Dated : 4/9/23...../

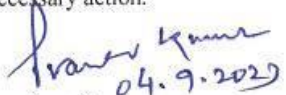
Copy forwarded to Director (Project) , NBPDCCL for kind information.


(Pranav Kumar) 04.9.2023
Chief Engineer, Project-II

Memo No.: 482...../

Dated : 4/9/23...../

Copy forwarded to PMA M/s Rodic Consultants Pvt. Ltd. for information and necessary action.


(Pranav Kumar) 04.9.2023
Chief Engineer, Project-II



Nucon Switchgears Private Limited

Guaranteed Technical Parameters

Dated 15 May 2023

Owner	North Bihar Power Distribution Company Limited
Contractor	Vindhya Telelinks Limited
Project	Revamped Reforms-Based And Results-Linked Distribution Sector Scheme
LOA NO.	246 Dated 6th March 2023 for Supply against NIT No.28/PR/NBPDCL/2022 17 Dated 6th March 2023 for Supply against NIT No.32/PR/NBPDCL/2022
Supplier	Nucon Switchgears Private Limited, Ludhiana, Punjab

Sr. No.	Description	Unit / Type	As per Firm's Offer
1	Name of manufacturer		Nucon Switchgear Pvt. Ltd. ✓
2	Place of Manufacturing		Village Malipur, NH-44, Doraha, Ludhiana-141421, ✓
3	Transformer capacity	KVA	25 ✓
4	Voltage	11/0.433-0.250 KV	11/0.433-0.250 KV ✓
5	No. of Phases	3 No./1 No.	3 No. ✓
6	Vector Group	DY-11	DYn11 ✓
7	Type of Cooling	ONAN	ONAN ✓
8	Type of Transformer	Sealed/Unsealed	SEALED ✓
9	For 200 KVA/500 KVA transformers		
	a) No. of tap positions in HV winding		NA ✓
	b) Voltage variation		NA ✓
10	Energy Efficiency Level	Level-1/Level-2	LEVEL - 1 ✓
11	Losses		
i	Core loss	Watts	
	a) at Normal Voltage	Watts	85 NA
	b) at Maximum Voltage	Watts	120 NA
ii	Full Load losses at 75 deg.C.	Watts	500 ✓
iii	Total losses at 50 % loading at 75 deg.C.	Watts	190 ✓
iv	Total losses at 100 % loading at 75 deg.C.	Watts	635 ✓
12	Percentage impedance at 75 deg.C.	%	4.50 % (Tol. as per IS:1180) ✓
13	Maximum temperature rise of		
	a) Windings by resistance method	40 deg C (35 deg C for 5KVA)	45 deg C ✓
	b) Oil by Thermometer	35 deg C (30 deg C for 5KVA)	35 deg C ✓
14	Clearances		
	a) Core & LV	mm	3 ✓
	b) LV & HV	mm	9 ✓
	c) HV Phase to Phase	mm	10 ✓
	d) End insulation clearance to Earth	mm	20 ✓
	e) Any point of winding to tank	mm	25 ✓
	f) HV to earth creepage distance	mm	280 mm ✓
	g) LV to earth creepage distance	mm	50 mm ✓



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[Signature]
 Chief Engineer
 (PROJECT-II)
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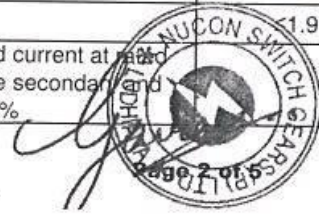
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Sr. No.	Description	Unit / Type	As per Firm's Offer
15	Efficiency at 75 deg.C.		
	a) Unity P.F.		
	1) 125% load	%	97.30 ✓
	2) 100% load	%	97.71 ✓
	3) 75% load	%	98.01 ✓
	4) 50% load	%	98.35 ✓
	5) 25% load	%	97.17 ✓
	b) 0.8 P.F.		
	1) 125% load	%	96.65 ✓
	2) 100% load	%	97.16 ✓
	3) 75% load	%	97.62 ✓
	4) 50% load	%	97.94 ✓
	5) 25% load	%	97.73 ✓
16	Regulation at		
	a) Unity P.F.		2.081 ✓
	b) 0.8 P.F. at 75 deg.C.		4.039 ✓
17	CORE	CRGO/ Amorphous	CRGO ✓
i	Core Grade		M4 OR BETTER ✓
ii	Core diameter	mm	82.5-82.75
iii	Gross Core area	Mtr ²	0.0050575
iv	Net Core area	Mtr ²	0.004905775
v	Flux density	Wb/Mtr ²	1.60 T (Max.) ✓
vii	Wt. of Core	Kg	68.5 ✓
viii	Loss per kg. of Core at the specified Flux density	Watts	1.00
ix	Core window height	mm	325 ✓✓
x	Centre to centre distance of the core	mm	213 ✓✓
xi	The nominal flux density at		
	a) 100% rated voltage	≤ 1.69 Wb/Mtr ²	≤ 1.69 Wb/Mtr ² ✓
	b) 110% of rated voltage	≤ 1.9 Wb/Mtr ²	≤ 1.9 Wb/Mtr ² ✓
	% No load current of full load current at rated voltage and frequency on the secondary winding and increase of voltage by 112.5%		



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Sr. No.	Description	Unit / Type	As per Firm's Offer
	(i) CRGO Core: at 100% and 112.5% of rated Voltage		
	a) Up to 200 KVA Transformer	≤ 3% and ≤ 6 %	≤ 3% and ≤ 6 % ✓
	b) Above 200 KVA Transformer	≤ 2% and ≤ 5 %	NA ✓
	(ii) Amorphous Core: at 100% and 112.5% of rated Voltage		
	a) All Ratings	≤ 2% and ≤ 5 %	NA ✓
18	WINDINGS	Aluminium Copper	Aluminium ✓
i	No. of L.V. Turns	No.	144 ✓
ii	No. of H V turns	No.	6336 ✓
iii	Size of LV Conductor bare/ covered	mm	7.80 X 3.60/8.10 X 3.90
iv	Size of HV conductor bare/covered	mm	0.98/1.08
v	No. of parallels	No.	ONE ✓
vii	Resistance of HV winding at 20 deg.C	Ohm	148.62
viii	Resistance of LV winding at 20 deg.C	Ohm	0.0642
ix	Current density of LV winding	Amps/sq.mm.	1.6 ✓
x	Current density of HV winding	Amps/sq.mm.	1.6 ✓
xi	Wt. of the LV winding for Transformer	kg.	10.8 ✓
xii	Wt. of the HV winding for Transformer	kg.	22.5 ✓
xiii	No. of LV Coils/phase	No.	1 ✓
xiv	No. of HV coils / phase	No.	2 ✓
xv	Height of LV Windings	mm	305
xvi	Height of HV winding	mm	133
xvii	ID/OD of LV winding	mm	88.5/120
xviii	ID/OD of HV winding	mm	140/203
xix	Size of the duct in LV winding	mm	NA ✓
xx	Size of the duct in HV winding	mm	NA ✓
xxi	Size of the duct between HV & LV	mm	3 mm ✓
xxii	Inter layer insulation provided in design for		
	1) Top & bottom layer		Epoxy dotted Kraft paper ✓
	2) In between all layer		Epoxy dotted Kraft paper ✓
	3) Details of end insulation		press board ✓

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	4) Whether wedges are provided at 50% turns of the HV coil		yes ✓
xxiii	Insulation materials provided		
	a) For Conductors		
	(1) HV		super enamel ✓
	(2) LV		Dpc ✓
	B) For Core		Carlite ✓
xxiv	Material and Size of the wire used		
	1) HV		
	a) Dia	mm	0.98 ✓
	2) LV a) Strips size	mm X mm	7.80 x 3.60 ✓
	b) No. of Conductors in parallel	No	1 ✓
	c) Total area of cross section	sq.mm.	27.22 ✓
19	Weight content of		
	a) Core lamination (min)	KG	68.5 ✓
	b) Windings (min) Aluminium/Copper	KG	33.3 Aluminium ✓
	c) Tank & Fittings	KG	55 ✓
	d) Oil	KG	70 ✓
	e) Oil qty (min)	Litre	85 ✓
	f) Total Weight	KG	260 ✓
20	Oil Data		
	1. Qty for first filling (min)	Litre	85 ✓
	2. Grade of oil used		As per IS:355 ✓
	3. Maker's name		Apar, Savita or any other equivalent Make ✓
	4. BDV at the time of filling	KV	Min. 60 kV ✓
21	Transformer		
	1) Overall length x breadth x height	mm X mm X mm	800 X 460 X 800 ✓
	2) Shape of Tank		Elliptical Tank ✓
	2) Tank length x breadth x height	mm X mm X mm	705 X 290 X 655 ✓
	3) Thickness of plates for		
	a) Side plate (min)	mm	2.50 ✓

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Nucon Switchgears Private Limited

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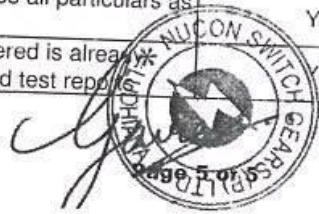
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	b) Top & Bottom plate (min)	mm	3.15 ✓
	4) Conservator Dimensions	mm X mm	NA ✓
	5) Tank base channel dimensions	mm X mm X mm	460 X 75 X 40 ✓
22	HV Bushings & Terminals		
	1) Make of HV bushing		As per specification ✓
	2) Rating in KV	KV	17.5 ✓
	3) Turret Height	mm	As per specification
	4) Material of HV terminal	Brass/Copper	Brass ✓
	5) Current Density of HV terminal	Amps/sq.mm.	M12 ?
23	LV Bushings & Terminals		
	1) Make of LV bushing		As per specification
	2) Rating in KV	KV	1.1 ✓
	3) Turret Height	mm	As per specification
	4) Material of LV terminal	Brass/Copper	Brass ✓
	5) Current Density of LV terminal	Amps/sq.mm.	M12 ?
24	Details of MOCB (for transformers having rating upto 25		NA ✓
	Make		NA ✓
	Rated thermal current	Amp.	NA ✓
	Current setting	Amp.	NA ✓
	Minimum short circuit breaking current	KA	NA ✓
25	Radiation		
	1) Heat dissipation by tank walls exclusive top & bottom		615 W ✓
	2) Heat dissipation by cooling tube		NA ✓
	3) Dia & thickness of cooling tube		NA ✓
	4) Whether calculation sheet for selecting cooling area to ensure that the transformer is capable of giving continuous rated output without exceeding temperature rise is	Yes/No	YES ✓
26	Whether the name plate gives all particulars as required in Tender	Yes/No	YES ✓
	Whether the transformer offered is already type tested for the design and test reports	Yes/No	YES ✓

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FLUX DENSITY CALCULATION OF 25 KVA (AL) WOUND TRANSFORMER

STEP NO.	WIDTH in mm	STACK in mm	AREA in mm ²
1	80	20.00	1600.00
2	75	14.00	1050.00
3	70	9.00	630.00
4	65	7.00	455.00
5	60	6.00	360.00
6	55	5.00	275.00
7	50	4.00	200.00
8	45	4.00	180.00
9	40	3.00	120.00
10	35	2.50	87.50
11	25	4.00	100.00

Total Area = 5057.50 mm²

LT Turns = 144

$$E = 4.44 \times f \times B_m \times A \times N \times 0.97 \times 10^{-6} \text{ where } A \text{ is in mm}^2$$

$$B_m = \frac{E \times 10^6}{4.44 \times f \times A \times N \times 0.97}$$

$$B_m = \frac{250 \times 10^6}{4.44 \times 50 \times 144 \times 5057.50 \times 0.97}$$

Bm = **1.594 Tesla**

The Flux density at rated value of V/f ratio = 1.594

The Flux density at 112.5% of rated value of V/f ratio = 1.594 x 1.125

= 1.793 Tesla

The saturation point is at 1.80 Tesla. This core will not saturate with combine effect of voltage and frequency for over fluxing up to 12.5%.

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TEMPERATURE RISE CALCULATION FOR 25KVA (ALU.) TRANSFORMER

No load loss = 85 Watts
 Load loss at 75°C = 500 Watts
 Total losses at 75°C = 585 Watts

<u>Ovel Tank dimensions</u>		<u>Top Cover</u>	<u>Elliptical tubes</u>	
L =	705 mm	L =	790 mm	0.00 Meter
W =	290 mm	W =	375 mm	
H =	655 mm			

Surface area of Tank sides (a) = $H \times (\pi \times W + 2L - 2W) \times 10^{-6}$
 = $655 \times (\pi \times 290 + 2 \times 705 - 2 \times 290) \times 10^{-6} = 1.140 \text{ m}^2$

Surface area of top cover (b) = $(\pi \times W^2/4 + (L - W)W) \times 10^{-6}$
 = $(\pi \times 375^2/4 + (790 - 375) \times 375) \times 10^{-6} = 0.266 \text{ m}^2$

Total tank surface area = a + b = 1.4065 m²

Heat dissipation by the tank surface at top oil temperature rise 35 °C is
 = 1.4065 X 437.5 = 615.3 Watts

Surface area of elliptical tubes = 0.16 x 0.00 = 0.000 m²

Heat dissipation by the Tubes at top oil temperature rise 35 °C is
 = 0.000 X 438 = 0 Watts

Total Heat dissipation ability at top oil temperature rise 35 °C is
 = 615 + 0 = 615.3 Watts

The top oil temperature rise will be less than 35 °C.

The approximately top oil temperature rise = $[585 / 615.3]^{0.8} \times 35$
 = 33.61 °C.

L.V. and H.V. Winding temperature rise (Approx.) = 33.61 + 5 = 38.61 °C.

NOTE : The temperature rise will be less than Guaranteed value

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Chief Engineer
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