भारत कोकिंग कोल लिमिटेड		BHARAT COKING COAL LIMITED
(कोल इंडिया लिमिटेड की एक अनुषंगी इकाई) एक मिनीरत्न कंपनी पंजीकृत कार्यालय :कोयला भवन, कोयला नगर धनबाद-826005, CIN :U10101JH1972GOI000918 सामग्री प्रबंधन विभाग कमर्शियल ब्लॉक L-III , फ़ैक्स- 0326-2230183 फ़ोन नंबर-0326-2230181 ईमेल:gmmm@bcclweb.in ,वैबसाइट:www.bcclweb.in		(A Subsidiary of Coal India Limited) A Mini Ratna Company Regt. Off: Koyla Bhawan ,Koyla Nagar Dhanbad-826005, CIN:U10101JH1972GOI000918 Materials Management Department Commercial Block L-III (Fax No- 0326-2230183) Phone No.0326-2230181 Email. Id: gmmm@bcclweb.in Website: www.bcclweb.in

SUPPLY/PURCHASE ORDER — ORIGINAL BY REGD. POST/BY E-MAIL

Ref. No.: BCCL/Pur/317033/Transformer/OTE/18-19/183 — Date: 30.03.2019

To,

M/s Sai Electricals
301, Czar Woods, Om Gardens, Maitree Vihar,
Chandrashekharpur, Bhubaneswar - 751023
Mobile: 9437559705

Vendor Category: NSIC
Email: saielectricals.cuttack@gmail.com
GSTIN No.: 09AACCS2787D2Z7
PAN: AACCS2787D

Sub: Supply of Power Transformers & Control Transformer.

Ref: 1. Our Tender no: BCCL/Pur/317033/Trans/17-18/28 dated 22.08.2017
2. Tender Id: 2017_BCCL_75519_1 opened on 23.09.17
2. Your online Bid no. 224131 dated 20.09.17 & subsequent correspondence on the above subject.

Dear Sir,

With reference to the above, we, for and on behalf of BCCL, hereby place PURCHASE ORDER on you for supply of following items as per rate, terms and conditions indicated below :

1. SCOPE OF SUPPLY: Power Transformers & Control Transformer

The detailed description along with specification of the items, Qty. to be supplied, Unit Rate and Extended Value will be as under:

TSN	Item Description	Qty. (Nos.)	Unit Basic Rate (In ₹)	Extended Landed Value (In ₹)
1.	Power Transformer, 7.5/10 MVA 33/11-6.6KV [Make and model : POWERWARE]	2	42,20,000.00	84,40,000.00
2.	Power Transformer, 5/7.5 MVA 33/11-6.6KV [Make and model : POWERWARE]	1	32,40,000.00	32,40,000.00
3.	Control Transformer, 315 KVA 33/0.415 KV [Make and model : POWERWARE]	1	3,81,000.00	3,81,000.00
			Sub-total	1,20,61,000.00
			GST @18 %[IGST]	21,70,980.00
			Sub-total	1,42,31,980.00
			CMPDI Pre-Dispatch Inspection Charge @1%	1,42,319.80
			GST on CMPDI Charge @ 18%	25,617.56
			Total Landed Rate on FOR Basis	1,43,99,917.36
			Total Landed Rate on FOR Basis (rounded off)	1,43,99,917.00

[Detailed technical specifications will be as per Annexure-A]

2. TOTAL ORDER VALUE: The total material value will be **₹ 1,43,99,917.00**/- (Rupees One Crore Forty Three Lakh Ninety Nine Thousand Nine Hundred Seventeen only) on F.O.R. Destination basis.

3. GST:

a) GST shall be paid extra as legally applicable during the scheduled delivery period. Presently applicable GST rate is 18% [IGST] as above.
b) The invoice shall be raised by you giving all the details as per GST Act/ Rules so as to enable BCCL to avail Input Tax Credit.
c) You have to ensure proper uploading in your return so that BCCL may be able to avail Input Tax Credit.
d) You have to ensure that if BCCL does not be able to avail Input Credit due to your fault then the loss amount to be recovered from you.
e) The benefit of any extra input tax credit earned by you, if any, in future shall be passed on to BCCL.
f) E-Way bill, if required, shall be arranged by you.
g) HSN codes and GST rates of the items covered in the above supply order placed will be as under:

Sl. No.	Item	HSN code	GST rate
1.	Transformer	8504	18% [IGST]

h) Your GST details are as under:

SN	Particulars	Firm's Details
1	Name	M/s Sai Electricals
2	Constitution of Business	Public Limited Company
3	Trade Type (Manufacturer/Dealer/Service Provider)	Manufacturer
4	PAN	AACCS2787D
5	Provisional/Permanent ID provided under GST	09AACCS2787D2Z7

4. Input Tax Credit: BCCL is entitled to avail Input tax credit of above GST amount and it will be availed on the submitting of all the necessary documents required as GST act.

5. Freight & Insurance Charges: Nil

6. Mode of Dispatch: By Road on F.O.R. Destination, Freight paid basis.

NOTE: You will ensure safe & sound delivery of stores at consignee's end.

7. Road Permit: if required it will be arranged by you.

8. Delivery Period: Within 6 months. Commissioning will be done in presence of supplier representative i.e. service engineer.

Delivery period will be reckoned from 10th day from the date of placement of order and the date of receipt of materials at our stores shall be treated as the date of delivery. However, keeping in view of our extreme urgency, earliest delivery will be highly appreciated.

(Any increase in the rate of taxes beyond delivery period will be to your account).

9. A) Consignee& Paying Authority: Consignee & Paying Authority for this Order will be as under:

Consignee	Paying Authority
Depot Officer Central Store, Ekra, BCCL.	HOD (F) MM, Purchase Finance, Koyla Bhawan, BCCL, Dhanbad.
BCCL GSTIN No. is 20AAACB7934MFZB	

B) Allocation: Area wise allocation of above ordered quantity as per respective indents will be as under:

Sl. No.	Item Description	Material Code	CV Area	Dugda Coal Washery
1.	Power Transformer, 7.5/10 MVA 33/11-6.6KV	95013001447	------	02 Nos.
2.	Power Transformer, 5/7.5 MVA 33/11-6.6KV	95013001743	01 No.	------
3.	Control Transformer, 315 KVA 33/0.415 KV	28311990056	------	01 No.

10. Payment Term: 100% within 21 days from the date of receipt and acceptance of the material at site or within 21 days from the date of receipt of suppliers' bills at consignee end, whichever is later.

11. Submission of Bill: 100% value of bill duly stamped, signed & pre-receipted in quadruplicate, as per terms of the order should be submitted for payment to the paying authority through consignee.
Bill should be submitted along with receipted delivery challan in original, Consignee note (if any), packing list if any ,Guarantee/ Warranty certificate, Price Certificate, Copy of Inspection Note and money receipt of CMPDIL , documentary evidence of taxes payment if claimed and other relevant documents as per order should be submitted to the Consignee for payment through Paying Authority *(Note – All documents to be submitted shall be duly authenticated).*
NB: all documents to be submitted shall be authenticated. No payment will be made without submission of performance Bank Guarantee & security deposit, if covered in order.

12.Guarantee /Warranty: Materials supplied should be guaranteed for a period of 12(twelve) months from the date of installation and commissioning or 18 months from the date of receipt and acceptance at consignee end , whichever is earlier, against any manufacturing defects / workmanship / inferior quality. Any defect observed on this account shall be attended within 07 days from the date of receipt of report and replace the materials within 30 days free of cost.

13. Price Certificate: You should submit a certificate along with bill as stated below:
"The rates of the stores under this contract are the lowest at which we are selling to any other customer/Govt. Deptt./ Subsidiaries of CIL/ Other PSUs . If the materials are sold at any lower rate than that mentioned in this contract to any other agency, the same will automatically be applied to this contract from that date".

14. Security Deposit: You are required to deposit 10 % of value of the order (order value means FOR destination price including taxes, duties, transportation & insurance charges & other charges if any) as security money in the form of Bank Draft /Bank Guarantee within 15 days from the date of order.
In case of SD in the form of BG, The Bank guarantee (as per enclosed format at Appendix-I) issued by the Bank on your behalf in favour of Bharat Coking Coal Limited, shall be in paper form as well as issued under "Structural Financial Messaging System".
The detail of beneficiary for issue of BG under SFMS mode are furnished below:

Name of Bank	State Bank of India		Name of Bank	ICICI Bank
Branch name	Main Branch, Dhanbad		Branch name	ICICI Bank, Dhanbad
A/C no.	35160317947	OR	A/C no.	019605001057
IFSC Code	SBIN0000066		IFSC Code	ICIC0000196

The validity of B.G. will be for a period of three months beyond the expiry of delivery period. If you fail to deposit the security deposit within 15(fifteen) days from the date of order, the same shall be recorded as unsatisfactory performance for future dealings apart from taking any other penal action as may be deemed fit by BCCL . The Security Money shall be refunded within 30 days of satisfactory execution of contract. . For unsatisfactory execution of contract and/or failure of execution of contract, the security money shall be forfeited.

15. PERFORMANCE BANK GUARANTEE: PBG on schedule/Nationalized Bank (as per enclosed format at Appendix-II) in India valid for three months beyond the expiry of Guarantee/Warranty period for 10 % value of the order (order value means FOR destination price including taxes, duties, transportation & insurance charges & other charges if any) shall have to submitted to MM Division, BCCL, Koyla Bhawan on or before commencement of supply. PBG may be submitted either for the entire order quantity at a time or each equipment wise/lot wise.

The Performance Bank guarantee (as per enclosed format at Appendix-II) issued by the Bank on behalf of the supplier in favour of Bharat Coking Coal Limited, shall be in paper form as well as issued under "Structural Financial Messaging System". The detail of beneficiary for issue of BG under SFMS mode are furnished below:

Name of Bank	State Bank of India		Name of Bank	ICICI Bank
Branch name	Main Branch Dhanbad	OR	Branch name	ICICI Bank, Dhanbad

A/C no.	35160317947		A/C no.	019605001057
IFSC Code	SBIN0000066		IFSC Code	ICIC0000196

The Performance Bank Guarantee shall be released after fulfillment of all contractual obligations including warranty /guarantee conditions stipulated in the contract. For unsatisfactory performance and/or contractual failure, BCCL shall have the full right to invoke/en-cash the Performance Bank Guarantee.

16. Inspection: Pre-dispatch Inspection shall be carried out by CMPDIL, Ranchi at your Works premises. Inspection Fees @1% on FOR destination price and GST @18% on inspection charges shall be paid initially by you along with your Inspection Call, which shall be subsequently reimbursed by BCCL along with your supply bills against documentary evidence e.g. money receipt etc. Final inspection shall be carried out at the consignee end after receipt of materials. The material shall also be subject to pre dispatch inspection by CMPDIL as per details indicated in Appendix III.

Final inspection shall be carried out at the consignee end after receipt of materials by the concerned technical head [i.e. GM (E&M)I/C or their authorized representative].

17. Transit Insurance: Shall be arranged and covered by you for safe arrival of materials to the consignee end at your cost and risk.

18. Penalty for failure to supply in time:

The delivery of stores stipulated in Purchase order shall be deemed to be of the essence of the contract and delivery of the stores must be completed by the date specified. No materials should be supplied beyond the specified delivery period, unless specific approval has been obtained from this office.

In the event of failure to deliver the stores within the stipulated date/ period in accordance with the samples and/or specification mentioned is the supply order, and in the event of breach of any terms and conditions mentioned in the supply order Bharat Coking Coal Limited reserves the right:

a) To recover from you, as agreed liquidated damages, a sum not less than 0.5% (half percentage) of the price of the stores which you have not been able to supply (for this purpose part of a unit supplied will not be considered) as aforesaid for each week or part of a week during which the delivery of such stores may be in arrears limited to 10%. Where felt necessary the limit of 10% can be increased to 15% at the discretion of Head of the Materials Management Division

b) To purchase elsewhere, after due notice to you, on your account and risk , the stores not supplied or others of a similar description without cancelling the supply order in respect of consignment not yet due for supply or

c) To cancel the supply order or a portion thereof, and if so desired to purchase the store at your risk and cost and also

d) To extend the period of delivery with or without penalty as may be considered fit and proper. The penalty, if imposed shall not be more than the agreed liquidated damages referred to in clause (a) above.

e) To encash any Bank guarantee which is available for recovery of the penalty or

f) To forfeit the security deposit full or in part.

g) Whenever under the contract a sum of money is recoverable from and payable by you, BCCL shall be entitled to recover such sum by appropriating, in part or whole by deducting any sum or which at any time thereafter may be due you in this or any other contract with Bharat Coking Coal Ltd. or any subsidiary of Coal India Ltd. Should this sum be not sufficient to cover the full amount recoverable, you will pay BCCL on demand the remaining amount. You will not be entitled to any gain under this clause.

19. PRICE FALL CLAUSE:

You undertakes that it has not supplied /is not supplying similar product/systems or subsystems at a price lower than that offered in the present bid in respect of any other Ministry/Department of the Government of India or PSU and if it is found at any stage that similar product/systems or sub systems was supplied by the BIDDER to any other Ministry/Department of the Government of India or a PSU at a lower price, then that very price, with due allowance for elapsed time, will be applicable to the present case and the difference in the cost would be refunded by the BIDDER to the BUYER, if the contract has already been concluded. All other remaining commercial terms & conditions and technical specifications along with scope of supply will strictly be as per our notice inviting tender and as confirmed in your techno-commercially acceptable offer & as per company norms.

ALL DISPUTES ARE SUBJECT TO DHANBAD COURT AND JHARKHAND HIGH COURT JURISDICTION ONLY.

This contract is concluded with the issuance of this order. Two copies of the order is being sent to you. You are advised to acknowledge the receipt and acceptance of the order by returning one copy duly signed and stamped to this office positively within 15 days, failing which this order shall be deemed to have been accepted by you for execution.

Encl:-1. Annexure-"A" (Technical Specifications & Parameters); 2. Appendix-I (SD Format); 3. Appendix-II (PBG Format); 4. Appendix-III (Pre-Dispatch Inspection Clause)

INDENT & BUDGET CERTIFICATION REFERENCE

Indent no. and Date	e. BC & e. FC Ref.
Indent No. BCCL/GM(E&M)/F-Central Indent/2016-17/ dated 05.07.16. IR no. 317033 dated 31.07.17.	**eBC no**. BCCL/C&B/CAP/Reg. PN-09/SN-93/eBC No. 1287 dated 12.03.19 Head: P&M (Others) New Job, amount of ₹ 1,43,99,917.00. **e.F.C.No**. 972 dated 30.03.19 of ₹ 1,43,99,917.00.

Yours faithfully,
For & on behalf of Bharat Coking Coal Ltd.

30/03/19

(Alok Kumar)
DM (MM)

30/03/19

(N S Saini)
GM (MM)

(This has got the concurrence and approval of competent authority)

Copy to:

1. Depot Officer, Central Store, Ekra, BCCL.
2. HOD(F)(MM), MM DIV, Koyla Bhawan.
3. GM(E&M)I/C, E&M Deptt, Koyla Bhawan
4. MM(Tech Cell), MM Div, Koyla Bhawan.
5. Master File/Office Copy.
6. GM(MM) CCL/NCL/WCL/SECL/ECL
7. Shri Aditya Prakash Mishra, IRSE (Retd.), Address: Flat No.24, Aster-1, Vatika City, Sohna Road, Sector-49, Gurgaon-122003.
8. Shri Pramod Deepak Sudhakar, IAS (Retd.), Address: A-002, Stellar Park Apartments, C-58/24 Sector-62, Noida (UP) - 201 301.
9. GM (E&M) Inspection, CMPDIL, Gondowana Place, Kanke Road, Ranchi-834008, Jharkhand. Ph: 0651-2792298; Fax No: 0651-2230127.

Annexure-A
TECHNICAL REQUIREMENT AND SPECIFICATIONS

(A) SCHEDULE OF REQUIREMENT:

Sl. No.	Item Description	Qty. (Nos.)
1.	Power Transformer, 7.5/10MVA 33/11-6.6KV	2
2.	Power Transformer, 5/7.5MVA 33/11-6.6KV	1
3.	Control Transformer, 315KVA 33/0.415KV	1

(B) Technical Specifications & Other Parameters:

1. **Power Transformer (7.5/10 MVA, 33/11-6.6 KV)**

Oil immersed power transformer for outdoor duty , copper wound , core type with provision for oil natural & fan cooling , having following technical specification , to be supplied with first filling of oil .

1. Rated Capacity : 7.5/10 MVA -2 Nos.
2. Rated Voltage : HV side -33 KV +-10%
   LV side-11 -6.6 KV +-10%.
3. No. of Phases : Three.
4. Frequency : 50 Hz +3% ,-5%
5. Vector Group : Dyn11
6. Percentage impedance with respect to rated current and frequency at 75 deg Celsius. : Percentage impedance shall be 8% with variation of (+)5% and (-)0% at 10 MVA base and 11 KV secondary voltage.
7. Tapping range : +/-10% in 14 steps of 1.43% each
8. Maximum guaranteed temp. rise : In Oil -45 deg Celsius .

Over the ambient temp. of 50 deg In winding – 55 deg Celsius Celsius at full load .

9. Bushing : HV side – Outdoor type
   LV side – Outdoor type.
10. Auxiliary control cubicles suitable for : 3 phase 4 wire 415 V system
11. Details of OLTC : As per **Annexure 1**
12. Details of mounting & fitting: As per **Annexure 2.**
13. Construction detail: As per **Annexure 3**.
14. The transformer shall confirm to : IS 2026(latest amended if any)
15. The provision of local as well as remote control cubicles for cooling fans including appropriate marshalling box shall exist.
16. Control panel for cooling fans: Outdoor type 415 V, 3 phase.
17. Automatic / manual control switch to be provided in the control panel for cooling fans. Necessary arrangements should be provided for auto made
18. Tenderer must submit technical particulars as per **Annexure 4**.
19. The manufacturer shall submit notorized copies of type test done in accordance with IS: 2026 at CPRI for same or above rating conducted during last five Calendar years.

Mechanical features

The transformer shall withstand the electro-dynamic stress due to thermal short circuit of the LV side assuming the HV side fed from an infinite bus . All leads and windings in cores shall be properly supported , clamped and tightened after vacuum drying to ensure the short circuit withstand ratings . The short circuit withstand duration shall be minimum 2 sec.

The Transformer shall be so designed as to minimize any undue noise and vibration.

ANNEXURE 1

DETAIL OF OLTC

A) **On Load Tap Changer** : Suitable for outdoor installation , oil immersed , high speed snap switches combining both selector and diverter duties , housed in a self contains single compartment chamber and suitable for mounting externally on a part flange provided on the transformer tank . The tap changer shall be suitable for connection to adjacent tapping as brought out from 33 KV winding (from +10% to -10% in steps of 1.43% each) covering a range of fourteen steps making a total of fifteen positions.

The tap changer shall have the following equipments / components in the cubicles , mounted externally on the transformer tank . The driving mechanism also shall be housed in the said cubicle .

1. High Torque Electric Motor for operation on 50 cycles ac supply .
2. Driving mechanism and energy accumulator .
3. Contactors with overload release .
4. Contactors for forward and reverse operation of the motor .
5. Raise / Lower push buttons .
6. Local / remote control selector switches .
7. Limit switch .
8. Retainer switch .
9. Set of fuses .
10. Handle for manual operation .
11. Interlock between manual & electrical operation.
12. Insulated terminal board & connectors for connection with transformer leads.
13. Mechanical tap position indicator .
14. Tap changer operation counter .
15. Anti condensation heater with switch .
16. Drain plug .
17. Auxiliary Transformer .
18. Step by step relay .
19. Mechanical stopper to prevent over cranking of the mechanism beyond extreme tap position .
20. Buchholz relay .

ANNEXURE 2

DETAILS OF MOUNTINGS AND FITTINGS

The Transformer should be provided with the following accessories .

1. Explosion vent with suitable diaphragm and equalizer pipe connection with drain cum air release valve .
2. 4nos. roller flanged wheel , bi-directional suitable for 1435 mm rail gauge . Wheel bracket should have holes in square formation to facilitate the movement of transformer in lateral direction also .
3. Dial thermometer 150 mm size for oil temperature with maximum temp indicator , resetting device and two set of contacts .
4. Buchholz relay 2" double float type two set of contacts (alarm & trip) and one no. of shut off valve .
5. 4 nos. jacking lugs /lifting lugs at an appropriate and convenient height .

6. Marshalling box with suitable control cable outlets and inspection cover with suitable size of aperture with glass and rubber gasket .
7. 150 mm dial temp indicator for winding temperature with capillary tube and two sets of contacts .
8. Fans for cooling (to be fixed below the radiator tubes) with control panel -440 V , 3 phase .
9. OLTC as per **Annexure 1** .
10. Rating and diagram plate .
11. Earthing terminals two nos .
12. 150 mm dia magnetic type oil level gauge with low oil level alarm contacts .
13. Thermometer pocket .
14. Spare thermometer pocket .
15. Air release plug .
16. Oil filling hole with plug .
17. Dehydrating silica gel breather of suitable size with oil seal .
18. Drain valve with plug .
19. Oil conservator with filling hole cover , oil drain valve and plug .
20. Two nos. of filter valve of 2" dia with adopter for PLUG .
21. Three nos . of ¾ " BSP sampling valves (Top , middle & bottom) with plugs for sampling of top, middle & bottom oil.
22. HV terminals-3 nos 36 KV clean outdoor type porcelain bushings fitted with single gap arcing horn .
23. LV terminals -4 nos. 12 KV suitable for heavily polluted area .
24. Lock with key in duplicate externally operated for tap switch .
25. Suitable links for change over from 6.6 KV to 11KV , easily accessible through inspection cover .
26. Inspection cover for terminals inside the tank .
27. Breather of suitable size .

ANNEXURE-3

Constructional details

Core

a) The transformer core shall be made of high grade non- ageing grain oriented cold rolled silicon steel sheets of low hysterisis loss and high permeability . The core structure shall be securely grounded to prevent electrostatic potential . Lifting eyes and lugs shall be provided on the limbs and coils assembly . Preferably no bolt shall be used in the cores . Clamping shall be done externally to the limb.

b) The design of the magnetic circuit shall be such as to avoid static discharges , development of short circuit paths within itself or to the earthed clamping structure and the production of flux component at right angles to plane of lamination which may cause local heating .

c) Core and windings shall be capable of withstanding shocks during transport , installation & service and adequate provision shall be made to prevent movement of core & winding relative to tank during these conditions.

d) All steel sections used for supporting the core shall be thoroughly sand blasted after cutting , drilling and welding .

Tanks

a) Tanks shall be of welded construction and fabricated from boiler steel plates of adequate thickness . The weld procedure and performance shall be in line with ASME BPV –IX. All seams and joints those are not required to be opened at site shall be factory welded and wherever possible shall be double welded.

b) Tanks stiffeners shall be provided for general rigidity and these shall be designed to prevent retention of water.
c) The tanks shall be designed to withstand – Mechanical shocks during transportation , Vacuum filling of oil & short circuit force .
d) Adequate space shall be provided at the bottom of the tank for settlement of sediments .
e) Suitable guides shall be provided in the tank for positioning the core & coil assembly.
f) The tanks shall be suitable for movement in both direction during shipment & each tanks shall be provided with Lifting lugs suitable for lifting the complete transformer and a minimum of four jacking pads.

Tank cover

a) The tank cover shall be sloped to prevent retention of rain water and shall not distort when lifted .
b) At least two adequately sized inspection covers one at each end of the tank shall be provided for easy access to bushing and earth connection . The inspection covers shall have suitable lifting arrangement .
c) The tank covers shall be fitted with thermometer pockets . The thermometer pocket shall be fitted with a captive screwed top to prevent ingress of water .

Mounting arrangement

The transformers shall be provided with two nos. bi- directional skids and pulling eyes integral with tank body for fixing the transformer tank on foundation.

Conservator tank

a) The conservator tank shall have adequate capacity to accommodate oil preservation system and volumetric expansion of the total cold oil volumetric expansion of the total cold oil volume in transformer and radiators for a change in temperature from minimum ambient air temperature of 5°C to 110°C.
b) The conservator shall be bolted into position so that it can be removed for cleaning purpose.
c) The conservator tank , shall be fitted with a silica gel filter breather.

The conservator of transformer shall be fitted with magnetic oil level gauge with two independent low level electrically insulated alarm and trip contacts . The oil level at 30°C shall be marked on the gauge.

Explosion Vent

a) The transformers shall be provided with the single diaphragm type of explosion vent with air release device .
b) An equalizer pipe shall be connected to explosion vent from the conservator .

Buchholz Relay

A double float type buchholz relay confirming to IS 3637 shall be provided . All gas evolved in the transformer shall be collected in this relay . The relay shall be provided with a test cock suitable for a flexible pipe connection for checking its operation . A copper tube shall be connected from the gas collector to a valve located about 1200 mm above ground level to facilitate sampling with the transformer in the service . The device shall be provided with two potential free contacts , one for alarm on gas accumulation and the other for tripping on rise of pressure.

Temperature Indicator – As per Annexure-2

Winding

- The conductors shall be of electrolytic grade copper free from scales & burns .

- All winding shall be fully insulated .
- Coil assembly and insulation spacers shall be so arranged as to ensure free circulation of oil and to reduce the hot spot of winding .
- All bus bars and leads shall be adequately supported in insulation cleats or frames shall be effectively locked .

Insulation materials
Class "A" insulating materials specified in IS 1271 or latest version shall be used .
Wood insulation , where used shall be well seasoned and treated .
Insulating oil :
The new insulating oil shall confirm to IS 335 . No inhibitors shall be used in the oil .
The manufacturer shall dispatch the transformer filled with oil . Ten percent extra oil shall be supplied for topping up , in non returnable sealed containers suitable for outdoor storage .

Earthing Terminals
Two earthing terminals suitable for connecting mild steel flat shall be provided at position close to the two diagonally opposite bottom corners of tank . These grounding terminals suitable for bolted connection . Two earthing terminals shall also be provided on marshalling box and any other equipment mounted separately.

Radiators :
The radiators shall be detachable type , mounted on the tank . Each radiator shall be provided with the following :

a) A drain valve at the bottom
b) An air release plug at the top
c) Shut off valve .

Marshalling box : A sheet steel weather, vermin and dust proof marshalling box shall be provided with each transformer to accommodate

- Temperature indicators
- Terminal blocks for incoming & outgoing cables

The marshalling box shall be supplied with space heater and cubical lighting with ON/OFF switches and associated fuses .

Note: **Any other thing left should be as per Annexure 2 .**

ANNEXURE-IV

TECHNICAL PARTICULARS YOU HAVE DECLARED IN THE TPS

A) GENERAL 1) Name of manufacturer :	SAI ELECRICALS
2) Service	Outdoor
3) Rating	As Below
4) Rated KVA :KVA	7.5/10MVA
5) Rated voltage of HV : KV	33KV
6) Rated voltage of LV : KV	11-6.6KV
7)Temperature rise in Oil : deg Celsius	45 Deg C
8)Temperature rise in winding : deg Celsius	55 Deg C
9)Rated frequency : Hz	50Hz
10)Number of phases	3
11) Connection HV LV Vector group	HV : Delta, LV : Star Vector Group : Dyn11
12) Tappings	OLTC
13)High Voltage : Percent .	+/-10@ 1.43%

14)No Load loss at rated voltage & Frequency : KW .	8.45KW +/- IS Tol. At 7.5MVA
15)Load Loss at rated current at 75 deg Celsius .: KW.	41.3KW +/- IS Tol. At 7.5MVA
16)Impedance at rated current & frequency at 75 deg Celsius : Percent .	8% +/- IS Tol.
17)Reactance at rated current & frequency : Percent.	6.98%
18)Efficiency at 75 deg Celsius at unity pf AT Full Load	99.34%
At ¾ Full load : Percent.	99.44%
At ½ full load : Percent .	99.50%
19)Regulation at full load at 75 deg Celsius At unity pf : Percent.	0.77%
At 0.8 pf lagging : Percent.	4.54%
20)No Load current at rated voltage & frequency : Percent .	2% of Full Load Current
21)Approximate weights : Core & winding :kg.	7050Kg App.
Tank & fitting :kg.	3550Kg App.
Oil :kg	3560Kg App.
Total weight :kg.	14120Kg App.
22)Approx quantity of Oil : Ltr.	4050 Ltr. App.
23)Approx overall dimensions : Length : mm	3560+/- 15%
Breadth : mm	2690+/- 15%
Height : mm	3345+/- 15%
24)Terminal arrangement : HV LV	Bare Bushing
25)Reference Standard :	IS 2026
(B) Special 1) Approximate maximum flux density at rated voltage & frequency : Tesla or wb/sq m	1.7T
2) Efficiency at 75°C at 0.8 p.f. lagging At full load : Percent	99.18%
At 3/4 full load : Percent	99.30%
At 1/2 full load : Percent	99.38%
3)Load at which maximum. Efficiency occurs : Percent full load	45.18%
4) Maximum efficiency : Percent	99.51%
5)Impulse level:- HV :KV	170Kvp
LV : KV	75Kvp
6) No load loss at 110% rated voltage & frequency : KW	16KW App.
7) No load current at 110% rated voltage & frequency : Percent	4% of Full Load Current
8)Type of winding : HV & LV	Discc Winding
9) Insulating materials : Turn insulation HV	Press Board & kraft Paper
Turn insulation LV	Press Board & kraft Paper
Insulation core to LV	Press Board & kraft Paper
Insulation HV to LV	Press Board & kraft Paper
10) Clearances : Minimum clearance between phases a) In oil : mm	As Per IS 2026/CBIP
b) Out of oil : mm	As Per IS 2026/CBIP
c) Minimum clearance HV to earth in oil : mm	As Per IS 2026/CBIP
d) Minimum clearance – HV to tank in oil : mm	As Per IS 2026/CBIP

11. Details of tank : Approx. thickness of sides bottom : mm	10mm
cover: mm	12mm
tube radiators : mm	1mm
12.Minimum clearance height for : mm lifting core and windings from tank	4000mm App.
13) Shipping Details : Parts detached for transport	Radiators, Conservator Etc.
Approx. wt. of heaviest package : Kg.	12000 Kg App.
Approx dimension of largest package (L×B×H) : mm	3400x2500x3200mm +/-15 % App.
(C) On-load tap changing gear • Make	On Load Gears/ Renowned Make
• Type	On Load Tap Changer
• Rated voltage	33KV
• Rated current	200Amps
• No. of steps	14Nos.
• Control	Auto/ Manual
• Auxiliary supply details	415V
• Voltage control	RTCC Provided
• Line drop compensation	Provided
• Parallel Operation	Provided
• Protective device	Provided
o Approx. over all weight : kg	As Per Supplier Std.
o Approx. over all dimensions : mm	As Per Supplier Std.
o Approx. overall quantity of oil : ltrs.	As Per Supplier Std.
o Position indication	Provided
o Any other item left out should be as per Annexure 1.	OK
Remote control panel for cooling fan operation a) Remote selector switch b) Line isolator switch c) Cubicle light d) Door interlock and limit switch. e) Push button for start / stop. f) Indicating lamps. g) ON/OFF Position indication of individual fans .	AGREE

Following documents have to be submitted at the time of supply:-

1) The manufacturer shall submit all routine standard tests in accordance with IS-2026 on each transformer.
2) Operation& maintenance manual.
3) Manufacturer Test Certificate.

2. Power Transformer (5/7.5 MVA ,33/11-6.6 KV)

Oil immersed power transformer for outdoor duty , copper wound , core type with provision for oil natural & fan cooling , having following technical specification , to be supplied with first filling of oil .

1. Rated Capacity : 5/7.5 MVA -1 No.
2. Rated Voltage : HV side -33 KV +-10%
   LV side-11 -6.6 KV +-10%.

3. No. of Phases : Three .
4. Frequency : 50 Hz +3% ,-5%
5. Vector Group : Dyn11
6. Percentage impedance with respect to rated current and frequency at 75 deg Celsius. : Percentage impedance shall be 8% with variation of (+)5% and (-)0% at 7.5 MVA base and 11 KV secondary voltage .
7. Tapping range : +/-10% in 14 steps of 1.43% each
8. Maximum guaranteed temp. rise : In Oil -45 deg Celsius .
   a. Over the ambient temp . of 50 deg In winding – 55 deg Celsius Celsius at full load .
9. Bushing : HV side – Outdoor type

LV side – Outdoor type .

10. Auxiliary control cubicles suitable for : 3 phase 4 wire 415 V system
11. Details of OLTC : As per **Annexure 1**
12. Details of mounting & fitting : As per **Annexure 2 .**
13. Construction detail : As per **Annexure 3 .**
14. The transformer shall confirm to : IS 2026(latest amended if any)
15. The provision of local as well as remote control cubicles for cooling fans including appropriate marshalling box shall exist .
16. Control panel for cooling fans : Outdoor type 415 V , 3 phase .
17. Automatic / manual control switch to be provided in the control panel for cooling fans . Necessary arrangements should be provided for auto made .
18. Tenderer must submit technical particulars as per **Annexure 4 .**
19. The manufacturer shall submit notorized copies of type test done in accordance with IS : 2026 at CPRI for same or above rating conducted during last five Calender years .

Mechanical features

The transformer shall withstand the electro-dynamic stress due to thermal short circuit of the LV side assuming the HV side fed from an infinite bus . All leads and windings in cores shall be properly supported , clamped and tightened after vacuum drying to ensure the short circuit withstand ratings . The short circuit withstand duration shall be minimum 2 sec.

The Transformer shall be so designed as to minimize any undue noise and vibration.

ANNEXURE 1

DETAIL OF OLTC

B) **On Load Tap Changer** : Suitable for outdoor installation , oil immersed , high speed snap switches combining both selector and diverter duties , housed in a self containes single compartment chamber and suitable for mounting externally on a part flange provided on the transformer tank . The tap changer shall be suitable for connection to adjacent tapping as brought out from 33 KV winding (from +10% to -10% in steps of 1.43% each) covering a range of fourteen steps making a total of fifteen positions

The tap changer shall have the following equipments / components in the cubicles , mounted externally on the transformer tank . The driving mechanism also shall be housed in the said cubicle .

- High Torque Electric Motor for operation on 50 cycles ac supply .

- Driving mechanism and energy accumulator .
- Contactors with overload release .
- Contactors for forward and reverse operation of the motor .
- Raise / Lower push buttons .
- Local / remote control selector switches .
- Limit switch .
- Retainer switch .
- Set of fuses .
- Handle for manual operation .
- Interlock between manual & electrical operation.
- Insulated terminal board & connectors for connection with transformer leads.
- Mechanical tap position indicator .
- Tap changer operation counter .
- Anti condensation heater with switch .
- Drain plug .
- Auxiliary Transformer .
- Step by step relay .
- Mechanical stopper to prevent over cranking of the mechanism beyond extreme tap position .
- Buchholz relay .

ANNEXURE 2

DETAILS OF MOUNTINGS AND FITTINGS

The Transformer should be provided with the following accessories .

1. Explosion vent with suitable diaphragm and equalizer pipe connection with drain cum air release valve .
2. 4nos. roller flanged wheel , bi-directional suitable for 1435 mm rail gauge . Wheel bracket should have holes in square formation to facilitate the movement of transformer in lateral direction also .
3. Dial thermometer 150 mm size for oil temperature with maximum temp indicator , resetting device and two set of contacts .
4. Buchholz relay 2" double float type two set of contacts (alarm & trip) and one no. of shut off valve .
5. 4 nos. jacking lugs /lifting lugs at an appropriate and convenient height .
6. Marshalling box with suitable control cable outlets and inspection cover with suitable size of aperture with glass and rubber gasket .
7. 150 mm dial temp indicator for winding temperature with capillary tube and two sets of contacts
8. Fans for cooling (to be fixed below the radiator tubes) with control panel -440 V , 3 phase .
9. OLTC as per **Annexure 1** .
10. Rating and diagram plate .
11. Earthing terminals two nos .
12. 150 mm dia magnetic type oil level gauge with low oil level alarm contacts .
13. Thermometer pocket .
14. Spare thermometer pocket .
15. Air release plug .
16. Oil filling hole with plug .
17. Dehydrating silica gel breather of suitable size with oil seal .

18. Drain valve with plug .
19. Oil conservator with filling hole cover , oil drain valve and plug .
20. Two nos. of filter valve of 2" dia with adopter for PLUG .
21. Three nos . of ¾ " BSP sampling valves (Top , middle & bottom) with plugs for sampling of top, middle & bottom oil.
22. HV terminals-3 nos 36 KV clean outdoor type porcelain bushings fitted with single gap arcing horn .
23. LV terminals -4 nos. 12 KV suitable for heavily polluted area .
24. Lock with key in duplicate externally operated for tap switch .
25. Suitable links for change over from 6.6 KV to 11KV , easily accessible through inspection cover .
26. Inspection cover for terminals inside the tank .
27. Breather of suitable size .

ANNEXURE-3

Constructional details

Core

a. The transformer core shall be made of high grade non- ageing grain oriented cold rolled silicon steel sheets of low hysterisis loss and high permeability . The core structure shall be securely grounded to prevent electrostatic potential . Lifting eyes and lugs shall be provided on the limbs and coils assembly . Preferably no bolt shall be used in the cores . Clamping shall be done externally to the limb.

b. The design of the magnetic circuit shall be such as to avoid static discharges , development of short circuit paths within itself or to the earthed clamping structure and the production of flux component at right angles to plane of lamination which may cause local heating .

c. Core and windings shall be capable of withstanding shocks during transport , installation & service and adequate provision shall be made to prevent movement of core & winding relative to tank during these conditions.

d. All steel sections used for supporting the core shall be thoroughly sand blasted after cutting , drilling and welding .

Tanks

a. Tanks shall be of welded construction and fabricated from boiler steel plates of adequate thickness . The weld procedure and performance shall be in line with ASME BPV –IX. All seams and joints those are not required to be opened at site shall be factory welded and wherever possible shall be double welded.

b. Tanks stiffeners shall be provided for general rigidity and these shall be designed to prevent retention of water.

c. The tanks shall be designed to withstand – Mechanical shocks during transportation , Vacuum filling of oil & short circuit force .

d. Adequate space shall be provided at the bottom of the tank for settlement of sediments .

e. Suitable guides shall be provided in the tank for positioning the core & coil assembly.

f. The tanks shall be suitable for movement in both direction during shipment & each tanks shall be provided with Lifting lugs suitable for lifting the complete transformer and a minimum of four jacking pads.

Tank cover

a. The tank cover shall be sloped to prevent retention of rain water and shall not distort when lifted .

b. At least two adequately sized inspection covers one at each end of the tank shall be provided for easy access to bushing and earth connection . The inspection covers shall have suitable lifting arrangement .

c. The tank covers shall be fitted with thermometer pockets . The thermometer pocket shall be fitted with a captive screwed top to prevent ingress of water .

Mounting arrangement

The transformers shall be provided with two nos. bi- directional skids and pulling eyes integral with tank body for fixing the transformer tank on foundation.

Conservator tank

a. The conservator tank shall have adequate capacity to accommodate oil preservation system and volumetric expansion of the total cold oil volumetric expansion of the total cold oil volume in transformer and radiators for a change in temperature from minimum ambient air temperature of 5°C to 110°C.
b. The conservator shall be bolted into position so that it can be removed for cleaning purpose.
c. The conservator tank , shall be fitted with a silica gel filter breather.
d. The conservator of transformer shall be fitted with magnetic oil level gauge with two independent low level electrically insulated alarm and trip contacts . The oil level at 30°C shall be marked on the gauge.

Explosion Vent

a. The transformers shall be provided with the single diaphragm type of explosion vent with air release device .
b. An equalizer pipe shall be connected to explosion vent from the conservator .

Buchholz Relay

A double float type buchholz relay confirming to IS 3637 shall be provided . All gas evolved in the transformer shall be collected in this relay . The relay shall be provided with a test cock suitable for a flexible pipe connection for checking its operation . A copper tube shall be connected from the gas collector to a valve located about 1200 mm above ground level to facilitate sampling with the transformer in the service . The device shall be provided with two potential free contacts , one for alarm on gas accumulation and the other for tripping on rise of pressure.

Temperature Indicator – As per Annexure-2

Winding

- The conductors shall be of electrolytic grade copper free from scales & burns .
- All winding shall be fully insulated .
- Coil assembly and insulation spacers shall be so arranged as to ensure free circulation of oil and to reduce the hot spot of winding .
- All bus bars and leads shall be adequately supported in insulation cleats or frames shall be effectively locked .

Insulation materials

Class "A" insulating materials specified in IS 1271 or latest version shall be used .
Wood insulation , where used shall be well seasoned and treated .

Insulating oil :

The new insulating oil shall confirm to IS 335 . No inhibitors shall be used in the oil .
The manufacturer shall dispatch the transformer filled with oil . Ten percent extra oil shall be supplied for topping up , in non returnable sealed containers suitable for outdoor storage .

Earthing Terminals

Two earthing terminals suitable for connecting mild steel flat shall be provided at position close to the two diagonally opposite bottom corners of tank . These grounding terminals suitable for

bolted connection . Two earthing terminals shall also be provided on marshalling box and any other equipment mounted separately.

Radiators :
The radiators shall be detachable type , mounted on the tank . Each radiator shall be provided with the following :

a. A drain valve at the bottom
b. An air release plug at the top
c. Shut off valve .

Marshalling box : A sheet steel weather, vermin and dust proof marshalling box shall be provided with each transformer to accommodate

- Temperature indicators
- Terminal blocks for incoming & outgoing cables

The marshalling box shall be supplied with space heater and cubical lighting with ON/OFF switches and associated fuses .

Note : Any other thing left should be as per Annexure 2 .

ANNEXURE-IV

TECHNICAL PARTICULARS YOU HAVE DECLARED IN THE TPS

A) GENERAL 1) Name of manufacturer :	SAI ELECRICALS
2) Service	Outdoor
3) Rating	As Below
4) Rated KVA :KVA	5/7.5MVA
5) Rated voltage of HV : KV	33KV
6) Rated voltage of LV : KV	11-6.6KV
7)Temperature rise in Oil : deg Celsius	45 Deg C
8)Temperature rise in winding : deg Celsius	55 Deg C
9)Rated frequency : Hz	50Hz
10)Number of phases	3Nos.
11) Connection HV LV Vector group	HV : Delta, LV : Star Vector Group : Dyn11
12) Tappings	OLTC +/-10@1.43%
13)High Voltage : Percent .	+/-10@ 1.43%
14)No Load loss at rated voltage & Frequency : KW .	6.3KW +/- IS Tol. At 5MVA
15)Load Loss at rated current at 75 deg Celsius .: KW.	37.6KW +/- IS Tol. At 5MVA
16)Impedance at rated current & frequency at 75 deg Celsius : Percent .	8% +/- IS Tol.
17)Reactance at rated current & frequency : Percent.	7.19%
18)Efficiency at 75 deg Celsius at unity pf AT Full Load	99.13%
At ¾ Full load : Percent.	99.27%
At ½ full load : Percent .	99.38%
19)Regulation at full load at 75 deg Celsius At unity pf : Percent.	0.98%
At 0.8 pf lagging : Percent.	4.83%
20)No Load current at rated voltage & frequency : Percent .	2% of Full Load Current

21)Approximate weights : Core & winding :kg.	5050Kg App.
Tank & fitting :kg.	3030Kg App.
Oil :kg	3100Kg App.
Total weight :kg.	11180Kg App.
22)Approx quantity of Oil : Ltr.	3540Ltr. App.
23)Approx overall dimensions : Length : mm	3410mm+/-15%
Breadth : mm	3150mm+/-15%
Height : mm	3100mm+/-15%
24)Terminal arrangement : HV LV	Bare Bushing
25)Reference Standard :	IS 2026
(B) Special 1) Approximate maximum flux density at rated voltage & frequency : Tesla or wb/sq m	1.7T
2) Efficiency at 75°C at 0.8 p.f. lagging At full load : Percent	98.92%
At 3/4 full load : Percent	99.09%
At 1/2 full load : Percent	99.22%
3)Load at which maximum. Efficiency occurs : Percent full load	40.85%
4) Maximum efficiency : Percent	99.39%
5)Impulse level:- HV :KV	170Kvp
LV : KV	75Kvp
6) No load loss at 110% rated voltage & frequency : KW	13KW +/- IS Tol.
7) No load current at 110% rated voltage & frequency : Percent	4% of Full Load Current
8)Type of winding : HV & LV	Discc Winding
9) Insulating materials : Turn insulation HV	Press Board & kraft Paper
Turn insulation LV	Press Board & kraft Paper
Insulation core to LV	Press Board & kraft Paper
Insulation HV to LV	Press Board & kraft Paper
10) Clearances : Minimum clearance between phases a) In oil : mm	As Per IS 2026/CBIP
b) Out of oil : mm	As Per IS 2026/CBIP
c) Minimum clearance HV to earth in oil : mm	As Per IS 2026/CBIP
d) Minimum clearance – HV to tank in oil : mm	As Per IS 2026/CBIP
11. Details of tank : Approx. thickness of sides bottom : mm	10mm
cover: mm	12mm
tube radiators : mm	1mm
12.Minimum clearance height for : mm lifting core and windings from tank	4000mm App.
13) Shipping Details : Parts detached for transport	Radiators, Conservator Etc.
Approx. wt. of heaviest package : Kg.	9000Kg App.

Approx dimension of largest package (L×B×H) : mm	3100x2200x3000mm +/-15%
(C) On-load tap changing gear • Make	On Load Gears/ Renowned Make
• Type	On Load Tap Changer
• Rated voltage	33KV
• Rated current	200Amps
• No. of steps	14Nos.
• Control	Auto/ Manual
• Auxiliary supply details	415V
• Voltage control	RTCC Provided
• Line drop compensation	Provided
• Parallel Operation	Provided
• Protective device	Provided
o Approx. over all weight : kg	As Per Supplier Std.
o Approx. over all dimensions : mm	As Per Supplier Std.
o Approx. overall quantity of oil : ltrs.	As Per Supplier Std.
o Position indication	Provided
o Any other item left out should be as per Annexure 1.	OK
Remote control panel for cooling fan operation a) Remote selector switch b) Line isolator switch c) Cubicle light d) Door interlock and limit switch. e) Push button for start / stop. f) Indicating lamps. g) ON/OFF Position indication of individual fans .	AGREE

Following documents have to be submitted at the time of supply :-

1)The manufacturer shall submit all routine standard tests in accordance with IS-2026 on each transformer.

2)Operation& maintenance manual .

3)Manufacturer Test Certificate.

3. Control Transformer : 315 KVA , 33KV/0.44KV

This specification broadly covers design , manufacture , supply and other requirements of power transformers to be used for power supply to coal mines This shall meet all the technical requirements of IS 2026 and relevant standards

The transformer shall be of proven design for giving satisfactory and reliable performance in heavily coal dust laden atmosphere unit ambient temperature of 45°C and other service condition prevalent in coalfield areas of BCCL.

The power transformer shall be of outdoor type , vector group DY11 , naturally oil cooled , copper wound of suitable class of insulation and shall be suitable for 3 phase , 50 HZ , ac power supply system .Continuous operated at rated KVA within ± 10% variation of voltage .Temp. rise limited to the following values :

Cooling	Oil	Winding
ONAN	45°C	55°C

Mechanical features

a) The transformer shall withstand the electro-dynamic stress due to thermal short circuit of the LV side assuming the HV side fed from an infinite bus . All leads and windings in cores shall

be properly supported , clamped and tightened after vacuum drying to ensure the short circuit withstand ratings . The short circuit withstand duration shall be minimum 2 sec.

b) The Transformer shall be so designed as to minimize any undue noise and vibration .

Constructional details

Core

(a) The transformer core shall be made of high grade non- ageing grain oriented cold rolled steel sheets of low hysterisis loss and high permeability . The core structure shall be securely grounded to prevent electrostatic potential . Lifting eyes and lugs shall be provided on the limbs and coils assembly . Preferably no bolt shall be used in the cores . Clamping shall be done externally to the limb.

(b) The design of the magnetic circuit shall be such as to avoid static discharges , development of short circuit paths within itself or to the earthed clamping structure and the production of flux component at right angles to plane of lamination which may cause local heating .

(c) Core and windings shall be capable of withstanding shocks during transport , installation & service and adequate provision shall be made to prevent movement of core & winding relative to tank during these conditions.

(d) All steel sections used for supporting the core shall be thoroughly sand blasted after cutting , drilling and welding .

Tanks

(a) Tanks shall be of welded construction and fabricated from boiler steel plates of adequate thickness . The weld procedure and performance shall be in line with ASME BPV –IX.

(b) All seams and joints those are not required to be opened at site shall be factory welded and wherever possible shall be double welded.

c)Tanks stiffness shall be provided for general rigidity and these shall be designed to prevent retention of water.

d)The tanks shall be designed to withstand – Mechanical shocks during transportation , Vacuum filling of oil & short circuit force .

e)Adequate space shall be provided at the bottom of the tank for settlement of sediments .

f)Suitable guides shall be provided in the tank for positioning the core & coil assembly.

g)The tanks shall be suitable for movement in both direction during shipment & each tanks shall be provided with Lifting lugs suitable for lifting the complete transformer and a minimum of four jacking pads.

Tank cover

a. The tank cover shall be sloped to prevent retention of rain water and shall not distort when lifted.

b. At least two adequately sized inspection covers one at each end of the tank shall be provided for easy access to bushing and earth connection. The inspection covers shall have suitable lifting arrangement.

c. The tank covers shall be fitted with thermometer pockets. The thermometer pocket shall be fitted with a captive screwed top to prevent ingress of water.

Mounting arrangement

The transformers shall be provided with two nos. bi- directional skids and pulling eyes integral with tank body for fixing the transformer tank on foundation.

Conservator tank

a. The conservator tank shall have adequate capacity to accommodate oil preservation system and volumetric expansion of the total cold oil volumetric expansion of the total cold oil volume in transformer and radiators for a change in temperature from minimum ambient air temperature of 5°C to 110°C.

b. The conservator shall be bolted into position so that it can be removed for cleaning purpose.

c. The conservator tank , shall be fitted with a silica gel filter breather.

d. The conservator of transformers shall be fitted with plain oil level gauge with two independent low level electrically insulated alarm contacts . The oil level at 30°C shall be marked on the gauge.

Explosion vent

a) The transformers shall be provided with the single diaphragm type of explosion vent with air release device .
b) An equalizer pipe shall be connected to explosion vent from the conservator.

Buchholtz Relay

A double float type buchholtz relay confirming to IS 3637 shall be provided . All gas evolved in the transformer shall be collected in this relay . The relay shall be provided with a test coke suitable for a flexible pipe connection for checking its operation . A copper tube shall be connected from the gas collector to a valve located about 1200 mm above ground level to facilitate sampling with the transformer in the service . The device shall be provided with two potential free contacts , one for alarm on gas accumulation and the other for tripping on rise of pressure.

Temperature indicator

a) <u>Oil temperature indicator (OTI)</u>

The transformers shall be provided with a 150 mm dial type thermometer for top oil temperature indication. The thermometer shall have adjustable, potential free alarm and trip contacts, maximum reading pointer and resetting device and shall be mounted on tank cover. A temperature sensing element located in a pocket in the top oil shall be furnished. This shall be connected to the OTI by means of capacity tubing. Accuracy class of OTI shall be 2° C or better. The OTI shall have full scale deflection of at least 240° C and shall have linear graduation to read every 2° C.

Winding

- The conductors shall be of electrolytic grade copper free from scales & burns.
- All winding shall be fully insulated .
- Coil assembly and insulation spacers shall be so arranged as to ensure free circulation of oil and to reduce the hot spot of winding.
- All bus bars and leads shall be adequately supported in insulated cleats or frames shall be effectively locked.

Insulation materials

- Class "A" insulating materials specified in IS 1271 or latest version shall be used . Wood insulation , where used , shall be well seasoned and treated .
- **Insulating oil :** The new insulating oil shall confirm to IS 335 . No inhibitors shall be used in the oil.

The manufacturer shall dispatch the transformer filled with oil . Ten percent extra oil shall be supplied for topping up , in non returnable sealed containers suitable for outdoor storage.

Earthing Terminals

Two earthing terminals suitable for connecting 50 x 8 mm mild steel flat shall be provided at position close to the two diagonally opposite bottom corners of tank . These grounding terminals suitable for bolted connection . Two earthing terminals shall also be provided on marshalling box and any other equipment mounted separately

Off -LoadTap change switch

The tap change switch shall be three phase , hand operated , for simultaneous switching of similar taps on the three phases by operating an extra handle .Arrangement shall be made for securing and pad locking the tap chamber in each of the working position . An indicating device shall be provided to show tap in use.

Radiators : The radiators shall be detachable type , mounted on the tank . Each radiator shall be provided with the following :

d) A drain valve at the bottom
e) An air release plug at the top
f) Shut off valve

Fittings : The following fittings shall be provided with all the transformers :

1. Rating and diagram plate
2. Terminal marking plate
3. Two earthing terminals
4. Lifting lugs
5. Jacking lugs
6. Drain valve with plug of 50mm size
7. Dehydrating breather
8. Buchholtz relay with alarm and trip contacts with one shut off valve on 50mm conservator side
9. Plain oil level indicator
10. Off load tap changing switch
11. Oil filling hole with cover
12. Conservator
13. OTI
14. Explosion vent with air release device
15. Skids and pulling eyes on both sides
16. Rollers
17. Filter valve
18. Inspection cover

TESTS

The manufacturer shall carry out all routine standard tests in accordance with IS : 2026 on each transformer . The manufacturer shall submit copies of type test in accordance with IS :2026 at CPRI for same or above rating conducted during last 5 calendar years .

TECHNICAL DATA SHEET OF TRANSFORMERS

1. Rated capacity /quantity :-

SL.NO.	KVA	PRIMARY VOLTAGE(KV)	SECONDRY VOLTAGE(KV)	Quantity (NOS)
1.	315	33	0.44	1

2. No. of phases : 3
3. Frequency : 50 HZ +3%,- 5%
4. Location : Outdoor
5. Type of cooling : ONAN
6. Type of oil : Mineral oil
7. Impedance voltage at rated current : 5%± 10% upto 315 KVA
8. Tap changer type : Off Load
9. Tapping : ±2.5%,±5%,±7.5%,0
10. Temp. rise (over ambient) in oil : 45°C

11. Temp. rise (over ambient) in Winding : 55°C
12. Earthing of neutral terminals : Required for LV winding
13. Method of system earthing : Star – solid (LV winding)

TECHNICAL PARTICULARS YOU HAVE DECLARED IN THE TPS

A) GENERAL a) Name of manufacturer :	SAI ELECRICALS
b) Service	Outdoor
c) Rating	As Below
Rated KVA :KVA	315KVA
Rated voltage of HV : KV	33KV
Rated voltage of LV : KV	0.440KV
Temperature rise in oil :°c	45 Deg C
Temperature rise in winding :°C	55 Deg C
Rated frequency	50Hz
Number of phases	3 Nos.
Connection HV LV Vector group	HV : Delta, LV : Star Vector Group : Dyn11
Tapping	+/- 7.50% @ 2.5%
No load loss at rated voltage & frequency : KW	0.85KW +/- ISTol.
Load loss at rated current at 75°C : KW	5.50KW +/- IS Tol.
Impedance at rated current & frequency at 75°C : Percent	5% +/- IS Tol.
Reactance at rated current & frequency : Percent	4.69%
Efficiency at 75°C at unity p.f. : At full load : Percent	98.02%
At 3/4 full load : Percent	98.36%
At 1/2 full load : Percent	98.61%
Regulation at full load at 75°C At unity p.f. : Percent	1.86%
At 0.8 p.f. lagging : Percent	4.06%
No load current at rated voltage & frequency : Percent	3% of Full Load Current
Approximate weights : Core & winding	600Kg App.
Tank & fitting	400Kg App.
Oil	345Kg App.
Total weight	1345Kg App.
Approx quantity of oil	395Ltr. App.
Approx overall dimensions : Length	2195mm +/- 15%
Breadth	1625mm+/- 15%
Height	1825mm+/- 15%
Terminal arrangement : HV	Bare Bushing
LV	Bare Bushing
Reference standard ;	IS 2026
Remarks	Nil

A) Special **1)** Approximate maximum flux density at rated voltage & frequency	1.7T
Efficiency at 75°C at 0.8 p.f. lagging At full load	97.54%
At 3/4 full load	97.96%
At 1/2 full load	98.26%
Load at which maximum. Efficiency occurs : Percent full load	38.50%
Maximum efficiency : Percent	98.68%
Impulse level HV	170Kvp
LV	NA
No load loss at 110% rated voltage & frequency : KW	1.6KW App.
No load current at 110% rated voltage & frequency : Percent	6% of Full Load Current
Type of winding : HV LV	HV : Cross Over, LV : Spiral
Insulating materials : Turn insulation HV	Press Board & kraft Paper
Turn insulation LV	Press Board & kraft Paper
Insulation core to LV	Press Board & kraft Paper
Insulation HV to LV	Press Board & kraft Paper
Clearances : Minimum clearance between phases a) In oil : mm	As Per IS 2026/CBIP
b) Out of oil : mm	As Per IS 2026/CBIP
Minimum clearance HV to earth in oil : mm	As Per IS 2026/CBIP
Minimum clearance – HV to tank in oil : mm	As Per IS 2026/CBIP
Details of tank : Approx. thickness of sides bottom : mm	3.15mm
cover : mm	5mm
tube radiators : mm	1mm
Minimum clearance height for lifting core and windings from tank	1800mm App.
Shipping details : Parts detached for transport	Radiators Etc.
Off-load tap changer • Make and type	Off Load Type
• Rated voltage and current	33KV
• Step voltage & no. of steps	825V , 6Nos.
• Locking arrangement	Provided
• Position indication & Line drop compensation	Provided

Following documents have to be uploaded at the time of supply :-

1)The manufacturer shall upload all routine standard tests in accordance with IS-2026 on each transformer.

2)Operation& maintenance manual .

3)Manufacturer Test Certificate.

APPENDIX -I
FORMAT OF BANK GUARANTEE FOR SECURITY DEPOSIT

M/s. Bharat Coking Coal Ltd.
Koyla Bhawan
Koyla Nagar
Dhanbad – 826005

In consideration of M/s Bharat Coking Coal Ltd. having its office at Koyla Bhawan, Koyla Nagar, Dhanbad hereinafter called "the Purchaser" (which expression shall unless repugnant to the subject or context including its successors and assigns) having agreed under the terms and condition of Contract No. ..... dated ..... made between M/s ..... a Company having its office at ..... (hereinafter called the supplier in connection with supply of ..... hereinafter called the "said Contract" to accept a Deed of Guarantee as herein provided for Rs. ..... in lieu of the security deposit to be made by the supplier for their due fulfillment of the terms contained in the said Contract, we, the ..... Bank Limited (hereinafter referred to as the said Bank having its office at ..... do hereby undertake and agree to indemnify and keep indemnified that Purchaser from time to time the extent of Rs. ..... (Rupees: .....) against any loss. Damage caused charges and expenses caused to or suffered by or that may be caused to suffered by Purchaser by reason of any breach or breaches by the said supplier or any of the terms and conditions contained in the said Contract and to unconditionally pay the amount claimed by the Purchaser on demand and without demur to the extent aforesaid.

We, the .....(Name of the Bank) do hereby agree that any demand made by Purchaser on the Bank shall be conclusive as regards the amount due and payable by the Bank under this Guarantee. We shall not withhold the payment on the ground that the supplier has disputed its liability to pay or has disputed the quantum of amount or that any legal proceeding is pending between the Purchaser and the Supplier regarding the claim. However, our liability under this Guarantee shall be restricted to an amount not exceeding Rs. .....

We, the ..... (Name of the Bank) do further agree Guarantee herein contained shall come into force from the date hereof and shall remain in full force and effect up to ..... Unless demand or claim under this Guarantee is made on us in writing on or before ..... we shall be discharged of all liabilities under this Guarantee thereafter.

We, the ..... (Name of the Bank) further agree with the Purchaser that the Purchaser, shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Contract or to extend the time of delivery of the specified items in the Contract from time to time or to postpone for any time or from time to time any of the powers exercisable by the Purchaser against the said supplier and to forebear or enforce any of the terms and conditions relating to the said contract we shall not be relieved from our liability by the reason or any such variations or extension being granted to the said Supplier or for any forbearance act or omission on the part of the Purchaser or any indulgence by the Purchaser to the said Supplier or by any such matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving us the Bank further agrees that in case this Guarantee is required for a longer period and it is not extended by the Bank beyond the period specified above. The Bank shall pay to the Purchaser the said sum of ..... or such lesser sum as may then be due to the Purchaser and as the Purchaser may demand. We, the ..... (Name of the Bank) lastly undertakes not to revoke this Guarantee during this currency except with the previous consent of the Purchaser in writing.

The Bank has under its constitution power, to give this Guarantee and Mr. ..... Manager who has signed it on behalf of the Bank has authority to do so.

This Bank Guarantee will not be discharged due to the change in the constitution of the Bank or the Supplier.

[In case the BGs are from outstation branch of Dhanbad then BG shall be encashable at Dhanbad/Kolkata branch of issuing bank with address and location of the said branch at Dhanbad/Kolkata will be as under .

Name of the Bank :
Name of the Branch :
Location & Address :

The BG shall be subject to the jurisdiction of the competent courts at Dhanbad District only.]

The Bank guarantee issued by the Bank on behalf of the supplier in favour of Bharat Coking Coal Limited, shall be in paper form as well as issued under " Structural Financial Messaging System". The detail of beneficiary for issue of BG under SFMS mode are furnished below:

Name of Bank	State Bank of India			Name of Bank	ICICI Bank
Branch name	Main Branch Dhanbad			Branch name	ICICI Bank, Dhanbad
A/C no.	35160317947			A/C no.	019605001057
IFSC Code	SBIN0000066	**OR**		IFSC Code	ICIC0000196

Dated .....day of .....
For ..... Bank

Signature of the authorized person
For and on behalf of the Bank
Emp. Code.

APPENDIX -II

FORMAT OF PERFORMANCE BANK GUARANTEE

1. Messers ---------- a company having Regd. Office /its office at ---------- ----------hereinafter called the Seller has entered into a Contract No.---------- dt.----------(hereinafter called the said Contract) with Bharat Coking Coal Limited having its Regd. Office (address to tbe given.....(hereinafter called , the Purchaser) to supply equipment on the terms and conditions in the said Contract.

It has been agreed that hundred percentage(100%) payment of the value of the equipment will be made to the seller in the terms of the said Contract on the seller furnishing to the Purchaser a Bank Guarantee for the sum of ---------- equivalent to 10 % of the value of each equipment and accessories dispatched by the seller as security for the due and faithful performance of the terms of the said contract and against any loss or damage caused to or would be caused to or suffered by the purchaser by reason of any of the terms or conditions contained in the said contract.

The---------- Bank having its office at ---------- has at the request of seller agreed to give the guarantee herein after contained.

2. We, ---------- (Name of the Bank) do hereby undertake to pay the amounts due and payable under this guarantee without any demur merely on a demand from the purchaser stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the purchaser by reason of any breach by the said seller of any of the terms or conditions contained in the said contract or by reason of the seller's failure to perform the said contract. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. We shall not withhold the payment on the ground that the seller has disputed its liability to pay or has disputed the quantum of the amount or that any arbitration proceeding or legal proceeding is pending between purchase and the seller regarding the claim. However, our liability under this guarantee shall be restricted to an amount not exceeding ----------.

3. We,---------- (Name of the Bank) further agree that the guarantee herein contained shall come into force from the date hereof and shall remain in full force and effect during the period of the said contract and that it shall continue to be enforceable till all the dues of the purchase under or by virtue of the said contract have been fully paid and its claim satisfied or purchase certified that the terms and conditions of the said contract have been fully and properly carried out by the said seller and accordingly discharged the guarantee .Unless a demand or claim under this guarantee is made on us in writing on or before the ----------(date to be given----------period of contract + 90 days from the date of Bank Guarantee) we shall be discharged from all liability under this guarantee thereafter.

4. We., (Name of the Bank) further agree with the purchaser ,that the purchaser , shall have the fullest liberty without our consent and without affecting in any manner no obligations hereunder to vary any of the terms and conditions of the said contract or to extend time of performance by the said seller(s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the purchaser , against the said seller and to forbear or enforce any of the terms and conditions relating to the said contract and we shall not be relived from our liability by reason or any such variation or extension being granted to the said seller or for any forbearance act or omission on the part of the purchaser , or any indulgence by the purchaser to the said seller by any such matter or thing whatsoever which under the law relating to sureties would be for this provision have effect of an relieving us. The Bank further agrees that in case this guarantee is required for a longer period and it is not extended by the bank beyond the period specified above , the bank shall pay to this purchaser the said sum of ---------- or such lesser sum as may than be due the purchaser and as the purchaser may demand.

5. We, ---------- (Name of the Bank) lastly undertake not to revoke this guarantee during its currency except with the previous consent of the purchaser, in writing.

6. The Bank has under its constitution power to give this guarantee and Mr. ----------Manager, who has signed it on behalf of the Bank has authority to do so.

7. This Bank Guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor.

[In case the BGs are from outstation branch of Dhanbad then BG shall be encashable at Dhanbad/Kolkata branch of issuing bank with address and location of the said branch at Dhanbad/Kolkata will be as under :

Name of the Bank :
Name of the Branch :
Location & address :

The BG shall be subject to the jurisdiction of the Civil courts Dhanbad District only.]

The Bank guarantee issued by the Bank on behalf of the supplier in favour of Bharat Coking Coal Limited, shall be in paper form as well as issued under "Structural Financial Messaging System". The detail of beneficiary for issue of BG under SFMS mode platform are furnished below:

Name of Bank	State Bank of India		Name of Bank	ICICI Bank
Branch name	Main Branch Dhanbad		Branch name	ICICI Bank, Dhanbad
A/C no.	35160317947	**OR**	A/C no.	019605001057
IFSC Code	SBIN0000066		IFSC Code	ICIC0000196

Dated .....day of .....
For ..... Bank

Signature of the authorized person
For and on behalf of the Bank
Emp. Code.

APPENDIX -III

PRE-DESPATCH INSPECTION CLAUSE

Pre-dispatch inspection of each consignment shall be carried out by M/s. Central Mine Planning & Design Institute Ltd (CMPDIL), Ranchi/their Regional Office as per the terms and conditions indicated hereunder:

Pre-dispatch inspection shall be carried out by M/s. CMPDIL (the above firm) as per their methodology. The third Party Inspection shall include examination of raw material, test certificate verification, continuous monitoring of quality assurance by manufacturer which will include regular and surprise visits. In brief, the scope and condition of inspection by M/s.CMPDIL will be as follows :

Checking and approval of test procedures/quality assurance plans.

Verification of records and documents of your works.

Verification of documents and test certificate of bought out items and cross checks.

You shall provide facilities for carrying out all necessary tests as required in the specification at your works else these will be carried out at an independent test house at your cost.

Final testing and checking of materials as per specifications.

M/s.CMPDIL will have full and free access to the premises of manufacturer during the process of manufacturing and during inspection activities.

Inspection fee @ 1% of total consignment billing (plus statutory levis like GST etc,as applicable on inspection fee) is to be paid to M/s.CMPDIL along with inspection call letter payable by SBI Collect as per enclosed appendix-II(a) which will be reimbursed subsequently by BCCL together with consignment billing.

Minimum 7 calendar days notice shall be given by the manufacturer to M/s.CMPDIL for arranging inspection within valid delivery period as per contract.

The ultimate responsibility for supply of correct materials as per requirement of relevant specification lies solely with the manufacturer inspite of clearance/acceptance by inspection authority i.e. M/s.CMPDIL. The manufacturer will be required to replace the material free of cost if found defective/unserviceable/not according to relevant specifications.

The charges for third party inspection and the cost of materials that would be required for destructive tests, if any, shall be reimbursed by BCCL together with the consignment billing. Such cost shall be reimbursed only if it is duly certified by M/s.CMPDIL.

Please send inspection call to M/s.CMPDIL, Ranchi/ their Regional. Office as per appendix-II(b).

Final inspection shall be arranged by the consignee after receipt of the material at our destination.

The purchaser shall, at its discretion, have the right to test the ordered material in a Government Test House or in a test house nominated by the purchaser. In case or failure of the material after testing the cost of tests as well as of the material shall have to be borne by the supplier.

FOR AND ON BEHALF OF BCCL

Appendix-III (a)

The manufacturer/firm, intending to submit the Pre-Dispatch Inspection (PDI) Fees online through SB collect has to follow the following steps:-

i. Visit CMPDI site (www.cmpdi.co.in).

ii. Click on the link of State Bank Collect to pay Inspection Fee

iii. Click the acceptance of terms & conditions and then click the proceed button.

iv. Next page will open. Here you select the state as *Jharkhand* and then select the type of institution as *PSU-Public Sector Undertaking*, then press *go* button.

v, Next page will open requesting to you select PSU name, here you select *CMPDI Ltd.* & then press the submit button.

vi. Next page will open, requesting to select the payment category. Here you select "*INSPECTIONN FEES*".

vii. Automatically you will be transferred to next page requesting to you to provide details of payment. Here you are required to fill the data as requested in each row including the remarks.

viii. After filling all the required data, press the *submit* button, you will be transferred to next page, which will request to verify the details and confirm the details. Press *confirm* button if entry made are correct otherwise press cancel If you press Confirm then you will be transferred to next page where payment option will appear.

ix. On this page you will find the various modes of e-payment of different banks i.e. net-banking, debit card, credit card etc.

x. At this page you are requested to make the payment by selecting the appropriate mode of payments offered by different banks as per your choice.

xi. After making the payment please take out the prints of e-receipt which should subsequently be submitted to us as a proof of payment made to CMPDl along with inspection call letter.

Xii. The inspection call is required to be submitted online on the email id gmenm.cmpdi@coalindia.in, with a copy to paresh.saxena@coalindia.in in in the following manner:

a) A Covering letter on your letter head giving the details of inspection.
b) Inspection call duly stamped and signed, addressed to GM (E&M) CMPDI in the required format on your letter head.
c) Copy of e-money receipt for the PDT Fee deposited online.
d) Copy of the respective complete supplied order against which inspection call is raised.
All the above four documents are to be submitted in separate POF files.

Xiii. Simultaneously a copy of e-money receipt for the POI Fee deposited online must be mailed on the email id: hqfinance@yahoo.com, with a copy to Sandeep.aru@coalindia.in

Note: - The facility for submission of POI Fee on State Bank Collect will be available from 1st to 28th of every month.

Appendix-III (b)

To

The General Manager (E&M),
CMPDI Ltd.
Gondwana Place, Kanke Road
Ranchi 834031
(Ph 0651-2230876, Fax 0651-2230127)

INSPECTION CALL
(to be typed in Company's Letter Head)

Name of Subsidiary Company of CIL	Inspection Call Ref No. & Date:
Manufacturer's Name with Address & Tel/Mobile phone No.:	P.O. No./R.C. No./Amendment/etc.: Date:
Contact Person Details: • Tel. /Mobile Phone No.: • email id:	Status of supply order: Running Order/ New Order: (Please tick the appropriate one.)
Place of Inspection:	Brief Description of Material :
Qty. of Offered Material:	Value of Offered material: Basic Value: Consignment Value (Inclusive of all Taxes, Packaging & forwarding charges ,Transit Insurance, Freight etc)
Date of readiness of Material: Proposed date of Inspection:	
1.Inspection Fee @1% of Consignment Value: Rs..... 2.GST as applicable on the date of submission of PDI Fee: Rs..... **Total (1+2):**	Details of e-receipt payment generated after paying the inspection Fee on SB collect: 1. e-receipt no.: ..... 2. Date:..... 3. Amount in Rs.....

Note:

1. Inspection fee and GST charges is being sent on email id: gmenm.cmpdi@coalindia.in, with a copy to paresh.saxena@coalindia.in
2. Copy of Purchase order to be enclosed with inspection call.

Signature with seal