

# GIRIDHAN METAL PRIVATE LIMITED

Registered Office : 'Premlata', 39, Shakespeare Sarani, 2nd Floor, Kolkata - 700 017, West Bengal, India  
Telefax : +91 33 22892734 / 35 / 36, E-Mail : giridhanmetal@gmail.com

Ref No. GMPL/24-25/MoEF&CC/11

Date: 30.11.2024

To,  
The IGF & Incharge  
GOI, MoEF&CC,  
Integrated Regional Office, Kolkata  
IB-198, Salt Lake City, Sector-III  
Kolkata - 700106

**Ref: Ministry's EC No J-11011/366/2010-IA.II (I) dated 8th April, 2021 & amendment dated 16th January 2023.**

**Sub: Submission of Six Monthly Compliance Report of Environmental Clearance.**

Respected Sir/Madam,

With reference to above, we are submitting herewith the six-monthly compliance report of Environmental Clearance (Period April-2024 to September-2024) of M/s Giridhan Metal Private Limited, Jamuria Industrial Estate, P.O- Nandi, P.S-Jamuria, Dist.-Paschim Bardhaman, West Bengal-713344 as per the directives of Ministry of Environment, Forest and Climate Change, Government of India. Point-wise compliance status report along with the latest environment monitoring data is enclosed for your kind perusal.

Hard copy of the report has not been sent following MoEF&CC direction vide File No. 106-12/EPE Dated 11.05.2020. Hope you will find the same in order.

Kindly acknowledge our submission.

**List of annexures are given bellow:**

- Annexure - 01 - Plantation Photographs
- Annexure - 02 - SEAF Photographs
- Annexure - 03 - Stack Analysis Report
- Annexure - 04 - Bag Filter Specification
- Annexure - 05 - SO<sub>2</sub>, NO<sub>x</sub> reduction process-compressed
- Annexure - 06 - Consent to Establish
- Annexure - 07 - ETP photographs
- Annexure - 08 - Garland Drain Photographs
- Annexure - 09 - Affidavit for MoEF
- Annexure - 10 Screenshot of CEMS & CAAQMS
- Annexure - 11 - Ambient Air Report
- Annexure - 12 - Fugitive Emission Report



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- Annexure - 13 - Pollution Control System
- Annexure - 14 - Covered canopy Photographs
- Annexure - 15 - SMS Pollution Control System Photographs
- Annexure - 16 - Screenshot of ETP
- Annexure - 17 - Village Ground Water Report
- Annexure - 18 - Ambient Noise report
- Annexure - 19 - Solar Panel Photographs
- Annexure - 20 - MOU-Fly Ash, Bed Ash
- Annexure - 21 - GHG emission inventory
- Annexure - 22 - HIRA (Hazardous Identifications of Risk Assessment)
- Annexure - 23 - Heat Stress Report
- Annexure - 24 - Health Register
- Annexure - 25 - CER Activity Details
- Annexure - 26 - Corporate Environment Policy
- Annexure - 27 - News Paper
- Annexure - 28 - EC intimation to ADDA and AMC
- Annexure - 29 - LED Display Photographs
- Annexure - 30 - EC Uploaded Acknowledgement
- Annexure - 31 - Environment Statement\_2023-24
- Annexure - 32 - Commitment status on PH

Thanking you.

Your sincerely,

  
Sanjay Agarwal



Director

CC: Environmental Engineer, West Bengal Pollution Control Board, Asansol Regional Office,  
K.S.T.P., Dr. B. C. Roy Road, P.O.-Dhadka, Asansol - 713302

# GIRIDHAN METAL PRIVATE LIMITED

Jamuria Industrial Estate, Jaluria, Vill – Ikra & Damodarpur, Dist – Paschim Bardhaman, West Bengal

**Name of the Project:** Expansion of Steel Plant by expanding Sponge Iron from 1,20,000 TPA to 3,18,000 TPA, MS Billets from 1,05,000 TPA to 3,72,000 TPA, Rolling Mill from 1,00,000 TPA to 3,00,000 TPA, Submerged Arc Furnace (SAF) from 15,000 TPA to 30,000 TPA & Captive Power Plant from 16 MW to 42 MW including Waste Heat Recovery Boiler (WHRB) by Giridhan Metal Private Limited at Jamuria Industrial Estate, Village- Ikra & Damodarpur, Tehsil-Jamuria, District-Paschim Bardhaman, West Bengal

**Clearance Letter/s No. and date:** J-11011/366/2010-IA.II (I) dated 8<sup>th</sup> April, 2021 & amendment dated 16<sup>th</sup> January, 2023

## **Period of Compliance Report: April 2024 to September 2024**

<b>Specific Conditions:</b>		
<b>Sl. No.</b>	<b>Condition</b>	<b>Compliance thereof</b>
i)	Green belt shall be developed in 31.38 acres of land (40%) including the gap filling in the existing green belt with a tree density of 2500 trees per hectare.	Complied. The earmarked green area within the plant as per existing Environmental Clearance is 12.7 Hectares (~40% of existing plant area of 31.74 Hectares). Currently, we have planted approx. 28430 no. of trees within the plant premises. Covering the area as stipulated. Balance on of trees shall be used for gap filling. Some photographs are also attached herewith as <b>Annexure – 01.</b>
ii)	Closed type Submerged Arc Furnace with 4 <sup>th</sup> hole extraction system shall be installed.	GMPL has installed Closed Type Submerged Arc Furnace with 4 <sup>th</sup> hole extraction system. Photographs are attached herewith as <b>Annexure – 02.</b>
iii)	1x350 TPD and 1x600 TPD DRI Kiln shall be installed. Remaining DRI Kilns as per existing EC accorded by MoEF&CC shall not be installed and 50 TPD DRI Kiln existing at the site shall be dismantled.	1x350 TPD and 1x600 TPD DRI Kiln has been installed as per EC.  The 50 TPD DRI kiln has already been dismantled.
iv)	Project proponent shall meet the particulate matter emission norms in all stacks less than 30 mg/Nm <sup>3</sup> .	GMPL has installed 5 field ESP at 350 TPD DRI, 600 TPD DRI & CFBC boiler to meet the standard norms and pulse jet bag filter at Ferro Alloys plant, SMS plant, raw materials and product handling of DRI plant. The emission reports of WBPCB as well as NABL accredited third party laboratory are within the stipulated standard norms. The latest test reports are attached herewith as <b>Annexure – 03.</b>
V)	The Project proponent shall comply with emission norms of PM,SO <sub>x</sub> ,NO <sub>x</sub> and Mercury for captive power plant at stipulated in the gazette notification no. S.O. 3305 (E) dated 7/12/2015.	GMPL is complying with the gazette notification no. S.O. 3305 (E) dated 7/12/2015. GMPL has analyzed the emission parameters by NABL accredited laboratory & the emission results of PM, SO <sub>x</sub> , NO <sub>x</sub> and Mercury are within the standard norms. WBPCB has also taken the samples and the results are

		within the standard norms. The latest results are attached herewith as <b>Annexure – 03.</b>
vi)	PP shall be prepare implement an action plan giving annual improvement targets for resource conservation and environment improvement. This plan shall be monitored by the concerned Regional office of the MoEF& CC	We have taken following performance target for the current financial year. <ol style="list-style-type: none"> <li>1. Dolomite consumption per ton of DRI will be reduced from 45 kg/ton to 40 kg/ton.</li> <li>2. Reduction in Auxiliary Power Consumption from 8.5% to 8%.</li> <li>3. Carbon per ton of Si-Mn production in Ferro Alloys will reduced from 400 kg/ton of Si-Mn to 380 kg/ton of Si-Mn.</li> <li>4. GMPL has installed Solar Power 213 KW on rooftop.</li> </ol>
vii)	The heat rate of coal-based power plant as specified by Central Electricity Authority shall be maintained and monitored	Coal based Power Plant has been installed and commissioned on 20 <sup>th</sup> June 2023. The heat rate is around 2600 kcal/kWh which is as specified by the Central Electricity Authority
viii)	Energy efficient drives, VFD for auxiliary motors and slip power recovery system for motors above 1000 KW shall be provided.	Complied. All the motors of above 500 KW are well equipped with VFD, energy efficient drives.
ix)	PTFE Membrane bags shall be used in filter bag house and designed for 150% of normal design air flow.	Complied. GMPL has installed PTFE Membrane bags with filter bag house and designed for 150% of normal design air flow. Specification of membrane bags attached herewith as <b>Annexure – 04.</b>
x)	PP shall use ultralow NOx burner with three stage combustion, flue gas recirculation and auto combustion control system. Shall use Post combustion control system (SCR/SCNR process) with NH <sub>3</sub> monitoring when Ammonia is used.	GMPL has installed De-SOx and De-NOx system in FBC boiler. M/s ISGEC Heavy Engineering, Noida has assured for the same & SO <sub>2</sub> , NOx will be less than permissible standard. The letter for the same is attached herewith as <b>Annexure- 05.</b>
xi)	Project proponent shall undertake rain water harvesting and recharge the ground water. Level monitoring indicators for online real time measurement of rain water harvesting shall be provided.	Rain water harvesting is done in plant premises and the harvested water is stored in the water storage tank for further use in the process.  Recharging of ground water is not permitted in our area as per the State Pollution Control Board as per General Condition no. 5 of the Consent to Establish, which is attached as <b>Annexure – 06.</b>  Since recharging is not allowed hence real time monitoring is not applicable to us.
xii)	Treated effluent shall be recycled and reused	Effluent, generated from entire plant is being treated in Effluent Treatment Plant of capacity 1540 KLD and reused inside the plant premises. The photographs of ETP is attached herewith as <b>Annexure – 07.</b>
xiii)	Air cooled condensers shall be used in CPP	As per accorded EC, 12 nos. air cooled condensers have been installed in captive power plant..

xiv)	All stockyards shall be having impervious flooring and shall be equipped with water spray system for dust suppression. Stockyards shall also have garland drains to trap the run off material.	All the stockyards are having impervious flooring and covered and the garland drains are being provided around the sheds to trap run off materials.  The photograph of garland drain is attached herewith as <b>Annexure - 08.</b>
xv)	Jigging and briquetting Plant shall be installed.	Jigging plant has been installed. GMPL will not be producing Ferro Chrome; hence briquetting plant is not required.
xvi)	85-90% hot charging of billets shall be done. Balance heating can be done through RHF using LDO/FO as heating fuel.	Hot charging of billets (approx. 85-90%) is being done by GMPL, rest will be rolled through re-heating furnace.
xvii)	An affidavit shall be submitted to the Ministry as well as the regional office stating that observations made in the inspection report of Regional Office has been complied within three months from date of issue of the EC.	Complied and the affidavit has been made on 27 <sup>th</sup> July 2021 stating that observations made in the inspection report of Regional Office has been complied within three months from date of issue of the EC. Copy of the same is attached as <b>Annexure-09.</b>

## General Conditions

### I. Statutory compliance

Sl No.	Condition	Compliance thereof
i)	The Environment Clearance (EC) granted to the project/activity is strictly under the provisions of EIA Notification, 2006 and its amendments issued from time to time. It does not tantamount construe to approvals/consent/ permissions etc., required to be obtained or standards/conditions to be followed under any other Acts/Rules/Subordinate legislations, etc., as may be applicable to the project.	Noted

### II. Air quality monitoring and preservation

i)	The project proponent shall install 24x7 continuous emission monitoring system at process stacks to monitor stack emission as well as Continuous Ambient Air Quality Station (CAAQS) for monitoring AAQ parameters with respect to standards prescribed in Environment (Protection) Rules 1986 as amended from time to time. The CEMS and CAAQMS shall be connected to SPCB and CPCB online servers and calibrate these systems from time to time according to equipment supplier specification through labs recognized under Environment (protection) Act, 1986 and NABL accredited laboratories as revised CPCB guidelines dated August, 2018 REV 01.	We have installed 24x7 continuous emission monitoring system at process stacks to monitor stack emission.  CAAQMS, has also been installed.  The CEMS and CAAQMS have been connected to CPCB online server and links have been sent to SPCB. The screenshot is attached herewith as <b>Annexure – 10.</b>  GMPL have considered 3 sites for manual Ambient Air Quality Monitoring covering 120° of the plant premises by NABL accredited laboratory and the latest results are attached herewith as <b>Annexure – 11.</b>
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ii)	The project proponent shall monitor fugitive emissions in the plant premises at least once in every quarter through laboratories recognized under Environment (Protection) Act, 1986 or NABL, accredited laboratories.	GMPL have been monitoring the fugitive emission on quarterly basis by NABL accredited & WBPCB recognized laboratory. The latest reports are attached herewith as <b>Annexure – 12.</b>
iii)	Appropriate Air Pollution Control (APC) system shall be provided for all the dust generating point including fugitive dust from all vulnerable sources, so as to comply prescribed stack emission and fugitive emission standards	GMPL has provided appropriate air pollution control systems in all the dust generating points to comply the stack emission and fugitive emission standard. 1. The 350 TPD& 600 TPD DRI is well equipped with 5-fields ESP. 2. The boiler is well equipped with 5-field ESP. 3. Ferro Alloy plant is well equipped with modern & pulse jet type, PTFE membrane filter. 4. Cooler discharge, surge bin, product separation area, product house area and every junction of DRI unit is well equipped with bag filter to control fugitive emissions. 5. Dry fog system has been installed in entire coal circuit area to control the fugitive emissions. 6. Primary as well as secondary suction hoods are installed and connected with modern & pulse jet type, PTFE membrane filter bag for steel smelting shop. Photographs of APC systems are attached herewith as <b>Annexure – 13.</b>
iv)	The project proponent shall provided leakage detection and mechanized bag cleaning facilities for better operation bag houses.	Mechanized bag cleaning facilities with Purging facility is being adopted for better operation of bag houses. Also, GMPL is adopting TPM (Autonomous Maintenance) in all pollution equipment.
v)	Recycle and reuse iron ore fines, coal and coke fines, lime fines and such other fines collected in the pollution control devices and vacuum cleaning devices in the process after briquetting/agglomeration.	Being complied. Coal and coke fines dust collected in pollution control devices are being reused in CPP.
vi)	The project proponent shall ensure covered transportation and conveying of ore, coal and other raw material to prevent spillage and dust generation.	The entire conveyors (raw materials & products) are covered by canopy and transportation of raw materials & products are also being done in fully covered conditions to prevent spillage and fugitive dust generation. Photographs of covered conveyors are attached herewith as <b>Annexure – 14.</b>
vii)	The project proponent shall provide primary and secondary fume extraction system at all melting furnaces.	Steel Melting Shop is well connected with primary and secondary fume extraction system. Photographs showing primary & secondary extraction system are attached herewith as <b>Annexure – 15.</b>
viii)	Wind shelter fence and chemical spraying shall be provided on the raw material stock piles.	Wind shelter fence, chemical spraying are not applicable. The entire raw material stock piles have been kept inside covered sheds.
ix)	Design the ventilation system for adequate air changes as per prevailing norms for all tunnels, motor houses, Oil Cellars	GMPL does not have any tunnels, motor houses & Oil Cellars, hence, ventilation systems for adequate air changes are not required.

<b>III. Water quality monitoring and preservation</b>		
i)	The proponent shall install 24×7 continuous effluent monitoring system with respect to standards prescribed in Environment (Protection) Rules 1986 (G.S.R. 414 (E) Dated 30th May 2008;S.O. 3305 (E) dated 7th December 2015 (Thermal Power Plants) as amended from time to time ) and connected to SPCB and CPCB online servers and calibrate these system from time to time according to equipment supplier specification through labs recognized under Environment (Protection) Act, 1986 or NABL accredited laboratories.	We have installed 24x7 continuous effluent monitoring system. The treated effluent shall be recycled and reused.  The continuous effluent monitoring system is well connected with CPCB server and the link has shared with the SPCB. The screenshot of CPCB connectivity data are attached herewith as <b>Annexure – 16</b> .
ii)	The project proponent shall monitoring regularly ground water quality at least twice a year (pre- and post-monsoon) at sufficient numbers of piezometers/sampling wells in the plant and adjacent areas through labs recognized under Environment (Protection) Act, 1986 or NABL accredited laboratories.	GMPL is monitoring regularly ground water quality twice a year (pre- and post-monsoon) in adjacent villages. Latest test results of groundwater monitoring in surrounding villages are attached herewith as <b>Annexure –17</b> .
iii)	Sewage Treatment Plant shall be provided for treatment of domestic waste water to meet the prescribed standards.	Complied.
iv)	The project proponent shall provide the ETP for effluents of rolling mills to meet the standards prescribed in G.S.R 277(E) 31 <sup>st</sup> March 2012 (applicable to IF.EAF) as amended from time to time	ETP has been installed and treated water is being reused. The treated water meets the prescribed standard. The screenshot is attached herewith as <b>Annexure – 16</b> .
<b>IV. Noise monitoring and preservation</b>		
I)	Noise pollution shall be monitored as per the prescribed noise pollution (Regulation and Control) Rules, 2000 and report in this regard shall be submitted to Regional Officer of the Ministry as a part of six-monthly compliance report.	Noise level monitoring is being carried out on quarterly basis by NABL accredited laboratory. The latest test reports are attached herewith as <b>Annexure –18</b> .
<b>v. Energy Conservation measures</b>		
i)	Energy conservation measures may be adopted such as adoption of solar energy and provision of LED light etc., to minimize the energy consumption.	The company is committed to maximize energy conservation measures to minimize energy consumption. For the same, GMPL has installed Solar Power of 213 KW on rooftop. Photographs are attached herewith as <b>Annexure – 19</b> .  LED lights have been provided in entire plant area including buildings & offices.
<b>VI. Waste management</b>		
i)	Used refractories shall be recycled as far as possible.	Till now no refractories are being generated in plant and the same shall be complied if generated.

ii)	100% utilization of fly ash shall be ensured. All the fly ash shall be provided to cement and brick manufacturers for further utilization and Memorandum of Understanding in this regard shall be submitted to the Ministry's Regional Office.	The fly ash generated from CFBC boiler is sent to nearby cement and bricks manufacturing plant. GMPL has done MoU with fly ash bricks manufacturers like M/s Shree Swastick Industries, M/s Sri OM Industries, M/s Damodar Ispat Ltd. etc. The copies of MoUs are attached herewith as <b>Annexure –20.</b>
iii)	Dolochar generated from DRI kiln shall be used for power generation.	Dolochar generated from DRI kiln is used in CFBC boiler as fuel along with coal for power generation.
iv)	Oily scum and metallic sludge recovered from rolling mills ETP shall be mixed, dried, and briquetted and reused in melting Furnaces.	Oily scum and metallic sludge recovered from rolling mills ETP is being mixed, dried, and reused in melting Furnaces.
v)	Kitchen waste shall be composted or converted to biogas for further use.	Kitchen waste generated from plant premises is being converted to biogas through 100kg biogas plant.

## **VII. Green Belt**

i)	The project proponent shall prepare GHG emissions inventory for the plant and shall submit the programme for reduction of the same including carbon sequestration by trees.	GHG emissions inventory and its reduction programme including carbon sequestration by trees for the existing plant has been carried out. The report is attached herewith as <b>Annexure – 21.</b>
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## **VIII. Public hearing and Human health issues**

i)	Emergency preparedness plan based on the Hazard Identification and Risk Assessment (HIRA) and Disaster Management Plan shall be implemented.	Hazard Identification and Risk Assessment (HIRA) and Disaster Management Plan are being implemented. HIRA with DMP is attached herewith as <b>Annexure-22.</b>
ii)	The project proponent shall carry out heat stress analysis for the workmen who work in high temperature work zone and provide Personal Protection Equipment (PPE) as per the norms of Factory Act.	Heat stress analysis has been done and the reports are attached herewith as <b>Annexure – 23.</b>
iii)	Occupational health surveillance of the workers shall be done on a regular basis and records maintained.	Occupational health surveillance of the workers is being done and records maintained as per Factory Act. Sample report of employee is attached herewith as <b>Annexure – 24.</b>

## **IX. Corporate Environment Responsibility**

i)	The project proponent shall comply with the provisions contained in this Ministry's OM vide F. No. 22-65/2017-IA.III dated 30/09/2020.	The company has spent Rs. 372.98 lacs towards CER activities. The balance amount shall be spent shortly.  The details of the expenditure has been attached as <b>Annexure – 25.</b>
ii)	The company shall have a well laid down environmental policy duly approved by the Board of Directors. The environmental policy should prescribe for standard operating procedures to have proper checks and balances and to bring into focus any infringement/deviation/violation of the environmental/forest/wildlife norms/conditions. The company shall have defined system of reporting infringements/deviation/ violation of the environmental/ forest/ wildlife norms/	GMPL has a well laid down environmental policy duly approved by the Board of Directors. The policy is attached herewith as <b>Annexure-26.</b>

	conditions and/ or shareholders/ stake holders. The copy of the board resolution in this regard shall be submitted to the MoEF&CC as a part of six-monthly report.	
iii)	A separate Environmental Cell both at the project and company head quarter level, with qualified personnel shall be set up under the control of control of senior Executive, who will report directly to the head of the organization.	A separate Environmental Cell has been prepared at the project and company head quarter level with qualified personnel, headed by director of the company.
<b>X. Miscellaneous</b>		
i)	The project proponent shall make public the environmental clearance granted for their project along with the environmental conditions and safeguards at their cost by prominently advertising it in at least two local newspapers of the District of State, of which one shall be in the vernacular language within seven days and in addition this shall also be displayed in the project proponent's website permanently.	M/s Giridhan Metal Private Limited has advertised public notice regarding Environment Clearance on 28 <sup>th</sup> April 2021 in two local newspapers "EiSamay" (vernacular language-Bengali) and "Prabhat Khabar" (Hindi). The scanned copies of newspaper are attached herewith as <b>Annexure –27</b> .  The Environment Clearance has also been uploaded in company's website – <a href="https://www.giridhanmetal.com">https://www.giridhanmetal.com</a>
ii)	The copies of the environmental clearance shall be submitted by the project proponents to the Heads of local bodies, Panchayats and Municipal Bodies in addition to the relevant offices of the Government who in turn has to display the same for 30 days from the date of receipt.	The copy of environmental clearance has been submitted to Heads of local bodies of "Asansol Municipal Corporation" and "Asansol Durgapur Development Authority". The letter with speed post documents are attached herewith as <b>Annexure – 28</b> .
iii)	The project proponent shall upload the status of compliance of the stipulated environment clearance conditions, including results of monitored data on their website and update the same on half-yearly basis.	Complied
iv)	The project proponent shall monitor the criteria pollutants level namely; PM <sub>10</sub> , SO <sub>2</sub> , NO <sub>x</sub> (ambient level as well as stack emissions) or critical sectoral parameters, indicated for the projects and display the same at a convenient location for disclosure to the public and put on the website of the company.	The Digital Board has been installed and the Photo of the same has been attached as <b>Annexure – 29</b> .
v)	The project proponent shall submit six-monthly reports on the status of the compliance of the stipulated environmental conditions on website of ministry of Environment, Forest and Climate Change at environment clearance portal.	The six-monthly reports on the status of the compliance of the stipulated environmental conditions on website of Ministry of Environment, Forest & Climate Change has been uploaded. The copy of acknowledgement is attached herewith as <b>Annexure – 30</b> .
vi)	The project proponent shall submit the environment statement for each financial year in Form-V to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended	GMPL has submitted the environment statement to State Pollution Control Board for 2023-24 FY. The environment statement is also putted on company's website <a href="https://www.giridhanmetal.com">https://www.giridhanmetal.com</a> . The environment statement attached herewith as <b>Annexure – 31</b> .

	subsequently and put on the website of the company.	
vii)	The project proponent shall inform the Regional Office as well as Ministry, the date of financial closure and final approval of the project by the concern authorities, commencing the land development work and start of production operation by the project.	The date of financial closure was 21 <sup>st</sup> December 2021.
viii)	The project proponent shall abide by all the commitments and recommendations made in the EIA/EMP report, commitment made during Public Hearing and also that during their presentation to the Expert Appraisal Committee.	The commitments made during Public Hearing and its compliances are attached herewith as <b>Annexure – 32</b> .
ix)	No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment, Forest and Climate Change (MoEF&CC).	Agreed.
x)	Concealing factual data or submission of false/fabricated data may result in revocation of this environmental clearance and attract action under the provisions of Environment (Protection) Act, 1986.	Agreed
xi)	The Ministry may revoke or suspend the clearance, if implementation of any of the above conditions is not satisfactory.	Agreed
xii)	The Ministry reserves the right to stipulate addition conditions if found necessary. The company in the time bound manner shall implement these conditions.	Agreed
xiii)	The Regional Office of this Ministry shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (s) of the Regional Office by furnishing data/ information/ monitoring reports.	Agreed & complied
xiv)	Any appeal against this EC shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010	Agreed

**Remarks: We have obtained new EC on 15<sup>th</sup> July 2024 and CTE on 30th July 2024. We will comply new EC during next six monthly compliance report (October 2024 to March 2025).**

**Greenbelt Development**















**Furnace – 1**



**Furnace - 2**

## Analysis Reports of Gaseous Emission

## Analysis done at:

Identification Code: 1 2 0 8 2 0 2 4 1 0 0 1 2



## WEST BENGAL POLLUTION CONTROL BOARD

Durgapur Regional Laboratory, Paribesh Bhawan, City Centre, Durgapur- 713 216

1. Name of Industry	M/s. Giridhan Metal Pvt. Ltd.		
2. Address	Jamuria Industrial Estate, P.O.: Nandi, Jamuria, Paschim Bardhaman, Paschim Bardhaman, 713314		
3. Category & Type	Red & Integrated Steel Plant		
4. Sampling Date	12.08.2024		
5. Duration of Sampling	32 min.		
6. Name of Laboratory	M/s. JM Biotech (P) Ltd.		
7. Height of Stack from ground (m)	80.0		
8. Cross section of Stack at sampling point (m <sup>2</sup> )	3.14		
9. Stack connected to	CFBC Boiler (21 MW) Stream Generation 82 TPH		
10. Emission due to (Furnace / Boiler)	Combustion Of Coal & Dolochar.		
11. Average operational hours of boiler/furnace (per month)	720 hrs.		
12. APC System (if any)	ESP		
13. Working load of source (MT/hr)	19 MW (77 TPH Steam Generation)		
14. Fuel used	Coal + Dolochar + DE Dust		
15. Rated Fuel consumption (Kg or l /hr)	21 Ton/hr.		
16. Working Fuel consumption (Kg or l /hr)	18 Ton/hr.		
17. Nature of furnace/boiler	CFBC Boiler		
18. Flue Gas Temp (°C)	118.0		
19. Flue gas velocity (m/s)	9.22	20. Volume of Flue gas drawn in lit (m <sup>3</sup> )	1.024
21. Corrected flue gas volume (Nm <sup>3</sup> )	0.8699	22. Percentage of CO <sub>2</sub> & O <sub>2</sub>	CO <sub>2</sub> =11.4% O <sub>2</sub> =7.8%
23. To be compensated at (% if required)	6% O <sub>2</sub>		
24. Initial wt of thimble (gm)	1.7305	25. Final wt of thimble (gm)	1.7511
26. Wt. of PM (mg)	20.60	27. Particulate matter (mg/Nm <sup>3</sup> )	26.91 at 6% O <sub>2</sub>
28. Barometric Pressure Head (mm of Hg)	753	29. Diameter of the nozzle	9.525 mm
30. Others SO <sub>2</sub> & NO <sub>x</sub>	31. Thimble Number		5486
32. Sampled by	Mr. R. Chakraborty, AEE		

22/08/24

Date of Reporting

Dimitri  
22/08/24

Prepared by

AEE  
22/08/24

Checked by

Bijoy  
22/08/2024

Signature of In-Charge, DRL

Copy to:

1. OSD - Operation & Execution, WBPCB
2. Chief Scientist, WBPCB
3. Env. Engineer (DRO) / Env. Engineer (ARO), WBPCB
4. Industry



## TEST REPORT

<b>Name &amp; Address Of the Customer :</b> M/s. Giridhan Metal Pvt. Ltd. Jamuria Industrial Estate, Damodarpur, Jamuria P.O. - Nandi, Paschim Bardhaman, Pin : 713 344	Report No.	: QLS/MR/A/24-25/C/585
	Date	: 13.11.2024
	Sample No.	: QLS/MR/A/24-25/585
	Sample Description	: Stack Flue Gas
	Date of Performance(s)	: 01-13.11.2024
	Sample Mark	: DRI-350 TPD & 600 TPD
	Ref No. Date	: 9400000031, Dated-27.05.2024

## Analysis Result

Date & Time of Sampling : 29.10.2024 at 12:30 hrs. Sampling done by : S.Ghosh	Sampling Procedures : EPA/IS		
<b>A : General Information of Stack:</b>			
1 Stack connected to	: 600 TPD & 350 TPD DRI attached with common stack through WHRB		
2 Emission due to	: Combustion of Coal & Reduction of Fe Ore		
3 Material of construction of Stack	: RCC		
4 Shape of Stack	: Circular		
5 Whether stack is provided with permanent platform	: Yes		
6 Generation Capacity	: Rated - 350 TPD & 600 TPD		
<b>B : Physical Characteristic of Stack:</b>			
1 Height of Stack from ground level	: 80.0 m		
2 Diameter of Stack at bottom	: ---		
3 Diameter of Stack at sampling point	: 4.0 m		
4 Height of the sampling point from ground level	: 35.0 m		
5 Area of Stack	: 12.57 m <sup>2</sup>		
<b>C : Analysis/Characteristic of Stack:</b>			
1 Fuel used : Coal	2. Fuel consumption : ---		
<b>D : Results of Sampling &amp; Analysis of gaseous Emission:</b>			
	<b>RESULT</b>	<b>METHOD</b>	<b>LIMIT</b>
1 Temperature of emission (°C)	: 170	EPA Part 2	---
2 Barometric pressure (mm of Hg)	: 756	EPA Part 2	---
3 Velocity of gas (m/sec)	: 9.33	EPA Part 2	---
4 Quantity of gas flow (Nm <sup>3</sup> /hr)	: 282065	EPA Part 2	---
5 Concentration of Carbon monoxide(%v/v)	: <0.2	IS-13270-1992, Reaf : 2019	---
6 Concentration of Carbon dioxide(%v/v)	: 8.2	IS-13270-1992, Reaf : 2019	---
7 Concentration of Sulphur dioxide (mg/Nm <sup>3</sup> )	: 71.6	EPA Part-6	100
8 Concentration of Oxides of Nitrogen (mg/Nm <sup>3</sup> )	: 49.6	EPA Part-7	100
9 Concentration of Particulate Matters (mg/Nm <sup>3</sup> )	: 21 at 12 % of CO <sub>2</sub>	EPA Part 5	30
<b>E : Pollution Control Device :</b>		Details of pollution control devices attached with the stack : ESP	
<b>F : Remarks:</b> Nil			
Note: 1) Equipment Name/ID	: Stack Sampler & Velocity Monitor		
2) Model No	: APM-160		
3) Make-	: Lata Envirotech Services		
4) Sl No-	: 82-DTF-2016		
5) Calibration valid Up to	: 29.11.2024		

Report Prepared By :

*BarDas*

for Qualissure Laboratory Services  
Reviewed & Authorized By

*Benimadhab Gorai*  
Benimadhab Gorai, Chemist  
(Authorized Signatory)

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## TEST REPORT

<b>Name &amp; Address Of the Customer :</b> M/s. Girdhan Metal Pvt. Ltd. Jamuria Industrial Estate, Damodarapur, Jamuria P.O. - Nandi, Paschim Bardhaman, Pin : 713 344	Report No.:	: QLS/MR/A/24-25/C/586
	Date	: 13.11.2024
	Sample No.	: QLS/MR/A/24-25/586
	Sample Description	: Stack Flue Gas
	Date of Performance(s)	: 01-13.11.2024
	Sample Mark	: CFBC Boiler
	Ref No. Date	: 9400000031, Dated-27.05.2024

## Analysis Result

Date & Time of Sampling : 29.10.2024 at 15:00 hrs.		Sampling Procedures : EPA/IS	
Sampling done by : S.Ghosh			
<b>A : General Information of Stack:</b>			
1	Stack connected to	: CFBC Boiler	
2	Emission due to	: Combustion of Coal	
3	Material of construction of Stack	: RCC	
4	Shape of Stack	: Circular	
5	Whether stack is provided with permanent platform	: Yes	
6	Generation Capacity	: 32 TPH	
<b>B : Physical Characteristic of Stack:</b>			
1	Height of Stack from ground level	: 80.0 m	
2	Diameter of Stack at bottom	: ---	
3	Diameter of Stack at sampling point	: 2.0 m	
4	Height of the sampling point from ground level	: 35.0 m	
5	Area of Stack	: 3.14 m <sup>2</sup>	
<b>C : Analysis/Characteristic of Stack:</b>			
1	Fuel used : Coal	2. Fuel consumption : ---	
<b>D : Results of Sampling &amp; Analysis of gaseous Emission:</b>			
		<b>RESULT</b>	<b>METHOD</b>
1	Temperature of emission (°C)	: 105	EPA Part 2
2	Barometric pressure (mm of Hg)	: 756	EPA Part 2
3	Velocity of gas (m/sec)	: 8.73	EPA Part 2
4	Quantity of gas flow (Nm <sup>3</sup> /hr)	: 73920	EPA Part 2
5	Concentration of Carbon monoxide(%v/v)	: <0.2	IS:13270-1992, Ref: 2019
6	Concentration of Carbon dioxide(%v/v)	: 11.0	IS:13270-1992, Ref: 2019
7	Concentration of Sulphur dioxide (mg/Nm <sup>3</sup> )	: 97.8 at 6% O <sub>2</sub>	EPA Part-6
8	Concentration of Oxides of Nitrogen (mg/Nm <sup>3</sup> )	: 84.4 at 6% O <sub>2</sub>	EPA Part-7
9	Concentration of Mercury (µg/Nm <sup>3</sup> )	: <0.01	EPA Part-29
10	Concentration of Particulate Matters (mg/Nm <sup>3</sup> )	: 27 at 6% O <sub>2</sub>	EPA Part 5
			<b>LIMIT</b>
			---
			---
			---
			100
			100
			<0.03
			30
<b>E : Pollution Control Device :</b>			
Details of pollution control devices attached with the stack : ESP			
<b>F : Remarks:</b> Nil			
Note: 1) Equipment Name/ID : Stack Sampler & Velocity Monitor			
2) Model No : APM-160			
3) Make- : Lata Envirotech Services			
4) Sl No- : 82-DTF-2016			
5) Calibration valid Up to : 29.11.2024			

Report Prepared By :

*Barbar*

for Qualissure Laboratory Services

Reviewed & Authorized By

Benimadhab Gorai, Chemist  
(Authorized Signatory)

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## TEST REPORT

<b>Name &amp; Address Of the Customer :</b> M/s. Giridhan Metal Pvt. Ltd. Jamuria Industrial Estate, Damodarpur, Jamuria P.O. - Nandi, Paschim Bardhaman, Pin : 713 344	Report No. :	QLS/MR/A/24-25/C/622
	Date :	13.11.2024
	Sample No. :	QLS/MR/A/24-25/622
	Sample Description :	Stack Flue Gas
	Date of Performance(s) :	01-13.11.2024
	Sample Mark :	SMS
	Ref No. Date :	9400000031, Dated-27.05.2024

## Analysis Result

Date & Time of Sampling : 30.10.2024 at 9:30 hrs. Sampling done by : S.Ghosh	Sampling Procedures : EPA/IS		
<b>A : General Information of Stack:</b>			
1 Stack connected to	: SMS (No. of Furnace-1,2,3,4,5,6)		
2 Emission due to	: Melting of Scrap Materials		
3 Material of construction of Stack	: M.S		
4 Shape of Stack	: Circular		
5 Whether stack is provided with permanent platform	: Yes		
6 Generation Capacity	: 20 X 6 Ton		
<b>B : Physical Characteristic of Stack:</b>			
1 Height of Stack from ground level	: 30.0 m		
2 Diameter of Stack at bottom	: ---		
3 Diameter of Stack at sampling point	: 3.79 m		
4 Height of the sampling point from ground level	: 18.0 m (Appx.)		
5 Area of Stack	: 11.28 m <sup>2</sup>		
<b>C : Analysis/Characteristic of Stack:</b>			
1 Fuel used : ---	2. Fuel consumption : ---		
<b>D : Results of Sampling &amp; Analysis of gaseous Emission:</b>			
	<b>RESULT</b>	<b>METHOD</b>	<b>LIMIT</b>
1 Temperature of emission (°C)	: 38	EPA Part 2	---
2 Barometric pressure (mm of Hg)	: 756	EPA Part 2	---
3 Velocity of gas (m/sec)	: 8.92	EPA Part 2	---
4 Quantity of gas flow (Nm <sup>3</sup> /hr)	: 345027	EPA Part 2	---
5 Concentration of Carbon monoxide(%v/v)	: <0.2	IS:13270-1992, Reaf : 2019	---
6 Concentration of Carbon dioxide(%v/v)	: <0.2	IS:13270-1992, Reaf : 2019	---
7 Concentration of Sulphur dioxide (mg/Nm <sup>3</sup> )	: ---	EPA Part-6	---
8 Concentration of Oxides of Nitrogen (mg/Nm <sup>3</sup> )	: ---	EPA Part-7	---
9 Concentration of Particulate Matters (mg/Nm <sup>3</sup> )	: 13	EPA Part 5	30
<b>E : Pollution Control Device :</b>			
Details of pollution control devices attached with the stack	: Bag Filter		
<b>F : Remarks: Nil</b>			
Note: 1) Equipment Name/ID	: Stack Sampler & Velocity Monitor		
2) Model No	: APM-160		
3) Make-	: Lata Envirotech Services		
4) SI No-	: 82-DTF-2016		
5) Calibration valid Up to	: 29.11.2024		

Report Prepared By :

*Barbon*

for Qualissure Laboratory Services  
Reviewed & Authorized By

Benimadhab Gorai, Chemist  
(Authorized Signatory)

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## TEST REPORT

<b>Name &amp; Address Of the Customer :</b> M/s. Giridhan Metal Pvt. Ltd. Jamuria Industrial Estate, Damodarapur, Jamuria P.O. - Nandi, Paschim Bardhaman, Pin : 713 344	Report No.	: QLS/MR/A/24-25/C/623
	Date	: 13.11.2024
	Sample No.	: QLS/MR/A/24-25/623
	Sample Description	: Stack Flue Gas
	Date of Performance(s)	: 01-13.11.2024
	Sample Mark	: SEAF-1 (9 MVA X 2)
	Ref No. Date	: 9400000031, Dated-27.05.2024

## Analysis Result

Date & Time of Sampling : 30.10.2024 at 10:30 hrs. Sampling done by : S.Ghosh	Sampling Procedures : EPA/IS		
<b>A : General Information of Stack:</b>			
1 Stack connected to	: SEAF -1 (9 MVA X 2)		
2 Emission due to	: Reduction Of Mn Ore & Quartz		
3 Material of construction of Stack	: M.S		
4 Shape of Stack	: Circular		
5 Whether stack is provided with permanent platform	: Yes		
6 Generation Capacity	: ----		
<b>B : Physical Characteristic of Stack:</b>			
1 Height of Stack from ground level	: 40.0 m		
2 Diameter of Stack at bottom	: ----		
3 Diameter of Stack at sampling point	: 1.8 m		
4 Height of the sampling point from ground level	: 27.0 m		
5 Area of Stack	: 2.54 m <sup>2</sup>		
<b>C : Analysis/Characteristic of Stack:</b>			
1 Fuel used : ----	2. Fuel consumption : ----		
<b>D : Results of Sampling &amp; Analysis of gaseous Emission:</b>			
	<b>RESULT</b>	<b>METHOD</b>	<b>LIMIT</b>
1 Temperature of emission (°C)	: 71	EPA Part 2	---
2 Barometric pressure (mm of Hg)	: 756	EPA Part 2	---
3 Velocity of gas (m/sec)	: 8.32	EPA Part 2	---
4 Quantity of gas flow (Nm <sup>3</sup> /hr)	: 65577	EPA Part 2	---
5 Concentration of Carbon monoxide(%v/v)	: <0.2	IS:13270-1992, Reaf : 2019	---
6 Concentration of Carbon dioxide(%v/v)	: <0.2	IS:13270-1992, Reaf : 2019	---
7 Concentration of Sulphur dioxide (mg/Nm <sup>3</sup> )	: 58.3	EPA Part-6	---
8 Concentration of Oxides of Nitrogen (mg/Nm <sup>3</sup> )	: 35.1	EPA Part-7	---
9 Concentration of Particulate Matters (mg/Nm <sup>3</sup> )	: 16	EPA Part 5	30
<b>E : Pollution Control Device :</b>			
Details of pollution control devices attached with the stack	: Bag Filter		
<b>F : Remarks: Nil</b>			
Note: 1) Equipment Name/ID	: Stack Sampler & Velocity Monitor		
2) Model No	: APM-160		
3) Make-	: Lata Envirotech Services		
4) Sl No-	: 82-DTF-2016		
5) Calibration valid Up to	: 29.11.2024		

Report Prepared By :

*Saeed*

for Qualissure Laboratory Services  
Reviewed & Authorized By



Benimadhab Goral, Chemist  
(Authorized Signatory)

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## TEST REPORT

<b>Name &amp; Address Of the Customer :</b> M/s. Giridhan Metal Pvt. Ltd. Jamuria Industrial Estate, Damodarpur, Jamuria P.O. - Nandi, Paschim Bardhaman, Pin : 713 344	Report No.	: QLS/MR/A/24-25/C/624
	Date	: 13.11.2024
	Sample No.	: QLS/MR/A/24-25/624
	Sample Description	: Stack Flue Gas
	Date of Performance(s)	: 01-13.11.2024
	Sample Mark	: Cooler Discharge & Surge Bin
	Ref No. Date	: 9400000031, Dated-27.05.2024

## Analysis Result

Date & Time of Sampling : 30.10.2024 at 12:00 hrs. Sampling done by : S.Ghosh	Sampling Procedures : EPA/IS		
<b>A : General Information of Stack:</b>			
1 Stack connected to	: Cooler Discharge & Surge Bin of 600 TPD DRI		
2 Emission due to	: Process Activity		
3 Material of construction of Stack	: M.S		
4 Shape of Stack	: Circular		
5 Whether stack is provided with permanent platform	: Yes		
6 Generation Capacity	: ---		
<b>B : Physical Characteristic of Stack:</b>			
1 Height of Stack from ground level	: 30.0 m		
2 Diameter of Stack at bottom	: ---		
3 Diameter of Stack at sampling point	: 1.2 m		
4 Height of the sampling point from ground level	: 20.0 m		
5 Area of Stack	: 1.1314 m <sup>2</sup>		
<b>C : Analysis/Characteristic of Stack:</b>			
1 Fuel used : ---	2. Fuel consumption : ---		
<b>D : Results of Sampling &amp; Analysis of gaseous Emission:</b>			
	<b>RESULT</b>	<b>METHOD</b>	<b>LIMIT</b>
1 Temperature of emission (°C)	: 50	EPA Part 2	---
2 Barometric pressure (mm of Hg)	: 756	EPA Part 2	---
3 Velocity of gas (m/sec)	: 8.64	EPA Part 2	---
4 Quantity of gas flow (Nm <sup>3</sup> /hr)	: 32307	EPA Part 2	---
5 Concentration of Carbon monoxide(%v/v)	: <0.2	IS:13270-1992, Reaf : 2019	---
6 Concentration of Carbon dioxide(%v/v)	: <0.2	IS:13270-1992, Reaf : 2019	---
7 Concentration of Sulphur dioxide (mg/Nm <sup>3</sup> )	: ---	EPA Part-6	---
8 Concentration of Oxides of Nitrogen (mg/Nm <sup>3</sup> )	: ---	EPA Part-7	---
9 Concentration of Particulate Matters (mg/Nm <sup>3</sup> )	: 17	EPA Part 5	30
<b>E : Pollution Control Device :</b>			
Details of pollution control devices attached with the stack	: Bag Filter		
<b>F : Remarks: Nil</b>			
Note: 1) Equipment Name/ID	: Stack Sampler & Velocity Monitor		
2) Model No	: APM-160		
3) Make-	: Lata Envirotech Services		
4) SI No-	: 82-DTF-2016		
5) Calibration valid Up to	: 29.11.2024		

Report Prepared By :

*B. Ghosh*

for Qualissure Laboratory Services  
Reviewed & Authorized By

*B. Ghosh*  
Benimadhab Gorai, Chemist  
(Authorized Signatory)

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**GIRIDHAN METAL PRIVATE LIMITED**Registered Office: 'Premlata', 39, Shakespeare Sarani, 3<sup>rd</sup> Floor, Kolkata – 700 017, West Bengal, India.  
Telefax- +91 33 22892734 / 35 / 36. E-Mail : giridhanmetal@gmail.com**ANNEXURE – 1****□ Technical Specifications of Bag Filter:**

SN	Technical Parameter (Bag Filter)	Unit	Technical Description
1	Model No.	-	IAEC BF 6-12x15-4.88
2	Location	-	Sub-merged Arc Furnace
3	Cleaning type	offline / online	Offline
4	Emission Level	mg/Nm <sup>3</sup>	Below 30 guarantee
5	Pressure drop across unit (max.)	mm WC	150 (Max)
6	Gas Volume	Am <sup>3</sup> /hr	1,75,000
7	Designed dust load	gm/Nm <sup>3</sup>	100
8	Gas Temp. at inlet	deg. C	125
9	Air to cloth ratio (net)	m <sup>3</sup> /min/m <sup>2</sup>	1.09
10	Air to cloth ratio (gross)	m <sup>3</sup> /min/m <sup>2</sup>	1.31
11	Filtration Efficiency	%	99.97
12	Compressed Air Quantity (FAD)	m <sup>3</sup> /hr	35
13	Gauge pressure	Kg/cm <sup>2</sup>	6-8( Dry)
14	Compartment arrangement	-	Box type/Panel
15	Total No. of Bags	Nos.	1080
16	No. of Solenoid Valves & Size	Nos./NB	90/40
17	Housing – Casing/ No.	-	Box Type/6
18	No. of hoppers	-	6
19	Hopper type/ Valley Angle	-	Pyramid / 60 Deg.
20	Thickness of casing /MOC	mm	5 / IS:2062
21	Thickness of Top Cover /MOC	mm	3.15 / IS:2062
22	Hopper thickness	mm	5 / IS:2062
23	Tube sheet thickness	mm	5 / IS:2062
24	Bag fixing arrangement	-	Snap Band type
25	Bag dia.	mm	160
26	Length	mm	4880
27	Filter area per Bag	m <sup>2</sup>	2.47
28	Filtration area (total )	m <sup>2</sup>	2668
29	Filer bag fabric with treatment	-	Non-woven PNF with PTFE membrane finish
30	Weight of fabric	Gm/m <sup>2</sup>	600±5 %
31	Max. Temp. filter fabric with stand	deg. C	150
32	No. of Cage for Filter Bags	Nos.	1080
33	Cage Type	-	Single

34	Cage material	-	G.I.
35	Painting	-	Aluminum
36	Knife Gates	-	6+2
<b>SN</b>	<b>Technical Parameter (Rotary Air Lock Valve)</b>	<b>Unit</b>	<b>Technical Description</b>
1	RAL Below BF Hopper	-	Considered
2	RAL Quantity / Size	mm	9 / 250 X250 sq.
3	Make	-	IAEC
4	Speed	rpm	31
5	Drive arrangement	-	Direct through coupling
6	Drive motor power	KW	0.37
7	MOC of Housing and Rotor / Shaft	-	IS: 2062 / EN-8
<b>SN</b>	<b>Technical Parameter (ID Fan)</b>	<b>Unit</b>	<b>Technical Description</b>
1	Location	-	After Bag filter
2	Model No.	-	IAEC-ACB-160-199-7
3	Type	-	Single inlet Single width Centrifugal Fan
4	Make	-	IAEC
5	Capacity	Am <sup>3</sup> /Hr	1,92,500
6	Qty.	-	1
7	Operating Temp	deg. C	125
8	Static pressure at specified temperature	mm WC	350 at 125 Deg. C.
9	Total pressure at 20 Deg. C	mm WC	475 at 20 Deg. C
10	Shaft Power at specified temperature	BKW	222 at 125 Deg. C.
11	Shaft Power at 20 Deg C	BKW	310 at 20 Deg. C.
12	Static efficiency	%	76
13	Speed	rpm	980
14	Type of Drive arrangement	-	Coupling
15	Rating	KW / Pole	300 /6
16	Casing/ Scroll ( thk) & MOC	mm	6 / 6 & IS: 2062
17	Impeller ( B. Plate/Blade/ Shroud) & MOC	mm	8/6 /5 & IS: 2062
18	Shaft (MOC)	-	EN8
<b>SN</b>	<b>Technical Parameter (Chimney)</b>	<b>Unit</b>	<b>Technical Description</b>
1	Diameter of the Chimney	mm	2000
2	Height of the Chimney	meter	30



## Sox formation and it's Reduction method in CFB boiler

### Sox formation

Sulfur oxides are the gaseous products of the oxidation of sulfur (mainly from fuel) by oxygen (from combustion air). The primary product of oxidation of the fuel sulfur is SO<sub>2</sub>.

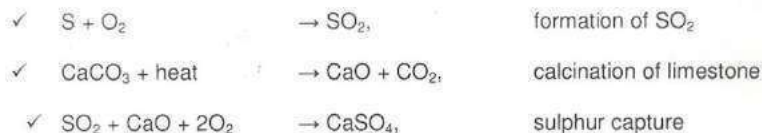
### Descriptions and Features De SO<sub>x</sub> System in CFB Technology:

CFB has been proven to be quite effective in the reduction of SO<sub>2</sub> emissions. Reduction of SO<sub>2</sub> emissions, in CFB is accomplished by the injection of limestone into the furnace. The CFB boiler is suitable for SO<sub>2</sub> reduction of 98% with the following features by injecting lime stone in the CFB furnace.

- Appropriate Furnace temperature (Typically 870- 910Deg.C) is maintained throughout the furnace which is effective temperature range for better sulphur capture.
- Furnace is designed with adequate height to have adequate gas and sorbent residence time.
- The time of contact between the formed SO<sub>2</sub> and the capturing Ca is taken into account via the furnace residence time and the separator
- Limestone feed system is designed to have even distribution of limestone over the furnace cross section.
- Optimum particle size distribution of sorbent (Lime stone) shall be maintained for effective sulphur capture.
- Compact separator of CFB boiler which collects the unburnt solids particle and un reacted limestone particles of size above 63 microns which are sent back to furnace for effective utilization of limestone and capture

### Process Description:

- The sorbent (Limestone) is calcined using a small amount of the heat generated by combustion of the fuel and can then react with gaseous sulphur to generate a solid sulphate (CaSO<sub>4</sub>) which is either captured in the ESP or it is retained in the bed material and removed as bottom ash.
- The primary reactions involved in the generation and reduction of SO<sub>2</sub> emissions with calcium-based sorbents are:



Due to proven state of art CFB combustion technology with above method, the Sox produced is lesser than the permissible limit.



BOILERS

Isgec Heavy Engineering Ltd  
Noida 201 301 (U. P.) India  
CIN: L23423HR1933PLC000097

### NOx Emission control in CFB boiler

NOx emissions from CFB boilers are much lower when compared with emissions from other combustion technology.

#### NOx Formation and it's control method:

- **Combustion temperature** : At higher temperatures (in excess of 1100 °C) a fraction of the nitrogen in the combustion air also reacts with oxygen to form NOx. However, Due to the lower combustion temperature 870 – 910 °C found in fluidized bed combustion as opposed to temperatures in excess of 1100 °C encountered in other combustion systems, very little thermal NOx is formed which will be negligible.
- **Extent of air staging** : Reduction in NOx emissions results from the staged combustion utilized in CFB boilers. Staged combustion will take place effectively by means of Secondary air provided in Front & Rear walls of Combustor with multiple locations to avoid any NOx formation in flue gases.
- **Excess air level** : In addition to the Stoichiometric air required for Combustion of CFB Boilers, excess air is supplied for complete fuel oxidation in order to ensure proper combustion in Furnace to eliminate NOx.

Due to proven state of art CFB combustion technology with above precautions the NOx produced is lesser than the permissible limit.

  
  
BOILERS  
ISGEC Heavy Engineering Ltd  
Noida (U. P.) India

**WEST BENGAL POLLUTION CONTROL BOARD**

Paribesh Bhawan  
10A, Block - LA, Sector III, Bidhannagar  
Kolkata - 700 106



Memo No. 477-2N-51/2003(E)-Pt.-I

Dated 28/06/2021

From:  
Member Secretary,  
West Bengal Pollution Control Board

To: M/s. Giridhan Metal Private Limited,  
'Prentala', 39, Shakespeare Sarani, 3rd Floor, Kolkata -700 017.

Sub: Consent to Establish (NOC) from Environmental Point of View

Ref: i) Your letter No. Nil Dated 05.05.2021  
ii) Env. Clearance issued by WBPCC vide 11011/366/2010-IA.II.  
(I) dtd.08.04.2021

# WEST BENGAL

Dear Sirs,

In response to the application for Consent to Establish (NOC) for proposed Unit of M/s Giridhan Metal Private Limited for expansion of their existing steel plant by expanding sponge iron plant from 1,20,000TPA to 3,18,000TPA, M.S. Billets from 1,05,000TPA to 3,72,000TPA, Rolling Mill from 1,00,000TPA to 3,00,000TPA Submerged Arc Furnace (S.A.F) from 15,000TPA to 30,000TPA & Captive Power Plant from 15 MW to 42 MW including Waste Heat Recovery Boiler (WHRB) at

this is to inform you that this Board hereby grants the Consent to Establish (NOC) from the environmental point of the above subject to the following conditions and special conditions annexed.

Jamuria Industrial Estate, Vill.-Ikra, Damodar, Tehsil-Jamuria, Dist.-Paschim Bardhaman, West Bengal. The details of the expansion project are\*

- The quality of sewage and trade effluent to be discharged from your factory shall satisfy the permissible limits as prescribed in IS : 2490 (Pt. I) of 1974, and/or its subsequent amendment and Environment (Protection) Rules 1986.  
\* given as Annexure - A.
- Suitable measures to treat your effluent shall be adopted by you in order to reduce the pollutional load so that the quality of the effluent satisfies the standards mentioned above.
- You shall have to apply to this Board for its consent to operate and discharge of sewage and trade effluent according to the provisions of the water (Prevention & Control of Pollution) Act, 1974. No sewage or trade effluent shall be discharged by you without prior consent of this Board.
- All emission from your factory shall conform to the standards as laid down by this Board.
- No emission shall be permitted without prior approval of this Board and you shall apply to this Board for its consent to operate and atmospheric emission as per provision of the Air (Prevention & Control Pollution) act, 1981.
- No industrial plant, furnace, flues, chimneys, control equipment, etc. shall be constructed/reconstructed/erected/re-erected without prior approval of this Board.

*[Signature]*  
28/06/2021

7. You shall comply with
- (i) Water (Prevention and Control of Pollution) Cess Act, 1977, if applicable.
  - (ii) Water (Prevention and Control of Pollution) Cess Act, 1978, if applicable.
  - (iii) Environment (Protection) Act, 1986
  - (iv) Environment (Protection) Rules, 1986
  - (v) Hazardous Wastes (Management and Handling) Rules, 1989 and Amended Rules, 2000
  - (vi) Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 and Amended Rules, 2000
  - (vii) Manufacture, Use, Import and Storage and Hazardous Micro-Organisms, Genetically Engineered Organisms or Cell Rules, 1989
  - (viii) The Public Liability Insurance Act, 1991 and Amended Act, 1992
  - (ix) The Public Liability Insurance Rules, 1991 and Amended Rules 1993
  - (x) Biomedical Wastes (Management & Handling) Rules, 1998 and Amended Rules 2000 if applicable.
  - (xi) Recycled Plastics Manufacture and Usage Rules 1999, if applicable and
  - (xii) Ozone Depleting Substances (Regulation & Control) Rules, 2000, if applicable
8. You will have to abide by any other stipulations as may be prescribed by any authority/local bodies/Government Departments etc.

**SPECIAL CONDITION :**

The total capital cost of the projects( including expansion) is Rs.996.69 Crores.

please refer to Annexure - B

Any violation of the aforesaid conditions shall entail cancellation of this Consent to Establish (NOC)

Yours faithfully,

*Mukherjee*  
28/06/2004  
Member Secretary/ SR. ENV. ENGR,  
West Bengal Pollution Control Board (EIM CELL)

Memo No. 477 -2N-51/2003(B)-Pt.-I dt. 28/06/2004  
Copy forwarded for information to :

Sr. Environmental Engineer  
W. B. Pollution Control Board  
Dept. of Environment, GoWB

1. Chief Inspector of Factories, Government of West Bengal, N. S. Building, Kolkata-700 001
2. Director of Industries/Director of Cottage & Small Scale Industries, Government of West Bengal, N. S. Building, Kolkata-700 001
3. Guard file, West Bengal Pollution Control Board.
4. Environmental Engineer, III/Alipur R.O./Howrah R.O./Hooghly R.O./B.R.O./D.R.O./Haldia R.O./S.R.O./Asansol/ Sub-R.O./WBPC Board

Himalaya Bhawan Delhi Road, Dankuni Dist. Hooghly	Vill, Panpur Kalyani Expressway P.O. Narayanpur Dist. 24 Pgs. (N)	Sahid Khudiram Sarani City Centre, Durgapur-16 Dist. Burdwan	10, Camac Street 2nd Floor Kolkata-700 017
---	--	--	--

Paribesh Bhawan 10A, LA-Block, Sector-III Salt Lake City, Kolkata - 700 098	Block-05 at 40 Flats Complex Adjacent to Priyambada Housing Estate P.O. : Khanjanchak, P.S. Durgachak Haldia-721602 Dist. : Purba Medinipur	Paribahan Nagar Matigara, Siliguri Dist.-Darjeeling
--	--	---

Satya Chowdhury Indoor Stadium Balurchar Bandh Road	Asansol Sub-Regional Office ADDA Commercial Market (2nd Floor) Opposite Asansol Fire Station
---	--

*Mukherjee*  
28/06/2004  
Member Secretary/ SR. ENV. ENGR,  
West Bengal Pollution Control Board (EIM CELL)

Annexure A to NOC Sl. No. NO164560

Special conditions issued to M/s. Giridhan Metal Private Limited, Jamuria Industrial Estate, Vill – Ikra & Damodarpur, Tehsil – Jamuria, District – Paschim Bardhaman, West Bengal (Expansion Project)

S. No.	Name	Existing Unit		Proposed Unit		Total (Existing + Proposed)		Stack Height (m)
		Configuration	Production (TPA)	Configuration	Production (TPA)	Configuration	Production (TPA)	
1.	Sponge Iron (DRI Plant)	1X 350 TPD	120000 TPA	1X 600 TPD	198000 TPA	1x 350 & 1X 600 TPD DRI Plant	318000 TPA	80
2.	MS Billets (Induction Furnace with LF & CCM)	2X15 Ton IF (Induction Furnace)* & 1X30 Ton LF (Ladle Furnace)	105000 TPA	6X15 Ton IF * (Induction Furnace)	267300 TPA	6X20 Ton IF * (Induction Furnace) & 1X30 Ton LF (Ladle Furnace)	372300 TPA	40
3.	Rolling Mill	310 TPD of rolled / bars / light structure	100000 TPA	625 TPD of rolled / bars / light structure	200000 TPA	310 TPD & 625TPD of rolled / bars / light structure	300000 TPA	Nil
4.	Submerged Arc Furnace (SAF)	1 X 9 MVA of Fe-Mn / Si-Mn	15000 TPA	1X9 MVA of Fe-Mn / Si-Mn	15000 TPA	2X9 MVA of Fe-Mn / Si-Mn	30000 TPA	40
5.	Waste Heat Recovery Boiler (WHRB) based CPP	35 TPH	7 MW	70 TPH	14 MW	35 TPH & 70 TPH	21 MW	Connected with DRI
6.	Captive Power Plant (FBC boiler)	1 X 32 TPH FBC boiler	9 MW	50 TPH FBC boiler	12 MW	1X 32 TPH & 50 TPH FBC boiler	21 MW	80
7.	Billet Caster	1 X 350 TPD DRI Plant	120000 TPA	-	2X2 Strand	2X2 Strand	-	NA
8.	Railway Siding with Wagon Tippler							
<p>Note: *instead of 2x15 Ton IF and proposed 6x15 Ton IF (Induction Furnace) (6x20 Ton IF) will be installed as a part of proposed expansion.</p> <p>Note: Presently only 15000 TPA Sponge Iron Plant (50 TPD DRI Plant) is installed which is currently on-operational and will be dismantled after commissioning of 1x350 TPD)</p>								

*[Signature]*  
28/6/2021  
Sr. Environmental Engineer  
W. B. Pollution Control Board  
Dept. of Environment, GoWB

Annexure B to NOC Sl. No. NO164560

Special conditions issued to M/s. Giridhan Metal Private Limited, Jamuria Industrial Estate, Vill – Ikra & Damodarpur, Tehsil – Jamuria, District – Paschim Bardhaman, West Bengal (Expansion Project)

**A) Specific Conditions :**

- i. Green belt shall be developed in 31.38 acres of land (40%) including the gap filling in the existing green belt with a tree density of 2500 trees per hectare.
- ii. Closed type submerged Arc Furnace with 4th hole extraction system shall be installed.
- iii. 1 x350 TPD and 1x600 TPD DRI kiln shall be installed. Remaining DRI kilns as per the existing EC accorded by MoEF&CC shall not be in taljed and 50 TPD DRI kiln existing at the site shall be dismantled.
- iv. Project proponent shall meet the particulate matter emission norms in all the stacks less than 30 mg/Nm<sup>3</sup>.
- v. The project proponent shall comply with emission norms of PM, SO<sub>x</sub>, NO<sub>x</sub> and mercury for captive power plant as stipulated in the gazette notification no. S.O. 3305 (E) dated 7/12/2015.
- vi. Jigging and briquetting Plant shall be installed. -

**B) Emission:-**

1. Stacks should have sampling port, platform and ladder as per the Emission Regulation Part-III of CPCB. Continuous stack monitoring facilities should be provided with sponge iron units, ferro-alloy plant & CPP.
2. New Standards for sponge iron plant issued by MoEF vide G.S.R 414(E) dated 30th May,2008 shall be complied with.
3. The National Ambient Air Quality Emission Standards issued by MoEF vide G.S.R 826(E) dated 16th November, 2009 should be complied with.
4. As proposed the unit shall not operate DRI kilns without WHRB-ESP operation.
5. Dry fog system and water sprinklers to be installed to arrest fugitive emission.

**C) Effluent :-**

1. Process – Any process effluent generated will be treated in properly designed ETP. Treated effluent to be utilized within the plant premises. Zero Discharge Principle should be strictly adhered to.
2. Cooling water to be recycled.
6. Domestic - to be discharged after treatment in adequately designed STP.

**D) Solid Waste :-**

1. Fly ash to be sold to cement manufacturing units.
2. Dolo-char to be used in AFBC.
3. Bottom ash and slag from induction furnace and SEAF to be used for land filling and road making.

*Mukherjee*  
18/12/2014  
Sr. Environmental Engineer  
W. B. Pollution Control Board  
Dept. of Environment, GoWB


Annexure B to NOC Sl. No. **NO164560**

Special conditions issued to **M/s. Giridhan Metal Private Limited, Jamuria Industrial Estate, Vill – Ikra & Damodarpur, Tehsil – Jamuria, District – Paschim Bardhaman, West Bengal (Expansion Project)**

4. Hazardous Waste to be collected and disposed of as per the Hazardous Wastes (Handling and Trans-boundary Movement) Rules, 2016 and as amended thereafter.

**E) General :-**

1. Noise Control – Ambient noise & D.G.Set noise level not to exceed the permissible limit.
2. No additional machinery / equipments can be installed without permission from this board.
3. Adequate arrangement for dust suppression in raw material handling section to be provided.
4. At least 40% of the project area should be under green belt.
5. Rain water harvesting must be done however recharging of harvested rain water is not allowed under any circumstances.
6. Conditions laid down in the Environmental Clearance obtained for the expansion project from MoEF, Govt vide no, J-11011/366/2010-IA II (1) dated 08.04.2021 must be strictly followed.
7. The conveyor belt for transferring materials to day bins & skip hoist to be covered.
8. Good house-keeping to be maintained.
9. Land conversion certificate, if applicable, should be obtained from the competent authority.
10. Permission for extracting ground water must be obtained from the competent authority.
11. Project proponent should not undertake any activity on any portion of land which is not under their possession.
12. This NOC is valid up to **31.05.2028** for setting up the expansion project.

  
Member Secretary / Sr. Environmental Engineer (EIM Cell)  
West Bengal Pollution Control Board

*Sr. Environmental Engineer*  
W. B. Pollution Control Board  
Dept. of Environment, GoWB

NOC NO172019

SPEED POST

# WEST BENGAL POLLUTION CONTROL BOARD

Paribesh Bhawan  
10A, Block - LA, Sector III, Bidhannagar  
Kolkata - 700 106



Memo No. 671-2N-51/2003(E)-Pt-I

Dated 30/12/2022

From :  
Member Secretary,  
West Bengal Pollution Control Board

To: M/s. Giridhan Metal Private Limited,  
premlata, 39, Shakespeare Sarani, 2nd Floor, Kolkata - 700 017.

Sub: Consent to Establish (NOC) from Environmental Point of View

Ref: i) Your letter No. N/D dated 23.12.2022  
ii) E.C. issued by MOEF&CC vide F.No. J=11011/366/2010-IA, II(I) dtd. 08.04.2021.  
iii) CTE issued vide Memo No. 477-2N-51/2003(E)-Pt-I dtd. 28.06.2021  
iv) Copy of information letter to MOEF&CC vide Ref. No. GMPL/22-23/MOEF&CC/10 dtd. 26.11.2022.

Dear Sirs,

In response to the application for Consent to Establish (NOC) for proposed ~~change in~~ configuration of the FBC boiler in the captive power plant of

~~M/s. Giridhan Metal Private Limited (Details given in annexure-I) in their existing plant at Jamuria Industrial Estate, Vill-Ikka, Damodarpur, Tehsil- Jamuria, Dist.- Paschim Bardhaman.~~

this is to inform you that this Board hereby grants the Consent to Establish (NOC) from the environmental point of the above subject to the following conditions and special conditions annexed.

1. The quality of sewage and trade effluent to be discharged from your factory shall satisfy the permissible limits as prescribed in IS : 2490 (Pt. II) of 1974, and/or its subsequent amendment and Environment (Protection) Rules 1986.
2. Suitable measures to treat your effluent shall be adopted by you in order to reduce the pollutional load so that the quality of the effluent satisfies the standards mentioned above.
3. You shall have to apply to this Board for its consent to operate and discharge of sewage and trade effluent according to the provisions of the water (Prevention & Control of Pollution) Act, 1974. No sewage or trade effluent shall be discharged by you without prior consent of this Board.
4. All emission from your factory shall conform to the standards as laid down by this Board.
5. No emission shall be permitted without prior approval of this Board and you shall apply to this Board for its consent to operate and atmospheric emission as per provision of the Air (Prevention & Control Pollution) act, 1981.
6. No industrial plant, furnace, flues, chimneys, control equipment, etc. shall be constructed/reconstructed/erected/re-erected without prior approval of this Board.

*M. S. Ghosh*  
Engineer  
W. B. Pollution Control Board  
Dept. of Environment, Govt. of W.B.

7. You shall comply with

- (i) Water (Prevention and Control of Pollution) Cess Act, 1977, if applicable.
- (ii) Water (Prevention and Control of Pollution) Cess Act, 1978, if applicable.
- (iii) Environment (Protection) Act, 1986
- (iv) Environment (Protection) Rules, 1986
- (v) Hazardous Wastes (Management and Handling) Rules, 1989 and Amended Rules, 2000
- (vi) Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 and Amended Rules, 2000
- (vii) Manufacture, Use, Import and Storage and Hazardous Micro-Organisms, Genetically Engineered Organisms or Cell Rules, 1989
- (viii) The Public Liability Insurance Act, 1991 and Amended Act, 1992
- (ix) The Public Liability Insurance Rules, 1991 and Amended Rules 1993
- (x) Biomedical Wastes (Management & Handling) Rules, 1998 and Amended Rules 2000 if applicable.
- (xi) Recycled Plastics Manufacture and Usage Rules 1999, if applicable and
- (xii) Ozone Depleting Substances (Regulation & Control) Rules, 2000, if applicable

8. You will have to abide by any other stipulations as may be prescribed by any authority/local bodies/Government Departments etc.

**SPECIAL CONDITION :**

The capital investment for the proposed is Rs.39.36 Crores.

Any violation of the aforesaid conditions shall entail cancellation of this Consent to Establish (NOC)

Yours faithfully,

*[Signature]*  
Member Secretary/Chief Engineer,  
West Bengal Pollution Control Board (EIM CELL)

*[Signature]*  
Chief Engineer  
W. B. Pollution Control Board  
Dept. of Environment, Govt. of W.B.

Memo No. 671 -2N-51/2003(E)-Pt-I dtd. 30/12/2022

Copy forwarded for information to :

1. Chief Inspector of Factories, Government of West Bengal, N. S. Building, Kolkata-700 001
2. Director of Industries/Director of Cottage & Small Scale Industries, Government of West Bengal, N. S. Building, Kolkata-700 001
3. Guard file, West Bengal Pollution Control Board.
4. Environmental Engineer, III/Alipur R.O./Howrah R.O./Hooghly R.O./B.R.O./D.R.O./Haldia R.O./S.R.O./Asansol/ Sub-R.O./WBPC Board

Himalaya Bhawan  
Delhi Road, Dankuni  
Dist. Hooghly

Vill, Panpur  
Kalyani Expressway  
P.O. Narayanpur  
Dist. 24 Pgs. (N)

Sahid Khudiram Sarani  
City Centre, Durgapur-16  
Dist. Burdwan

10, Camac Street  
2nd Floor  
Kolkata-700 017

Paribesh Bhawan  
10A, LA-Block, Sector-III  
Salt Lake City,  
Kolkata - 700 098

Block-05 at 40  
Flats Complex  
Adjacent to Priyambada  
Housing Estate  
P.O. : Khanjanchak,  
P.S. Durgachak  
Haldia-721602  
Dist. : Purba Medinipur

Paribahan Nagar  
Matigara, Siliguri  
Dist.-Darjeeling

Satya Chowdhury  
Indoor Stadium  
Balurchar Bandh Road  
Malda-732101

Asansol Sub-Regional Office  
ADDA Commercial Market (2nd Floor)  
Opposite Asansol Fire Station  
G.T. Road, Asansol-713 301

*[Signature]*  
Member Secretary/Chief Engineer,  
West Bengal Pollution Control Board  
Chief Engineer  
W. B. Pollution Control Board  
Dept. of Environment, Govt. of W.B.

Annexure 1 to NOC Sl. No. **NO172019**

Special conditions issued to **M/s. Giridhan Metal Private Limited, Jamuria Industrial Estate, Vill – Ikra & Damodarpur, Tehsil – Jamuria, District – Paschim Bardhaman, West Bengal (Expansion Project)**


Capacity of Captive Power Plant (FBC Boiler) as per CTE issued vide No. 477-2N-51/2003(E) Pt.I dated 28.06.2021						Capacity of Captive Power Plant (FBC Boiler)		Stack height (m)	Emission Control System
Existing		Proposed		Total		Proposed configuration	Production		
Configuration	Production	Configuration	Production	Configuration	Production				
FBC boiler – 1x32 TPH	9 MW	FBC boiler – 1x50 TPH	12 MW	1x32 TPH & 1x50 TPH FBC boiler	21 MW	1x82 TPH	21 MW	80	Adequately designed ESP to meet the particulate emission standard of 30 mg/Nm <sup>3</sup>

This is to be treated as an Annexure to the CTE issued vide No. 477-2N-51/2003(E) Pt.I dated 28.06.2021.

The existing boiler of 1x32 TPH shall be replaced by 1x82 TPH.

The particulate emission from the stack attached to the boiler shall be limited to 30 mg/Nm<sup>3</sup>.

Please note that all other conditions of the above mentioned CTE shall remain unchanged.

  
Chief Engineer (EIM Cell)  
West Bengal Pollution Control Board

Chief Engineer  
W. B. Pollution Control Board  
Dept. of Environment, Govt. of W.B.



## Government of West Bengal

This document having UDIN **24-G-GA000004-C-1722336170291** has been created by **WEST BENGAL POLLUTION CONTROL BOARD** with authorised person's Aadhaar no XXXXXXXX7589 on **04:12PM, July 30, 2024**.

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*Gibansa Mukherjee*

Authorised Signatory  
(E-signed)  
Department of IT&E



**WEST BENGAL POLLUTION CONTROL BOARD**  
**Paribesh Bhawan, 10A, Block LA, Sector III**  
**Salt Lake City, Bidhan Nagar, Kolkata – 700 106, INDIA**  
 Website : www.wbpcb.gov.in, e-mail : wbpcbnet@wbpcb.gov.in

**Validity Period :30/07/2024 To 31/07/2031**

**Category: RED**

**Application Type: CTE**

**CTE No.: WBPCB/5507639/2024**

**Date: 30/07/2024**

**Sub : Consent to Establish (CTE) under Section 25 & 26 of the Water (Prevention and Control of Pollution) Act, 1974 as amended and Section 21 of the Air (Prevention and Control of Pollution) Act, 1981 as amended.**

**Ref.: Application No. 5507639**

**To,**  
**M/s Giridhan Metal Private Limited**  
**Jamuria Industrial Estate, Village – Ikra & Damodarpur, Tehsil – Jamuria, Dist – Paschim Bardhaman, West Bengal.**

The West Bengal Pollution Control Board (hereinafter referred to as the State Board) hereby grants Consent to Establish (CTE) from environmental point under Section 25 & 26 of the Water (Prevention and Control of Pollution) Act, 1974, as amended and Section 21 of the Air (Prevention and Control of Pollution) Act, 1981 as amended and rules and orders made thereunder for proposed expan unit of **Giridhan Metal Private Limited** at **Jamuria Industrial Estate, Village – Ikra & Damodarpur, Tehsil – Jamuria, Dist – Paschim Bardhaman, West Bengal.** for the following activities :

Sl.No.	Name of Activity,Product and/or By-Product	Production Capacity
1	Sponge Iron	594000 Metric Tonnes/Year
2	MS Billets	124200 Metric Tonnes/Year
3	WHRB (126 TPH x 2)	60 Megawatt
4	Rolled/Bars/Light Structure	100000 Metric Tonnes/Year
5	From 3x5.5 MVA SAF (F-Mn/Si-Mn/Fe-Cr/Si-Cr/Fe-Si/Pig Iron)	52300 Metric Tonnes/Year
6	From 2x10 Ton EAF (Low Carbon Fe-Cr)	25000 Metric Tonnes/Year

<b>Total cost of the Project (in Lakhs)</b>	<b>86000.0</b>
---	----------------

**(A) General Conditions :**

- (1) The quality of sewage and industrial effluent to be discharged from the factory shall satisfy the permissible limits as per norms and Environment (Protection) Rules 1986.
- (2) The unit shall apply to the State Board for Consent to operate according to the provisions of the Water (Prevention & Control of Pollution) Act, 1974 as amended and the Air (Prevention & Control Pollution) Act, 1981 as amended prior to commencement of activities of the unit.
- (3) The unit shall comply with the following Environmental Acts and Rules and its amendment as applicable
  - (i) The Water (Prevention and Control of Pollution) Act, 1974 .
  - (ii) The Air (Prevention and Control of Pollution) Act, 1981
  - (iii) The Environment (Protection) Act, 1986
  - (iv) The Public Liability Insurance Act, 1991
  - (v) The Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989
  - (vi) The Ozone Depleting Substances (Regulation and Control) Rules, 2000

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WBPCB/5507639/2024

Page1



- (vii) The Batteries (Management and Handling) Rules, 2022
- (viii) The Noise Pollution (Regulation and Control) Rules, 2000
- (ix) The Bio-medical Wastes Management Rules, 2016
- (x) The Hazardous Wastes (Management and Transboundary Movement) Rules, 2016
- (xi) The Plastic Waste Management Rules, 2016
- (xii) The Solid Waste Management Rules, 2016
- (xiii) The E-Waste (Management Rules), 2022
- (xiv) The Construction and Demolition Waste Management Rules, 2016

(4) The State Board reserves the right to review, amend, suspend, revoke etc. this consent for establishment and the same shall be binding on the unit.

(5) The unit shall obtain permission/clearance from the other competent authorities, as applicable and such permissions may be required at the time of submitting application for Consent to operate.

(6) The unit shall abide by the stipulations as may be prescribed by any authority / local body / government departments etc.

(7) Suitable measures to treat the effluent and emission shall be adopted in order to reduce the pollution load so that the quality of the effluent and emission from the unit always conforms to the relevant permissible standards.

(8) No equipment/machinery, emission and effluent generation/discharge source etc. shall be installed/modified without prior approval of the State Board.

**(B) Special Conditions:**

Please refer to Annexure 1, 2 & 3 (Pages 1-9).

**Any Violation of the aforesaid Conditions shall entail cancellation of this Consent to Establish**



**For and on behalf of West Bengal Pollution Control Board**

30/07/2024

**Chief Engineer  
Environment Impact Management Cell**

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WBPCB/5507639/2024

Page2



## Annexure – 1 to CTE No. – WBPCB/5507693/2024

Special conditions issued to: **M/s Giridhan Metal Private Limited** located at Jamuria Industrial Estate, Village – Ikra & Damodarpur, Tehsil – Jamuria, Dist – Paschim Bardhaman, West Bengal. (Expansion project).

## Unit configuration and capacity

S. No.	Plant Equipment/ Facility	Existing facilities as per EC dated 8th April, 2021 and subsequent amended dated 16 <sup>th</sup> Jan, 2023		As per CTO		Proposed Unit		Total (Existing + Proposed)		Remarks
		Config	Prod (TPA)	Config	Prod (TPA)	Config	Prod (TPA)	Config	Prod (TPA)	
1.	Sponge Iron (DRI Plant)	1x 350 & 1x 600 TPD DRI Plant	318000 TPA	1x 350 & 1x 600 TPD DRI Plant	318000 TPA	2x 900 TPD	594000 TPA	(1x 350 + 1x 600 + 2x 900 TPD DRI Plant)	912000 TPA	Product - Sponge Iron
2.	MS Billets (Induction Furnace with LF & CCM)	6x20 Ton IF (Induction Furnace) & 1x30 Ton LF (Ladle Furnace)	372300 TPA	6x20 Ton IF (Induction Furnace) & 1x30 Ton LF (Ladle Furnace)	372300 TPA	2x20 Ton IF (Induction Furnace)	124200 TPA	{8x20 Ton IF (Induction Furnace) & 1x30 Ton LF (Ladle Furnace)}	496500 TPA	Product - MS Billets
3.	Rolling Mill	310 TPD & 625 TPD of rolled/bars/light structure	300000 TPA	310 TPD & 625 TPD of rolled/bars/light structure	300000 TPA	By adding new stand in existing premises	100000 TPA	1x1250 TPD of rolled/bars/light structure	400000 TPA	Product - Flat & Rolled Product
4.	Submerged Arc Furnace (SAF)	2x9 MVA of Fe-Mn/ Si-Mn	30000 TPA	2x9 MVA of Fe-Mn/ Si-Mn	30000 TPA	3x5.5 MVA (Fe-Mn/ Si-	52,300 TPA	2x9 + 3x5.5 MVA of Fe-	82,300 TPA Ferro	Product - Ferro Manganese or
						Mn/Fe-Cr/Si-Cr)		Mn/ Si-Mn/Fe-Cr/Si-Cr	Manganese or 56,200 TPA Silico Manganese or 56,200 Ferro	Product - Silico manganese or Ferro Chrome or Silico Chrome or



S. No.	Plant Equipment/ Facility	Existing facilities as per EC dated 8th April, 2021 and subsequent amended dated 16 <sup>th</sup> Jan, 2023		As per CTO		Proposed Unit		Total (Existing + Proposed)		Remarks
		Config	Prod (TPA)	Config	Prod (TPA)	Config	Prod (TPA)	Config	Prod (TPA)	
									Chrome or 48,100 Silico Chrome or 43,100 TPA Ferro Silicon or 82,300 TPA Pig Iron	Ferro Silicon or Pig Iron (Only product interchangeability by changing charge mix)
5.	Electric Arc Furnace (EAF)	---	---	---	---	2x10 MT	25000 TPA	2x10 MT	25000 TPA	Product - 25000 TPA Alloys Metal (To be used for as intermediary product)
6.	Waste Heat Recovery Boiler (WHRB)	35 TPH & 70 TPH	21 MW	35 TPH & 70 TPH		2 x 126 TPH	60 MW	(1x35 + 1x70 + 2x126 TPH)	81 MW	Product - Power



## Annexure – 2 to CTE No. – WBPCB/5507693/2024

Special conditions issued to: **M/s Girdhan Metal Private Limited** located at Jamuria Industrial Estate, Village – Ikra & Damodarpur, Tehsil – Jamuria, Dist – Paschim Bardhaman, West Bengal (Expansion project).

Sl. No.	Emission Sources	Air Pollution Control System	Stack (Nos. & height from GL. in m.)
<b>Sponge Iron Plant</b>			
1	Rotary Kiln with WHRB (2x900TPD)	Individual assembly of WHRB of capacity – 126TPH each, followed by individual ESP and common stack for 2x900 TPD DRI kiln	01 no, 85m (for 2x900 TPD kiln)
		Individual bag filters with individual stack to be installed for cooler discharge, I-bin of 2x900 TPD DRI.	02 no, 30m (for 900 TPD kiln each)
		Individual bag filters with individual stack to be installed for product separation, product house of 2x900 TPD DRI.	02 no, 30m (for 900 TPD kiln each)
<b>Captive Power</b>			
2	WHRB (2x126 TPH for each 900TPD DRI Kiln) (60MW)	----	----
<b>Induction Furnace (IF)</b>			
3	2x20Ton Induction Furnace	2x20Ton IF attached with the assembly of spark arrestor and bag filter with stack of existing IF (6x20Ton)	01 no, 30m (Common with existing stack of 6x20Ton IF)
<b>Rolling Mill</b>			
4	0.1MTPA Hot Rolling Mill	----	----
<b>Ferro Alloys Plant</b>			
5	3x5.5MVA SAF (Fe-Mn/Si-Mn/Fe-Cr/Si-Cr/Fe-Si/Pig Iron)	Individual assembly of spark arrestor and bag filter for each furnace followed by common stacks for each assembly at 2x5.5 MVA and 1x5.5 MVA SAF	02 no, 30m each
6	2x10Ton EAF (Low Carbon Fe-Cr)	Individual assembly of spark arrestor and bag filter with common stack	01 no, 30m
<b>DG Set</b>			
7	DG Set – 1x750KVA, 3x2000KVA & 1x500KVA	Individual DG Set to be provided with proper air pollution control device, acoustic enclosure and stack	05 nos, 05m for 1x750KVA, 10m for 3x2000KVA and 05m for 1x500 KVA DG sets



## Annexure – 3 to CTE No. – WBPCB/5507693/2024

Special conditions issued to: **M/s Giridhan Metal Private Limited** located at Jamuria Industrial Estate, Village – Ikra & Damodarpur, Tehsil – Jamuria, Dist – Paschim Bardhaman, West Bengal (Expansion project).

**A) Specific Condition:**

- i. The project proponent shall utilize modern technologies for capturing of carbon emitted and shall also develop carbon sink/carbon sequestration resources capable of capturing more than emitted. The implementation report shall be submitted to the IRO, MoEF&CC & WBPCB in this regard.
- ii. Damodarpur Village is adjacent in NW, Sekpur Village (0.5 km, E), Akhalpur Village (0.59 km, WSW), Ikra Village (0.88 km, SE), Mandalpur Village (1 km, SW) exists along with other sensitive areas within the study area of the project site. Proponent shall take appropriate environmental safeguard measures to minimise the impact on the habitation of the locals. The project proponent needs to strengthen green belt all around the plant area to reduce the dust pollution. The PP shall also include some of these locations in its environmental monitoring programme.
- iii. There are several water bodies within the study area of the project site. A robust and full proof Drainage Conservation scheme to protect the natural drainage and its flow parameters; along with Soil conservation scheme and multiple Erosion control measures shall be implemented.
- iv. Total water requirement is after expansion is estimated as 6730 m<sup>3</sup>/day that will be obtained from Surface Water (River Damodar) through Damodar Valley Corporation (DVC). PP shall obtain necessary permission from the Competent Authority in this regard.
- v. Three tier Green Belt shall be developed in atleast 40% of the project area, in the monsoon season of 2024, of adequate width and tree density shall not be less than 2500 per ha. Survival rate of green belt developed shall be monitored on periodic basis to ensure that damaged plants are replaced with new plants in the subsequent years. PP shall also develop greenbelt in the form of shelter belt comprising of total of 6 rows of 2x2 m plantation with tall trees & broad leaves with thick canopy along with windshield inside the plant premises to act as green barrier for air pollution & noise levels towards sensitive areas nearby project site. Additionally, thick plantation of 5000 trees in the nearby villages and schools, rainwater harvesting pond etc. in the ensuing monsoon. Compliance status in this regard, shall be submitted to concerned Regional Office of the MoEF&CC & WBPCB.
- vi. All the commitments made towards socio-economic development of the nearby villages shall be satisfactorily implemented. The action plan based on the social impact assessment study of the project as per the EMP in accordance to the Ministry's OM dated 30.09.2020 amounting to Rs. 16 Crores shall be strictly implemented and progress shall be submitted to the Regional Office of MoEF&CC & WBPCB.
- vii. The project proponent shall undertake village adoption programme and prepare and implement the action plan to develop them into a model village.
- viii. PP shall comply with the recommendations as stated in the report from Jadavpur University, Kolkata regarding the construction activities of Railway Siding with wagon tippler.
- ix. PP shall prepare an action plan for improving the housekeeping of the plant premises and implement it strictly.
- x. PP shall undertake strict measures to reduce the dust emissions and pollution level in the project premises.
- xi. There are two patches of road around 40 m length and 20 m width inside the plant area which shall be concreted/paved within a time frame of 3 months as committed.
- xii. The PP shall provide additional drinking water facility of approx. 18000 Liters per day in the adjacent Damodarpur village within three months.
- xiii. PP shall install a permanent fencing around the temple, school within a timeframe of three months, as committed.
- xiv. PP shall improve the infrastructure in the adjacent village within a stipulated time period.



## Annexure – 3 to CTE No. – WBPCB/5507693/2024

Special conditions issued to: **M/s Giridhan Metal Private Limited** located at Jamuria Industrial Estate, Village – Ikra & Damodarpur, Tehsil – Jamuria, Dist – Paschim Bardhaman, West Bengal (Expansion project).

**B) General Conditions****I. Air quality monitoring and preservation**

- i. The project proponent shall install 24x7 continuous emission monitoring system at process stacks to monitor stack emission as well as 04 Nos. Continuous Ambient Air Quality Station (CAAQMS) for monitoring AAQ parameters with respect to standards prescribed in Environment (Protection) Rules 1986 as amended from time to time. The CEMS and CAAQMS shall be connected to SPCB and CPCB online servers and calibrate these systems from time to time according to equipment supplier specification through labs recognized under Environment (Protection) Act, 1986 or NABL accredited laboratories.
- ii. The project proponent shall carryout Continuous Ambient Air Quality monitoring for common/criterion parameters relevant to the main pollutants released (e.g. PM10 and PM2.5 in reference to PM emission, and SO2 and NOx in reference to SO2 and NOx emissions) within and outside the plant area (at least at four locations one within and three outside the plant area at an angle of 120° each), covering upwind and downwind directions.
- iii. The project proponent shall monitor fugitive emissions in the plant premises at least once in every quarter through laboratories recognized under Environment (Protection) Act, 1986 or NABL accredited laboratories.
- iv. Sampling facility at process stacks shall be provided as per CPCB guidelines for manual monitoring of emissions.
- v. Appropriate Air Pollution Control (APC) system shall be provided for all the dust generating points including fugitive dust from all vulnerable sources, so as to comply prescribed stack emission and fugitive emission standards.
- vi. The project proponent shall provide leakage detection and mechanized bag cleaning facilities for better maintenance of bags.
- vii. Sufficient number of mobile or stationery vacuum cleaners shall be provided to clean plant roads, shop floors, roofs, regularly.
- viii. Ensure covered transportation and conveying of raw material to prevent spillage and dust generation. The project proponent use leak proof trucks/dumpers carrying coal and other raw materials and cover them with tarpaulin.
- ix. Recycle and reuse iron ore fines, coal and coke fines, lime fines and such other fines collected in the pollution control devices and vacuum cleaning devices in the process after briquetting/ agglomeration.
- x. The project proponent shall provide primary and secondary fume extraction system at all heat treatment furnaces.
- xi. Wind shelter fence and chemical spraying shall be provided on the raw material stock piles.
- xii. Design the ventilation system for adequate air changes as per prevailing norms for all tunnels, motor houses, Oil Cellars.
- xiii. Pollution control system in the plant shall be provided as per the CREP Guidelines of CPCB.
- xiv. The project proponent shall adopt the Clean Air practices like mechanical collectors, wet scrubbers, fabric filters (bag houses), electrostatic precipitators, combustion systems (thermal oxidizers), condensers, absorbers, adsorbers, and biological degradation. Controlling emissions related to transportation shall include emission controls on vehicles as well as use of cleaner fuels. Sufficient numbers of additional truck mounted Fog/Mist water cannons shall be procured and operated regularly inside the project premises and also in the surrounding villages to arrest suspended dust in the atmosphere.



Annexure – 3 to **CTE No. – WBPCB/5507693/2024**

Special conditions issued to: **M/s Giridhan Metal Private Limited** located at Jamuria Industrial Estate, Village – Ikra & Damodarpur, Tehsil – Jamuria, Dist – Paschim Bardhaman, West Bengal (Expansion project).

- xv. Bag filters shall be cleaned regularly and efficiency of bag filter system shall be monitored at regular intervals.
- xvi. Water Sprinklers/Water mist system shall be installed near raw material yards, operational units and other strategic locations to control fugitive emissions from the plant.
- xvii. **The particulate matter emissions from the process stacks shall be less than 30 mg/Nm<sup>3</sup>. Efficient Air monitoring equipment shall be installed.**
- xviii. Following additional arrangements to control fugitive dust shall be provided:
  - a. Fog / Mist Sprinklers at all on bulk raw material storage area (at the transfer points) like Iron Ore, Coal and for Fly Ash and similar solid waste storage areas.
  - b. Proper covered vehicle shall be used while transport of materials.
  - c. Wheel washing mechanism shall be provided in entry and exit gates with complete recirculation system.
- xix. Briquetting and Jigging plant shall be installed in Ferro Alloys Plant.
- xx. The PP shall minimize the evaporation losses in jigging operation to less than 10% using suitable advanced process.
- xxi. The 4th hole extraction system shall be provided in the Sub Merged Arc Furnaces and EAF.
- xxii. Industry is going to use silica quartz in large quantities and going to produce Silico Manganese and Ferro Silicon alloy steel. Therefore, it is necessary to control silica/quartz exposures at production Departments, not only emission norms as per Indian Factories Act. The permissible limit for silica/quartz should be within 10 mg/m<sup>3</sup> for total dust as per Indian Factories Act. Therefore, it is recommended to monitor personal and area exposures for silica quartz dust in the process plants.
- xxiii. The coal dust should be monitored at coal unloading, crushing, furnace areas and should be within 2 mg/m<sup>3</sup>, respirable dust fraction containing less than 5% quartz as per Indian Factories Act, 1948.
- xxiv. Online stack monitoring system for IF and RHF shall be installed and monitoring report shall be submitted to the concerned Regional Office of the MoEF&CC & WBPCB along with the six monthly compliance report.
- xxv. Low NO<sub>x</sub> Burners will be installed at Reheating Furnace for control of Gaseous emissions generated while using PNG.
- xxvi. CO sensors with alarms must be installed in the Plant at strategic locations.

## II. **Water quality monitoring and preservation**

- i. The project proponent shall install 24x7 continuous effluent monitoring system with respect to standards prescribed in Environment (Protection) Rules 1986 as amended from time to time and connected to SPCB and CPCB online servers and calibrate these systems from time to time according to equipment supplier specification through labs recognized under Environment (Protection) Act, 1986 or NABL accredited laboratories.
- ii. The project proponent shall monitor regularly ground water quality at least twice a year (pre- and post-monsoon) at sufficient numbers of piezometers/sampling wells in the plant and adjacent areas through labs recognized under Environment (Protection) Act, 1986 and NABL accredited laboratories.
- iii. Garland drains and collection pits shall be provided for each stock pile to arrest the run-off in the event of heavy rains and to check the water pollution due to surface runoff.
- iv. Water meters shall be provided at the inlet to all unit processes in the plants.



**Annexure – 3 to CTE No. – WBPCB/5507693/2024**

Special conditions issued to: **M/s Giridhan Metal Private Limited** located at Jamuria Industrial Estate, Village – Ikra & Damodarpur, Tehsil – Jamuria, Dist – Paschim Bardhaman, West Bengal (Expansion project).

- v. The project proponent shall make efforts to minimise water consumption in the plant complex by segregation of used water, practicing cascade use and by recycling treated water.
- vi. The proposed project shall be designed as "Zero Liquid Discharge" Plant. ETP shall be installed and there shall be no discharge of effluent from the plant. Domestic effluent shall be treated in Sewage Treatment Plant. Suitable measures shall be adopted for sewage water handling to ensure no contamination of any kind of water body.
- vii. All stockyards shall have impervious flooring and shall be equipped with water spray system for dust suppression. Stock yards shall also have garland drains and catch pits to trap the run off material and shall be implemented.
- viii. The project proponent shall provide the ETP for effluents of rolling mills to meet the standards prescribed in G.S.R 277 (E) 31st March 2012 (applicable to IF/EAF) as amended from time to time.
- ix. Air Cooled condensers shall be used in the captive power plant.

**III. Noise monitoring and prevention**

- i. Noise pollution shall be monitored as per the prescribed Noise Pollution (Regulation and Control) Rules, 2000 and amendments thereof, and report in this regard shall be submitted to Regional Officer of the Ministry & WBPCB as a part of six-monthly compliance report.
- ii. The ambient noise levels should conform to the standards prescribed under E(P)A Rules, 1986 viz. 75 dB(A) during day time and 70 dB(A) during night time.
- iii. PP shall identify extreme hot areas through heat stress survey as well as noise monitoring within process plants to ensure that workers not exposed above 90 dBA levels as per Factories Act, 1948.

**IV. Energy Conservation measures**

- i. Use torpedo ladle for hot metal transfer as far as possible. If ladles not used, provide covers for open top ladles.
- ii. Restrict Gas flaring to < 1%.
- iii. Provide solar power generation on roof tops of buildings, for solar light system for all common areas, street lights, parking around project area and maintain the same regularly;
- iv. Provide LED lights in their offices and residential areas.
- v. The project proponent shall provide waste heat recovery system (pre-heating of combustion air) at the flue gases of reheating furnaces.
- vi. Practice hot charging of slabs and billets/blooms as far as possible.
- vii. Ensure installation of regenerative type burners on all reheating furnaces.
- viii. The project proponent shall provide waste heat recovery system on the DRI Kilns.
- ix. The dolochar generated shall be used for power generation.
- x. Tar shall be recovered from producer gas and shall be sold to registered processors and phenolic water shall be incinerated in After Burn Chamber (ABC) of DRI kilns.
- xi. The PP shall implement the guidelines on sponge iron plants issued by the CPCB/SPCB in this regard.

**V. Waste management**

- i. Oil Collection pits shall be provided in oil cellars to collect and reuse/recycle spilled oil.
- ii. Kitchen waste shall be composted or converted to biogas for further use.
- iii. 100% utilization of fly ash shall be ensured. All the fly ash shall be provided to cement and brick manufacturers for further utilization and Memorandum of Understanding in this regard shall be submitted to the Ministry's Regional Office & WBPCB.



**Annexure – 3 to CTE No. – WBPCB/5507693/2024**

Special conditions issued to: **M/s Giridhan Metal Private Limited** located at Jamuria Industrial Estate, Village – Ikra & Damodarpur, Tehsil – Jamuria, Dist – Paschim Bardhaman, West Bengal (Expansion project).

- iv. The Plastic Waste Management Rules 2016, inter-alia, mandated banning of identified Single Use Plastic (SUP) items with effect from 01/07/2022. In this regard, CPCB has issued a direction to all the State Pollution Control Boards (SPCBs)/Pollution Control Committees (PCCs) on 30/06/2022 to ensure the compliance of Notification published by Ministry on 12/08/2021. The technical guidelines issued by the CPCB in this regard is available at <https://cpcb.nic.in/technical-guidelines-3/>. All the project proponents are hereby requested to sensitize and create awareness among people working within the Project area as well as its surrounding area on the ban of SUP in order to ensure the compliance of Notification published by this Ministry on 12/08/2021. A report, along with photographs, on the measures taken should be submitted.
- v. A proper action plan must be implemented to dispose of the electronic waste generated in the industry.
- vi. Solid waste utilization
  - a. PP shall install a slag crusher to convert steel slag into aggregate for use in construction industry, fine sand for use as flux in steel plant, sand in brick making and as lime in cement making.
  - b. PP shall recycle/reuse solid waste generated in the plant as far as possible.
  - c. Used refractories shall be recycled as far as possible.

**VI. Green Belt**

- i. The project proponent shall prepare GHG emissions inventory for the plant and shall submit the programme for reduction of the same including carbon sequestration by trees.
- ii. Project proponent shall submit a study report on Decarbonisation program, which would essentially consist of company's carbon emissions, carbon budgeting/ balancing, carbon sequestration activities and carbon capture, use and storage and offsetting strategies. Further, the report shall also contain time bound action plan to reduce its carbon intensity of its operations and supply chains, energy transition pathway from fossil fuels to Renewable energy etc. All these activities/ assessments should be measurable and monitor able with defined time frames.
- iii. Greening and Paving shall be implemented in the plant area to arrest soil erosion and dust pollution from exposed soil surface.

**VII. Public hearing and Human health issues**

- i. Emergency preparedness plan based on the Hazard identification and Risk Assessment (HIRA) and Disaster Management Plan shall be implemented.
- ii. The project proponent shall carry out heat stress analysis for the workmen who work in high temperature work zone and provide Personal Protection Equipment (PPE) as per the norms.
- iii. Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP. Safe drinking water, medical health care, creche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.
- iv. Occupational health surveillance of the workers shall be done on a regular basis and records maintained.

**VIII. Environment Management**

- i. The project proponent shall comply with the provisions contained in this Ministry's OM vide F. No. 22-65/2017-IA.III dated 30/09/2020. As part of Corporate Environment Responsibility (CER) activity, company shall adopt nearby villages based on the socio-economic survey and undertake community developmental activities in consultation with the village Panchayat and the District Administration as committed.



**Annexure – 3 to CTE No. – WBPCB/5507693/2024**

Special conditions issued to: **M/s Giridhan Metal Private Limited** located at Jamuria Industrial Estate, Village – Ikra & Damodarpur, Tehsil – Jamuria, Dist – Paschim Bardhaman, West Bengal (Expansion project).

- ii. The company shall have a well laid down environmental policy duly approved by the Board of Directors. The environmental policy should prescribe for standard operating procedures to have proper checks and balances and to bring into focus any infringements/deviation/violation of the environmental / forest / wildlife norms / conditions. The company shall have defined system of reporting infringements / deviation / violation of the environmental / forest / wildlife norms / conditions and / or shareholders / stake holders. The copy of the board resolution in this regard shall be submitted to the MoEF&CC & WBPCB as a part of six-monthly report.
- iii. A separate Environmental Cell both at the project and company head quarter level, with qualified personnel shall be set up under the control of senior Executive, who will directly report to the head of the organization.
- iv. Performance test shall be conducted on all pollution control systems every year and report shall be submitted to Integrated Regional Office of the MoEF&CC & WBPCB.

**C) Miscellaneous**

1. No additional machinery / equipment can be installed without permission from the Board.
2. All conditions of the Environmental Clearance issued by MoEF&CC, Govt vide **EC Identification no. EC24A1001WB5293926N, File No. IA-J-11011/366/2010-IA-II(IND-I) dated 15.07.2024** should be strictly complied with.
3. The PP has to obtain necessary land conversion from the competent authority for the entire project area prior to starting of construction activity.
4. The conveyor belt for transferring materials to be covered.
5. Good house-keeping to be maintained.
6. All requisite permissions / compliance / certificates / licenses from the Competent Authority shall be obtained.
7. Consent to Operate & Hazardous Waste Authorization to be obtained from the State Board before operation of the unit.
8. This NOC is valid up to **31/07/2031** for setting up the proposed project.





Effluent Treatment Plant (1540 KLD)



**Garland Drain**

1005 1005 5 5



পশ্চিমবঙ্গ পশ্চিম বঙ্গাল WEST BENGAL 56AB 940576



Before the Notary  
Govt of West Bengal  
Burdwan District  
Durgapur

BEFORE THE LD. NOTARY PUBLIC, GOVERNMENT OF WEST BENGAL  
AT DURGAPUR.

**AFFIDAVIT**

I, **Mr. Sanjay Agarwal**, son of **Late Om Prakash Agarwal**, resident of Flat No. - 4D, Block-9 BD-37, **Rabindra Pally, Kestopor, District - North Twenty Four Parganas, West Bengal 700101**; the Board of Directors of the **M/s Giridhan Metal Private Limited** having its Registered Office at 39, **Shakespeare Sarani, 3<sup>rd</sup> Floor, P.S. - Shakespeare Sarani, Kolkata - 700017, West Bengal**; do here by solemnly affirm and declare as follows :-



27 JUL 2021

27 JUL 2021

Serial No. 2001 Date 27 JUL 2021  
Sold to J. Sarkar  
Address C-9  
Value of Stamps of this Stamp Paper 24 JUN 2021  
Date of Purchase of this Stamp Paper 24 JUN 2021  
from the Treasury  
Name of the Treasury from where Purchased, DURGAPUR.

Subrata Kumar Chakraborty  
Stamp Vendor  
A. D. S. R. Office, Durgapur-16  
Licence No. 5 of 1980

RECEIVED BY THE GOVERNMENT OF WEST BENGAL

STAMP OFFICE

RECEIVED

Stamp paper received from Subrata Kumar Chakraborty, Stamp Vendor, A. D. S. R. Office, Durgapur-16, Licence No. 5 of 1980, on 27.07.2021. The value of stamps is Rs. 24.00. The stamps are of the denomination of Rs. 10.00 and Rs. 14.00. The stamps are to be used for the purpose of the Government of West Bengal.

Page 1

1. That Environment Clearance issued by the Ministry of Environment, Forest and Climate Change, New Delhi vide letter No. -11011/366/2010-IA. II(I) dated 2<sup>nd</sup> April 2012 and J-11011/366/2010-IA. II(I) dated 29<sup>th</sup> January 2020 (Transfer of Environment Clearance from M/s Damodar Ispat Limited. to M/s Giridhan Metal Private Limited) and Environment Clearance validity extension issued on 24<sup>th</sup> May, 2019 extended till 1<sup>st</sup> April, 2022 in favour of erstwhile company M/s Damodar Ispat Ltd. and now transferred in the name of our company that is the M/s Giridhan Metal Private Limited having its Registered Office at 39, Shakespeare Sarani, 3<sup>rd</sup> Floor, P.S. - Shakespeare Sarani, Kolkata – 700017, West Bengal.
2. That the project was monitored by Dr. Tandra Sarkar, Scientist-C, Ministry of Environment, Forest and Climate Change, Integrated Regional Office, Kolkata - 700106, West Bengal, India and Dr. Sudeshna Biswas, Research Officer, Ministry of Environment, Forest and Climate Change, Integrated Regional Office, Kolkata - 700106, West Bengal, India on 29.01.2021 and during monitoring, I, Shri Sanjay Agarwal, Director, M/s Giridhan Metal Private Limited along with Shri J. N. Mukerjee, HOD (Environment), Shri C. C. Ghosh, Manager (Environment) and other Officials of M/s Giridhan Metal Private Limited were present at the site visit of the project and discussions held during monitoring and the Project Authorities (PAs) provided information accordingly. The Project is under process and is expected to be completed within validity period i.e. before 1<sup>st</sup> April, 2022.
3. That Certified Compliance Report with some observations issued by Dr. Tandra Sarkar, Scientist-C, Ministry of Environment, Forest and Climate Change, Integrated Regional Office, Kolkata - 700106, West Bengal, India vide letter No. 102-410/20/EPE/07 dated 05.02.2021.
4. That I (Shri Sanjay Agarwal, Director, M/s Giridhan Metal Private Limited) am herewith submitting the point wise reply of the observations made by Dr. Tandra Sarkar, Scientist-C, Ministry of Environment, Forest and Climate Change, Integrated Regional Office, Kolkata - 700106, West Bengal, India vide letter No. 102-410/20/EPE/07 dated 05.02.2021 as follows:-

SL. NO.	OBSERVATIONS BY REGIONAL OFFICE AND INTEGRATED REGIONAL OFFICE, MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE	SUBMISSION ON BEHALF OF M/S GIRIDHAN METAL PRIVATE LIMITED AND PRAYER FOR CONSIDERATION
1.	Specific condition (v) : It is mentioned in that dust suppression system and bag filters shall be installed to control the fugitive dust emissions at conveyor and transfer points, product handling, loading and unloading points, but it is observed the same is being partially complied by the PA.	The former company had only one 50 TPD DRI production unit. After transfer of EC (Environment Clearance) from M/s Damodar Ispat Limited to M/s Giridhan Metal Private Limited, the new management has stopped the 50 TPD DRI production since 04.02.2020 and the same has been intimated to The Chairman, CPCB and Eastern Regional Office, Ministry of Environment, Forest and Climate Change, Bhubaneswar. The letter is enclosed as Annexure-1.  The project is now in construction phase for the present EC and company ensures dust suppression system and bag filters will be installed to control fugitive dust emissions at conveyor and transfer points, product handling, loading and unloading points.



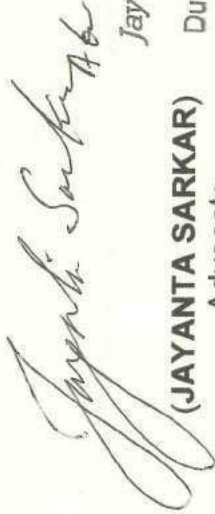
27 JUL 2021

2.	<p><b>Specific condition (xvi) :</b> As proposed, green belt shall be developed in 33% of plant area. Selection of plant species shall be as per the CPCB guidelines in consultation with the DFO. Though the project proponent has done some plantation along the boundary line of the plant, it is not 33% yet.</p>	<p>33% of the existing plant area i.e., 13.34 acres (5.4 ha) has been earmarked and is being developed under greenbelt &amp; plantation. Presently, 5533 trees i.e. ~1000 trees/ha have been planted. The company has also proposed expansion in their existing EC and as a part of expansion approx. 40% of the total plant area i.e. 31.38 acres (12.7 ha) will be developed under greenbelt &amp; plantation by planting trees to the tune of 2500 trees/ha. Plantation schedule is enclosed as Annexure 2.</p>
3.	<p><b>General condition (xi) :</b> The copy of the letter with respect to environment clearance letter marked to concerned Panchayat, Zila Parishad, Municipal Corporation / Urban Local Body, local NGO may be submitted to the Regional Office, Kolkata.</p>	<p>After taking over the assets of the former company, GMPL could not locate the submission receipts of letter w.r.t. EC marked to concerned authority. The company ensures that on receipt of Environment Clearance of proposed expansion the letter will be positively marked to concerned Panchayat, Zila Parishad, Municipal Corporation/Urban Local Body, local NGO may be submitted to the Regional Office, Kolkata.</p>


5. That by virtue of this Affidavit, may consider my prayer in view of above submissions, kindly issue us a formal closure report on the observations marked in issued Certified Compliance Report.
6. That on behalf of the company assures to abide by the Rules & Regulations w.r.t. Environment and to comply all conditions stipulated in our Environment Clearance issued by Ministry of Environment, Forest and Climate Change, New Delhi.
7. That we hereby further state that we know that relying on the above representation and believing the same to be true.

That the above statements are true to the best of my knowledge and I sign and swear this affidavit on the 27<sup>th</sup> day of July, 2021, at Durgapur Court.

Identified by me,

  
**(JAYANTA SARKAR)**  
 Advocate  
 District Courts of Paschim Bardhaman

*Jayanta Sarkar*  
 Advocate  
 Durgapur Court

**GIRIDHAN METAL PRIVATE LIMITED**  
  
**(SANJAY AGARWAL)**  
 Director  
 M/s Giridhan Metal Private Limited



Regn No -40/2007 Govt of W.B.  
 Durgapur, Burdwan, W.B.  
 Mrs. A. Banerjee, Notary

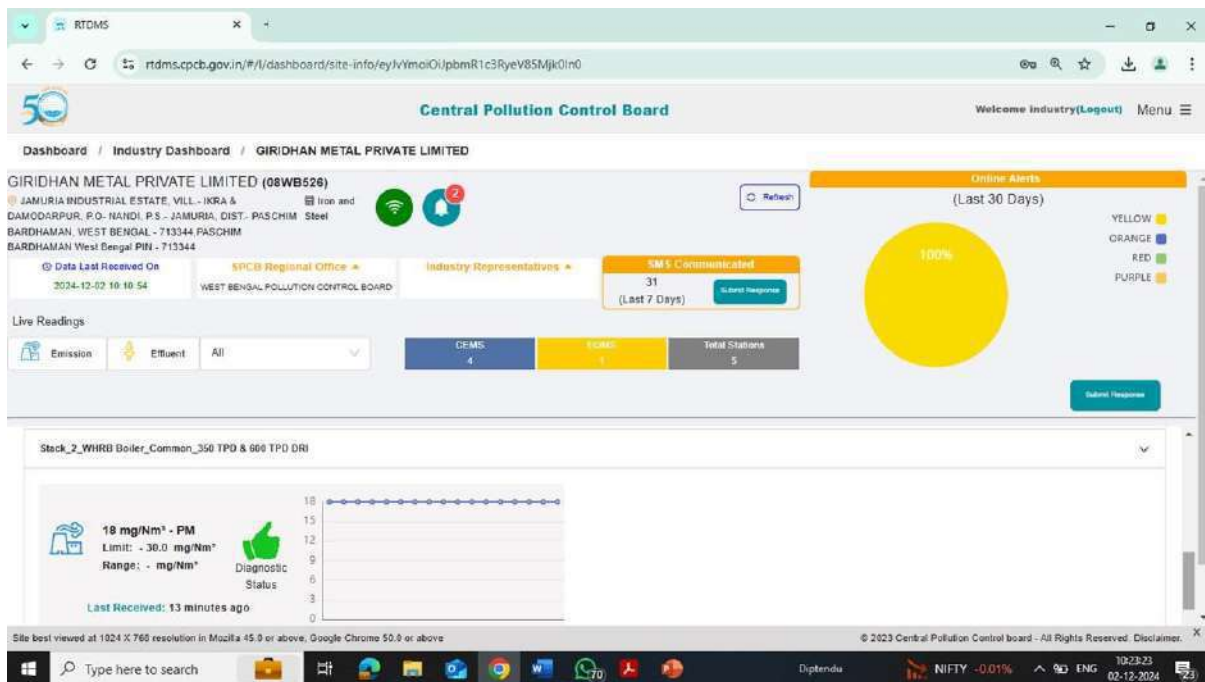
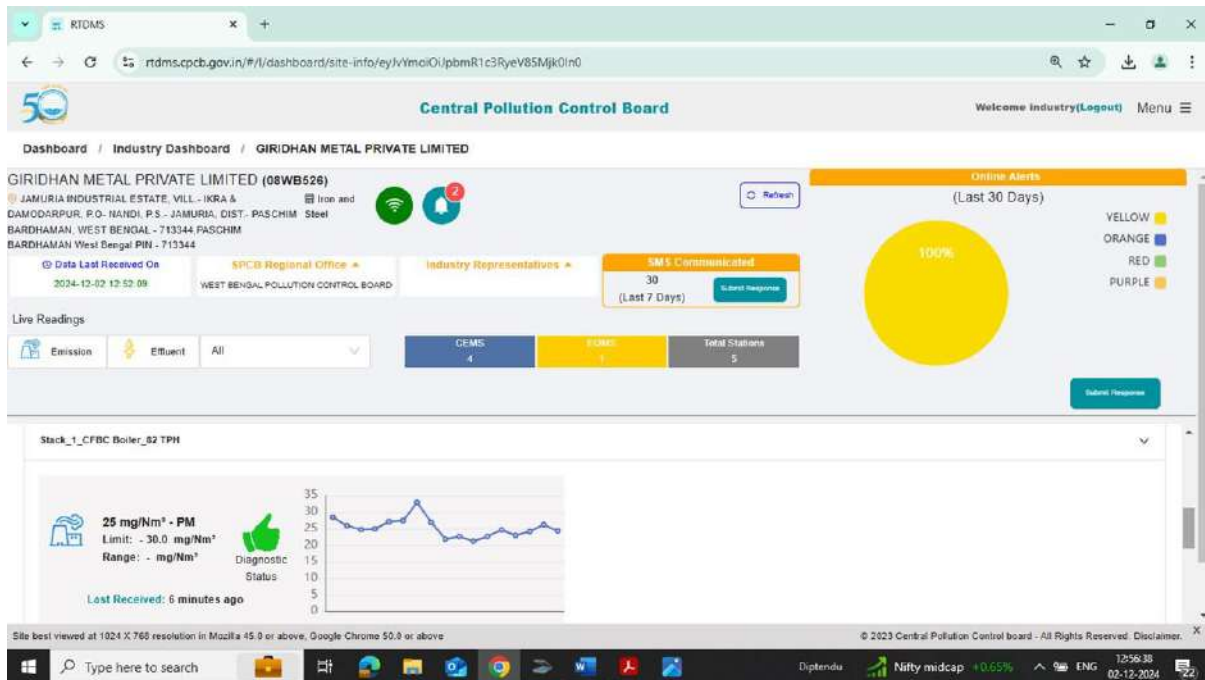
*A.B.*  
 before me on identification  
 solemnly Affirmed & sealed

Solemnly Affirmed & sealed  
 before me on identification

*Atishi Banerjee*  
 Mrs. A. Banerjee, Notary  
 Durgapur, Burdwan, W.B.  
 Regn No -40/2007 Govt. of W.B.

27 JUL 2021

**Screenshot of CEMS for Stack**



RTDMS

rdms.cpcb.gov.in/#/dashboard/site-info/eyJYVmoiOlJpbmR1c3RyeV85MjkiOi0

Central Pollution Control Board

Welcome Industry(Logout) Menu

Dashboard / Industry Dashboard / GIRIDHAN METAL PRIVATE LIMITED

GIRIDHAN METAL PRIVATE LIMITED (08WB526)

JAMURIA INDUSTRIAL ESTATE, VILL. - IKRA & DAMODARPUR, P.O. NANDI, P.S. - JAMURIA, DIST- PASCHIM Steel  
 BARDHAMAN, WEST BENGAL - 713344 PASCHIM  
 BARDHAMAN West Bengal PIN - 713344

Refresh

Online Alerts (Last 30 Days)

100%

YELLOW  
 ORANGE  
 RED  
 PURPLE

Data Last Received On: 2024-12-02 10:10:54

SPCB Regional Office: WEST BENGAL POLLUTION CONTROL BOARD

Industry Representatives

SMS Communicated: 31 (Last 7 Days)

Submit Response

Live Readings

Emission Effluent All

CEMS: 4

EMMS: 1

Total Stations: 5

Submit Response

Stack\_3\_Common Ferro Division

11 mg/Nm<sup>3</sup> - PM  
 Limit: - 30.0 mg/Nm<sup>3</sup>  
 Range: - mg/Nm<sup>3</sup>

Diagnostic Status

Last Received: 15 minutes ago

Site best viewed at 1024 X 768 resolution in Mozilla 45.0 or above, Google Chrome 50.0 or above. © 2023 Central Pollution Control board - All Rights Reserved. Disclaimer.

Screenshot of CAAQMS

CPCB Industrial Ambient Air Q...

airquality.cpcb.gov.in/industrial/#/industryReports/realTimeReport

CPCB Industrial Ambient Air Quality Management | CAAQMS

girdhanmetal@gmail...  
 Girdhan Metal Private L...

Real Time Report

State: West Bengal

District: Bardhaman (Bardhaman)

Station: Girdhan Metal Private L...

Start Date: 26-July-2024

End Date: 27-July-2024

Frequency: 1Hr

Submit

Chart Table

Select Columns

From Date To Date PM2.5(µg/m3) SO2(µg/m3) PM10(µg/m3) NO(µg/m3) NO2(ppm)

From Date	To Date	PM2.5(µg/m3)	SO2(µg/m3)	PM10(µg/m3)	NO(µg/m3)	NO2(ppm)
27-Jul-2024 08:00	27-Jul-2024 09:00	6.43	2.43	38.22		
27-Jul-2024 09:00	27-Jul-2024 10:00	5.66	2.65	25.05		
27-Jul-2024 10:00	27-Jul-2024 11:00	4.64	2.6	15.53		
27-Jul-2024 11:00	27-Jul-2024 12:00	3.82	2.33	10.86		

Total records: 48



## TEST REPORT

<b>Name &amp; Address Of the Customer :</b> <b>M/s. Giridhan Metal Pvt. Ltd.</b> Jamuria Industrial Estate, Damodarpur, Jamuria P.O.- Nandi, Paschim Bardhaman, Pin : 713 344	Report No.	: QLS/MR/A/24-25/C/582
	Date	: 13.11.2024
	Sample No.	: QLS/MR/A/24-25/582
	Sample Description	: Ambient Air
	Date of Performance(s)	: 01-13.11.2024
	Sample Mark	: Near Old Admin Building
	Ref No. Date	: 9400000031, Dated-27.05.2024

## Analysis Result

Location : Near Old Admin Building		Date of sampling : 28-29.10.2024		
Sampling Done by: S.Ghosh/P.Mandal		Sampling done as per : CPCB Guidelines (Volume-1)		
Environmental Condition : Clear & Sunny				
Sl. No.	POLLUTANT	RESULT	LIMIT	METHOD OF TEST REFERENCE
1	Particulate matter (<10 $\mu$ m) in $\mu$ g/m <sup>3</sup>	88	100	IS 5182 (Part-23) Ref 2022
2	Particulate matter (<2.5 $\mu$ m) in $\mu$ g/m <sup>3</sup>	56	60	IS 5182 (Part-24) Ref 2024
3	Sulphur dioxide (SO <sub>2</sub> ) in $\mu$ g/m <sup>3</sup>	8.5	80	IS 5182(Part-2) Ref 2023
4	Nitrogen dioxide (NO <sub>2</sub> ) in $\mu$ g/m <sup>3</sup>	27.6	80	IS 5182 (Part-6) Ref 2017
5	Carbon Monoxide (CO) in mg/m <sup>3</sup>	0.984	2	IS 5182 (Part-10) Ref 2019
6	Ammonia (NH <sub>3</sub> ) in $\mu$ g/m <sup>3</sup>	33.8	400	IS 5182 (Part-25) Ref 2018
7	Ozone (O <sub>3</sub> ) in $\mu$ g/m <sup>3</sup>	51.9	180	IS 5182 (Part-9) Ref 2019
8	Lead (Pb) in $\mu$ g/m <sup>3</sup>	0.03	1	IS 5182 (Part-22) Ref 2019
9	Nickel (Ni) in ng/m <sup>3</sup>	6.0	20	IS 5182 (Part-26) Ref 2020
10	Arsenic (As) in ng/m <sup>3</sup>	<1.0	6	Air Sampling, 3 <sup>rd</sup> Edn. Method 402 and APHA 23 <sup>rd</sup> Edition Part 3114B
11	Benzene (C <sub>6</sub> H <sub>6</sub> ) in $\mu$ g/m <sup>3</sup>	<2.0	5	IS 5182 (Part-11) Ref 2022
12	Benzo (a) pyrene in ng/m <sup>3</sup>	<1.0	1	IS 5182 (Part-12) Ref 2019
<b>NOTE:</b> Limit as per CPCB notification, New Delhi, 18th November 2009, for Ambient air quality.				

Report Prepared By :

*Barbar*

for Qualissure Laboratory Services  
 Reviewed & Authorized By

*Benimadhab Gorai*  
 Benimadhab Gorai, Chemist  
 (Authorized Signatory)

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## TEST REPORT

<b>Name &amp; Address Of the Customer :</b> <b>M/s. Giridhan Metal Pvt. Ltd.</b> Jamuria Industrial Estate, Damodarpur, Jamuria P.O.- Nandi, Paschim Bardhaman, Pin : 713 344	Report No.	: QLS/MR/A/24-25/C/583
	Date	: 13.11.2024
	Sample No.	: QLS/MR/A/24-25/583
	Sample Description	: Ambient Air
	Date of Performance(s)	: 01-13.11.2024
	Sample Mark	: Near Ferro Plant
	Ref No. Date	: 9400000031, Dated-27.05.2024

## Analysis Result

Location : Near Ferro Plant		Date of sampling : 28-29.10.2024		
Sampling Done by: S.Ghosh/P.Mandal		Sampling done as per : CPCB Guidelines (Volume-1)		
Environmental Condition : Clear & Sunny				
Sl. No.	POLLUTANT	RESULT	LIMIT	METHOD OF TEST REFERENCE
1	Particulate matter (<10µm) in µg/m <sup>3</sup>	97	100	IS 5182 (Part-23) Reff 2022
2	Particulate matter (<2.5µm) in µg/m <sup>3</sup>	51	60	IS 5182 (Part-24) Reff 2024
3	Sulphur dioxide (SO <sub>2</sub> ) in µg/m <sup>3</sup>	9.4	80	IS 5182(Part -2) Reff 2023
4	Nitrogen dioxide (NO <sub>2</sub> ) in µg/m <sup>3</sup>	32.0	80	IS 5182 (Part -6) Reff 2017
5	Carbon Monoxide (CO) in mg /m <sup>3</sup>	0.881	2	IS 5182 (Part -10) Reff 2019
6	Ammonia (NH <sub>3</sub> ) in µg/m <sup>3</sup>	22.7	400	IS 5182 (Part-25) Reff 2018
7	Ozone (O <sub>3</sub> ) in µg/m <sup>3</sup>	36.8	180	IS 5182 (Part-9) Reff 2019
8	Lead (Pb) in µg/m <sup>3</sup>	0.04	1	IS 5182 (Part-22) Reff 2019
9	Nickel (Ni) in ng/m <sup>3</sup>	6.6	20	IS 5182 (Part-26) Reff 2020
10	Arsenic (As) in ng/m <sup>3</sup>	<1.0	6	Air Sampling, 3 <sup>rd</sup> Edn. Method 402 and APHA 23 <sup>rd</sup> Edition Part 3114B
11	Benzene (C <sub>6</sub> H <sub>6</sub> ) in µg/m <sup>3</sup>	<2.0	5	IS 5182 (Part-11) Reff 2022
12	Benzo (a) pyrene in ng/m <sup>3</sup>	<1.0	1	IS 5182 (Part-12) Reff 2019
<b>NOTE:</b> Limit as per CPCB notification, New Delhi, 18th November 2009, for Ambient air quality.				

Report Prepared By :

*Barbar*

for Qualissure Laboratory Services  
Reviewed & Authorized By

Benimadhab Gorai, Chemist  
(Authorized Signatory)

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## TEST REPORT

<b>Name &amp; Address Of the Customer :</b> M/s. Giridhan Metal Pvt. Ltd. Jamuria Industrial Estate, Damodarpur, Jamuria P.O.- Nandi, Paschim Bardhaman, Pin : 713 344	Report No.	: QLS/MR/A/24-25/C/584
	Date	: 13.11.2024
	Sample No.	: QLS/MR/A/24-25/584
	Sample Description	: Ambient Air
	Date of Performance(s)	: 01-13.11.2024
	Sample Mark	: Near ETP
	Ref No. Date	: 9400000031, Dated-27.05.2024

## Analysis Result

Location : Near ETP		Date of sampling : 29-30.10.2024		
Sampling Done by: S.Ghosh/P.Mandal		Sampling done as per : CPCB Guidelines (Volume-1)		
Environmental Condition : Clear & Sunny				
Sl. No.	POLLUTANT	RESULT	LIMIT	METHOD OF TEST REFERENCE
1	Particulate matter (<10µm) in µg/m <sup>3</sup>	79	100	IS 5182 (Part-23) Reff 2022
2	Particulate matter (<2.5µm) in µg/m <sup>3</sup>	48	60	IS 5182 (Part-24) Reff 2024
3	Sulphur dioxide (SO <sub>2</sub> ) in µg/m <sup>3</sup>	7.3	80	IS 5182(Part -2) Reff 2023
4	Nitrogen dioxide (NO <sub>2</sub> ) in µg/m <sup>3</sup>	26.4	80	IS 5182 (Part -6) Reff 2017
5	Carbon Monoxide (CO) in mg /m <sup>3</sup>	0.778	2	IS 5182 (Part -10) Reff 2019
6	Ammonia (NH <sub>3</sub> ) in µg/m <sup>3</sup>	45.9	400	IS 5182 (Part-25) Reff 2018
7	Ozone (O <sub>3</sub> ) in µg/m <sup>3</sup>	44.5	180	IS 5182 (Part-9) Reff 2019
8	Lead (Pb) in µg/m <sup>3</sup>	<0.02	1	IS 5182 (Part-22) Reff 2019
9	Nickel (Ni) in ng/m <sup>3</sup>	5.2	20	IS 5182 (Part-26) Reff 2020
10	Arsenic (As) in ng/m <sup>3</sup>	<1.0	6	Air Sampling, 3 <sup>rd</sup> Edn. Method 402 and APHA 23 <sup>rd</sup> Edition Part 3114B
11	Benzene (C <sub>6</sub> H <sub>6</sub> ) in µg/m <sup>3</sup>	<2.0	5	IS 5182 (Part-11) Reff 2022
12	Benzo (a) pyrene in ng/m <sup>3</sup>	<1.0	1	IS 5182 (Part-12) Reff 2019
<b>NOTE:</b> Limit as per CPCB notification, New Delhi, 18th November 2009, for Ambient air quality.				

Report Prepared By :

*B. Gorai*

for Qualissure Laboratory Services  
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*B. Gorai*  
Benimadhab Gorai, Chemist  
(Authorized Signatory)

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## TEST REPORT

<b>Name &amp; Address Of the Customer :</b> <b>M/s. Giridhan Metal Pvt. Ltd.</b> Jamuria Industrial Estate, Damodarpur, Jamuria P.O.- Nandi, Paschim Bardhaman, Pin : 713 344	Report No.	: QLS/MR/A/24-25/C/587
	Date	: 13.11.2024
	Sample No.	: QLS/MR/A/24-25/587(A-F)
	Date of Performance(s)	: 01-13.11.2024
	Sample Description	: Fugitive Air
	Ref No. Date	: 9400000031, Dated-27.05.2024

### Analysis Result of Fugitive Air

Sampling Done by: S.Ghosh/P.Mandal		Sampling done as per : CPCB Guidelines (Volume-1)	
Environmental Condition : Clear & Sunny			
Sample No.	Location	Date of Sampling	(RPM) in $\mu\text{g}/\text{m}^3$
587-A	NEAR I BIN AREA (600 TPD DRI)	28.10.2024	689
587-B	Product House (Common 350 TPD DRI & 600 TPD DRI)		547
587-C	Near CPP Area		736
587-D	Cooler Discharge Area (350 TPD DRI)		476
587-E	Near Ferro Plant Area	29.10.2024	414
587-F	CHP Area (CPP)		1056
NOTE:- Nil			

Report Prepared By :

*Borlan*

for Qualissure Laboratory Services  
 Reviewed & Authorized By

Benimadhab Gorai, Chemist  
 (Authorized Signatory)



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**5 field ESP connected with 350 TPD DRI through WHRB**



**5 field ESP connected with 600 TPD DRI through WHRB**



Network: 25 Apr 2023 11:38:31 GMT+05:30  
Local: 25 Apr 2023 11:38:29 GMT+05:30  
23°41'50.145"N 87°5'52.551"E  
Jamuria Road  
Purba Bardhaman  
Burdwan Division  
West Bengal

**Bag Filter connected with 2x9 MVA SEAF**



Network: 25 Apr 2023 16:09:48 GMT+05:30  
Local: 25 Apr 2023 16:09:46 GMT+05:30  
23°41'46.585"N 87°5'44.65"E  
Asansol  
Burdwan Division  
West Bengal

**5 field ESP for CFBC Boiler**



**Bag Filter for Steel Smelting Shop**



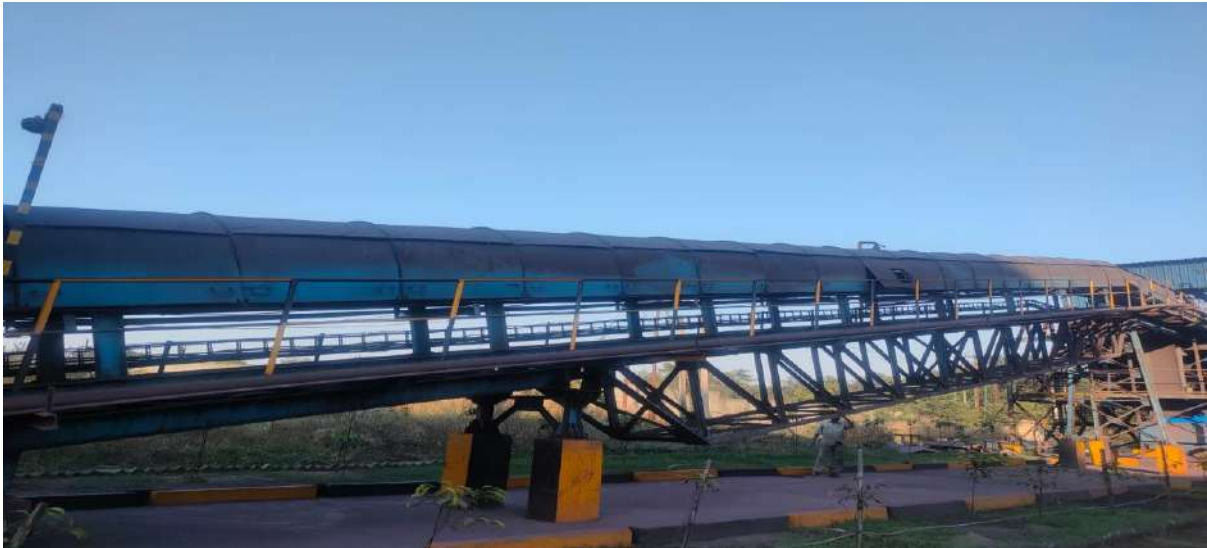
**Bag filter connected with CD & I-Bin of 300 TPD DRI**



**Bag filter connected with CD & I-bin of 600 TPD DRI**



**Bag Filter Connected with DRI 300 & 600 TPD (product separation & dispatch)**



**Closed Conveyor for raw materials handling**



**Pneumatic dust conveying system for fine dust**



**Dry fog system installed in coal handling system**



**Road sweeping machine to control fugitive dust from road during transportation**



**Raw material storage shed**



**Water tanker for sprinkling on road of project site**



**Water Sprinkler on road of plant site**



**Covered raw material handling**

**Primary & Secondary Extraction System connected with 06x20T Induction Furnace**



Bag filter with chimney connected with 6x20T Induction Furnace

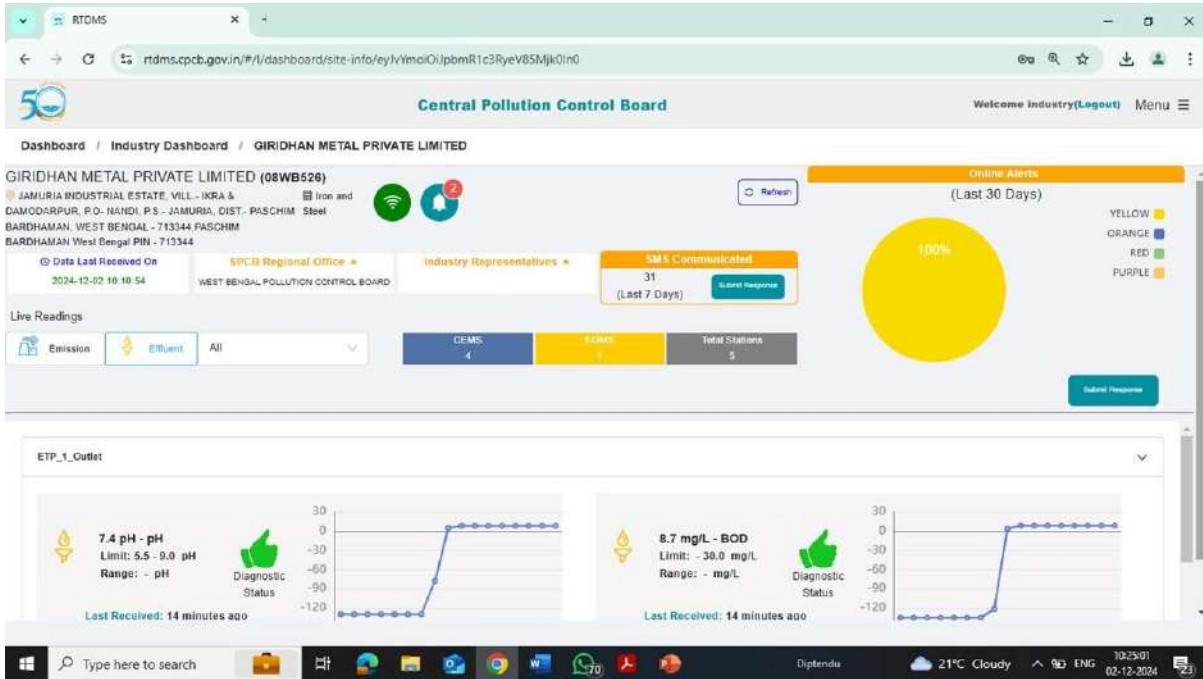
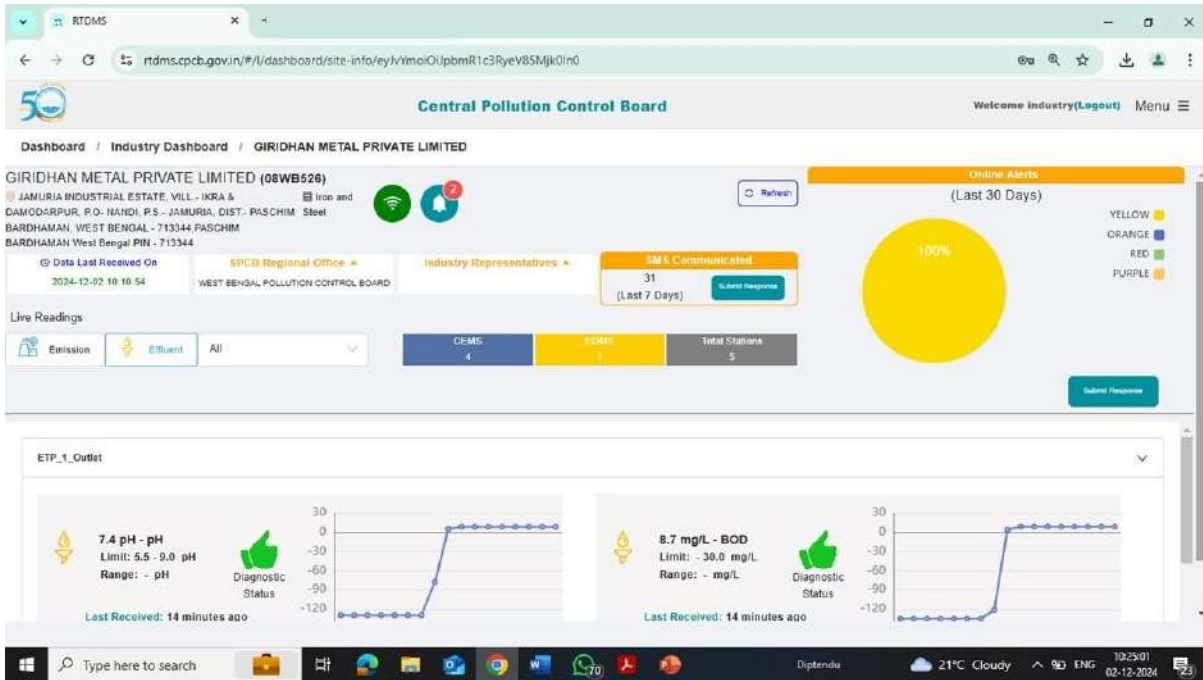


Induction furnace connected with primary hood



Primary & secondary suction connected with induction

**Screenshot of ETP report**





## TEST REPORT

<b>Name &amp; Address Of the Customer :</b>  <b>M/s. Giridhan Metal Pvt. Ltd.</b> Jamuria Industrial Estate, Damodarpur, Jamuria P.O.- Nandi, Paschim Bardhaman, Pin : 713 344	ULR No.	: TC62712400001309F
	Report No.	: QLS/MR/W/24-25/C/369
	Date	: 25.07.2024
	Sample No.	: QLS/MR/W/24-25/369
	Sample Description	: Ground Water
	Sample Mark/Location	: Ikra Village Borewell
	Sample Drawn On	: 15.07.2024
	Date of Performance(s)	: 16.07.2024-24.07.2024
	Sampling Method	: IS 17614(P-1, P-5 & P-25) 2021 & 2022
	Ref No. Date	: 9400000031 Dated 27.05.2024

### Analysis Result

#### (A) Microbiological Analysis

Sl.No.	Characteristic	Limit as Per IS 10500 :2012 Amd. 2	Test Method	Result
1.	E.coli/100ml	Not Detectable	IS 15185-2016	Not Detected
2.	Total Coliform Bacteria/100ml	Not Detectable	IS 15185-2016	Not Detected
3.	Faecal Coliform/100ml	—	IS 1622-1981 (RA 2019)	<2

#### (B) Chemical Analysis

Sl.No.	Test Parameter	Test Method	As per Drinking Water Standard : IS:10500, 2012 Amd. 1, 2 & 3		Result
			Acceptable Limit	Permissible Limit	
1.	Colour in Hazen Units	IS 3025 (Part 4): 1983 RA 2021	5	15	<5
2.	Odour	IS 3025(Part 5)-1983; RA:2018	Agreeable	Agreeable	Agreeable
3.	Taste	IS 3025 : Part 8 : 1984 ( RA: 2017)	Agreeable	Agreeable	Agreeable
4.	pH Value at 25°C	IS 3025 (Part 11)-1984; RA: 2019	6.5-8.5	No Relaxation	7.62
5.	Turbidity in NTU	IS 3025 (Part 10)-1984; RA: 2017	1	5	<1.0
6.	Total Dissolved Solids (as TDS) in mg/l	IS 3025(Part 16)-1984; RA: 2017	500	2000	558
7.	Aluminium (as Al) in mg/l	IS 15302: 2003 (RA 2019)	0.03	0.2	<0.03
8.	Ammonia (as NH <sub>3</sub> ) in mg/l	IS 3025 (Part 34): 1988;RA:2019	0.5	No Relaxation	<0.1
9.	Anionic Detergents(as MBAS) in mg/l	IS 13428-2005(Annex K) ; RA:2018	0.2	1.0	<0.02
10.	Boron(as B) in mg/l	IS 13428-2005(Annex L); RA:2018	0.5	2.4	<0.5
11.	Calcium(as Ca) in mg/l	IS 3025 (Part 40)-1991, RA: 2019	75	200	88.7
12.	Chloride(as Cl) in mg/l	IS 3025 (Part 32)-1988, RA: 2019	250	1000	96.6
13.	Copper(as Cu) in mg/l	IS 3025 (Part 42): 1992 ; RA 2019	0.05	1.5	<0.02
14.	Fluoride(as F) in mg/l	APHA 24th Edition 2023, 4500 F D	1.0	1.5	0.31
15.	Free Residual Chlorine in mg/l	IS 3025 (Part 26) 1986 RA: 2021	0.2	1.0	<0.1
16.	Iron (as Fe) in mg/l	IS 3025(Part 53)-1988 RA: 2019	1.0	No Relaxation	0.53
17.	Magnesium(as Mg) in mg/l	APHA 24 <sup>th</sup> Edition- 2023, 3500 Mg	30	100	44.7
18.	Manganese (as Mn) in mg/l	IS 3025 (Part 59): 2006 RA 2019	0.1	0.3	<0.02
19.	Mineral Oil in mg/l	IS 3025 (Part 39): 1991 (RA 2021)	1.0	No Relaxation	<0.5
20.	Molybdenum as Mo in mg/l	APHA 24 <sup>th</sup> Edition, 2023, 3113B	0.07	No Relaxation	<0.05
21.	Nitrate (as NO <sub>3</sub> ) in mg/l	IS 3025 (Part 34)-1986, RA: 2019	45	No Relaxation	<0.5
22.	Phenolic Compounds(as C <sub>6</sub> H <sub>5</sub> OH) in mg/l	IS 3025 (Part 43)-1992 RA: 2019	0.001	0.002	<0.001
23.	Selenium(as Se) in mg/l	IS 15303-2003; RA: 2019	0.01	No Relaxation	<0.01
24.	Sulphate (as SO <sub>4</sub> ) in mg/l	IS 3025 (Part 24)-1986, RA: 2022	200	400	52.3
25.	Alkalinity(as CaCO <sub>3</sub> ) in mg/l	IS 3025 (Part 23)- 1986, RA: 2019	200	600	352.0
26.	Total Hardness (as CaCO <sub>3</sub> ) in mg/l	IS 3025 (Part 21)-2009, RA: 2019	200	600	407.9
27.	Cadmium(as Cd) in mg/l	IS 3025(Part 41)-1992;RA: 2019	0.03	No Relaxation	<0.002
28.	Cyanide(as CN) in mg/l	IS 3025(Part 27)-1986;RA: 2019	0.05	No Relaxation	<0.02
29.	Lead(as Pb) in mg/l	IS 3025(Part 47)-1994;RA: 2019	0.01	No Relaxation	<0.01
30.	Mercury(as Hg) in mg/l	IS 3025(Part 48)-1994;RA: 2019	0.001	No Relaxation	<0.001
31.	Arsenic(as As) in mg/l	IS 3025 (Part 37)-1988, RA- 2019	0.01	No Relaxation	<0.01
32.	Zinc(as Zn) in mg/l	IS 3025(Part 49)-1994;RA: 2019	5	15	<0.02
33.	Total Chromium (as Cr) in mg/l	IS 3025 (Part 52): 2019	0.05	No Relaxation	<0.05

Report Prepared By:

Baillon

for Qualissure Laboratory Services  
Reviewed & Authorized By

S. Chakraborty  
Soumy Chakraborty, Microbiologist  
(Authorized Signatory)

End of the Report

for Qualissure Laboratory Services  
Reviewed & Authorized By

Bishnupriya Banerjee, Chemist  
(Authorized Signatory)

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## TEST REPORT

<b>Name &amp; Address Of the Customer :</b>  M/s. Giridhan Metal Pvt. Ltd. Jamuria Industrial Estate, Damodarpur, Jamuria P.O.- Nandi, Paschim Bardhaman, Pin : 713 344	ULR No.:	: TC627124000001310F
	Report No.:	: QLS/MR/W/24-25/C/370
	Date:	: 25.07.2024
	Sample No.:	: QLS/MR/W/24-25/370
	Sample Description:	: Ground Water
	Sample Mark/Location:	: Damodarpur Village Borewell
	Sample Drawn On:	: 15.07.2024
	Date of Performance(s):	: 16.07.2024-24.07.2024
	Sampling Method:	: IS 17614(P-1, P-5 & P-25) 2021 & 2022
	Ref No. Date:	: 9400000031 Dated 27.05.2024

### Analysis Result

#### (A) Microbiological Analysis

Sl.No.	Characteristic	Limit as Per IS 10500 :2012Amd. 2	Test Method	Result
1.	E.coli/100ml	Not Detectable	IS 15185-2016	Not Detected
2.	Total Coliform Bacteria/100ml	Not Detectable	IS 15185-2016	Not Detected
3.	Faecal Coliform/100ml	-	IS 1622-1981(RA 2019)	<2

#### (B) Chemical Analysis

Sl.No.	Test Parameter	Test Method	As per Drinking Water Standard: IS:10500, 2012 Amd. 1, 2 & 3		Result
			Acceptable Limit	Permissible Limit	
1.	Colour in Hazen Units	IS 3025 (Part 4)-1983 RA 2021	5	15	<5
2.	Odour	IS 3025(Part 5)-1983; RA:2018	Agreeable	Agreeable	Agreeable
3.	Taste	IS 3025 -Part 8 : 1984 ( RA: 2017)	Agreeable	Agreeable	Agreeable
4.	pH Value at 25°C	IS 3025 (Part 11)-1984; RA: 2019	6.5-8.5	No Relaxation	7.81
5.	Turbidity in NTU	IS 3025 (Part 10)-1984; RA: 2017	1	5	<1.0
6.	Total Dissolved Solids (as TDS) in mg/l	IS 3025(Part 16)-1984; RA: 2017	500	2000	574
7.	Aluminium (as Al) in mg/l	IS 15302; 2003 (RA 2019)	0.09	0.2	<0.01
8.	Ammonia as NH <sub>3</sub> in mg/l	IS 3025 (Part 34): 1988; RA: 2019	0.5	No Relaxation	<0.1
9.	Anionic Detergents(as MBAS) in mg/l	IS 13428-2005(Annex K) ; RA:2018	0.2	1.0	<0.02
10.	Boron(as B) in mg/l	IS 13428-2005(Annex L); RA:2018	0.5	2.4	<0.5
11.	Calcium(as Ca) in mg/l	IS 3025 (Part 40)-1991; RA: 2019	75	200	96.6
12.	Chloride(as Cl) in mg/l	IS 3025 (Part 32)-1988; RA: 2019	250	1000	108.4
13.	Copper(as Cu) in mg/l	IS 3025 (Part 42)-1992; RA: 2019	0.05	1.5	<0.02
14.	Fluoride(as F) in mg/l	APHA 24th Edition 2023, 4500 F D	1.0	1.5	0.42
15.	Free Residual Chlorine in mg/l	IS 3025 (Part 26) 1986 RA: 2021	0.2	1.0	>0.1
16.	Iron (as Fe) in mg/l	IS 3025(Part 53)-1988 RA: 2019	1.0	No Relaxation	1.03
17.	Magnesium(as Mg) in mg/l	APHA 24 <sup>th</sup> Edition- 2023, 3500 Mg	30	100	44.7
18.	Manganese (as Mn) in mg/l	IS 3025 (Part 59): 2006 RA 2019	0.1	0.3	<0.02
19.	Mineral Oil in mg/l	IS 3025 (Part 39): 1991 (RA 2021)	1.0	No Relaxation	<0.5
20.	Molybdenum as Mo in mg/l	APHA 24 <sup>th</sup> Edition, 2023, 31138	0.07	No Relaxation	<0.05
21.	Nitrate (as NO <sub>3</sub> ) in mg/l	IS 3025 (Part 34)-1986 RA: 2019	45	No Relaxation	<0.5
22.	Phenolic Compounds(as C <sub>6</sub> H <sub>5</sub> OH) in mg/l	IS 3025 (Part 43)-1992 RA: 2019	0.001	0.002	<0.001
23.	Selenium(as Se) in mg/l	IS 15303-2003; RA: 2013	0.01	No Relaxation	<0.01
24.	Sulphate (as SO <sub>4</sub> ) in mg/l	IS 3025 (Part 24)-1986; RA: 2022	200	600	61.3
25.	Alkalinity(as CaCO <sub>3</sub> ) in mg/l	IS 3025 (Part 23)-1986; RA: 2019	200	600	364.0
26.	Total Hardness (as CaCO <sub>3</sub> ) in mg/l	IS 3025 (Part 21)-2009; RA: 2019	200	600	427.7
27.	Cadmium(as Cd) in mg/l	IS 3025(Part 41)-1992; RA: 2019	0.003	No Relaxation	<0.003
28.	Cyanide(as CN) in mg/l	IS 3025(Part 27)-1986; RA: 2019	0.05	No Relaxation	<0.02
29.	Lead(as Pb) in mg/l	IS 3025(Part 47)-1994; RA: 2019	0.01	No Relaxation	<0.01
30.	Mercury(as Hg) in mg/l	IS 3025(Part 48)-1994; RA: 2019	0.001	No Relaxation	<0.001
31.	Arsenic(as As) in mg/l	IS 3025 (Part 37)-1988; RA: 2019	0.01	No Relaxation	<0.01
32.	Zinc(as Zn) in mg/l	IS 3025(Part 49)-1994; RA: 2019	5	15	<0.02
33.	Total Chromium (as Cr) in mg/l	IS 3025 (Part 52): 2019	0.05	No Relaxation	<0.05

Report Prepared By:

*Railan*

for Qualissure Laboratory Services

Reviewed & Authorized By



*S. Chakraborty*

Soumy Chakraborty, Microbiologist  
(Authorized Signatory)

-----End of the Report-----

for Qualissure Laboratory Services

Reviewed & Authorized By



*Bishuapriya Banerjee*

Bishuapriya Banerjee, Chemist  
(Authorized Signatory)

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## TEST REPORT

<b>Name &amp; Address Of the Customer :</b>  <b>M/s. Giridhan Metal Pvt. Ltd.</b> Jamuria Industrial Estate, Damodarpur, Jamuria P.O - Nandi, Paschim Bardhaman, Pin : 713 344	ULR No.	: TC627124000001311F
	Report No.	: QLS/MR/W/24-25/C/371
	Date	: 25.07.2024
	Sample No.	: QLS/MR/W/24-25/371
	Sample Description	: Ground Water
	Sample Mark/Location	: Mondalpur Village Borewell
	Sample Drawn On	: 15.07.2024
	Date of Performance(s)	: 16.07.2024-24.07.2024
	Sampling Method	: IS 17614(P-1, P-5 & P-25) 2021 & 2022
	Ref No. Date	: 9400000031 Dated 27.05.2024

### Analysis Result

#### (A) Microbiological Analysis

Sl.No.	Characteristic	Limit as Per IS 10500 :2012Amd. 2	Test Method	Result
1.	E.coli/100ml	Not Detectable	IS 15185-2016	Not Detected
2.	Total Coliform Bacteria/100ml	Not Detectable	IS 15185-2016	Not Detected
3.	Faecal Coliform/100ml	—	IS 1622-1981,(RA 2019)	<2

#### (B) Chemical Analysis

Sl.No.	Test Parameter	Test Method	As per Drinking Water Standard : IS:10500, 2012 Amd. 1, 2& 3		Result
			Acceptable Limit	Permissible Limit	
1.	Colour in Hazen Units	IS 3025 (Part 4)-1983 RA 2021	5	15	<5
2.	Odour	IS 3025(Part 5)-1983; RA-2018	Agreeable	Agreeable	Agreeable
3.	Taste	IS 3025 : Part 8 - 1984 (RA: 2017)	Agreeable	Agreeable	Agreeable
4.	pH Value at 25°C	IS 3025 (Part 11)-1984; RA: 2019	6.5-8.5	No Relaxation	7.62
5.	Turbidity in NTU	IS 3025 (Part 10)-1984; RA: 2017	1	5	<3.0
6.	Total Dissolved Solids (as TDS) in mg/l	IS 3025(Part 16)-1984; RA: 2017	500	2000	614
7.	Aluminium (as Al) in mg/l	IS 35302: 2003 (RA 2019)	0.03	0.2	<0.01
8.	Ammonia as NH <sub>3</sub> in mg/l	IS 3025 (Part 34): 1988; RA: 2019	0.5	No Relaxation	<0.1
9.	Anionic Detergents(as MBAS) in mg/l	IS 13428-2005(Annex K) ; RA: 2018	0.2	1.0	<0.02
10.	Boron(as B) in mg/l	IS 13428-2005(Annex L); RA: 2018	0.5	2.4	<0.5
11.	Calcium(as Ca) in mg/l	IS 3025 (Part 40)-1991; RA: 2019	75	200	99.8
12.	Chloride(as Cl) in mg/l	IS 3025 (Part 32)-1988; RA: 2019	250	1000	127.3
13.	Copper(as Cu) in mg/l	IS 3025 (Part 42): 1992; RA: 2019	0.05	1.5	<0.02
14.	Fluoride(as F) in mg/l	APHA 24th Edition 2023, 4500 F.D.	1.0	1.5	0.73
15.	Free Residual Chlorine in mg/l	IS 3025 (Part 26) 1986 RA: 2021	< 2	1.0	<0.1
16.	Iron (as Fe) in mg/l	IS 3025(Part 53)-1988 RA: 2019	1.0	No Relaxation	1.26
17.	Magnesium(as Mg) in mg/l	APHA 24 <sup>th</sup> Edition- 2023, 3500 Mg	30	100	53.2
18.	Manganese (as Mn) in mg/l	IS 3025 (Part 59): 2006 RA 2019	0.1	0.3	<0.02
19.	Mineral Oil in mg/l	IS 3025 (Part 39): 1991 (RA 2021)	1.0	No Relaxation	<0.5
20.	Molybdenum as Mo in mg/l	APHA 24 <sup>th</sup> Edition, 2023, 3113B	0.07	No Relaxation	<0.05
21.	Nitrate (as NO <sub>3</sub> ) in mg/l	IS 3025 (Part 34)-1986 RA: 2019	45	No Relaxation	<0.5
22.	Phenolic Compounds(as C <sub>6</sub> H <sub>5</sub> OH) in mg/l	IS 3025 (Part 43)-1992 RA: 2019	0.001	0.002	<0.001
23.	Selenium(as Se) in mg/l	IS 15303-2003; RA: 2013	0.01	No Relaxation	<0.05
24.	Sulphate (as SO <sub>4</sub> ) in mg/l	IS 3025 (Part 24)-1986; RA: 2022	200	400	71.6
25.	Alkalinity(as CaCO <sub>3</sub> ) in mg/l	IS 3025 (Part 23): 1986; RA: 2019	200	600	384.0
26.	Total Hardness (as CaCO <sub>3</sub> ) in mg/l	IS 3025 (Part 21)-2009; RA: 2019	200	600	471.2
27.	Cadmium(as Cd) in mg/l	IS 3025(Part 41)-1992; RA: 2019	0.003	No Relaxation	<0.002
28.	Cyanide(as CN) in mg/l	IS 3025(Part 27)-1986; RA: 2019	0.05	No Relaxation	<0.02
29.	Lead(as Pb) in mg/l	IS 3025(Part 47)-1994; RA: 2019	0.01	No Relaxation	<0.01
30.	Mercury(as Hg) in mg/l	IS 3025(Part 48)-1994; RA: 2019	0.001	No Relaxation	<0.001
31.	Arsenic(as As) in mg/l	IS 3025 (Part 37)-1988; RA: 2019	0.01	No Relaxation	<0.01
32.	Zinc(as Zn) in mg/l	IS 3025(Part 49)-1994; RA: 2019	5	15	<0.02
33.	Total Chromium (as Cr) in mg/l	IS 3025 (Part 52): 2019	0.05	No Relaxation	<0.05

Report Prepared By:

*Barikar*

for Qualissure Laboratory Services

Reviewed & Authorized By

*S. Chakraborty*  
Soumy Chakraborty, Microbiologist  
(Authorized Signatory)

-----End of the Report-----

for Qualissure Laboratory Services

Reviewed & Authorized By

*Bishnu Priya Banerjee*  
Bishnu Priya Banerjee, Chemist  
(Authorized Signatory)

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## TEST REPORT

<b>Name &amp; Address Of the Customer :</b> M/s. Giridhan Metal Pvt. Ltd. Jamuria Industrial Estate, Damodarpur, Jamuria P.O.: Nandi, Paschim Bardhaman, Pin : 713 344	Report No.	: QLS/MR/A/24-25/C/625
	Date	: 13.11.2024
	Sample No.	: QLS/MR/A/24-25/625(A-D)
	Sample Description	: Noise Monitoring
	Date of Performance(s)	: 01-13.11.2024
	Ref No. Date	: 9400000031, Dated-27.05.2024

## Monitoring Result of Noise

Sampling Done By: S.Ghosh/P.Mandal				
Sampling Guideline : As per IS: 9876: 1981 (RA-2001)				
Sample No	Date of Monitoring	Location	Leq dB (A) Day Time	Leq dB (A) Night Time
625A	29-29.10.2024	Near Old Admin Building	60.2	49.7
625B		Near Ferro Plant	63.0	48.5
625C	29-30.10.2024	Near ETP	59.4	47.0
625D		Near Main Gate	60.6	49.0

Code/ Category	Leq dB Day Time(A)	Leq dB Night Time(A)	<b>NOTE:</b> Day Time : 06.00 Hr. – 22.00 Hr. Night Time : 22.00 Hr. – 06.00 Hr.
A/Industrial	75	70	
B/Commercial	65	55	
C/Residential	55	45	
D/Ecological Sensitive	50	40	

Report Prepared By :

for Qualissure Laboratory Services  
Reviewed & Authorized By  
Benimadhab Gorai, Chemist  
(Authorized Signatory)

----- End of the Report -----

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**Photographs of Solar Power**

**NU VISTA LIMITED**  
(Formerly Emami Cement Limited)



To  
The Director  
Giridhan Metal Private Limited  
Jamuria Industrial Estate, Po. Nandi,  
Ps. Jamuria, Dist. Paschim Bardhaman,  
West Bengal - 713344

Sub: MoU for procurement of Fly Ash @ 45400 MT/Annum and Bottom Ash 19500 MT/Annum for production of Cement.

Respected Sir / Madam,

With reference to the above subject, our management has decided to procure Fly Ash @ 45400 MT/Annum and Bottom Ash 19500 MT/Annum w.e.f 01<sup>st</sup> January 2025 for production of Cement as per our multiple discussions had with you and after analysis of fly ash and bottom ash generated through your Power Plant.

This will be cost effective for both of us as your plant is located within the distance of 50 Km radius.

Thanking you in anticipation for your extended co-operation to execute this MoU that will be helpful for both of us in terms of cost benefit and availability of RM for us and disposal of fly ash for yours.

Looking forward for better relationship in future as well.

Yours faithfully,

M/s NU Vista Limited  
(Formerly Emami Cement Limited)  
Panagarh Cement Division.  
Panagarh Industrial Park,  
West Bengal-713148.

**NU VISTA LIMITED**

(Formerly Emami Cement Limited)

Registered Office: Acropolis, 15<sup>th</sup> Floor, 1858/1, Rajdanga Main Road, Kasba, Kolkata – 700107 | Tel: (033) 6627 1301

Corporate Office: 687 Anandapur, E.M.Bypass, Kolkata 700107 | Tel: (033) 6613 6264 | CIN: U26940WB2007PLC116503

Website: [www.nuvoco.com](http://www.nuvoco.com)

Mobile : 7063281706  
7908160258

# Maa RakhaKali Enterprise

GST IN : - 19ABLFM8725A1Z4

Vill. - Monoharbohal, P.O. - Ethora, P.S. - Barabani, Dist. - Paschim Bardhaman - 713359

Ref. No. ....

Date ... 05/01/2024 ..

To,  
The Giridhan Metal Private Limited  
Jamuria Industrial Estate, P.O.: Nandi  
P.S. Jamuria, Dist.- Paschim Bardhaman  
West Bengal-713344

Kind Attn.: Director

Dear Sir,

As per our last meeting held on dated 02<sup>nd</sup> January'2024, we are desirous of purchasing the following materials from your organization as per market rate prevailing at that time or as mutually agreed.

1. Power Plant Fly Ash – 3000 Ton per month (annually 36000 MT approx..) for manufacturing of Fly Ash Bricks.
2. Power Plant Bed Materials – 1000 Ton per month (annually 12,000 MT approx.) for manufacturing of Paver Block.

We would request you that you may send the above material at our plant premises situated at MANOHARBOHAL.

Thanking you  
With Regards,  
For Maa Rakhakali Enterprise

GSTIN: 19AALIFM245001ZE

Mob: 9732239603, 9933551352

# M/S MIGO ASH BRICKS

Manufacturer of Fly Ash Bricks



Gourangdi(Rupnarayanpur Road), Panuria, Burdwan, Pin- 713315, W.B.  
email : rajuchothury@gmail.com

Dated: 05/01/2024

To,  
The Giridhan Metal Private Limited  
Jamuria Industrial Estate, P.O.: Nandi  
P.S. Jamuria, Dist.- Paschim Bardhaman  
West Bengal-713344

Kind Attn.: Director

Dear Sir,

As per our last meeting held on dated 02<sup>nd</sup> January'2024, we are desirous of purchasing the following materials from your organization as per market rate prevailing at that time or as mutually agreed.

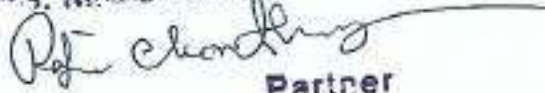
1. Power Plant Fly Ash - 3000 Ton per month (annually 36000 MT approx..) for manufacturing of Fly Ash Bricks.
2. Power Olant Bed Materials - 1000 Ton per month (annually 12,000 MT approx.) for manufacturing of Paver Block.

We would request you that you may send the above material at our plant premises situated at PANURIA.

Thanking you  
With Regards,  
For Mico Ash Bricks

(Authorized Signatory)

M/S. MICO ASH BRICKS

  
Partner



# JEO FLY ASH BRICKS

GSTIN: 19AASFJ6037A1Z9

VILL.: MANOHARBAHAL, P.O.: ETHORA, P.S.: ASANSOL NORTH  
DIST.: PASCHIM BURDWAN, PIN: 713359,

MOBILE: +91-99335-51352

Dated: 05/01/2024

To,  
The Giridhan Metal Private Limited  
Jamuria Industrial Estate, P.O.: Nandi  
P.S. Jamuria, Dist.- Paschim Bardhaman  
West Bengal-713344

Kind Attn.: Director

Dear Sir,

As per our last meeting held on dated 02<sup>nd</sup> January'2024, we are desirous of purchasing the following materials from your organization as per market rate prevailing at that time or as mutually agreed.

1. Power Plant Fly Ash – 3000 Ton per month (annually 36000 MT approx..) for manufacturing of Fly Ash Bricks.
2. Power Olant Bed Materials – 1000 Ton per month (annually 12,000 MT approx.) for manufacturing of Paver Block.

We would request you that you may send the above material at our plant premises situated at MANOHARBOHAL.

Thanking you  
With Regards,  
For Jeo Fly Ash Bricks

(Authorized Signatory)

JEO FLY ASH BRICKS  
*Subrata Das*



**SHREE SWASTICK  
INDUSTRIES**

Annexure 13\_Memorandum of Understanding (MoU) for Fly Ash sale

39 G.T. Road, Bansra More P.O. Seansole Rajbari - 713358, Raniganj, Dist. Burdwan (W.B.)  
Contact: (+91) 94340 34806 | shree\_swastick@yahoo.com | www.shreeswastick.com

Manufacturers of cement bricks, paver blocks, designer tiles and precast products

Ref: SSI/23-24/APR/21-3

Date: 21-04-2023

To,

M/s. Giridhan Metal Private Limited  
Jamuria Industrial Estate, Po. Nandi  
P.s. Jamuria, Dist- Paschim Burdwan  
(W.B) Pincode-713344

Kind. Attn: Director

Dear Sir,

As Discussed with you we are desirous of purchasing the following materials from your upcoming project as per market rate prevailing at that time or as mutually agreed.

1. Power Plant Fly Ash – Forty Five to Fifty thousand tons per annum.

We would request you that whenever your plant commenced production we should be given priority to lift the aforesaid material.

Thanking You  
Yours Faithfully

**For Shree Swastick Industries**



# **STUDY REPORT**

**ON**

**DE-CARBONISATION PROGRAM**

**FOR**

**EXISTING Steel Plant**

**by**

**M/s GIRIDHAN METAL PVT LIMITED**

**At**

**Jamuria Industrial Area,  
Village-Ikra and Damodarpur  
Tehsil-Jamuria, Dist- Paschim Bardhaman,  
West Bengal**

**PREPARED BY**

**RECYCLING AND ENVIRONMENT INDUSTRY  
ASSOCIATION OF INDIA**

**Email: [reiarecycle@gmail.com](mailto:reiarecycle@gmail.com)  
Mobile: +919818049505 / 01144781917  
Aug , 2023**

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### **PART I**

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- 3. Methodology of GHG Emission Calculations**
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### **PART II PROJECT DETAILS**

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- 2. Magnitude of the Operation**
- 3. Material Requirements of the Project**
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- 1. Identification of GHG Sources**
- 2. Selection of GHG Quantification methodology and Summary of Emissions**
- 3. Summary of GHG Emissions**
- 4. GHG Reduction Strategy**
- 5. Quality Control**
- 6. Reporting.**

\*\*\*\*\*

## **PART I**

### **1.1 Introduction**

United Nations Intergovernmental Panel on Climate Change (IPCC) has issued warning that the Climate Resilient Development is difficult at the present levels of temperature of the globe. If the global warming results in temperature increase beyond 1.5°C (2.7°F), further energy intensive development will be extremely difficult. This significant conclusion emphasizes the need for a climate policy that prioritizes equity and justice, adequate finance, technology transfer and interventions, political commitment, and collaboration, which necessarily shall contribute to more successful climate change adaptation and emissions reductions.

Steel plays a crucial role in building a sustainable global economy, but its manufacturing is the fifth largest contributor to global GHG emissions. De-carbonization of the steel sector is therefore a global concern and a big challenge. This industry is under tremendous pressure to improve upon its energy intensity to reduce GHG emissions and to further utilize CO<sub>2</sub> captured for useful purposes or go for long term sequestration to fix it in nature's cycle.

This report describes the methods for GHG inventorisation for an existing steel plant of M/s Girdhan Metals Private Limited at Jamuria WB and the measures proposed to be adopted to mitigate GHG emissions from the project along with the carbon capture, storage and CO<sub>2</sub> sequestration strategies.

### **1.2 Carbon Emissions: different scopes of emissions**

According to the Organizational Foot Printing Standard -ISO 14064-1, GHG emissions are categorised into 3 scopes :

#### **Scope 1 emissions:**

This includes the direct emissions that result from activities within the organization's control, e.g., on-site electricity generation, combustion in furnaces, heating/cooling operations at site; company-owned vehicles, fugitive emissions (e.g., refrigerants, emissions from fire extinguishers, refrigerators, circuit breakers etc).

#### **Scope 2 emissions:**

This includes indirect emissions from any electricity or heat or compressed air consumed that has been imported from outside the factory.

#### **Scope 3 emissions:**

This includes all of the indirect emissions that occur in the value chain, weighted according to the company's contribution. e.g., purchased goods and

services, employee commuting, business travel, upstream emissions from fuel extraction, waste management, T&D losses and electricity consumption and Ozone Depleting Substances refill for Work from Home. Scope 3 emissions are a consequence of the activities of the company, but occur from sources not owned or controlled by the company. Some examples of Scope 3 activities are extraction and production of purchased materials; transportation of purchased fuels & raw materials and use of products and services from outside. There are generally following categories of activities under Scope 3 ;

- Category 1: Purchased goods and services,
- Category 2: Capital goods purchased,
- Category 3: Upstream transportation and distribution,
- Category 4: Solid Waste disposal outside plant premises,
- Category 5: Business travel,
- Category 6: Employee commuting,
- Category 7: Upstream leased assets,
- Category 8: Downstream transportation and distribution,
- Category 9: Processing of sold products,
- Category 10: Use of sold products,
- Category 11: End-of-life treatment of sold products,
- Category 12: Downstream leased assets,
- Category 13: Franchises,
- Category 14: Investments,
- Category 15: Emissions during “Work from Home”, etc.

According to the GHG Corporate Protocol, all organizations should quantify Scope 1 and 2 emissions when reporting and disclosing GHG emissions, while quantification of Scope 3 emissions is voluntary and may be reported by companies to identify the greatest GHG reduction opportunities across their value chain which in turn makes business activities more sustainable and competitive. Latest trend in the industry is to quantify GHG emissions for Scope 3 as far as possible.

### 1.3 Methodologies for GHG Emission calculations as:

#### Scope 1

The methodology used for GHG emissions calculations for use of fossil fuels and refrigerants is briefly described in IPCC emission factor guide book available on IPCC website and or GHG protocol website for different types of fuels ie, coal, coke, liquid fuels, NG, LPG, LNG, ODS etc. Emission Factors are available from the following reference attached as Annexure I;

[https://www.epa.gov/sites/default/files/2021-04/documents/emission-factors\\_a-pr2021.pdf](https://www.epa.gov/sites/default/files/2021-04/documents/emission-factors_a-pr2021.pdf)

## **Scope 2: External Electricity Consumption:**

This may be noted that emission factor for electricity, can be obtained from CEA web site given below ( Attached as Annexure II); The average grid factor for India for 2020-21 is 0.790 tCO<sub>2</sub> per MWH.

[https://cea.nic.in/wp-content/uploads/tpecc/2022/02/User\\_Guide\\_ver\\_17\\_2021.pdf](https://cea.nic.in/wp-content/uploads/tpecc/2022/02/User_Guide_ver_17_2021.pdf)

For imported steam and compressed air, the supplier of these utilities should provide information on CO<sub>2</sub> emission per NM<sup>3</sup> of steam or compressed air.

## **Scope 3:**

**Upstream Transportation and Distribution:** Emissions due to upstream transportation in tCO<sub>2</sub>e = “Total distance travelled \* Emission Factor”.The emission Factors are available in Annexure III; **Downstream Transportation and Distribution:** Emissions due to downstream transportation of products in tCO<sub>2</sub>e = “Total distance travelled \* Emission Factor” but the same has not been considered in present scope as the destinations for the products after leaving the factory gate are not available. Scope 3 emissions for employees commute based on certain assumptions are presented in spreadsheets attached.

## **1.4 Carbon Neutrality**

Carbon neutrality refers to a balance between carbon emissions and carbon absorption from the atmosphere in carbon sinks. General strategy to be adopted by the project proponent to reduce GHG emissions and absorb carbon is defined below;

### **Scope 1 Emissions Reduction**

- a. Reduce fuel consumption and improve operational energy efficiency.
- b. Capital investments in newer, more energy-efficient equipment/technologies to lower operating costs while also lowering emissions.
- c. Conducting energy audits at workplaces where electricity and fuel consumption is high in order to identify better alternatives and save money on energy consumption.
- d. For carbon neutrality, CER may be considered to be purchased based on calculated footprint. CERs are electronic certificates issued for greenhouse gas emission reductions from CDM project activities or programmes of activities (PoAs) in accordance with CDM rules and requirements.

### **Scope 2 Emissions Reduction**

It may be noted that when Project Proponent buy Renewable Energy credits (RECs), they would enable more clean energy projects to supply power to the grid where they operate. Grid operators want to buy the cheapest power possible because energy from wind and solar plants is frequently less expensive than energy from coal-burning plants. As a result, by purchasing RECs, Project Proponent shall effectively be reducing carbon emissions by reducing brown power intake from the grid.

### **Scope 3 Emission Reduction**

Optimisation of employee commute, business travel, rail transport, local Out sourcing are some of the measures taken to reduce scope 3 emissions. Vocal for local is the business policy of Proponent.

\*\*\*\*\*

## PART II

### PROJECT DETAILS

#### 2.1 TYPE OF THE PROJECT

The company GMPL is having an existing Integrated Steel Plant (Sponge Iron - 3,18,000 TPA ; MS Billets -3,72,300 TPA , Rolling Mill -3,00,000 TPA; Submerged Arc Furnaces (SAF) - 30,000 TPA (Fe-Mn/Si-Mn) , Captive Power Plant 42 MW including Waste Heat Recovery Boiler (WHRB) (21 MW) at Jamuria Industrial Estate, Village Ikra & Damodarpur, Tehsil Jamuria, District Paschim Bardhaman, West Bengal.

The existing plant area is 31.75 hectares (78.44 acres);

#### 2.2 MAGNITUDE OF THE OPERATION

Size or magnitude of operation for the project and its expansion project is given below:

Table: 2.1 Details of expansion

	Existing Units as per EC J-11011/366/2010-IA. II(I) dated 8th April, 2021 as amended on 16 <sup>th</sup> Jan, 2023		Capacity as per Granted CTO
Name	Configuration	Production (TPA)	Production (TPA)
Sponge Iron (DRI Plant)	1 x 350 & 1 x 600 TPD DRI Plant	3,18,000 TPA	3,18,000 TPA (330 days/365 days)
MS Billets (Induction Furnace with LF & CCM)	6 x 20 Ton IF (Induction Furnace) & 1X30 Ton LF (Ladle Furnace)	3,72,300 TPA	3,72,300 TPA
Rolling Mill	Rolled bars/light structure	3,00,000 TPA	3,00,000 TPA
Submerged Arc Furnace (SAF)	2 x 9 MVA of Fe-Mn/Si-Mn	30,000 TPA	30,000 TPA
Waste Heat Recovery	35 TPH & 70 TPH	21 MW	35 TPH & 70 TPH

<b>Boiler (WHRB)</b>			
<b>Captive Power Plant</b>	<b>1x 32 TPH &amp; 50 TPH FBC boiler</b>	<b>21 MW</b>	<b>21 MW (1x82 TPH FBC boiler)</b>
<b>Billet Caster</b>	<b>2x2 Strand</b>	<b>-</b>	<b>2x2 Strand</b>

Source: *Pre-feasibility Report*

### 2.3 Material Requirements for the Project

The project requirement such as raw material, water, power, manpower with source of supply is described in the section below:

#### 2.3.1 Raw Material Requirement for the Project

The basic raw material for the manufacturing of Steel is Iron Ore Lumps/Fines which is being/will be sourced from nearby markets by rail/road. Details regarding quantity of raw materials required their source along with mode of transportation for expansion project have been tabulated below:

**Table 2.2 Raw Material Requirement**

S. No.	Required raw material	Quantity and Source of raw material TPA	Mode of transportation	Distance from plant site,Km
I	<b>Sponge Iron</b>			
1.	Iron Ore	4,77,000	Odisha & Jharkhand	Rail/Road 250-280
2.	Coal Imported	2,00,340	Overseas	Road/Rail from Port 300
	Indian Coal for DRI	85,860	ECL,	Rail/Road 60-80
3	Dolomite	11,130	Bhutan	Rail/Road 900-920

<b>II</b>	<b>Steel Meting Shop</b>				
<b>1</b>	<b>Pig Iron</b>	<b>53,000</b>	<b>TATA Steel, SAIL,</b>	<b>Rail/Road</b>	<b>150-170</b>
<b>2</b>	<b>Sponge Iron (DRI)- In house</b>	<b>318000</b>	<b>Own</b>	<b>Own</b>	<b>Nil</b>
<b>3</b>	<b>Sponge Iron (DRI)- Purchased</b>	<b>47000</b>	<b>Nearby Mills</b>	<b>Road</b>	<b>50</b>
<b>4</b>	<b>Scrap</b>	<b>32180</b>	<b>Market</b>	<b>Rail/Road</b>	<b>300</b>
<b>5</b>	<b>Ferro Alloys</b>	<b>4,840</b>	<b>Own</b>	<b>Own</b>	<b>Own</b>
<b>III</b>	<b>Caster</b>				
<b>1</b>	<b>Liquid Steel</b>	<b>3,72,300</b>	<b>Own Production</b>		
<b>IV</b>	<b>Ferro Alloys</b>				
<b>1</b>	<b>Mn Ore</b>	<b>75,000</b>	<b>Odisha</b>	<b>Rail/Road</b>	<b>900-950</b>
<b>2</b>	<b>Coal</b>	<b>12600</b>			
<b>3</b>	<b>Coke</b>	<b>12600</b>	<b>Local</b>	<b>Road</b>	<b>50</b>
<b>3</b>	<b>Electrode Paste</b>	<b>600</b>	<b>Maharashtra</b>	<b>Road</b>	<b>500</b>
<b>4</b>	<b>Dolomite</b>	<b>8,000</b>	<b>Bhutan</b>	<b>Rail/Road</b>	<b>900-920</b>
<b>V</b>	<b>Power Plant</b>				
<b>7</b>	<b>Coal for CPP</b>	<b>75,000</b>	<b>CIL</b>	<b>Rail/Road</b>	<b>60-80</b>

### 2.3.2 Water Requirement

Total make-up water requirement for Existing plant is 4178 KLD which will be sourced from Surface Water (River Damodar) through Damodar Valley Corporation (DVC) ) and Asansol Municipal Corporation. The water is being/will be supplied from Damodar river.

### 2.3.3 Power Requirement & D.G set Details

The existing power requirement is 84.3 MW. Own generation is 42 MW. 14.4 MW is connected with Ferro Alloy plant.

#### DG Set Details

Three Numbers 2000 KVA DG Sets with 10 m stack height above roof level have been installed in existing plant. DG set are used only as an emergency back-up system.

### 2.3.4 Manpower Requirement

Manpower of the existing plant is 2003 persons (408 persons regular & 1595 persons contractual).

## 2.4 MAJOR EQUIPMENT AND MACHINERIES

### 2.4.1 TECHNOLOGY & PROCESS DESCRIPTION

Plant consists of following unit operation steps:

- Direct Reduced Iron (DRI) in DRI Plant
- SMS - Induction Furnace (IF) , LRF and Continuous Caster
- Rolling Mills
- Ferro Alloy Plant
- Power Plant

#### A. DRI Plant (1 x 350 +3 x 600 TPD)

Table 2.3 Material Balance for DRI Kilns ( Maximum for all Kilns)

Input in PA		Output in TPA	
Pellet/Iron Ore	4,77,000	DRI	3,18,000

Imported coal (70%)	2,00,340	Char	47,700
Indian coal (30%)	85,860	APC Dust	51,675
Combustion air	13,64,220	Flue gas	17,19,225
Dolomite	11,130	Kiln Accretion	1,950
<b>Total</b>	<b>21,38,550</b>	<b>Total</b>	<b>21,38,550</b>

#### B. Steel Melt Shop (SMS)

6 Nos of Induction furnaces of capacity 20 T each have been installed.

LRF of Capacity 30 T for treatment and temperature adjustment of liquid steel tapped from induction furnaces is installed..

Double Strand Medium Speed Modular Billet Caster (4 x 2 Strand). In general 130 mm billets shall be processed.

Table 2.4 Material Balance for Induction Furnace

Existing: 6 x 20 T IF (Max)

Input in TPA		Output in TPA	
Pig Iron	53,000	Liquid steel	3,72,300
DRI (Captive)	3,18,000	Slag	52,120
DRI Purchased	47000		
Ferro Alloys (Si-Mn)	4,800	Fume	30,560
Scrap	32,180	-	-
<b>Total</b>	<b>4,54,980</b>	<b>Total</b>	<b>4,54,980</b>

#### C. Rolling Mills

Major Equipment & Specifications/Scope of Supply –

Rebar Mill –1 x 3,00,000 TPA

#### D. Ferro Alloys (2x9MVA)

Table 2.5 Material Balance for Fe-Mn/Si-Mn production

Mn Ore	75,000	Ferrol Alloys	30,000
Dolomite	8,000	Slag	28,500
Coke	12,600	Gaseous Emission	50,440
Coal	12,600		
Electrode Paste	600		
<b>Total</b>	<b>1,08,940</b>	<b>Total</b>	<b>1,08,940</b>

## 2.5. Solid & Hazardous Waste Management

The details are tabulated below: -

**Table 2.7- Solid & Hazardous Waste Quantity & Management Scheme**

Solid& Hazardous waste	Generated from	Quantity (TPA) Existing	Utilization Measures
CPP Fly ash	Captive Power plant	45,267	Used for making fly ash brick in nearby bricks manufacturing unit.
CPP Bottom ash		19,400	Use for making paver block. Supplied to cement plant to make Portland cement production.
Fe-Mn Slag	Ferro Alloy Plant	28500	Used for Si-Mn production.
IF slag	Induction furnace	54192	River sand substitute, land fill after iron separation.
Dolochar	Sponge Iron Plant	47700	Use in FBC for power generation & in sister concerned company
Kiln Accretion	Sponge Iron	1950	Road Making & Land fill
Mill scale & scrap	Rolling Mill	12210	To be fully consumed in plant
APC Dust	DRI Kilns	46,215	Dumped in abandoned OCP of Eastern coalfields Limited (ECL)
ETP Sludge	ETP	10	Disposed off at Secured landfill site through authorized and approved vendor
Used oil and grease	Maintenance	10	Sold to Authorized vendor.

No hazardous waste is being /will be generated except the Used oil and oily waste which is being/will be collected in drums, temporarily stored at earmarked place stored as per Hazardous & Other Waste (Management & Trans-boundary Movement) Rules,2016 and is being /will be sold to the authorized CPCB recyclers/pre-processors. ETP Sludge will be disposed off

at Secured land fill site through authorized and approved vendor. Contaminated cotton and wiping clothes collected from all units will be incinerated in the CPP as fuel.

## 2.6. Greenbelt Development & Plantation

Existing green belt is developed in 10.42 hectares (32.82% of the total area) by planting trees to the tune of 2500 trees/ha.

## 2.7 HSD Consumption

Estimated HSD consumption per year

Particulars	Existing
Consumption in Charging, RM handling by heavy vehicles inside the plant	148600 L
Consumption in DG set testing	1296 L
Actual consumption on DG when power is unavailable	14240 L
DRI – Light up	20000 L
CFBC – Start up	6000 L
Total	190136 L

## 2.8 Fire Extinguisher (CO2)

Capacity of Cylinder	Quantity (Nos.)
10 Kgs	4
9.50 Kgs	6
6.50 Kgs	41
2 Kgs	2
9 Kgs	25

## 2.9 Refrigerant Consumption

- GMPL do not use SF6 in their Breakers. All breakers are 11 KV.
- There are no chillers in the plant.
- Installed capacity of Air conditioners - 612 Tonnes  
Gas R-410A, R-407 is being used in ACs

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## **PART III - GHG INVENTORISATION AND MITIGATION STRATEGY**

### **3.1 Identification of GHG Sources in the Plant**

**3.1.1** The GHG emission and removal activities of the existing plant in general, are presented in the table below:

<b>S. No.</b>	<b>GHG Emission related Activity</b>	<b>Scope</b>
1	Coal, LPG, FO, LDO, Diesel consumption in furnaces and Diesel/Petrol consumption in internal vehicles.	Scope 1
2	LAM Coke and other reducing agents and raw materials consumption in process	Scope 1
3	Coal used in Thermal Power generation and DRI at site	Scope 1
4	Diesel Consumption in DG Sets and start up for Boilers	Scope 1
5	Fugitive emissions from chillers if installed	Scope 1
6	CO2 type fire extinguishers refilled	Scope 1
7	Use of Refrigerants in AC and Refrigerators.	Scope 1
8	HF6 consumption ( if used in HV breakers)	Scope 1
9	Electricity purchased from grid	Scope 2
10	Steam, Compressed air purchased from outside	Scope 2
11	Employees Commute	Scope 3
12	Transportation of Raw materials from nearest Source to the Plant	Scope 3
13	Any other activity from Section 2 Scope 3 of Part I of this report	Scope 3
14	Renewable Energy Purchase	Scope 2
15	Green Belt credits	Scope 1
16	Plantation outside	Scope 3

### **3.1.2 Likely Credits/Removal Activities**

- a) Green Belt Development.
- b) 100 % Solid Waste utilisation as Substitute to valuable minerals
- c) Use of Renewable Energy (5% REC credits)
- d) Hot charging of billets/slabs
- e) Waste heat recovery from SAFs
- f) Plantation out side the factory premises.
- g) Rainwater harvesting.
- h) CO2 Capture and Storage.

### 3.2 Selection of GHG Quantification Methodology

The methodologies used are based on factors presented in the Inter-governmental Panel on Climate Change (IPCC) 2006 “Guidelines for National Greenhouse Gas Inventories, 2006” and subsequent revisions. The report is based on calculation “GHG activity data multiplied by GHG emission factor”. The Plant has identified its GHG emission sources and sinks according to scope of emissions i.e. Scope 1, Scope 2 and Scope 3 from its organisation boundary which are categorised as follows:

The links for accessing the emission factors are given in Part I of this report.

### 3.3 Summary of GHG Emissions from the Existing Plant

#### **SUMMARY OF GHG EMISSIONS FROM EXISTING PLANT OF GIRDHAN METAL PVT LIMITED**

#### **A- STEEL MAKING AND ROLLING INCLUDING CPP AND UTILITIES**

	<b>Unit- T CO<sub>2</sub> /Year Existing Plant</b>
Scope 1 Process Emissions	847699
Scope 1 Fuel at Site	490950
Scope 1 Air conditioning	498
Scope 2 Grid Electricity	166630
<b>TOTAL</b>	<b>1505777</b>
Credits	106419
Net Emissions	1401358
Crude Steel Production TPA	372300
MTPA	
Specific CO <sub>2</sub> Emission, tCO <sub>2</sub> /tes	3.76

#### **B. FERRO ALLOYS PRODUCTION**

Scope 1 Process Emissions	68164
Scope 2 Grid Electricity	86003
<b>TOTAL</b>	<b>154167</b>
FA Production, MTPA	30000
Specific CO <sub>2</sub> Emission, tCO <sub>2</sub> /tes	5.1

#### **C. SCOPE 3 EMISSIONS.**

Employees Commute	5.4
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Transport of Raw Materials to Steel Plant	34
Transport of Raw Materials to FA Plant	11.6

### 3.4 GHG Emission Reduction Strategy

A. The facilities for GHG mitigation by resource conservation, energy recovery and GHG reduction are suggested as follows;

- a. Heat Recovery from flue gases of SAF for pre heating of the charge.
- b. Dry gas cleaning of SAF Flue gases and recovery of Heat.
- c. 4th Hole extraction system in the SAF helps increase the energy efficiency of the furnaces.
- d. Increased hot charging of billets to minimize the heat requirement for rolling.
- e. Installation of Recuperator in RHF
- f. 100 % solid waste utilization to conserve resources by installation of briquetting and micro pelletising facilities for fines collected from PCDs and road /floor sweeping.
- g. Carbon capture shall be explored subject to end user/ identification of storage locations and collaboration.

#### OBSERVATIONS:

- h. Coal Consumption in DRI is on higher side , specifically when 70% imported coal having low ash is being used.
- i. Pellet/Iron ore consumption per ton of DRI is around 1.6 T/ton of DRI. This is higher than the current practices in good operation plants.
- j. Coke/Coal consumption in FAP is on higher side. Specific CO2 emission from FA Plant is high.

#### B. Green Belt Credit

The plantation and green belt development will also be taken care in the plant and the space reserved for plantation will be more than 40% of the total plant area i.e. >34 Acres. Project Proponent will take-up extensive green belt development by planting about 1000 trees per Ac. it has been proposed to develop 15 meters wide green belt along the periphery inside the factory premises.

On an average, one acre of new forest can sequester about 2.5 tons of carbon annually. Young trees absorb CO2 at a rate of 6 kg per tree each year. Trees reach their most productive stage of carbon storage at about 10 years at which point they are estimated to absorb 22 kg of CO2 per year. At that rate, they release enough oxygen back into the atmosphere to support two human beings. Planting 100 million trees could reduce an estimated 18

million tons of carbon per year and consequently save American consumers \$4 billion each year on utility bills.

<http://urbanforestrynetwork.org/benefits/air%20quality.htm>

### C. Energy Transition from Fossil Fuel to Green Energy

The use of green hydrogen as fuel could help phase out coal, and enable India to move towards net-zero emissions. India has announced its commitment to reach net-zero greenhouse gas (GHG) emissions by 2070. GMPL will take necessary steps to adopt hydrogen based steel making technology as soon as the same is available at affordable cost.

### D. GHG Emission Reduction, Carbon Capture & Storage and Utilisation of CO<sub>2</sub>.

#### a. GHG Emission Reduction

The existing plant has been implemented using state-of-the art technologies for optimum consumption of fossil fuel based energy and other resources. In addition, a very compact layout has been planned for the project to minimise in plant transportation and handling of raw materials and products. All raw materials and utilities shall be purchased from vendors/partners after ensuring that they also follow sustainable environment and energy management practices. GMPL plant shall be certified to ISO 14001 and ISO 50001 Management Systems.

The fines and scrap generated during the process are being recycled within the plant for use in the production process. Water consumption would also be optimised to reduce pumping energy consumption. Energy conservation and energy recovery facilities to be installed along with main plant and equipment shall be commissioned with the main plant. These facilities are summarised below:

1. Hot charging of billets to minimise the heat requirement for rolling.
2. Waste heat recovery from SAF
3. Use of high pressure steam from WHRB to maximise power recovery in DRI kilns .
4. Installation of LED lights and solar power generation on Roof Tops.
5. Use of variable speed drives to reduce power consumption in units operating on variable loads.
6. Use of large capacity loaders, dumpers, ladles and transport vehicles to reduce fuel consumption.
7. Maximum solid waste utilisation to conserve resources by installation of briquetting facilities for fines collected from PCDs and road /floor sweeping.

8. Use of Slag in cement plants to enhance circular economy and reduce the emissions in cement sector thereby PP can claim credits for such sold quantities as per applicable emission factors).
9. Additional measures planned to reduce carbon dioxide emissions are elaborated in Section below;

**b. Carbon Capture and Use**

Carbon Capture practice is picking up in steel industry. DRI flue gases could be explored for CO<sub>2</sub> recovery using absorption or adsorption technologies and potentially used in downstream industry and also in the steel plant for following purposes;

1. Conditioning of SMS slag in presence of steam to convert the slag into concrete or slag sand for use in construction industry.
2. Conditioning of SMS slag with CO<sub>2</sub> to make it suitable for use in Cement making.
3. Sale to companies manufacturing CO<sub>2</sub> extinguishers.
4. Sale to companies making precipitated Calcium Carbonate used as base for most of the medicine tablets.
5. Synthesis of CO<sub>2</sub> into ethanol > This technology has been studied and pilot facility being set up by ArcelorMittal, Europe. Upon successful demonstration and commercial scale up, can be explored by PP

**c. Carbon Sequestration**

Carbon sequestration offers greater hope for addressing the issue of controlling Global Warming. The following practices shall be adopted by PP to initiate carbon sequestration:

1. In immediate future 40 % percent of the plant area shall be covered under green belt with tree density of 2500 trees per ha.
2. In collaboration with local forest department trees shall be planted by PP in degraded forest land.

GMPL remains committed to the nation's pledge of achieving carbon neutrality by 2070. Even after 2030, we will continue our efforts to bring down the emission intensity at the same or much faster rate.

### **3.5 Quality Assurance /Quality Control**

To ensure the credibility of the inventory, rigorous QA/QC procedures shall be followed to ensure the accuracy, transparency, and verifiability of the estimates.

The following issues shall be addressed:

1. GMPL shall ensure that the best and most accurate emission

factors are being used. Custom emission factors shall be calculated as far as possible. The methodology used to compute the company or plant specific custom emission factors shall be documented and strictly followed with necessary QA/QC checks, in line with IPCC guidelines.

2. If plant-specific information on the amount of coke used as reducing agent is available, this information shall be used. However, if this is not available, coke and petroleum consumption on a company-wide basis shall be used to estimate the mass of reducing agent.

3. Plant and company-wide activity data shall be checked to ensure that there is no double accounting.

4. Experts involved in GHG accounting shall be trained to account for energy consumption as per WSA and BEE guidelines.

### 3.6 Reporting and Documentation

GMPL is interested in auditing and certifying their GHG emissions. In order to ensure that estimates are verifiable, quantitative input data used to develop emission estimates shall be clearly documented, including listing of the relevant year. Records shall be maintained. Standard Operating Procedure shall be developed for calculations and data collection for verification and auditing of GHG inventory.

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**Table 4 Mobile Combustion CH<sub>4</sub> and N<sub>2</sub>O for On-Road Diesel and Alternative Fuel Vehicles**

Vehicle Type	Fuel Type	Vehicle Year	CH <sub>4</sub> Factor (g/mile)	N <sub>2</sub> O Factor (g/mile)
Passenger Cars	Diesel	1980-1989	0.0000	0.0000
		1990-1999	0.0000	0.0000
		2000-2019	0.0000	0.0000
Light-Duty Trucks	Diesel	1980-1989	0.0000	0.0000
		1990-1999	0.0000	0.0000
		2000-2019	0.0000	0.0000
Medium- and Heavy-Duty Vehicles	Diesel	1980-1989	0.0000	0.0000
		1990-1999	0.0000	0.0000
		2000-2019	0.0000	0.0000
Light-Duty Cars	Renewable		0.0000	0.0000
	Propane		0.0000	0.0000
	CNG		0.0000	0.0000
	LPG		0.0000	0.0000
	Bioethanol		0.0000	0.0000
Light-Duty Trucks	Renewable		0.0000	0.0000
	CNG		0.0000	0.0000
	LPG		0.0000	0.0000
	Bioethanol		0.0000	0.0000
	Propane		0.0000	0.0000
Medium-Duty Trucks	Renewable		0.0000	0.0000
	CNG		0.0000	0.0000
	LPG		0.0000	0.0000
	Bioethanol		0.0000	0.0000
	Propane		0.0000	0.0000
Heavy-Duty Trucks	Renewable		0.0000	0.0000
	CNG		0.0000	0.0000
	LPG		0.0000	0.0000
	Bioethanol		0.0000	0.0000
	Propane		0.0000	0.0000
Buses	Renewable		0.0000	0.0000
	Propane		0.0000	0.0000
	CNG		0.0000	0.0000
	LPG		0.0000	0.0000
	Bioethanol		0.0000	0.0000

Source: EPA (2020) Inventory of U.S. Greenhouse Gas Emissions and Sinks, 1990-2019, 14 tables and 16 appendices, Table 4-1 (through 4-15).

**Table 5 Mobile Combustion CH<sub>4</sub> and N<sub>2</sub>O for Non-Road Vehicles**

Vehicle Type	Fuel Type	CH <sub>4</sub> Factor (g/gallon)	N <sub>2</sub> O Factor (g/gallon)
Buses and Buses	Gasoline (2 strokes)	1.55	0.14
	Gasoline (4 strokes)	0.74	0.05
Construction Equipment <sup>1</sup>	Gasoline (2 strokes)	4.58	0.22
	Gasoline (4 strokes)	0.71	0.04
Aircraft	Jet Fuel	0.00	0.00
	Aviation Gasoline	0.00	0.11
Agricultural Equipment <sup>2</sup>	Gasoline (2 strokes)	12.06	0.28
	Gasoline (4 strokes)	7.24	0.21
	Diesel	0.20	0.05
Agricultural Offroad Trucks	LPG	1.19	0.09
	Gasoline	0.74	0.21
Construction/Mining Equipment <sup>2</sup>	Gasoline	0.12	0.40
	Gasoline (2 strokes)	12.40	0.27
	Gasoline (4 strokes)	0.59	0.20
Construction/Mining Offroad Trucks	Diesel	0.20	0.47
	LPG	1.08	0.41
	Gasoline	0.69	0.26
Aircraft and General Aviation	Gasoline	0.12	0.40
	Gasoline (2 strokes)	12.40	0.27
	Gasoline (4 strokes)	0.59	0.20
	Diesel	0.20	0.47
Aircraft Equipment	LPG	0.20	0.41
	Gasoline	0.59	0.20
	Diesel	0.19	0.43
Industrial/Commercial Equipment	LPG	0.20	0.41
	Gasoline (2 strokes)	12.40	0.27
	Gasoline (4 strokes)	0.59	0.20
	Diesel	0.20	0.47
Logging Equipment	LPG	0.20	0.41
	Gasoline (2 strokes)	12.40	0.27
	Gasoline (4 strokes)	0.59	0.20
Harvest Equipment	LPG	0.20	0.41
	Gasoline	0.74	0.21
	Diesel	0.41	0.47
Recreational Equipment	LPG	0.20	0.41
	Diesel	0.41	0.47

Source: EPA (2020) Inventory of U.S. Greenhouse Gas Emissions and Sinks, 1990-2019, 14 tables and 16 appendices, Tables 5-1 through 5-15.

<sup>1</sup> Includes equipment such as tractors and combines, as well as fuel consumption from tractors that are used off-road to generate electricity.  
<sup>2</sup> Includes equipment, such as chainsaws, pumps, and generators, as well as fuel consumption from tractors that are used off-road to generate electricity.

**Table 6 Electricity**

NACE subregion	Total Default Emission Factors			Non-Default Emission Factors		
	CO <sub>2</sub> Factor (g / kWh)	CH <sub>4</sub> Factor (g / kWh)	N <sub>2</sub> O Factor (g / kWh)	CO <sub>2</sub> Factor (g / kWh)	CH <sub>4</sub> Factor (g / kWh)	N <sub>2</sub> O Factor (g / kWh)
AWP1 (AWC - Alaska City)	1,124.7	0.000	0.000	1,125.3	0.000	0.000
AWP2 (AWC - Anchorage)	1,124.7	0.000	0.000	1,125.3	0.000	0.000
AZM1 (AZM - Southwest)	452.1	0.000	0.000	445.3	0.000	0.000
CAW1 (CWC - California)	471.1	0.000	0.000	364.3	0.000	0.000
CRCT (CRCT - IL)	989.2	0.000	0.000	1,277.2	0.000	0.000
CRCC (CRCC - IL)	961.2	0.000	0.000	1,258.2	0.000	0.000
FRM1 (FRM - Massachusetts)	1,139.0	0.110	0.000	1,143.2	0.110	0.000
FRM2 (FRM - Ohio)	1,134.9	0.100	0.000	1,134.2	0.100	0.000
IRW1 (IRW - Iowa)	1,124.7	0.140	0.000	1,124.7	0.140	0.000
IRW2 (IRW - West)	1,124.7	0.114	0.000	1,124.7	0.114	0.000
MSW1 (MCC - New England)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW2 (MCC - Vermont)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW3 (MCC - New Hampshire)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW4 (MCC - Maine)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW5 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW6 (MCC - Ontario)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW7 (MCC - Quebec)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW8 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW9 (MCC - Prince Edward Island)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW10 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW11 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW12 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW13 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW14 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW15 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW16 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW17 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW18 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW19 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW20 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW21 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW22 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW23 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW24 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW25 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW26 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW27 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW28 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW29 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW30 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW31 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW32 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW33 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW34 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW35 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW36 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW37 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW38 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW39 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW40 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW41 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW42 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW43 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW44 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW45 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW46 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW47 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW48 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW49 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW50 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW51 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW52 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW53 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW54 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW55 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW56 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW57 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW58 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW59 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW60 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW61 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW62 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW63 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW64 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW65 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW66 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW67 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW68 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW69 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW70 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW71 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW72 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW73 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW74 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW75 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW76 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW77 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW78 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW79 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW80 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW81 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW82 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW83 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW84 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW85 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW86 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW87 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW88 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW89 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW90 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW91 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW92 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW93 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW94 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW95 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW96 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW97 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW98 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW99 (MCC - Nova Scotia)	1,124.7	0.000	0.000	1,124.7	0.000	0.000
MSW100 (MCC - New Brunswick)	1,124.7	0.000	0.000	1,124.7	0.000	0.000

Source: EPA emissions factors, February 2019.  
 Note: Total default emission factors can be used as default factors for defining Emission Factors for electricity from electricity use when developing a carbon footprint or emissions inventory. Please use the most recent version of factors for each of the following. Factors for use in calculating CO<sub>2</sub> emissions reductions from electricity use.



**Table 7 Steam and Heat**

	CO <sub>2</sub> Factor (g / MWh)	CH <sub>4</sub> Factor (g / MWh)	N <sub>2</sub> O Factor (g / MWh)
Steam and Heat	88.22	1.250	0.020

Note: Emission factors are per metric ton of steam or heat purchased. These factors assume natural gas fuel at 100% efficiency and no losses in transmission.

**Scope 3 Emission Factors**

Scope 3 Emission Factors (emission factors) are aligned with the Greenhouse Gas Protocol Technical Support for Calculating Scope 3 Emissions (version 1.4) (Scope 3 Calculation Guidance). Where applicable, the specific calculation method is referenced. (Refer to the Scope 3 Calculation Guidance for more information on how to use programming code in EmissionCalculationOptions.)

**Table 3 | Scope 3, Category 4: Upstream Transportation and Distribution and Category 8: Downstream Transportation and Distribution**

These factors are intended for use in the activity-based method defined in the Scope 3 Calculation Guidance. If data are not available, then the fuel-based method should be used, with factors from Tables 4 through 6.

Vehicle Type	CO <sub>2</sub> Factor (kg / unit)	CH <sub>4</sub> Factor (g / unit)	N <sub>2</sub> O Factor (g / unit)	Units
Stationary and Fleets (City Cycle)	1,467	0.173	0.022	litres/mile
Passenger Car <sup>1</sup>	1,111	0.028	0.008	litres/mile
Light-Duty Truck <sup>2</sup>	1,864	0.172	0.019	litres/mile
Stationary and Fleets (City Cycle)	0.171	0.0001	0.0001	tonne/km
Truck	0.222	0.0017	0.0001	tonne/km
Freightliner Chalk	0.222	0.0017	0.0001	tonne/km
Aircraft <sup>3</sup>	1,385	0.0001	0.0001	tonne/km

**Notes:**

(1), (2), and (3) are CO<sub>2</sub> emission factors for jet vehicles are from Table 3-11 of the GHG Protocol (Inventory of U.S. Greenhouse Gas Emissions and Sinks, 2021).

(4) includes and passenger-mile data for road vehicles are from Table 3001 of the Federal Highway Administration Highway Statistics, 2019.

(5) Conversion rate for road vehicles are based on Table 3-14 of the EPA 2020 Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2019, which are distributed on CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O emissions based on Synthetic Activity Factors (Synthetic Activity Factors for road vehicles are from Table 3-15 of the Inventory of Transportation Emissions, Estimating Transportation Emissions for 2022, EPA Research Report).

**Notes:**

1. Stationary and Fleets are appropriate to use when the entire vehicle is dedicated to providing the reporting company's product. This note factor is appropriate when the vehicle is used for multiple purposes.

2. Passenger car includes passenger cars, minivans, SUVs, and multipurpose trucks vehicles are from (1) below.

3. Light-duty truck includes full-line pickup trucks, SUVs and vans, and minivans except for passenger van specialized grades from (1) above.

4. Aircraft includes flight to international airports.





## **Annexure III- Conversion Factors and Emission factors**

### A Conversion Factors used;

1. MMBTU per short Ton =  $278 \times 10^6$  Kcal/Kg
2. One BTU= 252 Calorie
3. One Calorie= 4.184 Joules

### B. GHG emissions during Transportation by

- a) Employees Travel by two wheelers;
  - i. CO<sub>2</sub> - 0.11 gms/km
  - ii. CH<sub>4</sub> - 0.005 gms/km
  - iii. N<sub>2</sub>O- 0.0005 gms/km
- b) Material Transport by Trucks of 20 T capacity
  - i. CO<sub>2</sub>- 0.90 gms/km
  - ii. CH<sub>4</sub> -0.009 gms/km
  - iii. N<sub>2</sub>O- 0.006 gms/km

### C. Emission Factors tCO<sub>2</sub>/t of material

1. Anthracite-2.86
2. Coal (Industry Sector)- 2.116 tCo<sub>2</sub>/short Ton of Coal=2.33 T/MT of Coal
3. Coking Coal- 2.819 ton/Short Ton of Coking Coal= 3.1 Ton/ton of coking Coal
4. Lime Stone - 0.44
5. Dolomite-0.47
6. Slag- 0.56

#### D. GHG Credits from use of: tCO<sub>2</sub>/t

- a) Iron ore tailings in Cement making- 0.56
- b) Fly ash in Cement making- 0.56
- c) EAF slag in Cement making-0.56

#### E. Emission factors for Different Fuels

S.No	Parameter	Value	Unit	Remarks/Source
1	CO <sub>2</sub> emission factor of diesel	74.1	tCO <sub>2</sub> /TJ	IPCC 2006 Guidelines for National Greenhouse Gas Inventories, 2006 ( <a href="http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html">http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html</a> ), Table 1.4 - Default CO <sub>2</sub> emission factors for combustion
2	CH <sub>4</sub> Default emissions for diesel	3	kgCO <sub>2</sub> /TJ	IPCC 2006 Guidelines for National Greenhouse Gas Inventories, 2006 ( <a href="http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html">http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html</a> ) Table 2.2 - Default emission factors for stationary combustion in the energy industry
3	N <sub>2</sub> O Default emissions for diesel	0.6	kgCO <sub>2</sub> /TJ	IPCC 2006 Guidelines for National Greenhouse Gas Inventories, 2006 ( <a href="http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html">http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html</a> ) Table 2.2 - Default emission factors for stationary combustion in the energy industry
4	Effective CO <sub>2</sub> emission factors in coal (Thermal)	95.8	tCO <sub>2</sub> /TJ	CEA Baseline CO <sub>2</sub> database for Indian Power Sector ( <a href="http://cea.nic.in/reports/others/thermal/tpecc/cdm_co2/user_guide_ver10.pdf">http://cea.nic.in/reports/others/thermal/tpecc/cdm_co2/user_guide_ver10.pdf</a> )
5	CH <sub>4</sub> Default emissions for coal	1	kgCO <sub>2</sub> /TJ	IPCC 2006 Guidelines for National Greenhouse Gas Inventories, 2006 ( <a href="http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html">http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html</a> ) Table 2.2 - Default emission factors for stationary combustion in the energy industry

6	N <sub>2</sub> O emission factor for coal	1.5	kgCO <sub>2</sub> /T J	IPCC 2006 Guidelines for National Greenhouse Gas Inventories, 2006 ( <a href="http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html">http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html</a> ) Table 2.2 - Default emission factors for stationary combustion in the energy industry
7	CO <sub>2</sub> emission factor in Natural Gas	56.1	tCO <sub>2</sub> /TJ	IPCC 2006 Guidelines for National Greenhouse Gas Inventories, 2006 ( <a href="http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html">http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html</a> ) Table 1.4 - Default CO <sub>2</sub> emission factors for combustion
8	CH <sub>4</sub> Default Emission for Natural Gas	1	kgCO <sub>2</sub> /T J	IPCC 2006 Guidelines for National Greenhouse Gas Inventories, 2006 ( <a href="http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html">http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html</a> ) Table 2.2 - Default emission factors for stationary combustion in the energy industry
9	N <sub>2</sub> O emission factors for Natural Gas	0.1	kgCO <sub>2</sub> /T J	IPCC 2006 Guidelines for National Greenhouse Gas Inventories, 2006 ( <a href="http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html">http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html</a> ) Table 2.2 - Default emission factors for stationary combustion in the energy industry

## Emission Factors for Steel Plant materials

<https://www.climate-policy-watcher.org/emission-factors/choice-of-emission-factors-tier-1-met-hod.html>

Sinter Purchase- 0.20 tCO<sub>2</sub> /T sinter  
Pig Iron- - 1.35 tCO<sub>2</sub> /T sinter  
DRI - 0.70 tCO<sub>2</sub> /T DRI  
Pellet - 0.03 tCO<sub>2</sub> /T Pellet  
Scrap -0.04 tCO<sub>2</sub> /T scrap

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# **CO<sub>2</sub> Baseline Database for the Indian Power Sector**

## **User Guide**

Version 17.0

OCTOBER 2021

**Government of India  
Ministry of Power  
Central Electricity Authority  
Sewa Bhawan, R.K.Puram,  
New Delhi-66**

## Revision History of the Database

Version No.	Date of Publication	Main Revisions Compared to Previous Version
1.0 Draft	October 2006	- Draft for Stakeholder Consultation
1.0	November 2006	- Added data on 10 stations which had been in exclusion worksheet of draft database - Adjusted values to latest IPCC Guidance (IPCC 2006 Guidelines for National Greenhouse Gas Inventories) where IPCC defaults are used
1.1	December 2006	- Adjusted fuel emission factor of lignite to be in line with Initial National Communication figures
2.0	June 2007	- Added data for FY 2005-06, including new stations and units commissioned during 2005-06 - Some retroactive changes to data for FY 2000-01 to 2004-05
3.0	December 2007	- Added data for FY 2006-07, including new stations and units commissioned during 2006-07 - Adapted calculations and User Guide to ensure consistency with new CDM methodologies: ACM0002 Version 07, and Tool to Calculate the Emission Factor for an Electricity System (Version 01.1, EB 35 Annex 12)
4.0	October 2008	- Added data for FY 2007-08, including new stations and units commissioned during 2007-08 - Adjusted delineation of regional grids - Adjusted IPCC-based fuel emission factors to account for uncertainty in line with EB 35 Annex 12
5.0	November 2009	- Added data for FY 2008-09, including new stations and units commissioned during 2008-09
6.0	March 2011	- Added data for FY 2009-10, including new stations and units commissioned during 2009-10
7.0	January 2012	- Added data for FY 2010-11, including new stations and units commissioned during 2010-11
8.0	January 2013	- Added data for FY 2011-12, including new stations and units commissioned during 2011-12 - From FY 2011-12, scope of database is restricted to stations exceeding 25 MW - Retroactive changes: Three units in NEWNE region identified as CDM units, leading to minor change in build margin for FY 2010-11
9.0	December 2013	- Added data for FY 2012-13, including new stations and units commissioned during 2012-13 - Retroactive changes: Nine units identified as CDM units, leading to changes in build margins back to FY 2009-10 - Updated GCVs of five stations back to FY 2008-09
10.0	December 2014	- Added data for FY 2013-14, including new stations and units commissioned during 2013-14 - Introduced distinction between Indian and imported coal as from FY 2013-14 - Retroactive changes to previous FY due to: identification of CDM units, identification of waste heat recovery steam turbines, harmonization of GCV for oil used as secondary fuel - One station was reclassified from SR to NEWNE region
11.0	April 2016	- Added data for FY 2014-15, including new stations and units commissioned during 2014-15 - Introduced integrated Single Indian Grid (NEWNE and Southern are now synchronized) - Export of power to Bangladesh also considered in the Import/Export data
12.0	May 2017	- Added data for FY 2015-16, including new stations and units commissioned during 2015-16
13.0	June 2018	- Added data for FY 2016-17, including new stations and units commissioned during 2016-17 - Export of power to Myanmar also considered in the Import/Export data
14.0	December 2018	- Added data for FY 2017-18, including new stations and units commissioned during 2017-18
15.0	December 2019	- Added data for FY 2018-19, including new stations and units commissioned during 2018-19
16.0	March 2021	- Added data for FY 2019-20, including new stations and units commissioned during 2019-20 - Some retroactive changes to data for FY 2018-19
17.0	October 2021	- Added data for FY 2020-21, including new stations and units commissioned during 2020-21

## Expert Team Contributing to the Database

### Central Electricity Authority:

Mr. Dhiraj Kumar Srivastava, Chief Engineer (TE&TD)      Mr. J.N. Prasad Chief Engineer-in charge (TPE&CC)  
Mr. Rajesh Kumar, Director (TPE&CC)                              Mr. K.K. Sharma, Deputy Director (TPE&CC)

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## Summary

Since the emergence of the Kyoto Protocol and its Clean Development Mechanism (CDM), energy projects lowering the carbon intensity of the electricity grid can generate additional revenues from carbon credits. Methodologies approved by the CDM Executive Board have to be applied to determine the resulting emission reductions, using the "baseline" CO<sub>2</sub> emission factor of the relevant geographical area.

In order to facilitate adoption of authentic baseline emissions data and also to ensure uniformity in the calculations of CO<sub>2</sub> emission reductions by CDM project developers, Central Electricity Authority (CEA) has compiled a database containing the necessary data on CO<sub>2</sub> emissions for all grid-connected power stations in India.

All regional grids have been integrated as a single Indian Grid covering all the states in December 2013. Small power exchanges also take place with the neighbouring countries Bhutan, Nepal, Bangladesh and Myanmar. For the unified grid, the main emission factors are calculated in accordance with the relevant CDM methodologies. CEA will continue updating the database at the end of each fiscal year.

1. The prevailing baseline emissions based on the data for the FY 2020-21 are shown in Table S-1. The calculations are based on generation, fuel consumption and fuel quality data obtained from the power stations. Typical standard data were used only for a few stations where information was not available from the station. Cross-border electricity transfers were also taken into account for calculating the CO<sub>2</sub> emission baseline.

*Table S-1: Weighted average emission factor, simple operating margin (OM), build margin (BM) and combined margin (CM) of the Indian Grid for FY 2020-21 (adjusted for cross-border electricity transfers), in t CO<sub>2</sub>/MWh*

Average	OM	BM	CM
0.79	0.94	0.87	0.90

Average is the average emission of all stations in the grid, weighted by net generation.

OM is the average emission from all stations excluding the low cost/must run sources.

BM is the average emission of the 20% (by net generation) most recent capacity addition in the grid.

CM is a weighted average of the OM and BM (here weighted 50: 50).

# 1 Background and Objective

## **Purpose of the CO<sub>2</sub> Database**

The Clean Development Mechanism (CDM) under the Kyoto Protocol to United Nations Framework Convention on Climate Change (UNFCCC) provides an opportunity for the Indian power sector to earn revenue through the reduction of greenhouse gas emissions (GHG), particularly carbon dioxide (CO<sub>2</sub>). India has tremendous potential for CDM projects. Power generation based on higher efficiency technologies such as supercritical technology, integrated gasification combined cycle, and renovation and modernisation of old thermal power plants, co-generation along with renewable energy sources are some of potential candidates for CDM in the power sector. Energy efficiency and conservation projects also present themselves as eligible CDM projects, as these would also result in energy savings and displace associated CO<sub>2</sub> emissions which otherwise would be produced by grid-connected power stations.

The CDM has by now become an established mechanism for crediting climate friendly projects. Projects involving displacement or saving of grid electricity must calculate their emission reductions based on a grid emission factor, which needs to be determined in accordance with the rules set by the CDM Executive Board. Central Electricity Authority (CEA) accordingly took up to compile a database for all grid-connected power stations in India. The purpose of the database is to establish authentic and consistent quantification of the CO<sub>2</sub> emission baseline, which can be readily used by CDM project developers in the Indian power sector. This would enhance the acceptability of Indian projects and would also expedite the clearance/approval process. The baseline emissions for the Indian Grid are given in Section 5 (Results) of this User Guide. The complete updated CO<sub>2</sub> Database (Microsoft Excel File) and this User Guide along with all previous versions is available on the website of Central Electricity Authority: [www.cea.nic.in](http://www.cea.nic.in).

The purpose of this User Guide is to provide a ready reference to the underlying calculations and assumptions used in the CO<sub>2</sub> database and to summarise the key results.

## **Official Status of the Database**

The database is an official publication of the Government of India for the purpose of CDM baselines. It is based on the most recent data available with the Central Electricity Authority.

## Consistency of the Database with CDM Methodologies

Under the CDM, emission reductions must be quantified using an approved methodology. Key examples of such methodologies include AMS-I.D and ACM0002 for grid-connected power generation from renewable sources in small- and large-scale projects, respectively. The latest versions of all approved CDM methodologies are available at the official CDM website, <http://cdm.unfccc.int>.

In addition, the CDM Executive Board has adopted a methodological tool to facilitate the calculation of baseline emission factors for electricity grids.<sup>1</sup> This tool, which is referred to as the Grid Tool in this user guide, has become the main reference for CDM methodologies involving baseline emission factors for power grids, such as ACM0002.

**This version of the database is designed to be consistent with version 7.0 of the Tool to calculate the emission factor for an electricity system published by the CDM Executive Board.**

## Installed Capacity

As a result of the impressive growth attained by the Indian Power Sector, the installed capacity has grown from mere 1,713 MW in 1950 to 382,151.22 MW as on 31.03.2021. Sector-wise details of installed capacity are shown in Table 1.

Table 1: Sector-wise installed capacity (MW) as on 31.03.2021

Sector	Thermal					Nuclear	Hydro	RES	Total
	Coal	Lignite	Gas	Diesel	Total				
State	65931.50	1150.00	7087.36	236.01	74404.86	0.00	27069.50	2395.27	103869.64
Central	62570.00	3640.00	7237.91	0.00	73447.91	6780.00	15646.72	1632.30	97506.93
Private	74173.00	1830.00	10598.74	273.70	86875.45	0.00	3493.00	90406.21	180774.66
All India	202674.50	6620.00	24924.01	509.71	234728.22	6780.00	46209.22	94433.79	382151.22

Note: These capacities are not identical with those listed in the Excel database, because the database excludes renewable, few small diesel and steam units.

It is evident from Table 1 that the installed capacity is predominantly coal based and therefore, is a major source of carbon dioxide emissions in India. Hence, there exists scope for reducing the CO<sub>2</sub> emissions in the country by way of fuel substitution, increased use of renewable energy sources, and also by improving the thermal efficiency of power generation.

<sup>1</sup> Tool to calculate the emission factor for an electricity system (Version 7.0). See <http://cdm.unfccc.int>

## Indian Grids

Historically, the Indian power system was divided into five independent regional grids, namely Northern, Eastern, Western, Southern, and North-Eastern. Each grid covered several states (see Table 2). Since August 2006, however, all regional grids except the Southern Grid had been integrated and were operating in synchronous mode, i.e. at same frequency. Consequently, the Northern, Eastern, Western and North-Eastern grids were treated as a single grid named as NEWNE grid from FY 2007-08 onwards for the purpose of this CO<sub>2</sub> Baseline Database. As of 31 December 2013, the Southern grid has also been synchronised with the NEWNE grid, hence forming one unified Indian Grid.

Power generation and supply within the Indian Grid is managed by Regional Load Dispatch Centres (RLDC). The National Power Committee (NPC) and Regional Power Committees (RPCs) provide a common platform for discussion and solution to the national and regional problems relating to the grid. Each state meets their demand with their own generation facilities and also with allocation from power plants owned by the central sector such as NTPC and NHPC etc. and IPP's being operated by private sector. Specific quotas are allocated to each state from the central sector power plants. Depending on the demand and generation, there are cross-border electricity exports and imports (e.g. from Bhutan, Nepal, Bangladesh and Myanmar).

Table 2: Geographical scope of the Indian electricity grid

INDIAN GRID				
Northern	Eastern	Western	North-Eastern	Southern
Chandigarh	Bihar	Chhattisgarh	Arunachal Pradesh	Andhra Pradesh
Delhi	Jharkhand	Gujarat	Assam	Karnataka
Haryana	Orissa	Daman & Diu	Manipur	Kerala
Himachal Pradesh	West Bengal	Daďar & Nagar Haveli	Meghalaya	Tamil Nadu
Jammu & Kashmir	Sikkim	Madhya Pradesh	Mizoram	Puducherry
Punjab	Andaman-Nicobar*	Maharashtra	Nagaland	Lakshadweep*
Rajasthan		Goa	Tripura	Telengana
Uttar Pradesh				
Uttarakhand				

\*The union territories Andaman and Nicobar Islands and Lakshadweep islands are not connected to the National grid. The power generation and distribution systems of these territories is served by standalone systems.

## 2 How to Use the Database

### Structure of the Database

Emission reductions from CDM projects in the power sector are calculated based on the net electricity generated by the project and the difference between the emissions factors (in t CO<sub>2</sub>/MWh) of the baseline and the project activity. The baseline emission factor reflects the carbon intensity of the displaced grid electricity. This baseline emission factor can be derived from the data provided in the CO<sub>2</sub> Database.

Specifically, the database contains the following elements:

- Worksheet "Data" provides the net generation and the absolute and specific CO<sub>2</sub> emissions of each grid-connected power station (see Section 4 for exceptions). It also indicates which stations and units were included in the operating margin and build margin, respectively.
- Worksheet "Results" provides the most commonly used aggregate emission factors. These are calculated from the station data in accordance with the most recent Grid Tool.<sup>2</sup> The emission factors are explained in more detail in the next section.
- Worksheet "Abbreviations" explains the abbreviations used in the "Data" worksheet.
- Worksheet "Assumptions" shows the assumptions that were used for the calculation of the CO<sub>2</sub> emissions at station and unit level, where the information was not provided by the station.
- Worksheet "Transfers" shows the cross-border power transfers.

### Different Types of Emission Factors

The CDM methodologies which have been approved to date by the CDM Executive Board distinguish a range of different emission factors. In the Indian context, the following four are most relevant, and were therefore calculated for the Indian Grid based on the underlying station data:

#### Weighted average:

The weighted average emission factor describes the average CO<sub>2</sub> emitted per unit of electricity generated in the grid. It is calculated by dividing the absolute CO<sub>2</sub> emissions of all power stations by the total net generation. Net generation from so-called low-cost/must-run sources is included in the denominator. In India, hydro and nuclear stations qualify as low-cost/must-run sources.

#### Simple operating margin (OM):

The operating margin describes the average CO<sub>2</sub> intensity of the existing stations in the grid which are most likely to reduce their output if a CDM project supplies electricity to the grid (or reduces consumption of grid electricity). "Simple" denotes one out of four possible variants listed in the Grid Tool for calculating the operating margin.<sup>3</sup> Furthermore, option A has been selected as the required disaggregated data is available in India.

<sup>2</sup> Tool to calculate the emission factor for an electricity system (Version 7.0). See <http://cdm.unfccc.int>

<sup>3</sup> The two variants "Simple adjusted operating margin" and "Dispatch data analysis operating margin" cannot currently be applied in India due to lack of necessary data.

The simple operating margin is the weighted average emissions rate of all generation sources *except* so-called low-cost or must-run sources (hydro and nuclear stations) and are excluded). The operating margin, therefore, can be calculated by dividing the grid's total CO<sub>2</sub> emissions by the net generation of all thermal stations. In other words, it represents the weighted average emissions rate of all thermal stations.

Values for operating margins given in this User Guide and the Database are always based on the "ex post" option as set out in the Grid Tool.<sup>4</sup>

**Build margin (BM):**

The build margin reflects the average CO<sub>2</sub> intensity of newly built power stations that will be (partially) replaced by a CDM project. In accordance with the Grid Tool, the build margin is calculated in this database as the average emissions intensity of the 20% most recent capacity additions in the grid based on net generation. The build margin generally covers units commissioned in the last five years.

**Combined margin (CM):**

The combined margin is a weighted average of the simple operating margin and the build margin. By default, both margins have equal weights (50%). However, CDM project developers may choose to argue for different weights. In particular, for intermittent and non-dispatchable generation types such as wind and solar photovoltaic, the Grid Tool allows to weigh the operating margin and build margin at 75% and 25%, respectively. However, the combined margins shown in the database are calculated based on equal weights.

In line with the Grid Tool, if a station is registered as a CDM activity, it is excluded from the build margin but not from the operating margin.<sup>5</sup>

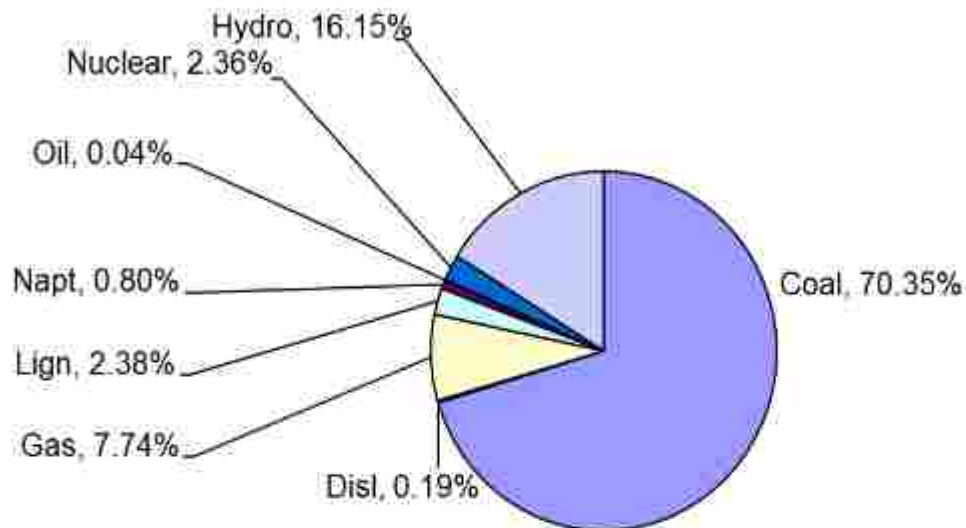
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<sup>4</sup> See *Tool to calculate the emission factor for an electricity system (Version 7.0)*.

<sup>5</sup> See *Tool to calculate the emission factor for an electricity system (Version 7.0)*, pp. 16 and pp.25 point (f)

### 3 Scope of Database

The database includes all grid-connected power stations having an installed capacity above 25 MW.<sup>6</sup> The data covers power stations of both public utilities and independent power producers (IPPs).



*Figure 1:* Breakdown of generation capacity covered by the database. The total corresponds to 287,783 MW as on 31.03.2021

The following power stations are currently not accounted for in the database:

- Small decentralised generation sets;
- Stations or units installed in Andaman and Nicobar Islands and Lakshadweep;
- Captive power stations: As on 31 March 2021, the aggregate installed capacity of captive stations in industries having demand of 1 MW and above was 77,000 MW (provisional figure). The generation of these stations in FY 2020-21 was 200,000 GWh (provisional figure). The data of captive plants could not be added in this database in absence of the data availability.
- Non-conventional renewable energy stations: These include hydro stations up to 25 MW, as well as all wind, biomass and solar photovoltaic stations. The installed, grid-connected capacity of these sources was 94,433.79 MW as on 31.03.2021.<sup>7</sup> The generation from these non-conventional renewable energy sources in FY 2020-21 was 144,247.51GWh.

<sup>6</sup> Previously, the database covered grid-connected power stations having an installed capacity above 3 MW in case of hydro and above 10 MW for all other plant types. Monitoring of stations up to 25 MW was discontinued from FY 2011-12. For archiving and consistency reasons, 70 of these small stations will remain in the database without new data entries.

<sup>7</sup> Ministry of New and Renewable Energy. The capacity figure may differ from CEA reported figure of installed capacity.

## 4 Data and Calculation Approach

This section gives an overview on the base data, annual data as well as the approaches used to calculate station-level and unit-level CO<sub>2</sub> emissions.

### 4.1 Base Data

The following base data parameters were collected for all the stations listed in the CO<sub>2</sub> database:

- **S No:**

The Station Numbers start at 1 and proceed alphabetically for all stations. All units of a station have the same station number. Numbers may change in future database versions due to insertion of new stations.

- **Station Name:**

Name of the power station. The station names have been arranged in alphabetical order.

- **Unit Number:**

The units of a station are numbered serially starting with 1. Stations are attributed with unit number 0 for the purpose of calculations.

- **Commissioning Date:**

The commissioning date is provided for each unit. Commissioning dates are important for the determination of the build margin.

- **Capacity:**

Capacity data is based on declared rated capacities in MW for each unit as of 31<sup>st</sup> March 2021.

- **State:**

State where the power station is located.

- **Sector:**

This denotes whether the station is operated by the central sector, the state authorities, or the private sector.

- **System:**

A list of the systems including abbreviations and full names is provided in Appendix A.

- **Type:**

Indicates the type of the station, viz. thermal, nuclear, and hydro.

- **Fuel:**

Fuel 1 and Fuel 2 indicates the main fuels used for power generation at each station. For example, in coal-based stations, Coal is indicated as Fuel 1 and Oil as Fuel 2.

## 4.2 Annual Data

The annual data columns in the database provide the following: net generation in GWh of the station, absolute carbon dioxide emissions in metric tonnes, and specific carbon dioxide emissions in t CO<sub>2</sub>/MWh, for the five fiscal years 2016-17 to 2020-21. In addition, there are columns to indicate whether the station is included in the operating margin in the respective year, and an additional column indicating which units are included in the build margin. If a unit is part of a registered CDM activity, it is excluded from the build margin, and the CDM registration number is indicated in the respective column.

CEA has compiled the CO<sub>2</sub> Database based upon generation, fuel consumption and fuel gross calorific value (GCV) data furnished by each power station. In cases where the station could not provide reliable data for all the relevant parameters, assumptions were made as described below. Further details on the assumptions made are provided in Appendix B.

### a) Assumptions at Station Level

At the station level, the following assumptions were made where the relevant data could not be provided by a station:

#### **Net generation:**

For hydro stations, only gross generation was available, but not net generation data. Therefore, the CEA standard value for auxiliary power consumption in hydro units (0.5%) was applied to derive the net generation from the gross generation data reported by the stations. Likewise, CEA standard values for auxiliary power consumption had to be applied for some thermal stations.

#### **Gross Calorific Value (GCV):**

Default values were used for some thermal stations where station-specific GCVs were not available.

If the station consists just of one unit, the assumptions at unit level were applied to the station level.

### b) Assumptions at Unit Level

At unit level, the following assumptions were made for those units falling into the build margin (i.e. the most recently built units comprising 20% of net generation):

#### **Gross generation:**

For some stations, gross generation data were not available at unit level. Therefore, the plant load factor of the respective station was used to derive the gross generation of the units. For units commissioned after the start of the relevant fiscal year, the gross generation was further adjusted pro rata the number of days since commissioning.

**Net generation:**

Net generation data is increasingly being reported at unit level by thermal stations. Two distinct approaches were applied to estimate net generation where unit level data was not available.

1. The auxiliary consumption (in % of gross generation) of the unit was assumed to be equal to that of the respective stations in the following cases:

- i. All units of a station fall into the build margin; or
- ii. All units of a station have the same installed capacity; or
- iii. The units in the station have different capacities but do not differ with respect to the applicable standard auxiliary consumption; or
- iv. If the default auxiliary power consumption for that type of generation unit is higher than the observed auxiliary power consumption of the station concerned, and the relevant unit is among the largest in that station.

2. In a few other cases, standard values for auxiliary consumption adopted by CEA were applied.

**Fuel consumption and GCV:**

In case fuel consumption and GCV are not reported at unit level by thermal stations, the specific CO<sub>2</sub> emissions of the units coming in the build margin could usually be assumed to be equal to the values of the respective station. See Section 4.3 for details.

### 4.3 Calculation of CO<sub>2</sub> Emissions

#### Calculation Approach – Station Level

CO<sub>2</sub> emissions of thermal stations were calculated using the formula below:

$$AbsCO_2(station)_y = \sum_{i=1}^2 FuelCon_{i,y} \times GCV_{i,y} \times EF_i \times Oxid_i \quad (1)$$

Where:

*AbsCO<sub>2,y</sub>* Absolute CO<sub>2</sub> emission of the station in the given fiscal year 'y'

*FuelCon<sub>i,y</sub>* Amount of fuel of type i consumed in the fiscal year 'y'

*GCV<sub>i,y</sub>* Gross calorific value of the fuel i in the fiscal year 'y'

*EF<sub>i</sub>* CO<sub>2</sub> emission factor of the fuel i based on GCV

*Oxid<sub>i</sub>* Oxidation factor of the fuel i

The emission and oxidation factors used in the CO<sub>2</sub> Database are provided in Appendix B.

The emission factors for Indian coal and lignite were based on the values provided in India's Initial National Communication under the UNFCCC (Ministry of Environment & Forests, 2004). The emission factor for coal is supported by the results of an analysis of approx. 120 coal samples collected from different Indian coal fields. Since the values in the National Communication are based on the NCV (Net Calorific Value), they were converted to GCV basis using a formula also furnished in the National Communication. For all other fuels as well as for imported coal, default emission factors were derived from the IPCC 2006 Guidelines.<sup>8</sup> In line with the Grid Tool, the low end values of the 95% confidence intervals indicated by IPCC were used.<sup>9</sup> The IPCC default factors were converted to GCV basis using IEA default conversion factors.

The oxidation factor for Indian coal and lignite was derived from an analysis performed with data on the unburnt carbon content in the ash from various Indian coal-fired power stations. The value of 98% is consistent with the default value provided in the IPCC 1996 Guidelines.<sup>10</sup> For all other fuels as well as imported coal, default values provided in the more recent IPCC 2006 Guidelines were used.

Specific CO<sub>2</sub> emissions of stations (*SpecCO<sub>2</sub>(station)<sub>y</sub>*) were computed by dividing the absolute emissions (*AbsCO<sub>2</sub>(station)<sub>y</sub>*) estimated above by the station's net generation (*NetGen(station)<sub>y</sub>*).

$$SpecCO_2(station)_y = \frac{AbsCO_2(station)_y}{NetGen(station)_y} \quad (2)$$

<sup>8</sup> 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2: Energy, Table 1.4

<sup>9</sup> In accordance with the *Tool to calculate the emission factor for an electricity system, Version 7.0*

<sup>10</sup> IPCC 1996 Revised Guidelines for National Greenhouse Gas Inventories, Volume 3 (Reference Manual), p. 1.13

In FY 2020-21, fuel consumption was not available for few stations. In these cases, conservative standard values have been applied for calculation of specific emissions of the respective station.

### Calculation Approach – Unit Level

Unit-level CO<sub>2</sub> emissions were calculated only for the units falling in the build margin.

Wherever reliable fuel consumption data was available at unit level, it was used for determining the emissions of units falling in the build margin, in the same way as for the station emissions. This applies for an increasing number of thermal units, especially new and large coal-fired stations.

In the remaining cases where unit-level fuel consumption was not available, the absolute CO<sub>2</sub> emissions of thermal units ( $AbsCO_2 (unit)_y$ ) were derived by multiplying the specific emissions ( $SpecCO_2 (unit)_y$ ) with the net generation of each unit ( $NetGen (unit)_y$ ), where net generation was obtained as described in Section 4.2:

$$AbsCO_2 (unit)_y = SpecCO_2 (unit)_y \times NetGen (unit)_y \quad (3)$$

Two distinct approaches were applied for determining the specific emissions of these units:

1. A unit was assumed to have the same specific emissions as the corresponding station in the following three cases:

- i. If all units of a station fall into the build margin;
- ii. If all units of a station have the same installed capacity;
- iii. If the default specific emissions for the respective unit is higher than the corresponding station's specific emissions, and the concerned unit is capacity-wise among the largest of the station.

The large majority of units for which fuel consumption was not reported fall in one of the above-mentioned three categories.

2. In the remaining cases, the specific emissions of the units were derived from conservative standard heat rate values (see Appendix B).

#### 4.4 Adjustment for Cross-Border Electricity Transfers

The weighted average emission factors and operating margins of the Indian Grid were adjusted for cross-border electricity imports and exports, in line with the Grid Tool:

- The relevant amounts of electricity imported and exported are listed in the database worksheet "Transfers";
- The CO<sub>2</sub> emissions associated with these imports were quantified based on the simple operating margin of the exporting grid.<sup>11</sup>

#### 4.5 Conservativeness

The need to ensure conservativeness of calculations in situations of uncertainty is a fundamental principle in the CDM. Assumptions are conservative if they tend to reduce the number of emission reductions being credited to a CDM project activity. The following approaches and assumptions contribute to the conservativeness of the database:

- The quality of station-level data was ensured through extensive plausibility testing and interaction with the station operators.
- In cases of data gaps at station level, standard data from CEA were used. For example, standard auxiliary power consumption was assumed for few coal-fired stations. Comparison with monitored values shows that these standard values are rather conservative, i.e. they lead to a somewhat lower heat rate and hence lower emissions than observed in many stations.
- The fuel emission factors and oxidation factors used are generally consistent with IPCC defaults and relevant EB guidance. For Indian coal, the emission factor provided in India's Initial National Communication was used (95.8 t CO<sub>2</sub>/TJ on NCV basis). The oxidation factor of 0.98 used for Indian coal appears to be conservative in light of recent efficiency improvements in coal-fired generation. All other fuel emission factors represent the lower limits of the respective 95% confidence intervals indicated by IPCC, as required by the CDM Executive Board.<sup>12</sup>
- The scope of the database remains conservative because of the exclusion of captive power stations, which are generally thermal stations. As detailed in Section 3, generation from these captive stations remains far greater than the generation from non-conventional renewable energy stations, which are also excluded. The overall effect of these restrictions in scope is that the weighted average emission factor will tend to be slightly understated.

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<sup>11</sup> This corresponds to Options a)+b) listed in the Grid Tool, (Version 7.0), p. 10 & 11

<sup>12</sup> See *Tool to calculate the emission factor for an electricity system* (Version 7.0), p.35

## 5 Results

Worksheet "Results" in the database provides the net generation and CO<sub>2</sub> emissions data and the resulting emission factors for the Indian Grid in the fiscal years 2016-17 to 2020-21. The emission factors are also reproduced in Appendix C. The values are rounded off at two decimals. See database file for additional decimals.

### 5.1 Results for Fiscal Year 2020-21

Table 3 indicates the development of total emissions over the last five years covered by the database.

Table 3: Total emissions of the power sector for the FY 2016-17 to 2020-21, in million tonnes CO<sub>2</sub>

2016-17	2017-18	2018-19	2019-20	2020-21
888.34	922.18	960.90	928.14	910.02

Percent Increase or Decrease as compared to previous year:

2016-17	2017-18	2018-19	2019-20	2020-21
4.97%	3.81%	4.20%	-3.41%	-1.95%

Table 4 shows the emission factors for FY 2020-21 both excluding and including cross-border power transfers.

Table 4: Weighted average emission factor, simple operating margin (OM), build margin (BM) and combined margin (CM) of the Indian Grid for FY 2020-21 (not adjusted and adjusted for cross-country electricity transfers), in t CO<sub>2</sub>/MWh

	Average	OM	BM	CM
Excluding cross-border power transfers	0.79	0.95	0.87	0.91
Including cross-border power transfers	0.79	0.94	0.87	0.90

Percent Increase or Decrease as compared to previous year:

	Average	OM	BM	CM
Excluding cross-border power transfers	-0.63%	-1.26%	-0.34%	-0.82%
Including cross-border power transfers	-0.90%	-1.57%	-0.34%	-0.98%

A comparison of both cases in Table 4 shows that cross border electricity transfers did not have a significant influence on the emission factors in 2020-21.

Table 5 shows the weighted average specific emissions for fossil fuel-fired power stations in the Indian Grid.

Table 5: Weighted average specific emissions for fossil fuel-fired stations in FY 2020-21, in t CO<sub>2</sub>/MWh

Coal	Diesel	Gas*	Lignite	Oil
0.97	0.58	0.42	1.30	-

Percent Increase or Decrease as compared to previous year:

Coal	Diesel	Gas*	Lignite	Oil
-0.86%	0.08%	-2.75%	-4.64%	-

\* Only gas-fired stations that do not use any other fuel. Stations that use naphtha, diesel or oil as a second fuel are excluded from the weighted average.

Note: Stations for which assumptions had to be made are included in this analysis (see Section 4 for details).

## 5.2 Developments over Time

Figure 2 shows the capacity additions from FY 2000-01 to FY 2020-21. The yearly additions of coal-based capacity increased significantly over the period from FY 2000-01 to FY 2015-16, whereas it decreased significantly over the period from FY 2016-17 to FY 2020-21. Hydro, & Gas-based capacity addition also decreased significantly from 2017-18 onwards in the Indian Grid, while the additions in other generation capacities is zero.

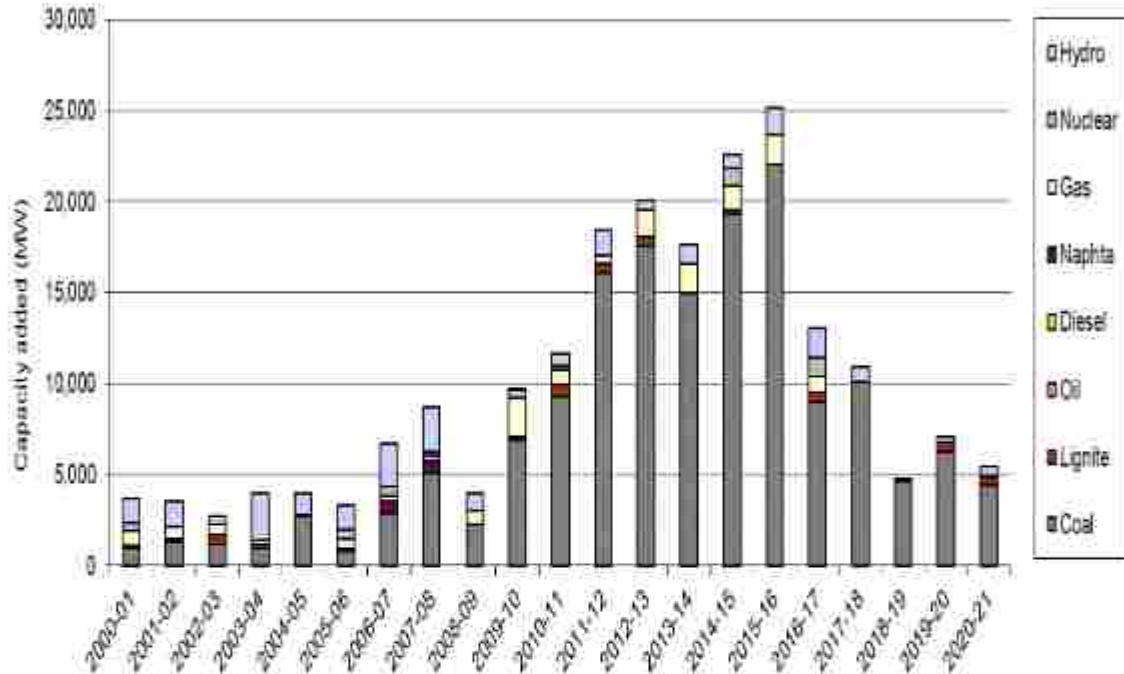


Figure 1: Breakdown of new added capacity covered by the database over the period 2000-01 to 2020-21.

Figure 2 shows the development of the weighted average emission factor over the period from FY 2016-17 to FY 2020-21 (see Appendix C for values before import adjustment). The weighted average has reduced marginally in FY 2020-21. This was mainly due to the decrease in lignite and naphtha-based generation in FY 2020-21.

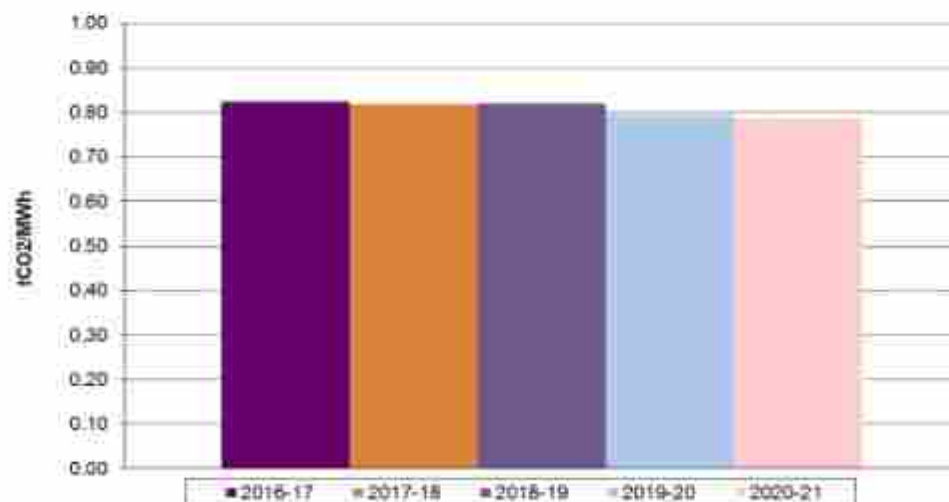


Figure 2: Development of the weighted average emission factor (adjusted for electricity transfers) for the Indian Grid over the period 2016-17 to 2020-21

Figure 4 illustrates the development of the import-adjusted operating margins over the period from FY 2016-17 to FY 2020-21 (see Appendix C for values before import adjustment). In 2020-

21 the import-adjusted operating margin decreased marginally due to operationalization of many high efficiency super-critical thermal power plants.

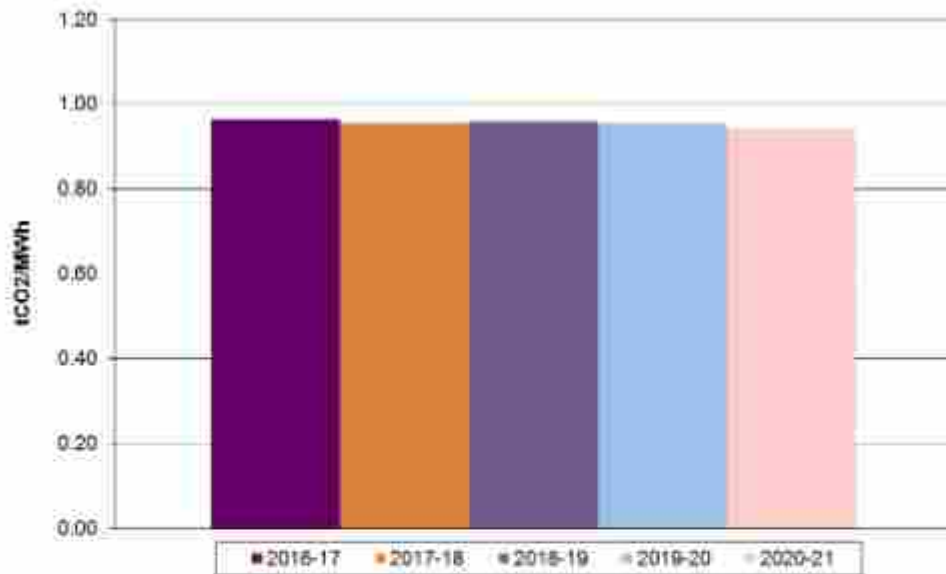


Figure 3: Development of the operating margin (adjusted for electricity transfers) for the Indian Grid over the period 2016-17 to 2020-21.

Figure 4 shows the build margins for the five fiscal years 2016-17 to 2020-21. The distinction between Indian and imported coal introduced from FY 2013-14 onwards led to a slight decrease in the build margin till 2017-18, due to the lower emission factor applied to imported coal in accordance with the CDM rules.

The build margin which was showing a decreasing trend till 2017-18 has increased marginally during 2018-19 due to more share of domestic coal and less share of imported coal. During 2019-20 and 2020-21 the build margin decreased marginally again due to the increase in the share of imported coal (see figure 6).

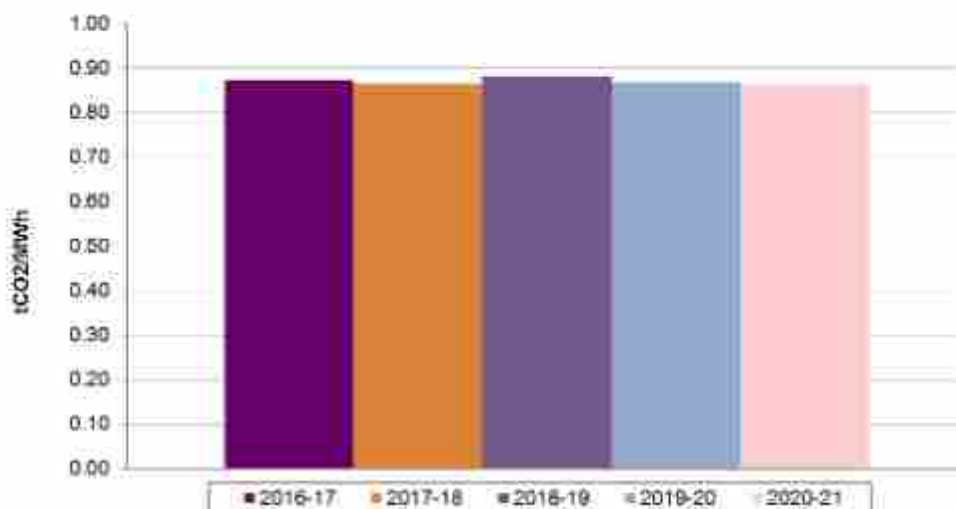


Figure 4: Development of the build margins over the period 2016-17 to 2020-21.

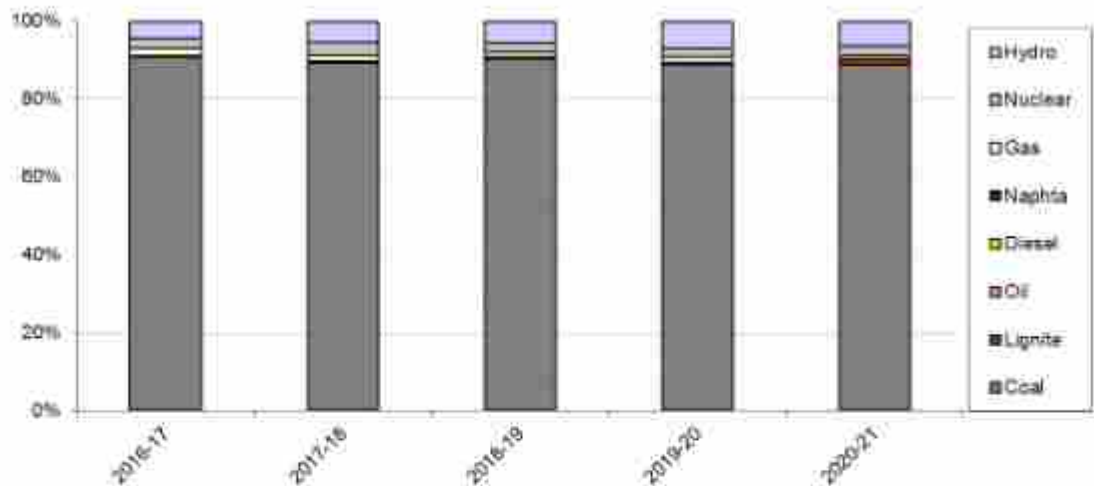


Figure 5: Breakdown of the build margins by fuel type (shares based on net generation)

Figure 6 shows the trends in the import-adjusted combined margins in the period 2016-17 to 2020-21. The combined margin decreased during 2016-17, 2017-18 and 2019-20 and 2020-21. It was mainly due to decrease in operating margin and build margin. The combined margin increased marginally during 2018-19 due to increase in both the operating and build margins



Figure 6: Development of the combined margin (adjusted for electricity transfers) for the Indian Grid over the period 2016-17 to 2020-21

### 5.3 Changes compared to Previous Database Versions

In comparison with the previous version of the Database (Version 16.0), this updated Version 17.0 includes the following changes:

- Added data for FY 2020-21, including new stations and units commissioned during 2020-21.
- The revised emission factors are provided in Appendix C and in the Database file.

## 6 User Examples

This section provides two illustrative examples of how the CO<sub>2</sub> Database can be applied. The examples are based on hypothetical renewable energy projects.

**Project A** is a grid-connected 5 MW small hydropower station located in the State of Assam. The station will be commissioned in 2022. Annual net generation is projected at approx. 17,500 MWh.

- The project qualifies as a small-scale CDM activity since its capacity is below the 15 MW threshold. Hence it will use the latest version of CDM methodology AMS-I.D for grid-connected renewable electricity generation.
- Methodology AMS-I.D gives two options for determining the baseline emission factor: Either the weighted average emissions, or the combined margin of the grid. In this example, it is assumed that the promoters choose the weighted average option. In addition, it is assumed that the promoters choose to adjust the weighted average emission factor for electricity imports, despite the fact that this is not mandatory under AMS-I.D.
- In the PDD, the expected emission reductions achieved by the hydro station are projected based on the expected annual generation, and the import-adjusted weighted average emission factor for the Indian Grid in the most recent year for which data is available (2020-21). The corresponding value is 0.79 t CO<sub>2</sub>/MWh. Hence the absolute emission reductions are projected at  $0.79 * 17,500 = 13,766$  t CO<sub>2</sub>/yr. The emission reductions are equal to the baseline emissions, since the project does not result in greenhouse gas emissions of its own.
- In accordance with AMS-I. D, the promoters will determine the *actual* baseline emission factor *ex post*. The actual emission reductions will then be calculated in each year of the crediting period based on the observed net generation and the weighted average emission factor for the respective year.<sup>13</sup> The latter would be published annually by CEA.

**Project B** is a 100 MW grid-connected wind farm located in the State of Tamil Nadu. The project will be commissioned in 2022. Average net supplies to the grid are projected at 312,500 MWh per year.

- The project exceeds the 15 MW threshold and thus qualifies as a large-scale CDM activity. Hence it is eligible to use the latest version of methodology ACM0002 for grid-connected power generation from renewable energy sources.
- Under ACM0002, the combined margin approach is mandatory.
- In contrast to the first example, the promoters decide to fix the baseline emission factor *ex ante*. That is, the baseline emission factor is determined based on the most recent data available, and remains fixed for the duration of the crediting period. The actual emission reductions will be calculated in each year based on the observed net generation and the pre-defined baseline emission factor.
- For this *ex ante*-option, the Grid Tool referred to in the methodology ACM0002 requires that the operating margin be calculated as the generation-weighted average of the three most recent years (here 2018-19 to 2020-21).<sup>14</sup> The operating margin to be applied thus works out to 0.953 t CO<sub>2</sub>/MWh.

<sup>13</sup> The emission factor of the previous year may be used instead. See *Tool to calculate the emission factor for an electricity system* (Version 7.0), p. 16

<sup>14</sup> See *Tool to calculate the emission factor for an electricity system* (Version 7.0), p. 16

- 
- Since wind is an intermittent energy source, the promoter is allowed to assign a weight of 75% to the operating margin, and 25% to the build margin. The resulting combined margin is 0.931 t CO<sub>2</sub>/MWh (75% x 0.953 + 25% x 0.865) for the FY 2020-21). This value is used for projecting the emission reductions in the PDD as well as for calculating the actual emission reductions.

The two CDM project activities are summarised in Table 6 below.

*Table 6: Illustration on how to use the CO<sub>2</sub> Database for calculating the emission reductions of CDM projects*

	Project A	Project B
<b>Project Info</b>		
Type:	Hydro station	Wind park
Size:	5 MW (small-scale according to CDM criteria)	100 MW (large-scale according to CDM criteria)
Projected Generation (net):	17'500 MWh /yr	312'500 MWh/yr
Commissioning year:	2022	2022
Year of CDM registration:	2022	2022
Grid:	Indian	Indian
CDM methodology:	AMS-I.D / Version 19	ACM0002 / Version 19.0
<b>Baseline Emission Factor Calculation</b>		
Calculation method:	Weighted average	Combined margin
Data vintage for projection of emission reductions:	2020-21 (most recent available at time of PDD validation)	For OM: 2018-19, 2019-20, 2020-21 (most recent 3 years available at time of PDD validation)  For BM: 2020-21
Data vintage for verification of emission reductions:	Actual year of generation, i.e., 2022-23, 2023-24 etc. (emission factor fixed <i>ex post</i> )	Same as for projection (emission factor fixed <i>ex ante</i> )
Accounting of imports:	Not mandatory, but done	Mandatory
Weights for combined margin:	Not applicable	Operating margin: 75% Build margin: 25% (default for intermittent sources)
<b>Emission Reduction Calculations</b>		
Values in t CO <sub>2</sub> /MWh:	0.79 Weighted average	0.953 Operating margin 0.865 Build margin 0.931 Combined margin
Projected emission reductions:	13,766 t CO <sub>2</sub> per year	290,938 t CO <sub>2</sub> per year
Actual emission reductions:	Monitored net generation x monitored weighted average	Monitored net generation x fixed combined margin

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## 7 Updating Procedure

The CO<sub>2</sub> Database will be updated annually by CEA and made available on its website: [www.cea.nic.in](http://www.cea.nic.in). Previous versions will be archived by CEA and the main changes relative to previous database versions will be documented.

## 8 Further Information

For any further information, contact by email:

Chief Engineer (TPE&CC)  
Central Electricity Authority  
Sewa Bhawan  
R. K. Puram, New Delhi-110066  
Email: [cdmcea-tpecc@gov.in](mailto:cdmcea-tpecc@gov.in)

## Appendix A – Systems in India's Grids

Abbreviation	Full name
ABAN	ABAN Power Company
ADHPL	AD Hydro Power Limited
APCPL	Aravali Power Company Limited
APGCL	Assam Power Generation Corporation Limited
APGENCO	Andhra Pradesh Power Generation Co Limited
APPDCL	Andhra Pradesh Power Development Corporation Ltd.
ASEB	Assam State Electricity Board
BBMB	Bhakra Beas Management Board
BECL	Bhavnagar Energy Co. Ltd.
BSEB	Bihar State Electricity Board
BALCO	Bharat Aluminum Co. India Pvt. Ltd.
CESC	Calcutta Electric Supply Company Limited
CSEB	Chattisgarh State Electricity Board
CSPGCL	Chattisgarh State Power Generation Co Ltd
D.B. Power Ltd	Diligent Power Limited
DANS EPL	DANS Energy Pvt. Ltd.
DPL	Durgapur projects Limited
DVC	Damodar Valley Corporation
DVC Tata JV	Damodar Valley Corporation-Tata Joint Venture
GAMA	Gama Infraprop
GIPCL	Gujarat Industries Power Company Ltd
GMDCL	Gujarat Mineral Development Corporation Limited
GMR Chattisgarh	GMR Chattisgarh
GMR Energy	GMR Energy
GMR K Ltd	GMR Karnianga Energy Ltd.
GPEC	Gujarat Paguthan Energy Corporation Pvt. Limited
GSECL	Gujarat State Electricity Corporation Limited
GSEGL	Gujarat State Energy Generation Limited
GTE Corp	GTE Corporation

Abbreviation	Full name
GVK Ind.	GVK Power & Infrastructure Limited
GVK	GVK Group
HEGL	HEG Limited
HNPCL	Hinduja National Power Corp. Ltd.
HPGCL	Haryana Power Generation Corporation Limited
HPPCL	Himachal Pradesh Power Corporation Ltd.
HPSEB	Himachal Pradesh State Electricity Board
HIRANMAYE	Hiranmaye Energy Ltd.
IEPL	Ideal Energy Pvt. Ltd.
IL&FS TN PC Ltd.	IL&FS Tamil Nadu Power Co. Ltd.
INDSIL	Indsil Electrosilt Ltd
IPPGCL	Indraprastha Power Generation Co Ltd
JINDAL	JSW Energy Limited
JIPL	Jas Infrastructure and Power Ltd.
JKEB	Jammu & Kashmir Electricity Board
JKPDC	Jammu & Kashmir Power Development Corp. Ltd.
JPHPL	Jai Prakash Hydro Power Limited
JPL	Jhabua Power Ltd.
JSEB	Jharkhand State Electricity Board
JSW Energy	JSW Energy Limited
JV NTPC & BSEB	Joint Venture NTPC & Bihar State Electricity Board
KPCL	Karnataka Power Corporation Limited
KSEB	Kerala State Electricity Board
KSK Ventures	KSK Energy Ventures Ltd.
LPG CO	Lalitpur Power Generation Co. Ltd.
LVS Power	LVS Power Limited
M B Power (M P)	M B Power Madhya Pradesh
Madurai P	Madurai Power Corporation Limited
MAHAGENCO	Maharashtra State Power Generation Company Limited
MAPS	Madras Atomic Power Station

Abbreviation	Full name
MEECL	Meghalaya Energy Generation Corporation Ltd.
MEGEB	Meghalaya State Electricity Board
MPDC	Manipur Power Development Corporation
MEECL	Meghalaya Energy Corporation Ltd.
MPDC	Manipur Power Development Corporation
MPGPCL	Madhya Pradesh Power Generating Co. Ltd.
NAPS	Narora Atomic Power Station
NCTPP	National Capital Thermal Power Plant
NDPL	North Delhi Power Ltd.
NEEPCO	North Eastern Electric Power Corporation Ltd.
NHDC	Narmada Hydro Electric Development Corporation
NHPC	National Hydro Electric Corporation
NLC	Neyveli Lignite Corporation Ltd.
NPC	Nuclear Power Corporation of India Ltd.
NTPC	NTPC Ltd.
NTPC/NTECL	NTPC Tamilnadu Energy Company Limited
OHPC	Orissa Hydro Power Corporation
OPGC	Orissa Power Generation Corporation
PPCL	Puducherry Power Corporation Limited
PPGCL	Prayagraj Generation Co. Ltd.
PPNPG	PPN Power Generating Company Pvt. Limited
PSEB	Punjab State Electricity Board
RAPS	Rajasthan Atomic Power Station
RATANAGIRI	Ratnagiri Gas & power Pvt Ltd.
REL	Reliance Energy Ltd.
RKM PPL	RKM Powergen Pvt. Ltd.
RPG	RP Goenka Group
RRVUNL	Rajasthan Rajya Vidyut Utpadan Nigam
Samalpatti	Samalpatti Power Company Limited
SHIRPUR	Shirpur Power Pvt. Ltd.

Abbreviation	Full name
SCPL Ltd.	Spectrum Power Limited
SJVNL	Suttuj Jal Vidyut Nigam Ltd
SKS Power	SKS Power Generation
SKPL	Sneha Kinetic Power Projects Pvt. Ltd.
SPECT. IND	Spectrum Power Generation Limited
SP&ML	Subhash Projects and Marketing Co. Ltd.
SSVNL	Sardar Sarovar Vidyut Nigam Limited
STPS	Super Thermal Power Station
Tata MAH	Tata Power Company Limited
Tata PCL	Tata Power Company Limited
THDC	Tehri Hydroelectric Development Corporation
TNEB	Tamilnadu Electricity Board
Torr. Power	Torrent Power Limited
TSECL	Tripura State Electricity Corporation Limited
TSGENCO	Telangana Power Generation Corp. Ltd.
TVNL	Tenughat Vidyut Nigam Limited
UJVNL	Uttarakhand Jal Vidyut Nigam Limited
UPCL	Uttarakhand Power Corporation Limited
UPHPC	Uttar Pradesh Hydro Power Corporation Limited
UPRVUNL	Uttar Pradesh Rajya Vidyut Utpadan Nigam
VVNL	Visvesarya Vidyut Nigam Ltd
WBPDC	West Bengal Power Development Corporation Ltd.
WBSEB	West Bengal State Electricity Board

## Appendix B – Assumptions for CO<sub>2</sub> Emission Calculations

**Fuel Emission Factors (EF)** (Source: for Indian Coal/Lignite + India National Communication; for Imported Coal/Gas/Oil/Diesel/Naphtha + IPCC 2006; for Coal – own assumption)

	Unit	Imported							
		Coal	Coal	Lignite	Gas	Oil	Diesel	Naphtha	Coals
EF based on NCV	gCO <sub>2</sub> /MJ	95.3	89.5	100.2	54.3	75.5	72.6	89.3	0.0
Bella GCV NCV	%	3.6%	5.0%	3.6%	10%	5%	5%	5%	n/a
EF based on GCV	gCO <sub>2</sub> /MJ	92.9	86.2	102.6	46.4	71.9	69.1	86.0	0.0
Oxidation Factor	-	0.98	1.00	0.98	1.00	1.00	1.00	1.00	n/a
Fuel Emission Factor	gCO <sub>2</sub> /MJ	90.8	85.2	100.5	48.4	71.9	69.1	86.0	0.0

n/a = not applicable (i.e. no assumptions were needed)

### Assumptions at Station Level (only where data was not provided by station)

	Unit	Coal	Lignite	Gas CC	Gas OC	Oil	Diesel-End	Diesel-OC	Naphtha	Hydro	Nuclear
Auxiliary Power Consumption	%	8.0	10.0	3.0	1.0	3.5	3.5	1.0	3.5	0.5	10.5
Gross Heat Rate	kcal/kWh (gross)	2,500	2,713	2,010	3,150	2,117	1,976	3,213	2,117	n/a	n/a
Net Heat Rate	kcal/kWh (net)	3,217	3,014	2,076	3,162	2,193	2,047	3,330	2,193	n/a	n/a
Specific Oil Consumption	ml/kWh (gross)	2.0	3.0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
GCV	kcal/kg (or m <sup>3</sup> )	3,755	n/a	8,800	n/a	10,100	10,500	10,500	11,300	n/a	n/a
Density	t/1,000 ft <sup>3</sup>	n/a	n/a	n/a	n/a	0.85	0.83	0.83	0.70	n/a	n/a
Specific CO <sub>2</sub> emissions	CO <sub>2</sub> /MWh	1.04	1.28	0.43	0.66	0.66	0.59	0.96	0.61	n/a	n/a

n/a = not applicable (i.e. no assumptions were needed)

### Assumptions at Unit Level (by capacity, only for units in the BM, where data was not provided by station)

Coal	Unit	200-250 MW		300 MW		500 MW		600 MW		680 MW		900 MW	
		Typ 1	Typ 2	Typ 1	Typ 2	Typ 1	Typ 2	Typ 1	Typ 2	Typ 1	Typ 2	Typ 1	Typ 2
Gross Heat Rate	kcal/kWh	2,750	2,500	2,500	2,950	2,425	2,380	2,380	2,178	2,128	2,128	2,128	2,128
Auxiliary Power Consumption	%	12.5	8.0	9.0	9.0	7.5	6.5	6.5	6.5	6.5	6.5	6.5	5.25
Net Heat Rate	kcal/kWh	3,125	2,747	2,747	2,562	2,622	2,545	2,545	2,329	2,274	2,274	2,274	2,344
Specific Oil Consumption	ml/kWh	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.3
Specific CO <sub>2</sub> Emissions	CO <sub>2</sub> /MWh	1.18	1.05	1.08	0.99	1.00	0.97	0.97	0.89	0.87	0.87	0.87	0.65
<b>Lignite</b>	Unit	75 MW	125 MW	200-250 MW	500 MW								
Gross Heat Rate	kcal/kWh	2,750	2,580	2,713	2,713								
Auxiliary Power Consumption	%	12.5	12.5	10.0	8.8								
Net Heat Rate	kcal/kWh	3,125	2,909	3,014	2,965								
Specific Oil Consumption	ml/kWh	3.0	3.0	3.0	3.0								
Specific CO <sub>2</sub> Emissions	CO <sub>2</sub> /MWh	1.30	1.23	1.28	1.25								
<b>Gas</b>	Unit	0-49.9 MW	50-99.9 MW	>100 MW									
Gross Heat Rate	kcal/kWh	1,950	1,910	1,970									
Auxiliary Power Consumption	%	3.0	3.0	3.0									
Net Heat Rate	kcal/kWh	2,010	1,969	2,031									
Specific CO <sub>2</sub> Emissions	CO <sub>2</sub> /MWh	0.43	0.41	0.43									
<b>Diesel</b>	Unit	0.1-1 MW	1-3 MW	3-10 MW	>10 MW								
Gross Heat Rate	kcal/kWh	2,350	2,290	2,100	1,975								
Auxiliary Power Consumption	%	3.5	3.5	3.5	3.5								
Net Heat Rate	kcal/kWh	2,435	2,302	2,176	2,047								
Specific CO <sub>2</sub> Emissions	CO <sub>2</sub> /MWh	0.70	0.67	0.63	0.59								
<b>Naphtha</b>	Unit	All sizes											
Increment to Gas Heat Rate	%	2%											
Gross Heat Rate	kcal/kWh	2,117											
Auxiliary Power Consumption	%	3.5											
Net Heat Rate	kcal/kWh	2,190											
Specific CO <sub>2</sub> Emissions	CO <sub>2</sub> /MWh	0.61											
<b>Combined Margin</b>	Unit												
Weight OM	%	50%											
Weight BM	%	50%											
<b>Conversion Factors</b>	Unit												
Energy	kJ/kcal	4.1868											
	MJ/kWh	3.6											
<b>Oil</b>													
Specific Emission	gCO <sub>2</sub> /ml	2.89											

## Appendix C – Grid Emission Factors

Note: Values are rounded off at two decimals here. See Database (Excel File, Worksheet "Results") for additional decimals.

**Table A: Values for FY 2016-17 to 2020-21, excluding cross-border electricity transfers.**

Emission Factors (tCO <sub>2</sub> /MWh) (excl. imports)	2016-17	2017-18	2018-19	2019-20	2020-21
Weighted Average Emission Rate	0.83	0.82	0.82	0.80	0.79
Simple Operating Margin (1)	0.97	0.96	0.96	0.98	0.95
Build Margin	0.87	0.87	0.88	0.87	0.87
Combined Margin (1)	0.92	0.91	0.92	0.92	0.91

(1) Operating margin is based on the data for the same year. This corresponds to the *ex post option* given in "Tool to Calculate the Emission Factor for an Electricity System", Ver. 7.0 (p.16)

**Table B: Values for FY 2016-17 to 2020-21, including cross-border electricity transfers.**

Emission Factors (tCO <sub>2</sub> /MWh) (incl. imports)	2016-17	2017-18	2018-19	2019-20	2020-21
Weighted Average Emission Rate (2)	0.82	0.82	0.82	0.79	0.78
Simple Operating Margin (1) (2)	0.96	0.95	0.96	0.96	0.94
Build Margin (not adjusted for imports)	0.87	0.87	0.88	0.87	0.87
Combined Margin (1) (2)	0.92	0.91	0.92	0.91	0.90

(1) Operating margin is based on the data for the same year. This corresponds to the *ex post option* given in "Tool to Calculate the Emission Factor for an Electricity System", Ver. 7.0 (p.16)

(2) For Adjustments of imports from other countries, an emission factor of zero is used.

See "Tool to Calculate the Emission Factor for an Electricity System", Ver. 7.0 (p.10 & 11), options a+b.

## Appendix D – Summary of Methodology ACM0002 / Version 20.0

Download ACM0002 at: <http://cdm.unfccc.int/methodologies/PAMethodologies/approved.html>

ACM0002 is a consolidated CDM methodology for grid-connected power generation from renewable energy sources. It covers grid-connected renewable power generation project activities that involve retrofitting, rehabilitation (or refurbishment), replacement or capacity addition of an existing power plant or construction and operation of a Greenfield power plant... Examples of eligible project types include hydro power plants with or without reservoir; wind energy; geothermal energy; solar energy; and wave and tidal energy.

The methodology requires the calculation of the baseline emission factor following the combined margin (CM) approach. The combined margin consists of a weighted average of:

- Operating margin (OM);
- Build margin (BM).

The relative weights used to determine the combined margin are by default the same, i.e. 50%. Alternative weights can be used for intermittent power sources.

There are four options to calculate the operating margin, depending on local conditions:

- *Simple operating margin*. This is the preferred approach for India.
- The other three approaches are: (i) *simple adjusted operating margin*, (ii) *dispatch data analysis operating margin*, and (iii) *average operating margin*.

The build margin is the generation-weighted average emission factor of the most recent power plants, consisting of the larger of (i) the five power plants that have been built most recently; or (ii) the capacity additions that represent 20% of the system generation that have been built most recently. In India, the latter approach generally yields the larger sample and hence must be followed. CDM projects must be excluded from the build margin, as long as the build margin does not contain generation units older than 10 years.

The operating margin must be adjusted for electricity transfers (imports) from connected electricity systems (other states/regions, other countries) to the project electricity system. Generally, no such adjustments are required for the build margin.

The actual emission reductions achieved by a CDM project are calculated based on the monitored electricity production in each year, and the combined margin (baseline emission factor). The combined margin is initially calculated from the most recent data available at the time of PDD submission. It can then either remain fixed for the duration of the project's crediting period (*ex-ante approach*), or be updated annually (*ex-post approach*). The two approaches have different requirements in terms of data vintage.

## Appendix E – Abbreviations

Abbreviation	Full Name
ACM0002	Approved Consolidated Methodology by CDM Executive Board for grid connected large scale renewable project
ACM0013	Approved Consolidated Methodology by CDM Executive Board for new grid connected fossil fuel fired power plants using a less GHG intensive technology.
AMS-1D	Approved Methodology for small scale grid connected renewable projects
BM	Build margin
CDM	Clean Development Mechanism
CEA	Central Electricity Authority
CER	Certified Emission Reduction
CM	Combined margin
CO <sub>2</sub>	Carbon Dioxide
FY	Fiscal year
GCV	Gross Calorific Value
GHG	Greenhouse Gases
GWh	Gigawatt hour
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
IPP	Independent Power Producer
MW	Megawatt
NEWNE	Integrated Northern, Eastern, Western and North Eastern Grid
OM	Operating margin
PDD	Project Design Document
RLDC	Regional Load Dispatch Centre
RPC	Regional Power Committee
SR	Southern Grid
UNFCCC	United Nations Framework Convention on Climate Change

## **GIRIDHAN METAL PRIVATE LIMITED**

JAMURIA INDUSTRIAL ESTATE,  
P. O. NANDI, P. S. JAMURIA,  
PASCHIM BARDHMAN-713344(W.B.)

Expansion of Integrated Steel Plant by expanding Sponge Iron from 1,20,000 TPA to 3,18,000 TPA, MS Billets from 1,05,000 TPA to 3,72,300 TPA, Rolling Mill from 1,00,000 TPA to 3,00,000 TPA, Submerged Arc Furnace (SAF) from 15,000 TPA to 30,000 TPA & Captive Power Plant from 16 MW to 42 MW including Waste Heat Recovery Boiler (WHRB).

A DOCUMENT ON  
**HAZARDS IDENTIFICATION AND RISK ASSESSMENT**

## HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

<b>Name of Job :</b> DEMOLITION WORK	<b>Department :</b> CONSTRUCTION	<b>Prepared By :</b>	<b>Checked By :-</b>	<b>Approved By :</b>
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HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Setting up working platform (Scaffold)	Scaffold rod collapsed and hit a person at site.	Major injury/illness (Long absenteeism, M.C > 14 days).	Use safety net; Proper planning of work.	2	4	<b>8</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Heat stress/stroke due to hot working environment.	Near miss/ unsafe act/ unsafe condition.	Workers to take a short break where applicable.	3	1	<b>3</b>	Additional control shall be proposed when necessary.
	Electrocution due to faulty wiring touching metal.	Fatality or permanent disability or irreversible illness	Do not allow electrical wiring through scaffold structures.	2	5	<b>10</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
Setting up working platform (Ladder)	Slippery, ladder fall.	Fatality or permanent disability or irreversible illness	Buddy system properly secured.	2	5	<b>10</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Ladder broke.	Fatality or permanent disability or irreversible illness	Check the ladder properly before use.	2	5	<b>10</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Heat stress/stroke due to hot working environment.	Near miss/ unsafe act/ unsafe condition.	Workers to take a short break where applicable.	3	1	<b>3</b>	Additional control shall be proposed when necessary.
	Overstretching.	Near miss/ unsafe act/ unsafe condition.	Workers to take a short break.	3	1	<b>3</b>	Additional control shall be proposed when necessary.
	Space constrain.	Near miss/ unsafe act/ unsafe condition.	Training and proper planning of work.	4	1	<b>4</b>	Additional control shall be proposed when necessary.
Setting up working platform (Temporary Staging)	Temporary staging broke due to overloading of debris which is not removed.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000).	Training and proper planning of work.	2	2	<b>4</b>	Additional control shall be proposed when necessary.
Working environment	Falling from height	Fatality or permanent disability or irreversible illness	Workers wear safety harness; Provide safe working procedure.	2	5	<b>10</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Electrocuted due to faulty electrical equipment/dismantling wiring.	Fatality or permanent disability or irreversible illness	Wear proper PPE; Provide safe working/proper handling procedure.	2	5	<b>10</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Use of solvents or any other chemical.	First aid cases/medical treatment (M.C between 1 to 3 days)	Proper protective clothing; Training.	3	2	<b>6</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Lighting.	First aid cases/medical treatment (M.C between 1 to 3 days)	To provide adequate lighting.	2	2	<b>4</b>	Additional control shall be proposed when necessary.
	Falling and drowned.	Fatality or permanent disability or irreversible illness	Fall protection provided; To wear life jacket.	2	5	<b>10</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.

## HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

<b>Name of Job :</b>	<b>Department :</b>	<b>Prepared By :</b>	<b>Checked By :-</b>	<b>Approved By :</b>
<b>DEMOLITION WORK (Cont'd)</b>	<b>CONSTRUCTION</b>			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Working at height	Fall during erection	Severe injury /fatality	Work Permit Procedure, Use of PPEs like Full body harness, fall arrestor and helmet.	4	2	8	BOCW Act 1996 and state rules
	Failure of ladder structure	Failure of ladder structure	Weekly safety inspection	4	2	8	BOCW Act 1996 and state rules
	Tripping or slipping from ladders or stairs	Severe injury /fatality	Work Permit Procedure, Use of PPEs like Full body harness, fall arrestor and helmet.	4	2	8	BOCW Act 1996 and state rules
Welding work	Incompetence of employees	Incompetence employees can result in an injury	BOCW Act 1996 and state rules	3	3	9	Only trained welders must be used, Work Permit System Procedure for Welding and Cutting Safety.
	Use of damaged welding holder & cable	Electrocution, shock resulting in injury	Electricity Rules 1956	3	3	9	Only trained welders must be used, Work Permit System Procedure for Welding and Cutting Safety.
	Explosion of cylinder due to mishandling	Burn injury/fatality/	Gas Cylinders Rules 2004	2	2	4	Procedure for Welding and Cutting Safety
	Working in inadequate lighting conditions	eye problem/ headache / other like slip/trip/fall	Light posts have been provided.	2	2	4	Light posts have been provided.
	Use of improper PPE's	Inadequate or wrong PPE could cause injuries	BOCW Act 1996 and state rules	2	2	4	Procedure for selection of PPEs, Procedure for Inspection of PPEs and Safety Devices.
Grinding work at Fabrication Area	Use of improper PPE's	Inadequate or wrong PPE could cause injuries	BOCW Act 1996 and state rules	2	2	4	Procedure for selection of PPEs Procedure for Inspection of PPEs and Safety Devices
	Operation of grinding wheel without wheel guard	Physical injury/fatality	BOCW Act 1996 and state rules	3	4	12	Guards to be ensured on the wheel, Abrasive Wheel Safety Procedure(
	No separate switches for common extension board	Physical injury/fatality	Electricity Rules 1956	2	2	4	Electrical Safety Procedure. Procedure for Electrical Safety Inspection
	Operation of grinding wheel without wheel guard	Physical injury/fatality	Electricity Rules 1956	2	2	4	Guards to be ensured on the wheel, Abrasive Wheel Safety Procedure
	Use of damaged power cables & bare wire connections	Electrical shock, physical injury	Electricity Rules 1956	2	2	4	Electrical Safety Procedure. 28) Procedure for Electrical Safety Inspection

## HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

Gas cutting work	Back fire in gas cutting torch and gas cylinder	Burn injury/fatality	BOCW Act 1996 and state rules	4	4	16	Flash back arrestors are available at cylinder side as well as gas cutting torch, Procedure for Welding and Cutting Safety
	Flash back in gas cutting torch	burn injury	BOCW Act 1996 and state rules	3	3	9	Flash back arrestors are available at cylinder side as well as gas cutting torch, Procedure for Welding and Cutting Safety
	Damage of gas cylinder valve due to roll and fall	Fire/major injury/explosion/fatality	Gas cylinder rules 2004	3	2	6	Procedure for Welding and Cutting Safety
	Improper storage of gas cylinders	Physical injury due to fall of cylinders/explosion/property damage	Gas cylinder rules 2004	3	3	9	Procedure for Welding and Cutting Safety
	Fire/explosion due to heat exposure	Major burn injury/fatality	Gas cylinder rules 2005	2	2	4	Procedure for Welding and Cutting Safety
	Use of inadequate/improper PPE's	Inadequate or wrong PPE could cause injuries	BOCW Act 1996 and state rules	2	3	6	Procedure for selection of PPEs , Procedure for Inspection of PPEs and Safety Devices
Working environment	Heat stress/stroke due to hot working environment.	Near miss/ unsafe act/ unsafe condition.	Use proper ventilation system; Workers to take a short break.	3	1	3	Additional control shall be proposed when necessary.
	Body injuries due to struck by object / material debris.	Fatality or permanent disability or irreversible illness	Wear proper PPE.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Physical stress/repetitive work.	Near miss/ unsafe act/ unsafe condition.	Workers to take a short break where applicable.	3	1	3	Additional control shall be proposed when necessary.
Working with manual handling	Physical stress due to vibration.	Near miss/ unsafe act/ unsafe condition.	Workers to take a short break where applicable.	3	1	3	Additional control shall be proposed when necessary.
	Punching.	First aid cases/medical treatment (M.C between 1 to 3 days)	Training on proper handling; Wear proper PPE.	2	2	4	Additional control shall be proposed when necessary.
	Repetitive work.	Near miss/ unsafe act/ unsafe condition.	Working in interval time limit.	3	1	3	Additional control shall be proposed when necessary.
	Rotating, Shearing.	Minor injury/illness (M.C between 5 to 14 days)	Machine guarding; Training on proper handling.	2	3	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Body injuries/cut caused by sharp object.	Major injury/illness (Long absenteeism, M.C > 14 days);	Worker wear proper PPE.	2	4	8	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Heat due to oxy cutting activities.	Near miss/ unsafe act/ unsafe condition.	Wear proper and safe attire.	3	1	3	Additional control shall be proposed when necessary.
	Electrocuted due to faulty tools wiring.	Fatality or permanent disability or irreversible illness	To check tool equipment free from defect; Wear proper PPE.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
Body injuries due to heat/radiation.	Near miss/ unsafe act/ unsafe condition.	Workers wear proper PPE.	2	1	2	Briefing By SHO on safety awareness. Additional control shall be made if necessary.	

## HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

	Inhalation of fume or chemical vapor.	Near miss/ unsafe act/ unsafe condition.	Worker wear proper PPE.	2	1	<b>2</b>	Additional control shall be proposed when necessary.
Working with machinery	Hit by moving object.	Fatality or permanent disability or irreversible illness	Provide signalman and barricade working area.	2	5	<b>10</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Damage to equipment/machinery due to mishandling.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000).	Trained operator and close supervision; Provide safe working procedure.	2	2	<b>4</b>	Additional control shall be proposed when necessary.

## HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

<b>Name of Job :</b>	<b>Department :</b>	<b>Prepared By : GMPLE TEAM</b>	<b>Checked By :- GMPLETEAM</b>	<b>Approved By : GMPLE TEAM</b>
<b>CONCRETEING WORK</b>	<b>CONSTRUCTION</b>			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Mobilization of machinery	Traffic Collision	Major injury/illness (Long absenteeism, M.C > 14 days)	Provide experience driver with legal driving licence.	2	4	8	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Machinery collapse due to unstable ground	Major injury/illness (Long absenteeism, M.C > 14 days)	Use steel plate/solid material as a temporary platform.	2	4	8	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Space constrain.	Near miss/ unsafe act/ unsafe condition	Engineer to plan site layout.	3	1	3	Additional control shall be proposed when necessary.
Machinery movement within work area	Traffic collision.	Major injury/illness (Long absenteeism, M.C > 14 days)	Provide trafficman.	2	4	8	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Space constrain.	Near miss/ unsafe act/ unsafe condition	Engineer to plan site layout.	3	1	3	Additional control shall be proposed when necessary.
Unloading of ready mix concrete	Hit by moving object.	Fatality or permanent disability or irreversible illness	Workers wearing proper PPE; Closed supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Hit by falling object.	Fatality or permanent disability or irreversible illness	Operator to check bucket condition; Closed supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Hit by falling object due to broken cable crane.	Fatality or permanent disability or irreversible illness	Crane with PMA certificate; Signal man properly monitor.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Heat stroke from prolonged exposure to sunlight and dehydration.	Near miss/ unsafe act/ unsafe condition	Worker wear hard hat and safety glove; Worker encouraged to take short break; Break if more than 2 hours.	3	1	3	Additional control shall be proposed when necessary.
	Crane boom failure due to overloading or mishandling.	Fatality or permanent disability or irreversible illness	Crane with PMA certificate; Signal man properly monitor.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
In-situ concrete mixing (Manually)	Physical injuries caused by sharp object or hand tools.	Minorinjury/illness (M.C between 5 to 14 days)	Workers wear gloves and safety shoes.	2	3	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Manual handling due to improper lifting techniques.	Minorinjury/illness (M.C between 5 to 14 days)	Use proper hand tool, Proper handling techniques.	2	3	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Working with cement and mineral dust.	Near miss/ unsafe act/ unsafe condition	Workers wear proper PPE.	3	1	3	Additional control shall be proposed when necessary.
	Dermatitis/skin irritation.	Near miss/ unsafe act/ unsafe condition	Workers wear gloves and safety shoes.	3	1	3	Additional control shall be proposed when necessary.

## HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

<b>Name of Job :</b>	<b>Department :</b>	<b>Prepared By :</b>	<b>Checked By :-</b>	<b>Approved By :</b>
<b>EXCAVATION WORK</b>	<b>CONSTRUCTION</b>			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Mobilization/ Unloading of excavator	Physical injuries caused by weight, sharp edges, hit by moving object.	Fatality or permanent disability or irreversible illness	Workers wear proper PPE; Signal man to monitor; Close supervision.	2	5	<b>10</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Insects bites or allergy to plants.	Near miss/ unsafe act/ unsafe condition	To ensure that worker wear heavy duty gloves during work.	3	1	<b>3</b>	Additional control shall be proposed when necessary.
	Trip or fall during mount or dismount of machinery.	Minor injury/illness (M.C between 5 to 14 days)	Worker wear proper PPE; Closed supervision.	2	3	<b>6</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Sudden injuries caused by excessive or cumulative lifting and/or work-rest cycle.	Near miss/ unsafe act/ unsafe condition	To ensure that worker do not work more than 2 hours at each time.	3	1	<b>3</b>	Additional control shall be proposed when necessary.
	Struck by overturning machinery due to unstable ground/traffic collision or machinery mishandling.	Fatality or permanent disability or irreversible illness	Instruction and site condition being briefed; Use solid platform; Signal man provided for traffic; Monitoring and provide signage.	2	5	<b>10</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
Excavator and case prepare base for site office container, diesel tank and store	Heat stroke caused by prolong exposure to sunlight and lack of water.	Near miss/ unsafe act/ unsafe condition	Workers wear hat and take a short break where applicable.	3	1	<b>3</b>	Additional control shall be proposed when necessary.
	Physical injuries caused by startup/mobilization such as belts, chain or weight of bucket wheel or hydraulic breaker during changeover between different types of accessories.	Minor injury/illness (M.C between 5 to 14 days)	To ensure that only competent person/operator performed mobilization for respective machinery.	2	3	<b>6</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Fire caused by heats engine or cigarette during refuel.	Localized damage (Repair cost > RM10,000 and < RM50,000)	To ensure that operator or worker not smoking during refueling and engine cool down of 15 minutes before refuel.	2	3	<b>6</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.

## HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

<b>Name of Job :</b>	<b>Department :</b>	<b>Prepared By :</b>	<b>Checked By :-</b>	<b>Approved By :</b>
EXCAVATION WORK (Cont'd)	CONSTRUCTION			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Excavate drainage/trenches/channel/site	Struck by collapse slope/falling object/material.	Fatality or permanent disability or irreversible illness	Close supervision; Working in buddy system; Barrier at excavate site area.	4	5	<b>20</b>	Briefing By SHO on safety awareness. Provide extra slope protection.
	Electrocution due to punching underground or overhead electric cable.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	Worker or operator being briefed of site condition and hidden danger; Wear proper PPE; Closed supervision.	3	2	<b>6</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Monotony of work and work rest cycle for excavator operator; cumulative trauma of bending over in drainage trenches/channels during side shoring for workers.	Near miss/ unsafe act/ unsafe condition	To ensure that operator or worker not work continuously more than 4 hours and encourage short breaks where applicable.	2	1	<b>2</b>	Additional control shall be proposed when necessary.
	Punching by moving bucket due to improper manual handling.	Fatality or permanent disability or irreversible illness	Provide safe working practice; Warning signage; Close supervision.	2	5	<b>10</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Trip/fall/drop into trenches/drain/site during work or inspection.	Minor injury/illness (M.C between 5 to 14 days)	Set up barrier or warning markers; Close supervision.	2	3	<b>6</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.

## HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

<b>Name of Job :</b>	<b>Department :</b>	<b>Prepared By :</b>	<b>Checked By :-</b>	<b>Approved By :</b>
ROAD WORK	CONSTRUCTION			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Unloading material	Physical injuries caused by weight, sharp edges, hit by falling object.	Fatality or permanent disability or irreversible illness	Workers wear gloves and hard hat; Provide safe working procedure; Close supervision.	2	5	<b>10</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Snakes & insects bites & allergies from plant might be occurred during the activities	First aid cases/medical treatment (M.C between 1 to 3 days)	All workers at the site are required to wear long safety boots.	2	2	<b>4</b>	Additional control shall be proposed when necessary.
	During verification of peg points, trip / fall might happen.	First aid cases/medical treatment (M.C between 1 to 3 days)	All workers at the site are required to wear long safety boots.	2	2	<b>4</b>	Additional control shall be proposed when necessary.
	Punching.	Major injury/illness (Long absenteeism, M.C > 14 days)	Stay away from the working area.	2	4	<b>8</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Physical injuries caused by swinging object and property damage.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	Provide safe working procedure on proper lifting and material handling; Provide warning signage.	2	2	<b>4</b>	Additional control shall be proposed when necessary.
	Crane collapse due to unstable ground.	Fatality or permanent disability or irreversible illness	To check outrigger and ground condition; Close supervision.	2	5	<b>10</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Damage to road surface due to crane sitting.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	Proper use of outrigger pad; Use of supporting platform.	3	2	<b>6</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Electrocution due to over head or underground live cable.	Minor injury/illness (M.C between 5 to 14 days)	Wear proper gloves; Provide warning signage; Close supervision.	2	3	<b>6</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Boom failure due to overloading or mishandling.	Fatality or permanent disability or irreversible illness	To check on load chart and proper lifting method.	2	5	<b>10</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Material falling onto public vehicle/road.	Localized damage (Repair cost > RM10,000 and < RM50,000)	Provide warning signage; Put barrier on working area; Close supervision.	2	3	<b>6</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
Hit by falling object due to improper stacking.	Fatality or permanent disability or irreversible illness	Requirements on proper stacking techniques; Close supervision.	2	5	<b>10</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.	

## HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

<b>Name of Job :</b>	<b>Department :</b>	<b>Prepared By :</b>	<b>Checked By :-</b>	<b>Approved By :</b>
<b>ROAD WORK (Cont'd)</b>	<b>CONSTRUCTION</b>			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Working environment and with material	Body injuries while handling machinery/hopper.	Major injury/illness (Long absenteeism, M.C > 14 days).	Provide safe working procedure; Training on machinery handling; Close supervision.	2	4	<b>8</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Health hazard due to tar and bitumen exposure.	Near miss/ unsafe act/ unsafe condition	Wear proper PPE; Close supervision.	3	1	<b>3</b>	Additional control shall be proposed when necessary.
	Heat stroke and dehydration due to prolonged exposure to sunlight or heating material.	Near miss/ unsafe act/ unsafe condition	Worker wear proper PPE; Worker to take a short break where applicable.	3	1	<b>3</b>	Additional control shall be proposed when necessary.
	Heat injury to body due to inappropriate insulation hand tools or inappropriate hands tools.	First aid cases/medical treatment (M.C between 1 to 3 days)	To use proper insulated hand tool; Wear proper PEP.	2	2	<b>4</b>	Additional control shall be proposed when necessary.
	Burnt injury due to mishandling flammable liquid or other combustible materials.	Fatality or permanent disability or irreversible illness	Wear proper PPE; Provide warning signage/MSDS; Close supervision.	1	5	<b>5</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Struck or hit by moving object (Hand tool or machinery).	Fatality or permanent disability or irreversible illness	To check outrigger and ground condition; Close supervision.	2	5	<b>10</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Physical injuries caused by traffic collision with public vehicle.	Minor injury/illness (M.C between 5 to 14 days)	Road site barrier/warning signage; Signal man proper monitoring; Close supervision.	2	3	<b>6</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Fall hazard due to cable snap or mishandling during lifting works.	Minor injury/illness (M.C between 5 to 14 days)	To check wire rope and proper handling during lifting work.	2	3	<b>6</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Fall into loading tray.	Minor injury/illness (M.C between 5 to 14 days)	Training for workers; Close supervision.	2	3	<b>6</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Fall into paver grader with rotating equipment.	Near miss/ unsafe act/ unsafe condition	Training for workers; Close supervision.	1	5	<b>5</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.

## HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

<b>Name of Job :</b>	<b>Department :</b>	<b>Prepared By :</b>	<b>Checked By :-</b>	<b>Approved By :</b>
ROAD WORK (Cont'd)	CONSTRUCTION			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Working environment and with material.	Material falling onto public vehicle/live lane/roads.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	Close supervision; Proper cover and close the road while unloading material.	2	2	4	Additional control shall be proposed when necessary.
	Communication interrupted by noisy condition.	Near miss/ unsafe act/ unsafe condition	Training to workers use proper hand signal where applicable.	3	1	3	Additional control shall be proposed when necessary.
	Traffic collision with public vehicle.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	To wear high visibility vest and clothing; Close supervision.	2	2	4	Additional control shall be proposed when necessary.
	Material lifting interrupted by windy condition.	Near miss/ unsafe act/ unsafe condition	Training to workers proper lifting techniques and to provide sling man.	2	1	2	Additional control shall be proposed when necessary.
	Sudden injuries on hand due to vibration using jackhammer.	First aid cases/medical treatment (M.C between 1 to 3 days)	Provide safe working procedure; Training on hand tool handling.	3	2	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.

## HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

<b>Name of Job :</b>	<b>Department :</b>	<b>Prepared By :</b>	<b>Checked By :-</b>	<b>Approved By :</b>
<b>ROOF WORK</b>	<b>CONSTRUCTION</b>			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Mobilization/ Unloading of roof.	Physical injuries caused by weight/sharp edges.	Major injury/illness (Long absenteeism, M.C > 14 days)	Workers wear gloves and hard hat; Provide safe working procedure.	2	4	<b>8</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Physical injuries due to hit by falling material/object.	Fatality or permanent disability or irreversible illness	Workers wear proper PPE; Close supervision.	2	5	<b>10</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Manual handling.	First aid cases/medical treatment (M.C between 1 to 3 days)	Training and regular toolbox talk; Close supervision.	2	2	<b>4</b>	Additional control shall be proposed when necessary.
	Hit by moving/falling object during transfer of material.	Fatality or permanent disability or irreversible illness	Provide signal man; Close supervision.	2	5	<b>10</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Damage of material due to mishandling and fall from height during lifting work.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	Provide safe working/material handling procedure; Close supervision.	2	2	<b>4</b>	Additional control shall be proposed when necessary.
Material storage at roof top.	Heat stress/stroke due to hot working environment	Near miss/ unsafe act/ unsafe condition	Use proper ventilation system; Take a short break and drink water.	3	1	<b>3</b>	Additional control shall be proposed when necessary.
	Falling/flying object material due to windy condition.	Fatality or permanent disability or irreversible illness	Material to be securely stack and away from edges.	2	5	<b>10</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
Walkways and working platform.	Slip and fall from height.	Fatality or permanent disability or irreversible illness	Provide safe working procedure; Wear safety harness and provides lifeline.	2	5	<b>10</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Space constraint.	Near miss/ unsafe act/ unsafe condition	Training and proper planning of work.	3	1	<b>3</b>	Additional control shall be proposed when necessary.
Installation of roof material	Slip & fall from height	Fatality or permanent disability or irreversible illness	Provide safe working procedure; Wear safety harness & provide lifelines.	3	5	<b>15</b>	Permit to work, qualification/competency, briefing by SHO on safety awareness
	Material damage due to falling/hit by falling object	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	Provide safe material handling & toe board at edge of roof; Cordon working area; Warning signage.	2	2	<b>4</b>	Additional control shall be proposed when necessary

## HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

<b>Name of Job :</b>	<b>Department :</b>	<b>Prepared By :</b>	<b>Checked By :-</b>	<b>Approved By :</b>
<b>SCAFFOLDING WORK</b>	<b>CONSTRUCTION</b>			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Mobilization/ Unloading	Physical injuries caused by weight, sharp edges, hit by moving object.	Fatality or permanent disability or irreversible illness	Workers wearing proper PPE; Provide warning signage; Safe handling/working procedure.	2	5	<b>10</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Heat stress/stroke due to hot working environment.	Near miss/ unsafe act/ unsafe condition	Workers wearing hard hat; To take a short break and drink water.	3	1	<b>3</b>	Additional control shall be proposed when necessary.
	Physical injuries due to slip/trip fall during carry scaffold for storage.	First aid cases/medical treatment (M.C between 1 to 3 days)	Workers wearing proper PPE; Provide safe material handling/working procedure; Close supervision.	2	2	<b>4</b>	Additional control shall be proposed when necessary.
	Space constraint.	Near miss/ unsafe act/ unsafe condition	Training and proper planning of work; Safe work procedure.	3	1	<b>3</b>	Additional control shall be proposed when necessary.
	Physical injuries caused by fall of material during lifting process.	First aid cases/medical treatment (M.C between 1 to 3 days)	Workers wearing proper PPE; Close supervision; Provide safe material handling/working procedure.	2	2	<b>4</b>	Additional control shall be proposed when necessary.
	Sudden injuries caused by excessive lifting.	First aid cases/medical treatment (M.C between 1 to 3 days)	Workers wearing proper PPE; Provide warning signage; Safe handling/working procedure.	2	2	<b>4</b>	Additional control shall be proposed when necessary.
	Hand injuries when stacking the scaffold from lorry.	First aid cases/medical treatment (M.C between 1 to 3 days)	Workers wearing proper PPE; Provide safe working procedure.	2	2	<b>4</b>	Additional control shall be proposed when necessary.

## HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

Name of Job :	Department :	Prepared By :	Checked By :-	Approved By :
SCAFFOLDING WORK (Cont'd)	CONSTRUCTION			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Installation of scaffold	Hit by moving object.	Fatality or permanent disability or irreversible illness	Wear proper PPE, Provide safe working procedure.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Platform collapse due to unstable ground.	Extensive damage > RM250,000	Provide safe working procedure, safe handling/working procedure, supervisor to check platform ground	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Hit by falling object.	Fatality or permanent disability or irreversible illness	Wearing hard hat, close supervision by competent scaffold supervisor.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Slip & trip while set up of installation at platform.	First aid cases/medical treatment (M.C between 1 to 3 days),	Wear proper PPE, platform to be clear & dry, close supervision.	2	2	4	Additional control shall be proposed when necessary
	Fall from height.	Fatality or permanent disability or irreversible illness	Provide safe working procedure, wear safety harness & provide lifelines	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
Erection of scaffold	Slip and trip during erection.	First aid cases/medical treatment (M.C between 1 to 3 days),	Using safe working platform; Passageway clear from obstruction; Workers wear proper PPE.	3	2	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Material falling.	Minor injury/illness (M.C between 5 to 14 days)	Close supervision by competent scaffold supervisor; Provide warning signage at working area; Workers wear proper PPE.	2	3	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Falling from height.	Fatality or permanent disability or irreversible illness	Close supervision; Using safe working platform; Worker wearing safety harness.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.

## HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

<b>Name of Job :</b>	<b>Department :</b>	<b>Prepared By :</b>	<b>Checked By :-</b>	<b>Approved By :</b>
DRAINAGE, SEWERAGE & PIPING WORK	CONSTRUCTION			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Check and verify peg points as per survey drawings with reference to construct drawings	When checking peg points, possible injuries from snakes/insects bites and allergies from plants.	First aid cases/medical treatment (M.C between 1 to 3 days)	Worker to work in buddy system and compulsory use of safety shoes or proper PPE.	2	2	4	Additional control shall be proposed when necessary
	Trip/fall during verification of peg point.	First aid cases/medical treatment (M.C between 1 to 3 days)	Worker to work in buddy system and use of belay lines for transversing slopes if applicable; Workers to rotate carrying equipment and position.	2	2	4	Additional control shall be proposed when necessary
	Cumulative trauma from carrying peg variation equipment such as dumpy level, theodolite and stands inclusive of measurement staff.	First aid cases/medical treatment (M.C between 1 to 3 days)	Workers to rotate carrying equipment and position.	1	2	2	Additional control shall be proposed when necessary
Mobilize excavator or case	Trip/fall during mount/dismount of machinery, noise and vibration of machinery gives physical discomforts.	First aid cases/medical treatment (M.C between 1 to 3 days)	To ensure that operator to perform pre start check and clean up of slippery surfaces before mount/dismount.	2	2	4	Additional control shall be proposed when necessary
	Fire caused by heated engine or cigarette during refueling.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	Enforce no smoking area and cool down engine before refueling.	2	2	4	Additional control shall be proposed when necessary
	Drop of machinery parts and hit the body of worker, noise and vibration of machinery might cause injury.	First aid cases/medical treatment (M.C between 1 to 3 days)	Workers to wear proper PPE; Provide safe working procedure; Close supervision.	2	2	4	Additional control shall be proposed when necessary

## HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

<b>Name of Job :</b>	<b>Department :</b>	<b>Prepared By :</b>	<b>Checked By :-</b>	<b>Approved By :</b>
DRAINAGE, SEWERAGE & PIPING WORK (Cont'd)	CONSTRUCTION			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Unloading pipes from trailers	The crane's chain slipped or broken during the lifting operation and piles fall off and hit the body of worker causing body parts dislocated/fracture.	Major injury/illness (Long absenteeism, M.C > 14 days)	Workers to wear proper PPE; Provide signalman; Crane to have a valid PMA certificate; Provide safe work procedure.	1	4	4	Additional control shall be proposed when necessary
	Hand injuries might be occurred when the workers help to unload the pipes.	First aid cases/medical treatment (M.C between 1 to 3 days)	Workers to wear proper PPE; Provide safe work procedure.	2	2	4	Additional control shall be proposed when necessary
	Sudden body injuries due to excessive load weight.	First aid cases/medical treatment (M.C between 1 to 3 days)	Provide training/safety awareness; Close supervision.	2	2	4	Additional control shall be proposed when necessary
	Physical injuries caused by weight, sharp edges.	Minor injury/illness (M.C between 5 to 14 days)	Workers wear proper PPE.	2	3	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Hit by moving object.	Fatality or permanent disability or irreversible illness	Provide warning signage; Close supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
Stacking of pipes	Improper stacking of pipes might cause others to fall off and cause body injuries.	First aid cases/medical treatment (M.C between 1 to 3 days)	Workers wear proper PPE.	2	2	4	Additional control shall be proposed when necessary
	Hand injuries due to stacking the pipes on form ground with timber blocks and wedges.	First aid cases/medical treatment (M.C between 1 to 3 days)	Workers wear proper PPE.	2	2	4	Additional control shall be proposed when necessary
	Snakes and insects bites and allergies from plant might be occurred during the activities.	Near miss/ unsafe act/ unsafe condition	Workers wear proper PPE.	2	1	2	Additional control shall be proposed when necessary

<b>Name of Job :</b>	<b>Department :</b>	<b>Prepared By :</b>	<b>Checked By :-</b>	<b>Approved By :</b>
DRAINAGE, SEWERAGE & PIPING WORK (Cont'd)	CONSTRUCTION			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Excavate drainage/ channels and preparing foundation	Trip/fall during mount/dismount of machinery, noise and vibration of machinery gives physical discomforts.	First aid cases/medical treatment (M.C between 1 to 3 days),	To ensure that operator to perform pre start checks and clean up of slippery surfaces before mount/dismount.	2	2	4	Additional control shall be proposed when necessary
	Monotony of work and work cycle for excavator operator; cumulative trauma of bending over in drainage trenches/channel during side shoring.	First aid cases/medical treatment (M.C between 1 to 3 days),	To ensure worker take a short break where applicable.	2	2	4	Additional control shall be proposed when necessary
	Buried alive by collapse ground or material.	Fatality or permanent disability or irreversible illness	Adequate slope protection; Safe excavation technique; Close supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Trip/fall/drop into trenches during work or inspection.	First aid cases/medical treatment (M.C between 1 to 3 days),	Trenches have barricade or warning signage; Close supervision.	2	2	4	Additional control shall be proposed when necessary
	Struck by collapse machinery.	Fatality or permanent disability or irreversible illness	Provide solid platform/use steel plate; Close supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Heat stroke from prolonged exposure to sunlight and dehydration.	Near miss/ unsafe act/ unsafe condition	Workers wear hard hat; Workers encourage to take a short where applicable.	3	1	3	Additional control shall be proposed when necessary
Placing of culverts/lay bedding concrete/pipes or related materials	Snakes and insects bites and allergies from plant might be occurred during the activities.	Near miss/ unsafe act/ unsafe condition	Workers wear proper PPE	2	1	2	Additional control shall be proposed when necessary
	Powered equipment and machinery such as hopper or manual compactor may cause possible injuries.	First aid cases/medical treatment (M.C between 1 to 3 days),	Workers wear proper PPE	2	2	4	Additional control shall be proposed when necessary

### HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

<b>Name of Job :</b>	<b>Department :</b>	<b>Prepared By :</b>	<b>Checked By :-</b>	<b>Approved By :</b>
DRAINAGE, SEWERAGE & PIPING WORK (Cont'd)	CONSTRUCTION			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Placing of culverts/lay bedding concrete/pipes or related materials (Cont'd)	Physical injuries caused by weight, sharp edges.	Minor injury/illness (M.C between 5 to 14 days)	Workers wear proper PPE.	2	3	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Hit by moving object.	Fatality or permanent disability or irreversible illness	Provide warning signage; Close supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Fire caused by heated engine or cigarette during refueling.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	Enforce no smoking area and cool down engine before refueling.	2	2	4	Additional control shall be proposed when necessary
	Buried alive by collapse ground or material.	Fatality or permanent disability or irreversible illness	Adequate slope protection; Safe excavation technique; Close supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Physical injuries caused by heavy items slipping from hands/lifting equipment and falling onto worker.	Minor injury/illness (M.C between 5 to 14 days)	Workers wear proper PPE; Signalman to be provided to stop other from working under the crane.	2	3	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Sudden body injuries due to excessive lifting.	First aid cases/medical treatment (M.C between 1 to 3 days),	Allowed to carry only where one's can; Required assistant when needed; Use crane or lifting machinery.	2	2	4	Additional control shall be proposed when necessary
	Electrocuted by faulty wiring.	Fatality or permanent disability or irreversible illness	Workers wear proper PPE; Close supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Struck by collapse machinery due to unstable ground.	Fatality or permanent disability or irreversible illness	Use of solid supporting platform; Close supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Radiation.	Major injury/illness (Long absenteeism, M.C > 14 days)	Worker wearing proper eye protection.	1	4	4	Additional control shall be proposed when necessary
	Heat stroke from prolonged exposure to sunlight and dehydration.	Near miss/ unsafe act/ unsafe condition	Workers wear hard hat; Workers encourage to take a short where applicable.	3	1	3	Additional control shall be proposed when necessary
	Trip/fall/drop into trenches during work or inspection.	First aid cases/medical treatment (M.C between 1 to 3 days),	Trenches have barricade or warning signage; Close supervision.	2	2	4	Additional control shall be proposed when necessary
	Dermatitis due to prolonged direct contact with cement.	First aid cases/medical treatment (M.C between 1 to 3 days),	Workers wear proper PPE.	2	2	4	Additional control shall be proposed when necessary

## HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

<b>Name of Job :</b>	<b>Department :</b>	<b>Prepared By:</b>	<b>Checked By :-</b>	<b>Approved By :</b>
DRAINAGE, SEWERAGE & PIPING WORK (Cont'd)	<b>CONSTRUCTION</b>			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Install applicable components according to specifications	Physical injuries caused by weight, sharp edges when transferring material and equipment.	Minor injury/illness (M.C between 5 to 14 days)	Workers wear proper PPE; Workers to work in buddy system.	2	3	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Snakes and insects bites and allergies from plant might be occurred during the activities.	Near miss/ unsafe act/ unsafe condition	Workers wear proper PPE.	2	1	2	Additional control shall be proposed when necessary
	Possible injuries from fall and or equipment/ components falling onto workers when work at night.	Minor injury/illness (M.C between 5 to 14 days)	Workers wear proper PPE; Provide proper lighting.	2	3	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Heat stroke from prolonged exposure to sunlight and dehydration.	Near miss/ unsafe act/ unsafe condition	Workers wear hard hat; Workers encourage to take a short where applicable.	3	1	3	Additional control shall be proposed when necessary
	Physical injuries caused by heavy items slipping from hands/lifting equipment and falling on to worker.	First aid cases/medical treatment (M.C between 1 to 3 days),	Workers wear proper PPE; Signalman to be provided to stop other from working under the crane.	2	2	4	Additional control shall be proposed when necessary
Conduct applicable acceptance test or benchmark acceptance procedure	Heat stroke from prolonged exposure to sunlight and dehydration.	Near miss/ unsafe act/ unsafe condition	Workers wear hard hat; Workers encourage to take a short where applicable.	3	1	3	Additional control shall be proposed when necessary
	Physical injuries caused by weight, sharp edges when transferring test equipment.	First aid cases/medical treatment (M.C between 1 to 3 days),	Workers wear proper PPE; Workers to work in buddy system.	2	2	4	Additional control shall be proposed when necessary
	Possible injuries from fall and or hit by falling equipment.	Minor injury/illness (M.C between 5 to 14 days)	Ensure trenches have boundaries and warning markers.	2	3	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.

## HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

<b>Name of Job :</b>	<b>Department :</b>	<b>Prepared By :</b>	<b>Checked By :-</b>	<b>Approved By :</b>
DRAINAGE, SEWERAGE & PIPING WORK (Cont'd)	<b>CONSTRUCTION</b>			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Backfill for applicable closed drainage system to desired level	Excessive vibration of compactor/hopper and heat radiation from closed proximity of equipment.	Near miss/ unsafe act/ unsafe condition	To ensure workers not working more than 4 hours continuously and encourage to take a short break.	3	1	3	Additional control shall be proposed when necessary
	Monotony of work and work rest cycle for excavator operator; cumulative.	Near miss/ unsafe act/ unsafe condition	To ensure workers not working more than 4 hours continuously and encourage to take a short break.	3	1	3	Additional control shall be proposed when necessary
	Heat stroke from prolonged exposure to sunlight and dehydration.	Near miss/ unsafe act/ unsafe condition	Workers wear hard hat; Workers encourage to take a short where applicable.	3	1	3	Additional control shall be proposed when necessary
	Trip/fall/drop into trenches during work or inspection.	First aid cases/medical treatment (M.C between 1 to 3 days),	Trenches have barricade or warning signage; Close supervision.	2	2	4	Additional control shall be proposed when necessary
Post-work safety	Fire caused by heated engine or cigarette during refueling.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	Enforce no smoking area and cool down engine before refueling.	2	2	4	Additional control shall be proposed when necessary
	Fall from height due to unprotected opening.	Fatality or permanent disability or irreversible illness	Provide warning system; Provide barrier.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Inhalation/exposure to toxic gases.	Fatality or permanent disability or irreversible illness	Working in buddy system; Close supervision; Check for toxic gases.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Confine space and insufficient oxygen.	Fatality or permanent disability or irreversible illness	Provide proper ventilation; Working in buddy system; Exhaust fan system.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.

## HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

<b>Name of Job :</b>	<b>Department :</b>	<b>Prepared By :</b>	<b>Checked By :-</b>	<b>Approved By :</b>
<b>CONFINED WORK SPACE</b>	<b>CONSTRUCTION</b>			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Entering confined space	Physical injuries due to slip and fall into manhole.	Major injury/illness (Long absenteeism, M.C > 14 days).	Workers wear proper PPE; Use safety harnesses if required; Closed supervision.	2	4	<b>8</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Toxication due to inhalation of toxic gases.	Fatality or permanent disability or irreversible illness	Competent gas tester checks the air; Provide proper ventilation; Closed supervision.	2	5	<b>10</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Electrocuted due to faulty wiring or electric leakage.	Fatality or permanent disability or irreversible illness	Workers wear proper PPE; Closed supervision.	2	5	<b>10</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Body cut/pierce by sharp object.	Major injury/illness (Long absenteeism, M.C > 14 days).	Workers wear proper PPE; Closed supervision.	2	4	<b>8</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
Mobilize material or equipment into confined space	Hand injuries might be occurred when the workers to unload material/ equipment.	First aid cases/medical treatment (M.C between 1 to 3 days),	Workers to wear proper PPE; Provide safe work procedure.	2	2	<b>4</b>	Additional control shall be proposed when necessary
	Hit by moving object.	First aid cases/medical treatment (M.C between 1 to 3 days),	Provide warning signage; Closed supervision.	2	2	<b>4</b>	Additional control shall be proposed when necessary
	Sudden body injuries due to excessive load weight.	First aid cases/medical treatment (M.C between 1 to 3 days),	Provide training/safety awareness; Closed supervision.	2	2	<b>4</b>	Additional control shall be proposed when necessary
Working in confined space	Physical injuries or death caused by hazardous atmosphere: asphyxiate, toxic gases, explosion.	Fatality or permanent disability or irreversible illness	Workers to wear proper PPE; Provide proper ventilation system; Work in buddy system; Closed supervision.	2	5	<b>10</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Sudden injuries due to prolonged bending over .	First aid cases/medical treatment (M.C between 1 to 3 days),	Workers wear proper PPE; Workers to take break where applicable.	2	2	<b>4</b>	Additional control shall be proposed when necessary

## HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

Name of Job :	Department :	Prepared By :	Checked By :-	Approved By :
<b>CONFINED WORK SPACE (Cont'd)</b>	<b>CONSTRUCTION</b>			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Working in confined space (Cont'd)	Heat stroke due to excessive heat and dehydration.	Near miss/ unsafe act/ unsafe condition	Workers to take a short break where applicable and drink more water; Provide proper ventilation system; Closed supervision.	3	1	<b>3</b>	Additional control shall be proposed when necessary
	Buried alive due to slope collapse/earth/solid material/fluid.	Fatality or permanent disability or irreversible illness	Workers to wear proper PPE; Provide lifeline communication system and work in buddy system; Closed supervision; Provide adequate slope protection.	2	5	<b>10</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Death due to inhalation of carbon monoxide.	Fatality or permanent disability or irreversible illness	Any machinery to be place outside; Provide proper ventilation system; Closed supervision.	2	5	<b>10</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
Inspection/ finished up and exit from confined space	Trip/fall/drop into manhole during inspection.	Fatality or permanent disability or irreversible illness	Provide warning signage; Closed supervision.	2	5	<b>10</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Buried by collapse ground or material.	Fatality or permanent disability or irreversible illness	Adequate slope protection; Safe excavation technique; Closed supervision.	2	5	<b>10</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Electrocuted by faulty wiring.	Fatality or permanent disability or irreversible illness	Workers wear proper PPE; Closed supervision.	2	5	<b>10</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Space constraint.	First aid cases/medical treatment (M.C between 1 to 3 days),	Training and proper planning of work; Provide safe working procedure.	2	2	<b>4</b>	Additional control shall be proposed when necessary
	Hit by moving object.	First aid cases/medical treatment (M.C between 1 to 3 days),	Workers wearing proper PPE; Provide safe working procedure.	2	2	<b>4</b>	Additional control shall be proposed when necessary

## HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

<b>Name of Job :</b>	<b>Department :</b>	<b>Prepared By :</b>	<b>Checked By :-</b>	<b>Approved By :</b>
<b>WELDING WORK</b>	<b>CONSTRUCTION</b>			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Mobilization/ unloading of welding equipment	Physical injuries caused by weight, sharp edges.	First aid cases/medical treatment (M.C between 1 to 3 days),	Workers wear proper PPE.	2	2	4	Additional control shall be proposed when necessary
	Physical injuries caused by falling cylinder.	First aid cases/medical treatment (M.C between 1 to 3 days),	Workers wear safety shoes; Provide safe handling procedure.	2	2	4	Additional control shall be proposed when necessary
	Environment pollution caused leaking gases.	First aid cases/medical treatment (M.C between 1 to 3 days),	Provide safe storage procedure; Provide maintenance schedule; Closed supervision.	2	2	4	Additional control shall be proposed when necessary
	Sudden injuries caused by excessive lifting and mishandling.	First aid cases/medical treatment (M.C between 1 to 3 days),	Provide safe handling/lifting procedure; Closed supervision.	2	2	4	Additional control shall be proposed when necessary
Welding process	Eyes injury caused by excessive flash light.	First aid cases/medical treatment (M.C between 1 to 3 days),	Workers wearing face shield/goggle; Provide only competent welder.	2	2	4	Additional control shall be proposed when necessary
	Gas inhalation/welding fume.	First aid cases/medical treatment (M.C between 1 to 3 days),	Wearing face mask and face shield; Provide safe working procedure; Provide proper ventilation/exhaust fan.	2	2	4	Additional control shall be proposed when necessary
	Explosion due to leaking cylinder/valve/hose.	Fatality or permanent disability or irreversible illness	Worker wear proper PPE; Provide safe working procedure; Provide warning signage; Proper maintenance schedule; Closed supervision.	1	5	5	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Body injuries due to burnt/hot surface.	Major injury/illness (Long absenteeism, M.C > 14 days).	Worker wear proper PPE; Provide safe working procedure.	2	4	8	Briefing By SHO on safety awareness. Additional control shall be made if necessary.

## HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

<b>Name of Job :</b>	<b>Department :</b>	<b>Prepared By :</b>	<b>Checked By :-</b>	<b>Approved By :</b>
<b>WELDING WORK (Cont'd)</b>	<b>CONSTRUCTION</b>			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Welding process (Cont'd)	Fire caused by improper welding procedure.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	Worker wears proper PPE; Provide safe working procedure; Provide fire extinguisher; Closed supervision.	2	2	4	Additional control shall be proposed when necessary
	Physical injuries caused by sharp objects.	First aid cases/medical treatment (M.C between 1 to 3 days),	Worker wear proper PPE; safe material handling.	2	2	4	Additional control shall be proposed when necessary
	Falling from height due to unstable platform.	Fatality or permanent disability or irreversible illness	Worker wearing safety harness; Provide safe working procedure; Provide safe working platform.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
Inspect and storage of welding set	Manual handling.	First aid cases/medical treatment (M.C between 1 to 3 days),	Training and regular toolbox talk; Closed supervision.	2	2	4	Additional control shall be proposed when necessary
	Material damage due to falling/mishandling during storage.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	Provide safe handling procedure; Provide a specific storage room.	2	2	4	Additional control shall be proposed when necessary
	Hand injury due to hot surface/platform.	First aid cases/medical treatment (M.C between 1 to 3 days),	Worker wear proper PPE; To ensure/wait till hot surface is cold.	2	2	4	Additional control shall be proposed when necessary
	Hit by moving object during transfer of equipment.	First aid cases/medical treatment (M.C between 1 to 3 days),	Provide safe working procedure; Closed supervision.	2	2	4	Additional control shall be proposed when necessary

## HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

<b>Name of Job :</b>	<b>Department :</b>	<b>Prepared By :</b>	<b>Checked By :-</b>	<b>Approved By :</b>
<b>MASONRY WORK</b>	<b>CONSTRUCTION</b>			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Transporting of material	Traffic collision.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	Competent and certified driver; Closed supervision.	2	2	4	Additional control shall be proposed when necessary
	Machinery breakdown.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	Regular maintenance and servicing.	2	2	4	Additional control shall be proposed when necessary
	Material overloading, falling and hit workers.	Minor injury/illness (M.C between 5 to 14 days)	Workers wear proper PPE; Closed supervision.	2	3	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
Unloading of material	Physical injuries due to hit by moving objects.	Fatality or permanent disability or irreversible illness	Workers wear proper PPE; Provide safe working procedure.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Physical injuries due to hit by falling objects.	Fatality or permanent disability or irreversible illness	Workers wear proper PPE; Provide safe working procedure.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Crane collapse due to unstable ground/platform or mishandling.	Fatality or permanent disability or irreversible illness	Provide a proper PMA certificate; Fully use outrigger platform.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Trip and fall due to poor housekeeping.	Major injury/illness (Long absenteeism, M.C > 14 days).	Provide good/save access and maintain good hours keeping.	2	4	8	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Manual handling due to improper lifting techniques.	Minor injury/illness (M.C between 5 to 14 days)	Use proper hand tools; Workers wear proper PPE.	2	3	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Physical injuries due to cut/pierce by sharp edge object.	Minor injury/illness (M.C between 5 to 14 days)	Workers wear proper PPE; Provide safe working procedure.	2	3	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.

## HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

<b>Name of Job :</b>	<b>Department :</b>	<b>Prepared By :</b>	<b>Checked By :-</b>	<b>Approved By :</b>
MASONRY WORK (Cont'd)	CONSTRUCTION			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Storage of material	Hit by falling object due to improper stacking.	First aid cases/medical treatment (M.C between 1 to 3 days),	Requirements proper stacking techniques.	2	2	4	Additional control shall be proposed when necessary
	Fall hazard due to mishandling during stacking.	First aid cases/medical treatment (M.C between 1 to 3 days),	To check safe condition of platform; Wear a proper PPE; Close supervision.	2	2	4	Additional control shall be proposed when necessary
	Sudden body injuries due to excessive lifting is carried out.	First aid cases/medical treatment (M.C between 1 to 3 days),	Allowed to carry only where one's can; Required assistant when needed; Use crane or lifting machinery.	2	2	4	Additional control shall be proposed when necessary
	Manual handling.	Near miss/ unsafe act/ unsafe condition	Training and regular toolbox talk; Closed supervision.	3	1	3	Additional control shall be proposed when necessary
Working environment	Material fall onto public vehicle/live lane/road.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	To properly cover the material/stacked it away from the edge.	3	2	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Heat stroke from prolonged exposure to sunlight and dehydration.	Near miss/ unsafe act/ unsafe condition	Workers wear hard hat; Workers encourage to take a short break where applicable.	3	1	3	Additional control shall be proposed when necessary
	Trip and fall due to poor housekeeping.	First aid cases/medical treatment (M.C between 1 to 3 days),	Provide good/save access and maintain good house keeping.	2	2	4	Additional control shall be proposed when necessary
	Dusty work environment.	First aid cases/medical treatment (M.C between 1 to 3 days),	Workers to wear proper PPE (i.e Face mask); Conduct housekeeping regularly.	3	2	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Falling from height.	Fatality or permanent disability or irreversible illness	To provide barrier at open space edge; Workers to wear safety harness; Closed supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Body injuries/cut caused by sharp object.	Minor injury/illness (M.C between 5 to 14 days)	Worker wears proper PPE.	2	3	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.

## HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

<b>Name of Job :</b>	<b>Department :</b>	<b>Prepared By :</b>	<b>Checked By :-</b>	<b>Approved By :</b>
MASONRY WORK (Cont'd)	CONSTRUCTION			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Working with material	Hit by falling object due to mishandling/slip/fall.	Fatality or permanent disability or irreversible illness	Provide safe working procedure; Closed supervision.	2	5	<b>10</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Dermatitis due to exposure to cement/mineral dust.	First aid cases/medical treatment (M.C between 1 to 3 days),	Worker wear gloves/face mask; Conduct housekeeping regularly.	3	2	<b>6</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Damage to equipment/material due to mishandling.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	Train worker for properly handling; Provide safe working procedure.	2	2	<b>4</b>	Additional control shall be proposed when necessary
	Fall from height due to unstable/collapse platform.	Fatality or permanent disability or irreversible illness	Provide safe working platform; To provide barrier at open space edge; Workers to wear safety harness; Closed supervision.	2	5	<b>10</b>	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Physical stress/repetitive work.	Near miss/ unsafe act/ unsafe condition	Worker to take a short break where applicable.	3	1	<b>3</b>	Additional control shall be proposed when necessary
	Environment pollution due to concrete and mineral dust.	Near miss/ unsafe act/ unsafe condition	Worker wear gloves/face mask; Conduct housekeeping regularly; Provide water spray system.	3	1	<b>3</b>	Additional control shall be proposed when necessary

## HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

<b>Name of Job :</b>	<b>Department :</b>	<b>Prepared By :</b>	<b>Checked By :-</b>	<b>Approved By :</b>
<b>LIFTING WORK</b>	<b>CONSTRUCTION</b>			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Transporting of lifting machinery	Traffic collision.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	Provide experience driver with legal driving license; Provide traffic man.	2	2	4	Additional control shall be proposed when necessary
	Machinery breakdown.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	Regular maintenance and servicing.	3	2	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Equipment/machinery falling onto public vehicle/road.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	To securely tighten up equipment/machinery before transporting; Provide warning signage.	2	2	4	Additional control shall be proposed when necessary
	Body injuries while handling or secure equipment/ machinery for transporting.	First aid cases/medical treatment (M.C between 1 to 3 days),	Provide safe working procedure; Training on machinery handling; Close supervision.	2	2	4	Additional control shall be proposed when necessary
Mobilization/ unloading machinery/ material	Physical injuries caused by fall/hit by moving object during lifting process.	Fatality or permanent disability or irreversible illness	Worker wear gloves and hard hat; Signalman monitored lifting process; Close supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Crane cable slipped or break during the lifting process.	Fatality or permanent disability or irreversible illness	Provide a proper PMA certificate; Signalman monitored lifting process; Close supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Damage to road surface due to crane sitting.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	Proper use of outrigger pad; Use of support platform.	3	2	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Struck by moving object due to unstable ground or mishandling.	Fatality or permanent disability or irreversible illness	Provide safe working procedure; Signalman monitored lifting process; Provide barrier and signage, Closed supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.

## HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

<b>Name of Job :</b>	<b>Department :</b>	<b>Prepared By :</b>	<b>Checked By :-</b>	<b>Approved By :</b>
<b>LIFTING WORK (Cont'd)</b>	<b>CONSTRUCTION</b>			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Working environment	Heat stroke from prolonged exposure to sunlight and dehydration.	Near miss/ unsafe act/ unsafe condition	Workers wear hard hat; Workers encourage taking a short break where applicable.	3	1	3	Additional control shall be proposed when necessary
	Sudden body injuries due to excessive lifting.	Near miss/ unsafe act/ unsafe condition	Allowed to carry only where one's can; Required assistant when needed; Use crane or lifting machinery.	3	1	3	Additional control shall be proposed when necessary
	Physical injuries caused by trip and fall during lifting and carrying material.	Minor injury/illness (M.C between 5 to 14 days)	Safe working procedure; Closed supervision.	2	3	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Space constraint.	Near miss/ unsafe act/ unsafe condition	Training and proper planning of work; Safe working procedure.	3	1	3	Additional control shall be proposed when necessary
Working with lifting/hoisting machinery.	Crane boom failure/collapse due to overloading.	Fatality or permanent disability or irreversible illness	Provide a proper PMA certificate; Signalman monitored lifting process; Close supervision; Provide barrier and signage.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Crane topple due to overweight/unstable ground.	Fatality or permanent disability or irreversible illness	Crane park at solid platform and outrigger support is fully used; Close supervision.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Manual handling.	First aid cases/medical treatment (M.C between 1 to 3 days),	Training and regular toolbox talk; Closed supervision.	2	2	4	Additional control shall be proposed when necessary
	Material damage due to falling/mishandling during storage.	Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000)	Provide safe handling procedure; Provide specific storage room.	2	3	6	Briefing By SHO on safety awareness. Additional control shall be made if necessary.

## HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

<b>Name of Job :</b>	<b>Department :</b>	<b>Prepared By :</b>	<b>Checked By :-</b>	<b>Approved By :</b>
<b>HANDTOOL WORK</b>	<b>CONSTRUCTION</b>			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Working environment	Space constraint.	First aid cases/medical treatment (M.C between 1 to 3 days),	Training and proper planning of work; Safe working procedure.	2	2	4	Additional control shall be proposed when necessary
	Physical injuries caused by swinging object and property damage.	First aid cases/medical treatment (M.C between 1 to 3 days), Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000).	Provide safe working procedure; Provide warning signage; Work in safe condition and space; Closed supervision.	2	2	4	Additional control shall be proposed when necessary
Working with hand tool	Physical injuries caused by weight/sharp object.	First aid cases/medical treatment (M.C between 1 to 3 days),	Workers wear gloves; Provide safe working procedure.	2	2	4	Additional control shall be proposed when necessary
	Electrocution due to faulty wiring.	Fatality or permanent disability or irreversible illness	Worker wear proper PPE, make sure all equipment free from defect.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.
	Injuries or damage due to excessive vibration (Jackhammer/hopper).	First aid cases/medical treatment (M.C between 1 to 3 days),	Provide training how to use hand tool; Provide safe working procedure; Closed supervision.	2	2	4	Additional control shall be proposed when necessary
	Eyes injury caused by flying object/debris of hand tools.	First aid cases/medical treatment (M.C between 1 to 3 days),	Provide safe working procedure; Workers wearing face shield / goggle; Provide only competent worker.	2	2	4	Additional control shall be proposed when necessary
	Physical stress/repetitive work.	Near miss/ unsafe act/ unsafe condition	Worker to take a short break where applicable.	3	1	3	Additional control shall be proposed when necessary
	Injuries or damage due to mishandling or use of tools.	First aid cases/medical treatment (M.C between 1 to 3 days),	Conduct training; Provide safe working procedure; Closed supervision.	2	2	4	Additional control shall be proposed when necessary
	Electrical hand toolbreakdown	Near miss/ unsafe act/ unsafe condition	Regular maintenance and servicing; Provide safe working procedure.	3	1	3	Additional control shall be proposed when necessary

## HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

<b>Name of Job :</b>	<b>Department :</b>	<b>Prepared By :</b>	<b>Checked By :-</b>	<b>Approved By :</b>
HANDTOOL WORK (Cont'd)	CONSTRUCTION			




HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Storage of hand tool	Physical injuries caused by weight/sharp objects.	First aid cases/medical treatment (M.C between 1 to 3 days),	Workers wear gloves; Provide safe working procedure.	2	2	4	Additional control shall be proposed when necessary
	Possible injuries from fall and or hit by falling hand tool.	First aid cases/medical treatment (M.C between 1 to 3 days),	Worker wear Proper PPE (i.e. Safety shoes).	2	2	4	Additional control shall be proposed when necessary
Working/office environment	Sudden injuries caused by excessive lifting and mishandling of files, table, boxes and files cabinet.	First aid cases/medical treatment (M.C between 1 to 3 days),	Provide safe handling/lifting procedure; Close supervision.	2	2	4	Additional control shall be proposed when necessary
	When dealing with people with unsound/unstable mind and being attack, verbally or physically abuse.	First aid cases/medical treatment (M.C between 1 to 3 days),	Inculcate team spirit in the office; Create a friendly office environment; Provide two way communication; Closed supervision.	2	2	4	Additional control shall be proposed when necessary
	Physical injuries and property damage caused by fire at company's floor or other floors.	First aid cases/medical treatment (M.C between 1 to 3 days), Minor damage (No or less disruption, repair cost > RM1,000 and < RM10,000).	Provide overload tripping device at main breaker and main switch; Provide fire extinguisher; Conduct ERP and fire drill training; Closed supervision.	2	2	4	Additional control shall be proposed when necessary
	Fall sick/fever/flu due to unstable room temperature.	First aid cases/medical treatment (M.C between 1 to 3 days),	Provide sweater; Air conditioning temperature to be set comfortably.	2	2	4	Additional control shall be proposed when necessary
	Vomiting and diarrhea due to food or water poisoning in the office.	First aid cases/medical treatment (M.C between 1 to 3 days),	Provide boiling water to all employees or visitor; To ensure cleanliness of pantry.	2	2	4	Additional control shall be proposed when necessary

## HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL

<b>Name of Job :</b>	<b>Department :</b>	<b>Prepared By :</b>	<b>Checked By :-</b>	<b>Approved By :</b>
HANDTOOL WORK (Cont'd)	CONSTRUCTION			

HAZARD IDENTIFICATION				RISK ASSESSMENT			Recommended Action/Additional Control
Job Activity	Hazard	Hazard Character	Current Risk Control	Probability	Severity	Risk	
Working/office environment (Cont'd)	Body injuries due to sitting for a very long period.	Near miss/ unsafe act/ unsafe condition	To ensure worker take a short break where applicable.	3	1	3	Additional control shall be proposed when necessary
	Allergic reactions or infections due to air contamination caused by rotten waste, fungi, bacteria and cigarette smoke.	Near miss/ unsafe act/ unsafe condition	Instruct building management to clean the air filter regularly; Impose NO SMOKING in the office.	2	1	2	Additional control shall be proposed when necessary
	Eyes injuries due to working in front of/looking at the computer for a very long period.	Near miss/ unsafe act/ unsafe condition	To ensure worker take a short break where applicable.	2	1	2	Additional control shall be proposed when necessary
	Electrocution due to short circuit or power leakage.	Fatality or permanent disability or irreversible illness	Provide overload tripping device at main breaker and main switch; Use SIRIM proven electrical appliances; Use only highly insulated electrical appliances.	2	5	10	Briefing By SHO on safety awareness. Additional control shall be made if necessary.

**HAZARD IDENTIFICATION, RISK ASSESSMENT & DETERMINING CONTROL**

Occurrence Probability(OP) ↓	Severity →					
	TRR	1	2	3	4	5
1	1	1	2	3	4	5
2	2	2	4	6	8	10
3	3	3	6	9	12	15
4	4	4	8	12	16	20
5	5	5	10	15	20	25
		Low risk				
		Medium risk				
		High risk				

REPORT OF  
“WORK ZONE MONITORING”

*For*

**GIRIDHAN METAL PVT. LTD.**

JAMURIA INDUSTRIAL ESTATE, P. O.: NANDI, P. S.: JAMURIA,  
PASCHIM BARDHAMAN, PIN : 713344, WEST BENGAL, INDIA.



*Conducted by*



**PIONEER SAFETY INDUSTRIES**

85, Bentinck Street, 5<sup>th</sup> Floor, Kolkata 700 001.

Mobile : 9433120475

E-mail : [pioneersafetyindustries@gmail.com](mailto:pioneersafetyindustries@gmail.com) / [subhrodaspioneer@rediffmail.com](mailto:subhrodaspioneer@rediffmail.com)

## *Acknowledgement*

We express our sincere thanks to the management and employees of **GIRIDHAN METAL PVT. LTD.** for their manufacturing plant situated at **JAMURIA INDUSTRIAL ESTATE, P. O.: NANDI, P. S.: JAMURIA, PASCHIM BARDHAMAN, PIN : 713 344, WEST BENGAL, INDIA** for their co-operation and total help without which **WORK ZONE MONITORING** could not have been possible. The courtesy and cordiality extended to the audit team is highly appreciated.

**PIONEER SAFETY INDUSTRIES**



**INTRODUCTION :**

GIRIDHAN METAL PVT. LTD. for their manufacturing plant situated at JAMURIA INDUSTRIAL ESTATE, P.O.: NANDI, P.S.: JAMURIA, PASCHIM BARDHAMAN, PIN : 713 344, WEST BENGAL, INDIA requested to PIONEER SAFETY INDUSTRIES to conduct the survey of work environment monitoring at their works for assessment of Air borne contaminates accordingly the monitoring (as per your scope the said job) was completed as per requirement of Factories Rules. The entire site examinations were completed on 03.06.2024 results of the monitoring have reported.

**STANDARDS :**

Factories Acts 1948, under Sec7A (2)e  
West Bengal Factories Rules 1958. Rules 13(B)2

**SCOPE OF WORK :**

Heat Stress.

**Date of Inspection : 03.06.2024**

**OBSERVATION :**

Results as mention in which are annexed herewith reveal the under noted. Heat Stress have been found to be within permission limit in general.



**INSTRUMENT USED :**

- Globe Thermometer
- Digital Anemometer
- Dry & wet Bulb

**RECOMMENDATION :**


- Working personal should be protected with suitable safety appliances for protection against dust and gases.
- Periodical assessment of the work environment is suggested for better control of work zone environment and protection of working personnel.
- Advised the working personal to use PPEs DUST MUSK, EAR MUFF AND EARPLUG at high noise zone.



Register Containing particular of monitoring of work environment required under section 7-A (2)(E) of the Act

Name of the Factory : GIRIDHAN METAL PVT. LTD.  
 Factory Address : JAMURIA INDUSTRIAL ESTATE, P.O.: NANDI, P.S.: JAMURIA, PASCHIM BARDHAMAN, PIN - 713344, WEST BENGAL, INDIA  
 Particulars of sampling : HEAT STRESS

Location/ Operation monitored	Identified Contaminates	Date of Monitoring	Air borne Contaminates				TWA Contaminates as given in Schedule-II	Sampling instrument used and method	Number of workers exposed at the location being monitored		Remarks	Signature of Persons taking samples	Name (in block letters)
			No. of Reading	Unit	Range	Average			Continuous Exposure	Short time Exposure			
DRI KILN PLATFORM NO - 1 (SRT AREA)	Heat Stress	03.06.2024	4	OC	28.7	29.3	31 OC	Globe and Wet Bulb thermometer	04	02	Below TLV	AS MS	BHOLANATH SAMANTA MANOJ JANA
					29.2								
					29.4								
					29.7								
DRI KILN PLATFORM NO - 2 (GRT AREA)	Heat Stress	03.06.2024	4	OC	29.1	29.5	31 OC	Globe and Wet Bulb thermometer	04	02	Below TLV	AS MS	BHOLANATH SAMANTA MANOJ JANA
					29.4								
					29.6								
					29.8								
FERRO FURNACE FLOOR	Heat Stress	03.06.2024	4	OC	28.4	29.0	31 OC	Globe and Wet Bulb thermometer	06	02	Below TLV	AS MS	BHOLANATH SAMANTA MANOJ JANA
					28.7								
					29.2								
					29.6								
FERRO TAPPING AREA	Heat Stress	03.06.2024	4	OC	27.7	28.1	31 OC	Globe and Wet Bulb thermometer	07	02	Below TLV	AS MS	BHOLANATH SAMANTA MANOJ JANA
					27.9								
					28.3								
					28.6								

Name of Field Supervisor : M. Basak M. Sc. Signature of Field Supervisor : 

  
 (Authorised Signatory)  
 SK. ABDUL FARUK  
 B. Tech (Chemical)



NB: TLV: Threshold Limit Values

**Form 30**  
**Register Containing particular of monitoring of work environment required under section 7-A (2)(E) of the Act**

Name of the Factory : GIRIDHAN METAL PVT. LTD.  
 Factory Address : JAMURIA INDUSTRIAL ESTATE, P.O.: NANDI, P.S.: JAMURIA, PASCHIM BARDHAMAN, PIN - 713344, WEST BENGAL, INDIA  
 Particulars of sampling : HEAT STRESS

Location/ Operation monitored	Identified Contaminates	Date of Monitoring	Air borne Contaminates				TWA Contaminates as given in Schedule-II	Sampling instrument used and method	Number of workers exposed at the location being monitored		Remarks	Signature of Persons taking samples	Name (in block letters)
			No. of Reading	Unit	Range	Average			Continuous Exposure	Short time Exposure			
SMS FURNACE FLOOR	Heat Stress	03.06.2024	4	OC	28.5	29.0	31 OC	Globe and Wet Bulb thermometer	12	02	Below TLV		BHOLANATH SAMANTA MANOJ JANA
					28.8								
					29.1								
					29.4								
CCM FLOOR	Heat Stress	03.06.2024	4	OC	25.3	26.0	31 OC	Globe and Wet Bulb thermometer	10	03	Below TLV		BHOLANATH SAMANTA MANOJ JANA
					25.7								
					26.4								
					26.7								
CPP (CFBC 0 Mtr.)	Heat Stress	03.06.2024	4	OC	23.8	24.3	31 OC	Globe and Wet Bulb thermometer	08	01	Below TLV		BHOLANATH SAMANTA MANOJ JANA
					24.1								
					24.5								
					24.8								
TG FLOOR	Heat Stress	03.06.2024	4	OC	24.5	25.1	31 OC	Globe and Wet Bulb thermometer	03	01	Below TLV		BHOLANATH SAMANTA MANOJ JANA
					24.9								
					25.2								
					25.6								

Name of Field Supervisor	M. Bouck M. SC	Signature of Field Supervisor	
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NB: TLV: Threshold Limit Values



(Authorised Signatory)  
 SK. ABDUL FARUK  
 B. Tech (Chemical)

Register Containing particular of monitoring of work environment required under section 7-A (2)(E) of the Act

Name of the Factory : GIRIDHAN METAL PVT. LTD.  
 Factory Address : JAMURIA INDUSTRIAL ESTATE, P.O.: NANDI, P.S.: JAMURIA, PASCHIM BARDHAMAN, PIN - 713344, WEST BENGAL, INDIA  
 Particulars of sampling : HEAT STRESS

Location/ Operation monitored	Identified Contaminates	Date of Monitoring	Air borne Contaminates				TWA Contaminates as given in Schedule-II	Sampling instrument used and method	Number of workers exposed at the location being monitored		Remarks	Signature of Persons taking samples	Name (in block letters)
			No. of Reading	Unit	Range	Average			Continuous Exposure	Short time Exposure			
ROLLING MILL COLD SEAR	Heat Stress	03.06.2024	4	°C	27.1	27.9	31 °C	Globe and Wet Bulb thermometer	10	03	Below TLV	<i>MB BS</i>	BHOLANATH SAMANTA MANOJ JANA
					27.6								
					28.3								
					28.5								
ROLLING MILL BILLET CHAIN TRANSFER AREA	Heat Stress	03.06.2024	4	°C	27.6	28.1	31 °C	Globe and Wet Bulb thermometer	20	06	Below TLV	<i>MB BS</i>	BHOLANATH SAMANTA MANOJ JANA
					27.8								
					28.3								
					28.5								

Name of Field Supervisor : M. Basak M. Sc. Signature of Field Supervisor : *MB*

NB: TLV: Threshold Limit Values

*SK. Abdul Fawaz*  
 (Authorised Signatory)  
 SK. ABDUL FARUK  
 B. Tech (Chemical)



TABLE 1

Threshold Limit Values for Heat Stress Exposure as per Occupational Safety and Health Administration				
% Work	Workload			
	Light	Moderate	Heavy*	Very Heavy*
75 to 100% (Continuous)	31.0°C	28.0°C	N/A	N/A
50 to 75%	31.0°C	29.0°C	27.5°C	N/A
25 to 50%	32.0°C	30.0°C	29.0°C	28.0°C
0 to 25%	32.5°C	31.5°C	30.5°C	30.0°C

\*Criteria values are not provided for Heavy/Very Heavy work for continuous and 25% rest because of the extreme physical strain. Detailed job hazard analyses and physiological monitoring should be used for these cases rather than these screening criteria.

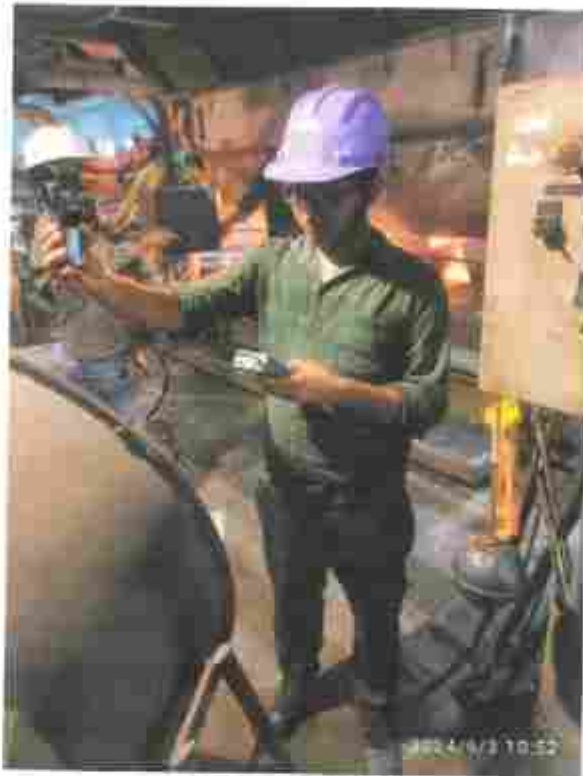


## *Acknowledgement*

The Team is grateful to the management and employees of **GIRIDHAN METAL PVT. LTD.** for their manufacturing plant situated **JAMURIA INDUSTRIAL ESTATE, P. O.: NANDI, P. S.: JAMURIA, PASCHIM BARDHAMAN, PIN – 713344, WEST BENGAL, INDIA** for extending their full corporation during the period of conducting the examination.



PHOTOGRAPHS OF WORK ZONE MONITORING



CCM FLOOR



CPP (CFBC 0 METER)



PHOTOGRAPHS OF WORK ZONE MONITORING



DRI KILN PLATFORM NO - 1 (QRT AREA)



DRI KILN PLATFORM NO - 2 (QRT AREA)



PHOTOGRAPHS OF WORK ZONE MONITORING



**FERRO FURNACE FLOOR**



**FERRO TAPING AREA**



PHOTOGRAPHS OF WORK ZONE MONITORING



**FERRO FURNACE FLOOR**



**FERRO TAPING AREA**



PHOTOGRAPHS OF WORK ZONE MONITORING



**ROLLING MILL BILLET CHAIN TRANSFER AREA**



**ROLLING MILL COLD SEAR**



PHOTOGRAPHS OF WORK ZONE MONITORING



**ROLLING MILL BILLET CHAIN TRANSFER AREA**



**ROLLING MILL COLD SEAR**



PHOTOGRAPHS OF WORK ZONE MONITORING



**SMS FURNACE**



**TG FLOOR**

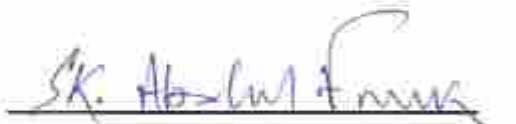


## *Conclusion*

On the basis of the assessment of the hazard control arrangement as noted under various parts and considering the observations on the Work Zone Monitoring as stated when concluded it is found that sincere attention is paid by the management for the safety and health of its employees.

However, it may please be noted that there is always a scope of further improvement.

**Audited by -**

  
( *Authorised Signatory* )  
SK. ABDUL FARUK  
B. Tech (Chemical)



*Prepared by : -*



PIONEER SAFETY INDUSTRIES

## **PIONEER SAFETY INDUSTRIES**

### **COMPETENT AUTHORITY**

**Approved by Chief Inspector of Factories, Govt. of West Bengal under  
Factories Act Under Section 21 (2), 28, 29, 31 and 36 (6 & 112) of the  
Factories Act**

**SAFETY AUDIT, ELECTRICAL SAFETY AUDIT, WORK ZONE  
MONITORING, JOB SAFETY ANALYSIS, HIRA / HAZOP STUDY,  
STABILITY TEST & CERTIFICATION, FIRE SAFETY CERTIFICATION,  
SAFETY TRAINING, NDT AND DP TEST**

**: OFFICE :**

**"YASHODA BUSINESS CENTRE", 85, Bentinck Street, 5<sup>th</sup> Floor,  
Room No. 9, Kolkata - 700 001.**

**Mobile : 8583992136 / 7003065634 / 9433120475**

**E-mail : [pioneersafetyindustries@gmail.com](mailto:pioneersafetyindustries@gmail.com)**



## DEPARTMENT OF LABORATORY SERVICES

<b>Patient Name</b>	MR. GOUTAM BOURI	<b>Lab No</b>	1242238
<b>UHID</b>	319882	<b>Sample Date</b>	22/09/2023 11:56AM
<b>Age/Gender</b>	33 Yrs/Male	<b>Receiving Date</b>	22/09/2023 12:08PM
<b>Bed No/Ward</b>	OPD	<b>Report Date</b>	22/09/2023 3:45PM
<b>Referred By</b>		<b>Report Status</b>	Final
<b>Prescribed By</b>	Dr. Self		
<b>Collected At</b>	Healthworld Hospitals, City Centre, Durgapur - 16	<b>Processed At</b>	Lab-Healthworld Hospitals,Durgapur-16

Test Name	Result	Unit	Bio. Ref. Range	Method
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### Haematology

#### CBC Haemogram, Blood

Sample: EDTA Whole Blood

Hemoglobin	13.8	g/dL	13.0 - 16.0	Cyanide-free sodium lauryl sulfate (SLS)
Red Blood Cell [RBC] Count	<b>5.90</b>	$10^6/\mu\text{L}$	4.50 - 5.50	Electrical resistant impedance
Packed cell volume [PCV]/Haematocrit [HCT]	44.5	%	36.0 - 46.0	Manually Calculated
MCV	<b>75.3</b>	fL	83.0 - 101.0	Manually Calculated
MCH	<b>23.4</b>	pg	27.0 - 32.0	Manually Calculated
MCHC	<b>31.1</b>	g/dL	31.5 - 34.5	Manually Calculated
RDW CV	<b>15.6</b>	%	11.5 - 15.0	Calculated
Erythrocyte Sedimentation Rate [ESR]	08	mm/hr	0 - 10	Modified westergren tube
Platelet count	224	$10^3/\mu\text{L}$	150 - 410	Electrical resistant impedance
Total Leucocyte Count [TLC]	6.70	$10^3/\mu\text{L}$	4.00 - 10.00	Fluorescence flow cytometry
<b>DLC</b>				
Neutrophils	56	%	40 - 80	Electrical impedance & Diff channel scattergram
Lymphocytes	33.1	%	20 - 40	Electrical impedance & Diff channel scattergram
Monocytes	5.2	%	2.0 - 10.0	Electrical impedance & Diff channel scattergram
Eosinophils	5.1	%	1 - 6	Electrical impedance & Diff channel scattergram
Basophils	0.6	%	0 - 1	Electrical impedance & Diff channel scattergram
Neutrophil-to-Lymphocyte ratio [NLR]	1.69			Calculated

\*\*End Of Report\*\*

*Vandana Raut*

Dr. Vandana Raut

MBBS, MD (Pathology), Senior Consultant - Lab Services,  
Reg No: 80135 (WBMC)

- \* Content of this report is only an opinion not the diagnosis. Please correlate clinically.
- \* Report shall not be reproduced except in full and with written approval from the Concern Department.
- \* For amended reports, the contents are final and supersede the recalled report.

Printed at 22/09/2023 16:41 Page: 1 Of 3

A Unit of Parashmani Medical Centre Pvt. Ltd.

Croutam Bowri

33/m




UHID :- 319882

Date :- 22.09.23

VA  $\left\{ \begin{array}{l} 6/6 - N6 \\ 6/6 - N6 \end{array} \right.$

Colour vision - NORMAL.

WNL

  
22.9.23



## DEPARTMENT OF LABORATORY SERVICES

<b>Patient Name</b>	MR. GOUTAM BOURI	<b>Lab No</b>	1242238
<b>UHID</b>	319882	<b>Sample Date</b>	22/09/2023 11:56AM
<b>Age/Gender</b>	33 Yrs/Male	<b>Receiving Date</b>	22/09/2023 12:08PM
<b>Bed No/Ward</b>	OPD	<b>Report Date</b>	22/09/2023 2:03PM
<b>Referred By</b>		<b>Report Status</b>	Final
<b>Prescribed By</b>	Dr. Self		
<b>Collected At</b>	Healthworld Hospitals, City Centre, Durgapur-16	<b>Processed At</b>	Lab-Healthworld Hospitals,Durgapur-16

Test Name	Result	Unit	Bio. Ref. Range	Method
<b>Clinical Biochemistry</b>				
<b>Glucose Random [R]</b>				Sample: Plasma (fluoride)
Glucose R	92.4	mg/dL	70 - 140	
<b>Serum Creatinine</b>				Sample: Serum
Serum Creatinine	0.92	mg/dL	0.67 - 1.20	Jaffe, Kinetic

\*\*End Of Report\*\*

**Dr. Moushumi Lodh**

**MBBS,MD (Biochemistry), MHA, Executive Director- Lab Services,Healthworld Hospitals,Reg No: 71993 (WBMC)**

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## DEPARTMENT OF LABORATORY SERVICES

<b>Patient Name</b>	MR. GOUTAM BOURI	<b>Lab No</b>	1242238
<b>UHID</b>	319882	<b>Sample Date</b>	22/09/2023 11:56AM
<b>Age/Gender</b>	33 Yrs/Male	<b>Receiving Date</b>	22/09/2023 12:18PM
<b>Bed No/Ward</b>	OPD	<b>Report Date</b>	22/09/2023 4:29PM
<b>Referred By</b>		<b>Report Status</b>	Final
<b>Prescribed By</b>	Dr. Self		
<b>Collected At</b>	Healthworld Hospitals, City Centre, Durgapur - 16.	<b>Processed At</b>	Lab-Healthworld Hospitals,Durgapur-16

Test Name	Result	Unit	Bio. Ref. Range	Method
-----------	--------	------	-----------------	--------

### Clinical Pathology

#### Urine Routine Examination

Sample: Urine

#### Physical Examination:

Colour:-	Pale Yellow		Pale Yellow
Volume:	35	ml.	
Appearance:	Clear		

#### Chemical Examination:

pH:-	6.0		4.5 - 8.0	Strip Test
Specific Gravity:	1.010		1.015 - 1.030	Strip Test
Protein:	NEGATIVE		NEGATIVE	Strip test / Sulphosalicylic acid
Glucose:	NEGATIVE		NEGATIVE	Strip test / Benedict's
Ketone:	NEGATIVE		NEGATIVE	Strip test / Notheras
Urobilinogen	NEGATIVE			
Bilirubin:	NEGATIVE		NEGATIVE	Strip test / Fouchet's test
Nitrite:	NEGATIVE		NEGATIVE	Strip Test
Hb / Erythrocytes	NEGATIVE			

#### Microscopic Examination:

Leukocytes:	0-3/HPF		Less than 5/HPF	Light microscopy
Epithelial Cells :	Occasional/HPF		Few /HPF	Light microscopy
RBC:	Nil/HPF		0-2 /HPF	Light microscopy
Crystals:	Nil		NIL	Light microscopy
Casts:	Nil		NIL	Light microscopy

\*\*End Of Report\*\*

*Devashis Mandal*

**Dr. Devashis Mandal**

**MBBS, MD (Pathology), Consultant - Lab Services, Reg No: 66456 (WBMC)**

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A Unit of Parashmani Medical Centre Pvt. Ltd.

Address: Plot No. C-49, Commercial Area, Opp. ESIC Regional Office, City Centre, Durgapur-713216, Dist. - Paschim Bardhaman, West Bengal, India  
 Website: www.healthworldhospitals.com, Email: info@hwilac.com, CIN: L85100WB2014PTC201736 PAN: AAHCR6273G  
 For any query, H. Call: 8170055555 / 8170066666 / 0343-2542755; For Ambulance, Call: 8170052660  
 For Blood Collection from Home, Contact: 8170052815 (Durgapur), 8170032700 (Avanadi), 8170052680 (Dhanbad)

# HEALTHWORLD HOSPITALS

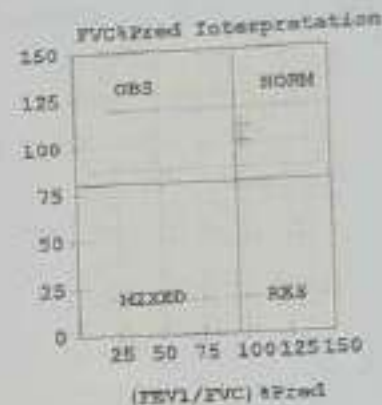
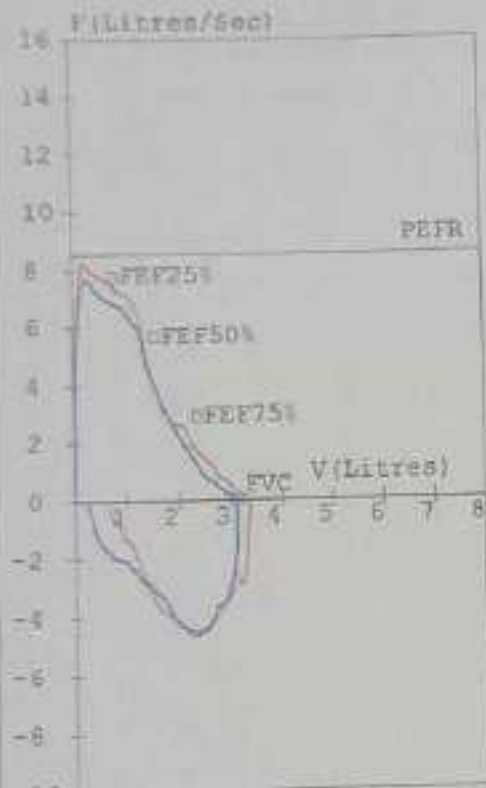
G-49, COMMERCIAL AREA, CITY CENTRE, DURGAPUR-713216, WB.



Patient: MR GOUTAM BOURI  
 Refd. By: SELF  
 Prod. Equip: RECORDERS  
 Date: 22-Sep-2023 01:44 PM

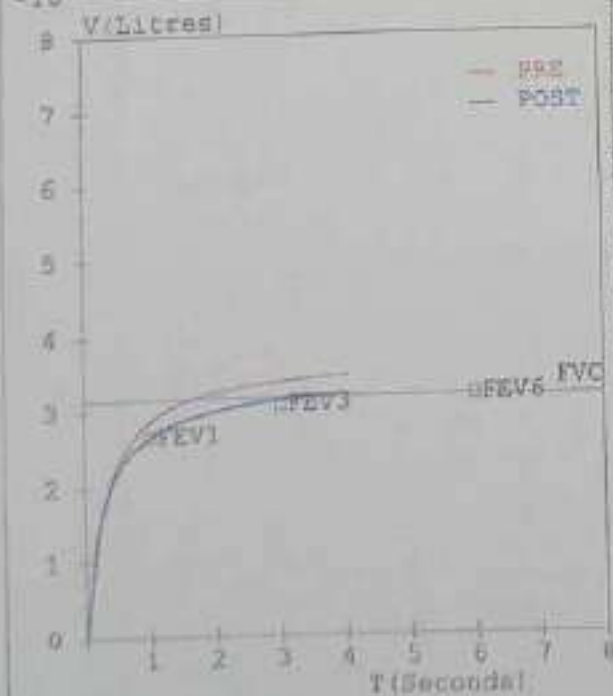
Age: 33 Yrs  
 Height: 162 Cms  
 Weight: 57 Kgs  
 ID: 319882

Gender: Male  
 Smoker: No  
 Eth. Corr: 100  
 Temp: :



### FVC Results

Parameter	Unit	Pred	M.Pre	%Pred	M.Post	%Pred	%Imp
FVC	(L)	03.15	03.43	109	03.19	101	-07
FEV1	(L)	02.66	02.86	108	02.67	100	-07
FEV1/FVC	(%)	84.44	83.38	099	83.70	099	---
FEF25-75	(L/s)	04.10	02.91	071	02.93	071	+01
PEFR	(L/s)	08.53	08.18	096	07.59	089	-07
FIVC	(L)	-----	02.80	---	02.93	---	+05
FEV.5	(L)	-----	02.27	---	02.19	---	-04
FEV3	(L)	03.05	03.36	110	03.12	102	-07
PIFR	(L/s)	-----	04.52	---	04.65	---	+03
FEF75-85	(L/s)	-----	00.86	---	00.73	---	-15
PEF.2-1.2	(L/s)	06.96	07.31	105	06.75	097	-08
PEF 25%	(L/s)	07.74	07.17	093	06.71	087	-06
PEF 50%	(L/s)	05.62	03.01	054	03.68	065	+22
PEF 75%	(L/s)	02.90	01.34	046	01.10	038	-18
FEV.5/FVC	(%)	-----	66.18	---	66.65	---	+04
FEV3/FVC	(%)	95.83	97.96	101	97.81	101	---
FET	(Sec)	-----	04.21	---	04.26	---	---
ExptTime	(Sec)	-----	00.03	---	00.03	---	---
Lung Age	(Yrs)	033	030	091	033	100	+10
FEV6	(L)	03.15	-----	---	-----	100	---
FIF25%	(L/s)	-----	00.27	---	03.75	---	+1289
FIF50%	(L/s)	-----	04.16	---	04.14	---	+00
FIF75%	(L/s)	-----	04.28	---	02.58	---	-40



Pre Medication Report Indicates Spirometry within normal limits as (FEV1/FVC)%Pred >95 and FVC%Pred >80  
 Post Medication Report Indicates Spirometry within normal limits as (FEV1/FVC)%Pred >95 and FVC%Pred >80

DR. RAMPRASAD GORAI

DOB 1990-03-03  
33 Y

HEALTHWORLD HOSPITALS

319882

Goutam Bourl

R



2024-09-22 12:36:32  
045774

HEALTHWORLD HOSPITAL

Mr. Goutam Boun, 33 years  
ID: 316882

Male

Technician  
Ordering Ph  
Referring Ph  
Attending Ph

QRS : 76 ms  
QT / QTcBaz : 360 / 402 ms  
PR : 138 ms  
P : 94 ms  
RR / PP : 804 / 800 ms  
P / QRS / T : 46 / 50 / 3 degrees

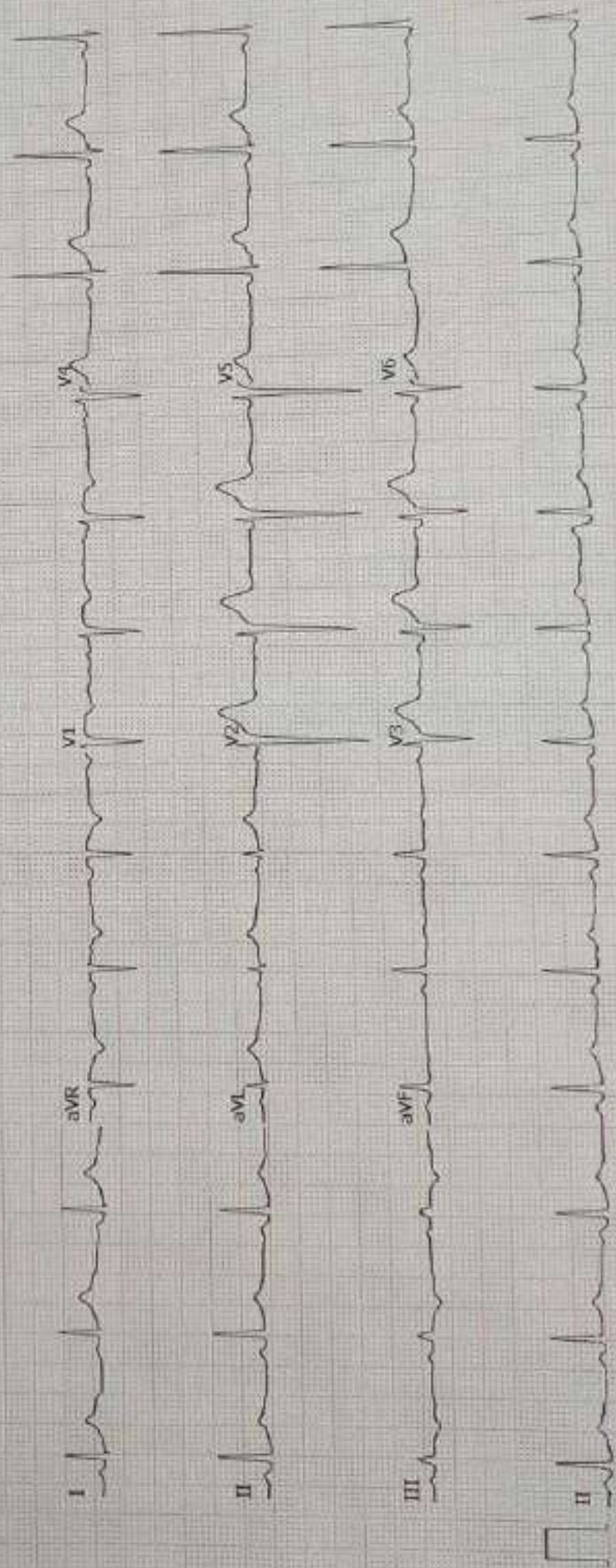
Normal sinus rhythm  
Normal ECG

22.09.2023 12:57:54  
HealthWoods Hospital  
Gandhi More  
Durgapur

Location  
Order Number  
Vital  
Indication  
Medication 1  
Medication 2  
Medication 3

Floor:

75 bpm  
- / - mmHg





# HEALTHWORLD HOSPITALS

C-49, Commercial Area, City Centre, Durgapur - 713216

Patient ID : 443

Name : GOUTAM BOURI

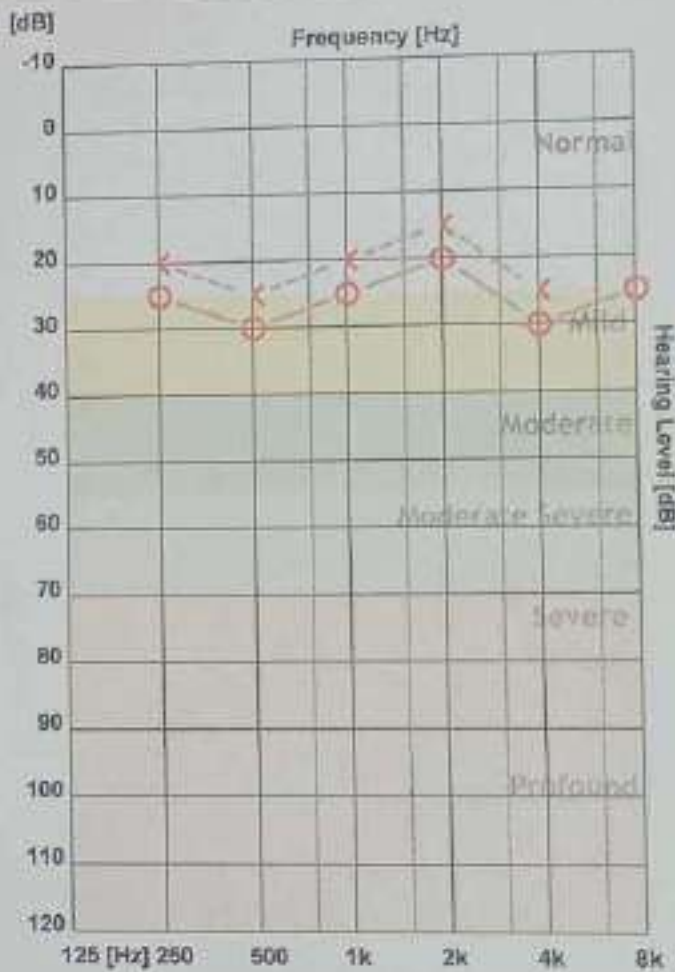
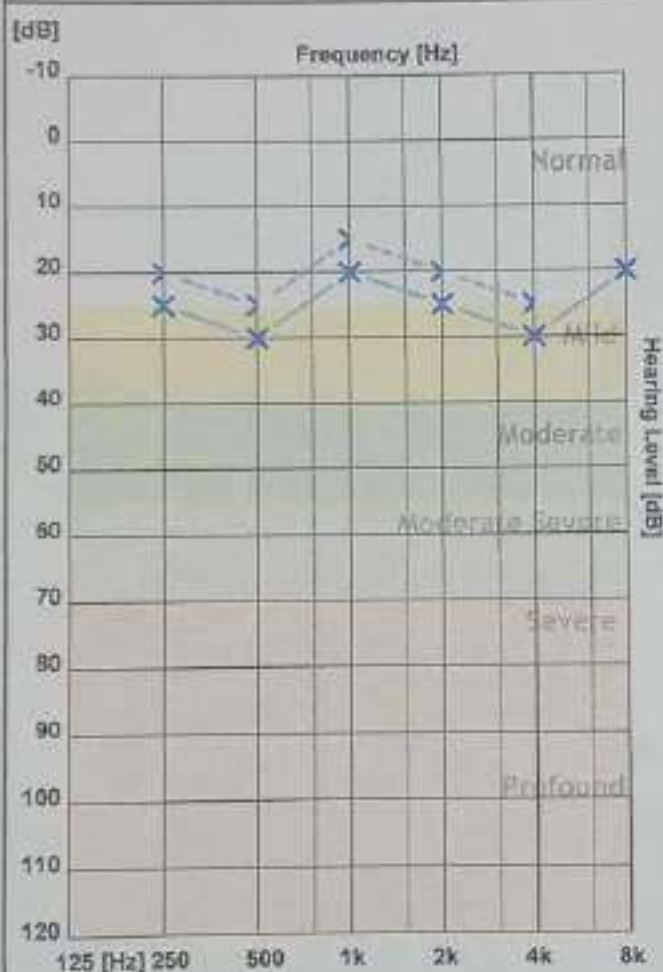
CR Number : 20230922141732

Registration Date : 22-Sep-2023

Age : 33

Gender : Male

Operator : HEALTHWORLD HOSPITAL



	125 Hz	250 Hz	500 Hz	750 Hz	1000 H	1500 H	2000 H	3000 H	4000 H	6000 H	8000 H
X - Air Left		25	30		20		25		30		20
O - Air Right		25	30		25		20		30		25
[- Bone Left		20	25		15		20		25		
]- Bone Right		20	25		20		15		25		

	Average	High	Mid	Low
AIR Left	25.00 dB	25.00 dB	25.00 dB	25.00 dB
AIR Right	25.00 dB	25.00 dB	25.00 dB	26.67 dB

**Clinical Notes :**

ANNUAL HEALTH CHECK UP

PTA

RIGHT EAR: 25 dB (N.R: Upto 25 dB)

LEFT EAR: 25 dB (N.R: Upto 25 dB)

BILATERAL NORMAL HEARING SENSITIVITY.

Dr. BISWAJIT BANIK  
MBBS, MS (ENT)  
Senior Consultant - ENT  
Reg No.: 88916 (WBMC)



## DEPARTMENT OF LABORATORY SERVICES

<b>Patient Name</b>	MR. SATYENDRA PAL SINGH	<b>Lab No</b>	1242231
<b>UHID</b>	319879	<b>Sample Date</b>	22/09/2023 11:53AM
<b>Age/Gender</b>	48 Yrs/Male	<b>Receiving Date</b>	22/09/2023 12:05PM
<b>Bed No/Ward</b>	OPD	<b>Report Date</b>	22/09/2023 3:42PM
<b>Referred By</b>		<b>Report Status</b>	Final
<b>Prescribed By</b>	Dr. Self	<b>Processed At</b>	Lab-Healthworld Hospitals,Durgapur-16
<b>Collected At</b>	Healthworld Hospitals, City Centre, Durgapur - 16		

Test Name	Result	Unit	Bio. Ref. Range	Method
<b>Haematology</b>				
<b>CBC Haemogram, Blood</b>				
Sample: EDTA Whole Blood				
Hemoglobin	13.8	g/dL	13.0 - 16.0	Cyanide-free sodium lauryl sulphate (SLS)
Red Blood Cell [RBC] Count	4.50	10 <sup>6</sup> /μL	4.50 - 5.50	Electrical resistant impedance
Packed cell volume [PCV]/Haematocrit [HCT]	43.4	%	36.0 - 46.0	Manual/ Calculated
MCV	96.6	fL	83.0 - 101.0	Manual/ Calculated
MCH	30.6	pg	27.0 - 32.0	Manual/ Calculated
MCHC	31.7	g/dL	31.5 - 34.5	Manual/ Calculated
RDW CV	13.5	%	11.5 - 15.0	Calculated
Erythrocyte Sedimentation Rate [ESR]	10	mm/hr	0 - 10	Modified westergren tube
Platelet count	129	10 <sup>3</sup> /μL	150 - 410	Electrical resistant impedance
Total Leucocyte Count [TLC]	4.45	10 <sup>3</sup> /μL	4.00 - 10.00	Fluorescence flow cytometry
<b>DLC</b>				
Neutrophils	47	%	40 - 80	Electrical impedance & Diff channel scattergram
Lymphocytes	45.5	%	20 - 40	Electrical impedance & Diff channel scattergram
Monocytes	5.0	%	2.0 - 10.0	Electrical impedance & Diff channel scattergram
Eosinophils	1.9	%	1 - 6	Electrical impedance & Diff channel scattergram
Basophils	0.6	%	0 - 1	Electrical impedance & Diff channel scattergram
Neutrophil-to-Lymphocyte ratio [NLR]	1.03			Calculated

\*\*End Of Report\*\*

*Vandana Raut*

Dr. Vandana Raut

**MBBS, MD (Pathology), Senior Consultant - Lab Services,  
Reg No: 80135 (WBMC)**

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**A Unit of Parashmani Medical Centre Pvt. Ltd.**

Satyendra Pal Singh  
48/M



UHID: - 319879.

Date: - 22.09.23

VA  $\left\{ \begin{array}{l} 6/6 \\ 6/6 \end{array} \right.$

Refr

Colour vision - NORMAL.



**DEPARTMENT OF LABORATORY SERVICES**

<b>Patient Name</b>	MR. SATYENDRA PAL SINGH	<b>Lab No</b>	1242231
<b>UHID</b>	319879	<b>Sample Date</b>	22/09/2023 11:53AM
<b>Age/Gender</b>	48 Yrs/Male	<b>Receiving Date</b>	22/09/2023 12:05PM
<b>Bed No/Ward</b>	OPD	<b>Report Date</b>	22/09/2023 2:03PM
<b>Referred By</b>		<b>Report Status</b>	Final
<b>Prescribed By</b>	Dr. Self	<b>Processed At</b>	Lab-Healthworld Hospitals_Durgapur-16
<b>Collected At</b>	Healthworld Hospitals, City Centre, Durgapur - 16		

Test Name	Result	Unit	Bio. Ref. Range	Method
<b>Clinical Biochemistry</b>				
<b>Glucose Random [R]</b>				Sample: Plasma (fluoride)
Glucose R	83.8	mg/dL	70 - 140	
<b>Serum Creatinine</b>				Sample: Serum
Serum Creatinine	0.94	mg/dL	0.67 - 1.20	Jaffe, Kinetic

\*\*End Of Report\*\*

**Dr. Moushumi Lodh**  
MBBS, MD (Biochemistry), MHA, Executive Director- Lab Services, Healthworld Hospitals, Reg No: 71993 (WBMC)

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DOB: 1975-06-15  
48 Y

**R**

HEALTHWORLD HOSPITALS  
219879  
Satyendra Pal Singh



12-4020

HEALTHWORLD HOSPITAL

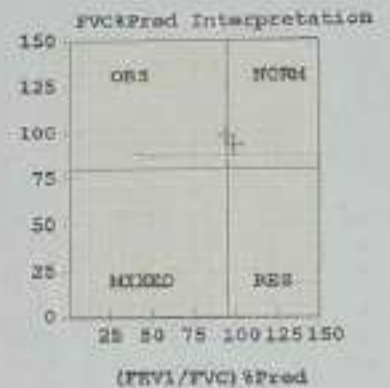
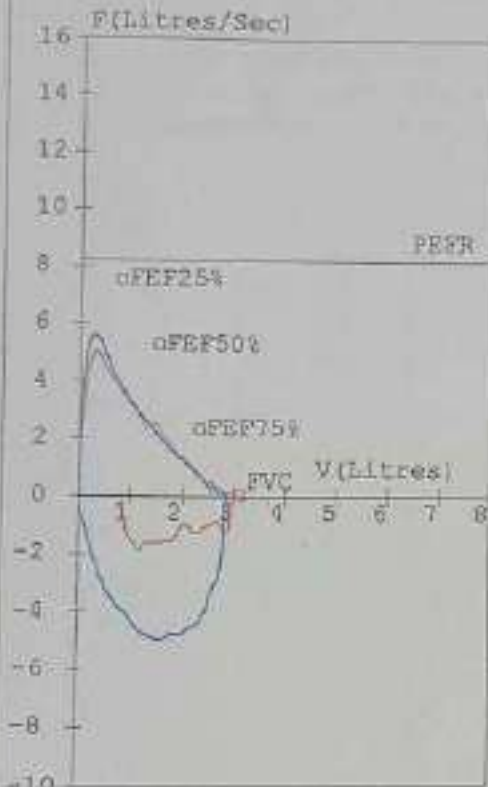
# HEALTHWORLD HOSPITALS

C-49, COMMERCIAL AREA, CITY CENTRE, DURGAPUR-713216, WB.

Patient: MR SATYENDRA PAL SINGH  
 Refd. By: SELF  
 Pred. Eqns: RECORDERS  
 Date : 22-Sep-2023 01:52 PM

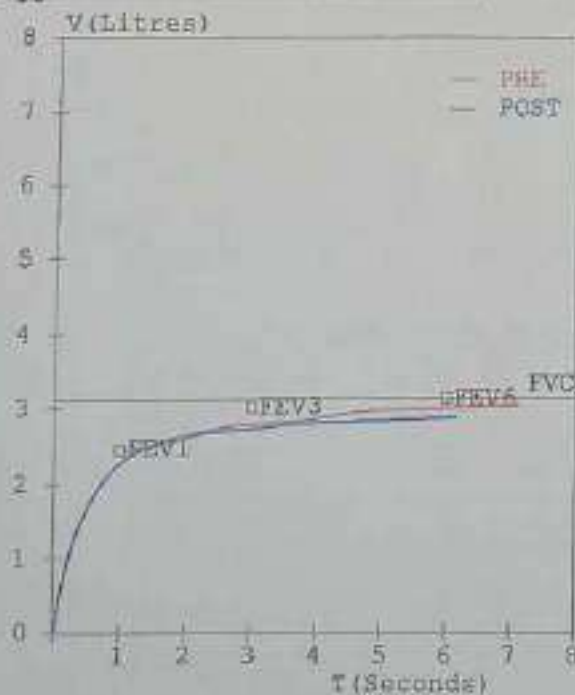
Age : 48 Yrs  
 Height : 165 Cms  
 Weight : 55 Kgs  
 ID : 319879

Gender : Male  
 Smoker : No  
 Eth. Corr: 100  
 Temp :



### FVC Results

Parameter	Pred	M.Pre	%Pred	M.Post	%Pred	%Imp
FVC (L)	03.09	03.03	098	02.87	093	-05
FEV1 (L)	02.46	02.27	092	02.27	092	---
FEV1/FVC (%)	79.61	74.92	094	79.09	099	+06
FEF25-75 (L/s)	03.48	01.79	051	01.99	057	+11
PEFR (L/s)	08.22	05.01	061	05.54	067	+11
FIVC (L)	-----	02.21	---	02.88	---	+30
FEV.5 (L)	-----	01.65	---	01.67	---	+01
FEV3 (L)	03.00	02.80	093	02.73	091	-02
PIFR (L/s)	-----	01.88	---	04.98	---	+165
FEF75-85 (L/s)	-----	00.35	---	00.67	---	+91
FEF.2-1.2 (L/s)	06.09	03.72	061	03.93	065	+06
FEF 25% (L/s)	07.54	03.74	050	04.01	053	+07
FEF 50% (L/s)	05.25	02.39	046	02.22	042	-07
FEF 75% (L/s)	02.32	00.76	033	00.97	042	+28
FEV.5/FVC (%)	-----	54.46	---	58.19	---	+07
FEV3/FVC (%)	97.09	92.41	095	95.12	098	+03
FET (Sec)	-----	07.15	---	06.30	---	---
Exptime (Sec)	-----	00.05	---	00.05	---	---
Lung Age (Yrs)	048	052	108	052	108	---
FEV6 (L)	03.09	02.99	097	02.86	093	-04
FIF25% (L/s)	-----	00.13	---	04.56	---	+3408
FIF50% (L/s)	-----	01.17	---	04.87	---	+316
FIF75% (L/s)	-----	01.31	---	03.66	---	+179



#### Pre Medication Report Indicates

Early Small Airway Obstruction as FEF 25-75 %Pred or PEFR %Pred < 70

Mild Obstruction as (FEV1/FVC)%Pred < 95 and FVC%Pred > 80

#### Post Medication Report Indicates

Early Small Airway Obstruction as FEF 25-75 %Pred or PEFR %Pred < 70

Spirometry within normal limits as (FEV1/FVC)%Pred > 95 and FVC%Pred > 80

DR. RAMPRASAD GORAI



## DEPARTMENT OF LABORATORY SERVICES

<b>Patient Name</b>	MR. SATYENDRA PAL SINGH	<b>Lab No</b>	1242231
<b>UHID</b>	319879	<b>Sample Date</b>	22/09/2023 11:53AM
<b>Age/Gender</b>	48 Yrs/Male	<b>Receiving Date</b>	22/09/2023 12:15PM
<b>Bed No/Ward</b>	OPD	<b>Report Date</b>	22/09/2023 4:29PM
<b>Referred By</b>		<b>Report Status</b>	Final
<b>Prescribed By</b>	Dr. Self		
<b>Collected At</b>	Healthworld Hospitals, City Centre, Durgapur - 15	<b>Processed At</b>	Lab-Healthworld Hospitals,Durgapur-15

Test Name	Result	Unit	Bio. Ref. Range	Method
-----------	--------	------	-----------------	--------

### Clinical Pathology

Sample: Urine

#### Urine Routine Examination

##### Physical Examination:

Colour:-	Straw		Pale Yellow
Volume:	30	mL	
Appearance:	Clear		

##### Chemical Examination:

pH:-	5.0		4.5 - 8.0	Strip Test
Specific Gravity:	1.025		1.015 - 1.030	Strip Test
Protein:	Trace		NEGATIVE	Strip test / Sulphosalicylic acid
Glucose:	NEGATIVE		NEGATIVE	Strip test / Benedict's
Ketone:	NEGATIVE		NEGATIVE	Strip test / Rothera's
Urobilinogen	NEGATIVE			
Bilirubin:	NEGATIVE		NEGATIVE	Strip test / Fouchet's test
Nitrite:	NEGATIVE		NEGATIVE	Strip Test
Hb / Erythrocytes	NEGATIVE			

##### Microscopic Examination:

Leukocytes:	3-4/HPF		Less than 5/HPF	Light microscopy
Epithelial Cells :	Occasional/HPF		Few /HPF	Light microscopy
RBC:	Occasional/HPF		0-2 /HPF	Light microscopy
Crystals:	NIL		NIL	Light microscopy
Casts:	NIL		NIL	Light microscopy

\*\*End Of Report\*\*

*Devashis*

Dr. Devashis Mandal

MBBS, MD (Pathology), Consultant - Lab Services, Reg No: 66456 (WBMC)

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Address : Plot No. C-42, Commercial Area, Opp. ENCI Regional Office, City Centre, Durgapur-713216, Dist. : Paschim Bardhaman, West Bengal, India  
 Website : www.healthworldhospitals.com, Email : info@whos.com, CIN : U65100WB2014PTC201736 PAN : AAHCP6673G  
 For any query, Pl. Call : 8170055555 / 8170066678 / 0343-2547755, For Ambulance, Call : 8170052660  
 For Blood Collection from Home, Contact : 8170052885 (Durgapur), 8170052700 (Warduli), 8170052660 (Dhanbad)

Mr Satyendra Pal Singh, 48yrs  
ID: 315879

22 09 2023 13:10:08  
HealthWorld Hospital  
Gandhi More  
Durgapur

Location:  
Order Number:  
Indication:  
Medication 1:  
Medication 2:  
Medication 3:

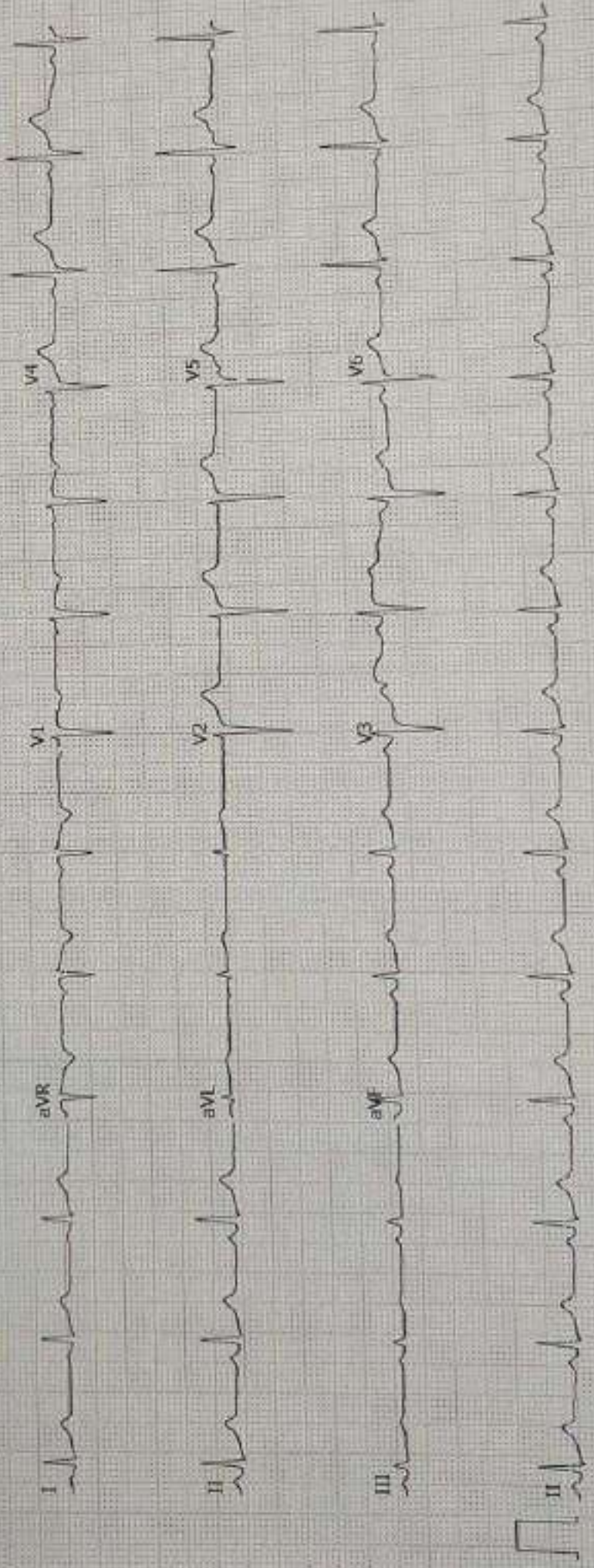
Room:

74 bpm  
/ / mmHg

Technician:  
Ordering Ph:  
Referring Ph:  
Attending Ph:

QRS : 80 ms  
QT / QTcbar : 386 / 428 ms  
PR : 142 ms  
P : 106 ms  
RR / PP : 806 / 810 ms  
P / QRS / T : 69 / 45 / -44 degrees

Normal sinus rhythm  
Normal ECG



Unconfirmed  
4x2.5x3\_25\_R1 U/I  
ADS 0.5G-20 Hz 50 Hz

25 mm/s 10 mm/mV

12SL™ v241

1.1

GE MAC3000



# HEALTHWORLD HOSPITALS

C-49, Commercial Area, City Centre, Durgapur - 713216

Patient ID : 444

Name : SATYENDRA PAL SINGH

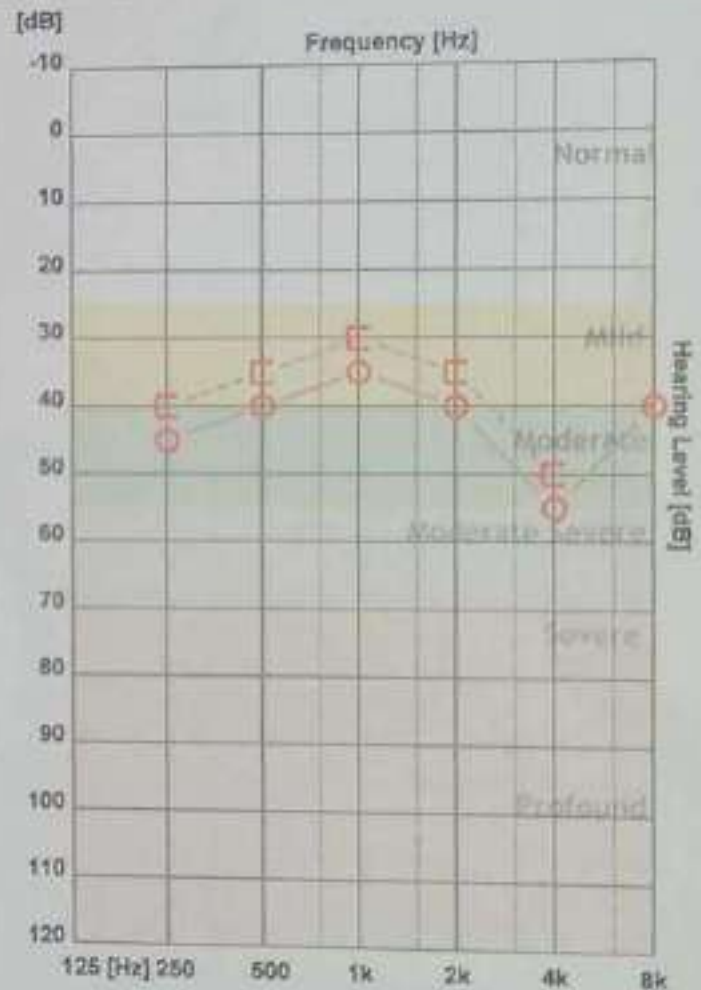
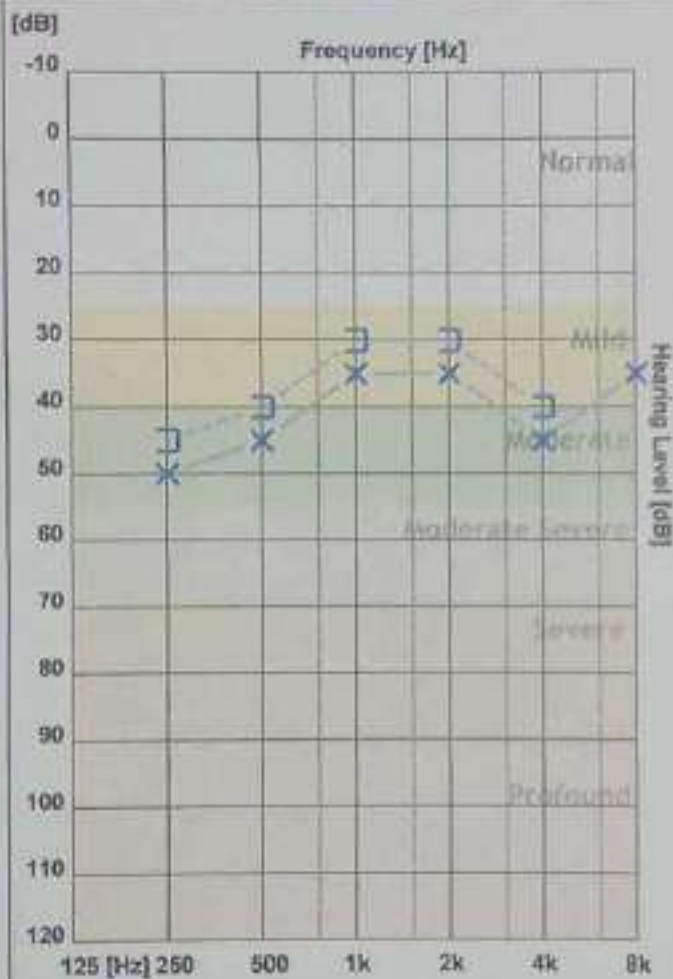
CR Number : 20230922142019

Registration Date : 22-Sep-2023

Age : 48

Gender : Male

Operator : HEALTHWORLD HOSPITAL



125 Hz 250 Hz 500 Hz 750 Hz 1000 H 1500 H 2000 H 3000 H 4000 H 6000 H 8000 H

X - Air Left		50	45		35		35		45		35
O - Air Right		45	40		35		40		55		40
] - Bone Left		45	40		30		30		40		
] - Bone Right		40	35		30		35		50		

	Average	High	Mid	Low
AIR Left	36.33 dB	38.33 dB	38.33 dB	43.33 dB
AIR Right	38.33 dB	45.00 dB	43.33 dB	40.00 dB

### Clinical Notes :

#### ANNUAL HEALTH CHECK UP

PTA

RIGHT EAR: 38.33 dB (R: 26 dB - 40 dB)

LEFT EAR: 38.33 dB (R: 26 dB - 40 dB)

BILATERAL MILD SN HEARING LOSS.

Dr. BISWAJIT BANIK  
MBBS, MS (ENT)  
Senior Consultant - ENT  
Reg No.: 88916 (WBMC)

Prasanta Bauri  
24/m

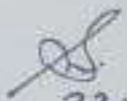


VHID:- 319889  
Date:- 22.09.23

VA  $\left\{ \begin{array}{l} 6/6 - N_6 \\ 6/6 - N_6 \end{array} \right.$

WNL.

Colour vision - NORMAL

  
22.9.23.

A Unit of Parashmani Medical Centre Pvt. Ltd.

Address: Plot No. C-49, Commercial Area, Opp. ESE Regional Office, City Centre, Durgam-713216, Dist. - Paschim Bardhaman, West Bengal, India  
Website: [www.healthworldhospitals.com](http://www.healthworldhospitals.com), Email: [info@hwlin.com](mailto:info@hwlin.com), CDN: URS100WB2014PTC201736, PAN: AAHCP6871G  
For any queries, P. Call: 0170055555 / 0170064660 / 0341-2547755, For Ambulance, Call: 0170052660  
For Blood Collection from Home, Contact: 0170032815 (Durgam), 0170052700 (Asansol), 0170052680 (Dhanbad)



**DEPARTMENT OF LABORATORY SERVICES**

<b>Patient Name</b>	MR. PRASANTA BAURI	<b>Lab No</b>	1242263
<b>UHID</b>	319889	<b>Sample Date</b>	22/09/2023 12:12PM
<b>Age/Gender</b>	24 Yrs/Male	<b>Receiving Date</b>	22/09/2023 12:25PM
<b>Bed No/Ward</b>	OPD	<b>Report Date</b>	22/09/2023 2:03PM
<b>Referred By</b>		<b>Report Status</b>	Final
<b>Prescribed By</b>	Dr. Self		
<b>Collected At</b>	Healthworld Hospitals, City Centre, Durgapur - 16	<b>Processed At</b>	Lab-Healthworld Hospitals,Durgapur-16

Test Name	Result	Unit	Bio. Ref. Range	Method
<b>Clinical Biochemistry</b>				
<b>Glucose Random [R]</b>				Sample: Plasma (fluoride)
Glucose R	84.4	mg/dL	70 - 140	
<b>Serum Creatinine</b>				Sample: Serum
Serum Creatinine	0.93	mg/dL	0.67 - 1.20	Jaffe, Kinetic

\*\*End Of Report\*\*

**Dr. Moushumi Lodh**

**MBBS,MD (Biochemistry), MHA, Executive Director- Lab Services,Healthworld Hospitals,Reg No: 71993 (WBMC)**

- \* Content of this report is only an opinion not the diagnosis. Please correlate clinically. Printed at 22/09/2023 16:45 Page: 2 Of 3  
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\* For amended reports, the contents are final and supercede the recalled report.



## DEPARTMENT OF LABORATORY SERVICES

<b>Patient Name</b>	MR. PRASANTA BAURI	<b>Lab No</b>	1242263
<b>UHID</b>	319889	<b>Sample Date</b>	22/09/2023 12:12PM
<b>Age/Gender</b>	24 Yrs/Male	<b>Receiving Date</b>	22/09/2023 12:25PM
<b>Bed No/Ward</b>	OPD	<b>Report Date</b>	22/09/2023 3:23PM
<b>Referred By</b>		<b>Report Status</b>	Final
<b>Prescribed By</b>	Dr. Self	<b>Processed At</b>	Lab-Healthworld Hospitals,Durgapur-18
<b>Collected At</b>	Healthworld Hospitals, City Centre, Durgapur - 18		

Test Name	Result	Unit	Bio. Ref. Range	Method
<b>Haematology</b>				
Sample: EDTA Whole Blood				
<b>CBC Haemogram, Blood</b>				
Hemoglobin	14.8	g/dL	13.0 - 16.0	Cyanide-free sodium baryl sulphate (SLS)
Red Blood Cell [RBC] Count	<b>4.47</b>	$10^6/\mu\text{L}$	4.50 - 5.50	Electrical resistant impedance
Packed cell volume [PCV]/Haematocrit [HCT]	45.1	%	36.0 - 46.0	Manual/ Calculated
MCV	100.8	fl	83.0 - 101.0	Manual/ Calculated
MCH	<b>33.0</b>	pg	27.0 - 32.0	Manual/ Calculated
MCHC	32.8	g/dL	31.5 - 34.5	Manual/ Calculated
RDW CV	13.2	%	11.5 - 15.0	Calculated
Erythrocyte Sedimentation Rate [ESR]	<b>27</b>	mm/hr	0 - 10	Modified westergren tube
Platelet count	207	$10^3/\mu\text{L}$	150 - 410	Electrical resistant impedance
Total Leucocyte Count [TLC]	<b>10.14</b>	$10^3/\mu\text{L}$	4.00 - 10.00	Fluorescence flow cytometry
<b>DLC</b>				
Neutrophils	64.3	%	40 - 80	Electrical impedance & Diff channel scattergram
Lymphocytes	26.9	%	20 - 40	Electrical impedance & Diff channel scattergram
Monocytes	4.6	%	2.0 - 10.0	Electrical impedance & Diff channel scattergram
Eosinophils	3.7	%	1 - 6	Electrical impedance & Diff channel scattergram
Basophils	0.5	%	0 - 1	Electrical impedance & Diff channel scattergram
Neutrophil-to-Lymphocyte ratio [NLR]	2.39			Calculated

\*\*End Of Report\*\*

*Vandana Raut*

Dr. Vandana Raut

MBBS, MD (Pathology), Senior Consultant - Lab Services,  
Reg No: 80135 (WBMC)



# HEALTHWORLD HOSPITALS

C-49, Commercial Area, City Centre, Durgapur - 713216

Patient ID : 449

Name : PRASANTA BAURI

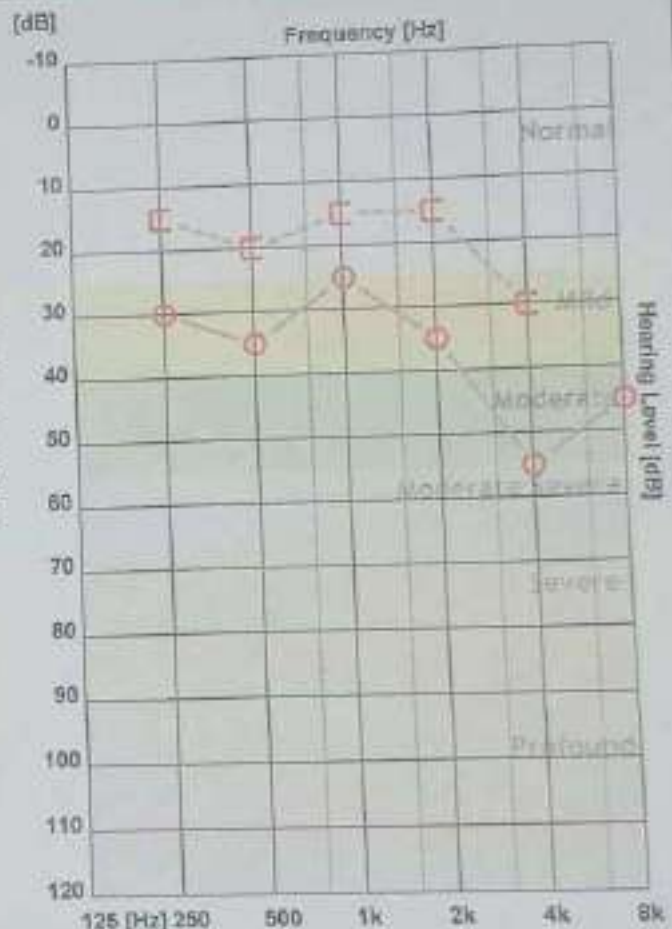
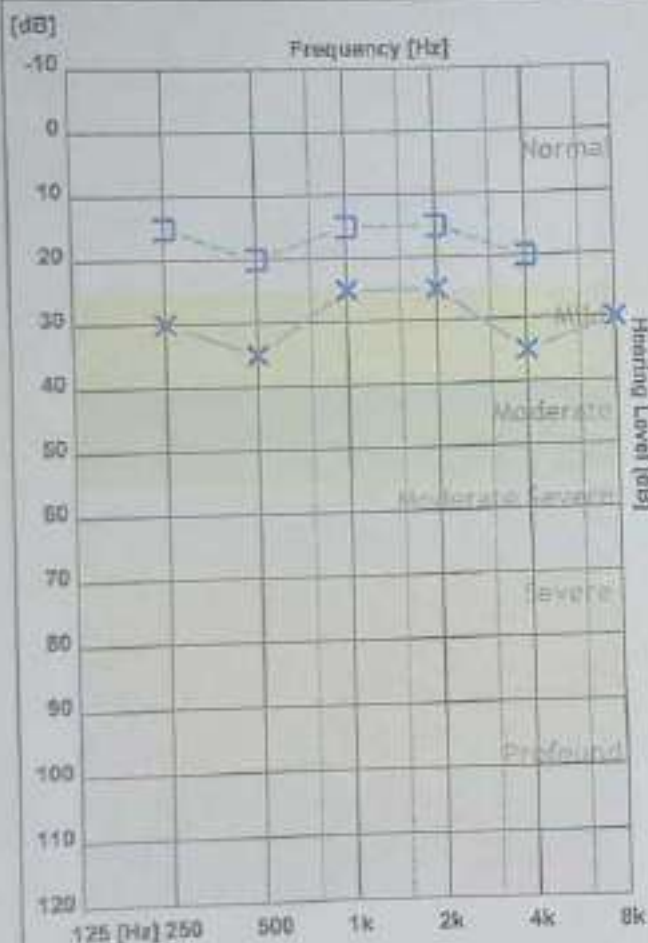
CR Number : 20230922150536

Registration Date : 22-Sep-2023

Age : 24

Gender : Male

Operator : HEALTHWORLD HOSPITAL



	125 Hz	250 Hz	500 Hz	750 Hz	1000 H	1500 H	2000 H	3000 H	4000 H	6000 H	8000 H
X - Air Left		30	35		25		25		35		30
O - Air Right		30	35		25		35		55		45
I - Bone Left		15	20		15		15		20		
I - Bone Right		15	20		15		15		30		

	Average	High	Mid	Low
AIR Left	28.33 dB	35.00 dB	28.33 dB	30.00 dB
AIR Right	31.67 dB	45.00 dB	38.33 dB	30.00 dB

**Clinical Notes :**

ANNUAL HEALTH CHECK UP  
 PTA  
 RIGHT EAR: 31.67 dB (R: 25 dB - 40 dB)  
 LEFT EAR: 28.33 dB (R: 25 dB - 40 dB)

BILATERAL MILD CONDUCTIVE HEARING LOSS.

*Dr. Biswajit Banik*  
 22/9/23  
 Dr. BISWAJIT BANIK  
 MBBS, MS (ENT)  
 Senior Consultant - ENT  
 88916 (WBMC)



## DEPARTMENT OF LABORATORY SERVICES

<b>Patient Name</b>	MR. PRASANTA BAURI	<b>Lab No</b>	1242263
<b>UHID</b>	319889	<b>Sample Date</b>	22/09/2023 12:12PM
<b>Age/Gender</b>	24 Yrs/Male	<b>Receiving Date</b>	22/09/2023 12:36PM
<b>Bed No/Ward</b>	OPD	<b>Report Date</b>	22/09/2023 4:28PM
<b>Referred By</b>		<b>Report Status</b>	Final
<b>Prescribed By</b>	Dr. Self		
<b>Collected At</b>	Healthworld Hospitals, City Centre, Durgapur - 16	<b>Processed At</b>	Lab-Healthworld Hospitals,Durgapur-16

Test Name	Result	Unit	Bio. Ref. Range	Method
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### Clinical Pathology

Sample: Urine

#### Urine Routine Examination

##### Physical Examination:

Colour:-	Pale Yellow		Pale Yellow
Volume:	40	mL	
Appearance:	Clear		

##### Chemical Examination:

pH:-	5.0		4.5 - 8.0	Strip Test
Specific Gravity:	1.010		1.015 - 1.030	Strip Test
Protein:	NEGATIVE		NEGATIVE	Strip test / Sulphosalicylic acid
Glucose:	NEGATIVE		NEGATIVE	Strip test / Benedicts
Ketone:	NEGATIVE		NEGATIVE	Strip test / Rotheras
Urobilinogen	NEGATIVE			
Bilirubin:	NEGATIVE		NEGATIVE	Strip test / Fouchet's test
Nitrite:	NEGATIVE		NEGATIVE	Strip Test
Hb / Erythrocytes	NEGATIVE			

##### Microscopic Examination:

Leukocytes:	0-1/HPF		Less than 5/HPF	Light microscopy
Epithelial Cells :	Occasional/HPF		Few /HPF	Light microscopy
RBC:	Nil/HPF		0-2 /HPF	Light microscopy
Crystals:	Nil		NIL	Light microscopy
Casts:	Nil		NIL	Light microscopy

\*\*End Of Report\*\*

*Devashis Mandal*

Dr. Devashis Mandal

MBBS, MD (Pathology), Consultant - Lab Services, Reg No: 66456 (WBMC)

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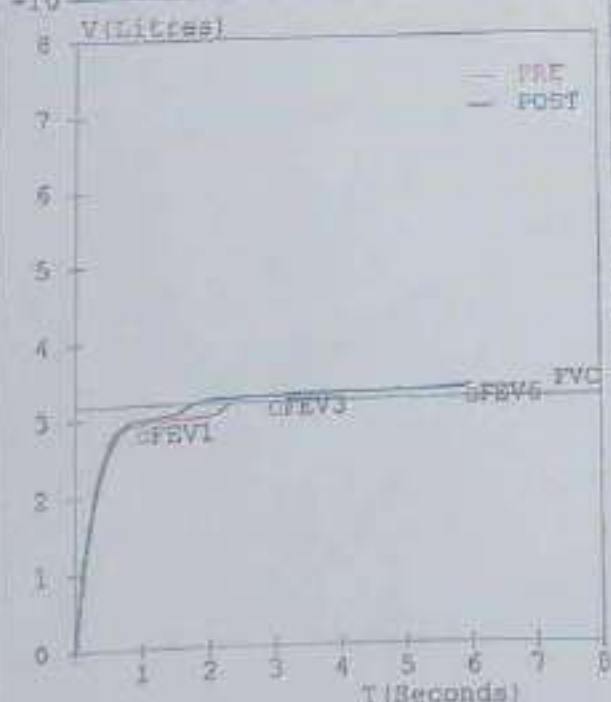
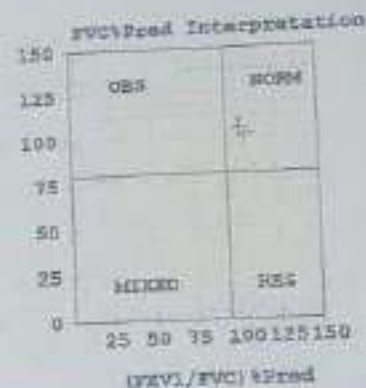
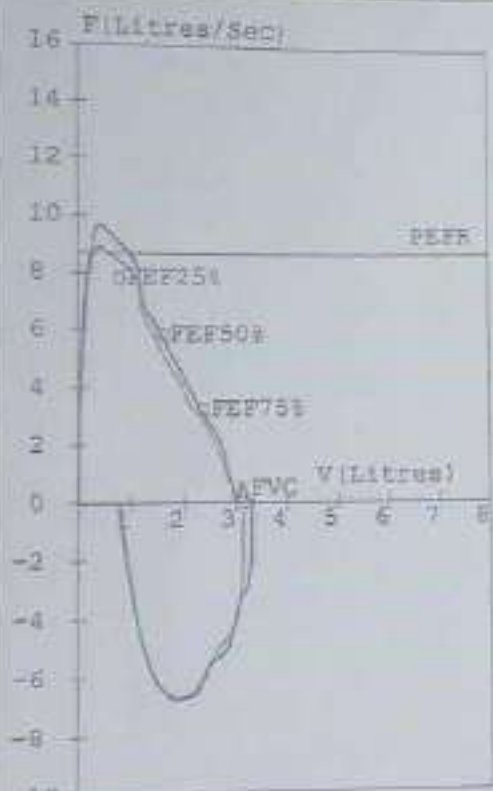
# HEALTHWORLD HOSPITALS

C-49, COMMERCIAL AREA, CITY CENTRE, DURGAPUR-713216, WB.

Patient: MR PRASANTA SAURI  
 Refd. By: SSKP  
 Pred. Eqns: RECORDERS  
 Date : 22-Sep-2023 02:41 PM

Age : 24 Yrs  
 Height : 160 Cms  
 Weight : 52 Kgs  
 ID : 319869

Gender : Male  
 Smoker : No  
 Eth. Corr: 100  
 Temp :



FVC Results							
Parameter		Pred	M.Pre	%Pred	M.Post	%Pred	%Imp
FVC	(L)	03.17	03.19	101	03.34	105	+05
FEV1	(L)	02.77	02.96	107	03.00	108	+01
FEV1/FVC	(%)	87.38	92.79	106	89.82	103	-03
FEF25-75	(L/s)	04.47	04.77	107	04.94	111	+04
PEFR	(L/s)	08.70	08.93	103	09.62	111	+08
FIVC	(L)	-----	02.40	---	02.59	---	+08
FEV.5	(L)	-----	02.58	---	02.68	---	+04
FEV3	(L)	03.08	03.19	104	03.26	106	+02
PIFR	(L/s)	-----	06.79	---	06.72	---	-01
FEF75-85	(L/s)	-----	02.15	---	01.90	---	-12
FEF.2-1.2	(L/s)	07.47	08.16	109	08.79	118	+08
FEF 25%	(L/s)	07.85	08.29	106	08.88	113	+07
FEF 50%	(L/s)	05.84	05.15	088	05.42	093	+05
FEF 75%	(L/s)	03.24	02.75	085	02.68	083	-03
FEV.5/FVC	(%)	-----	80.88	---	80.24	---	-01
FEV3/FVC	(%)	97.16	100.00	103	97.60	100	-02
FET	(Sec)	-----	02.36	---	06.16	---	---
ExptTime	(Sec)	-----	00.04	---	00.04	---	---
Long Age	(Yrs)	024	022	092	022	092	---
FEV6	(L)	03.17	-----	---	03.33	105	-99
FIF25%	(L/s)	-----	00.05	---	00.05	---	+00
FIF50%	(L/s)	-----	04.75	---	04.95	---	+04
FIF75%	(L/s)	-----	06.49	---	06.54	---	+01

Pre Medication Report Indicates Spirometry within normal limits as (FEV1/FVC)%Pred >95 and FVC%Pred >80  
 Post Medication Report Indicates Spirometry within normal limits as (FEV1/FVC)%Pred >95 and FVC%Pred >80

DR. RAMPRASAD GOR

HEALTHWORLD HOSPITALS

Priyanka Baruah

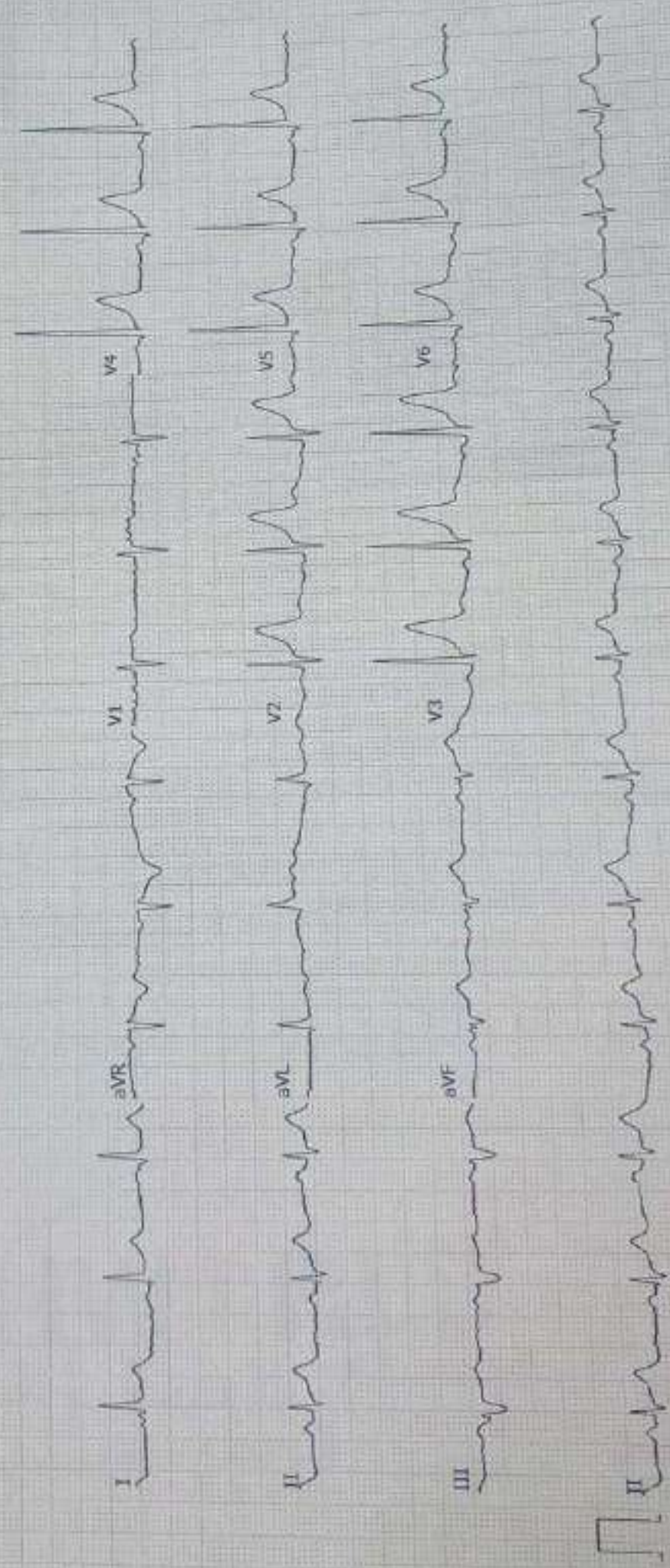
R



Technician:  
Ordering Ph:  
Referring Ph:  
Attending Ph:

QRS :  
QT / QTc Baz : 376 / 419 ms  
PR : 124 ms  
P : 76 ms  
RR / PP : 800 / 800 ms  
P / QRS / T : 67 / 7 / 49 degrees

Normal sinus rhythm  
Early repolarization  
Normal ECG



### CER Details

S. No.	Particulars	Physical activity and action plan	UOM	Status	Physical activity and action plan	UOM	Status	Physical activity and action plan	UOM	Status	Tentative Budget (In Lakhs)	Total expenses till date
		To be implemented in 1 <sup>st</sup> year	To be implemented in 2 <sup>nd</sup> Year		To be implemented in 3 <sup>rd</sup> Year							
1.	<b>Concern Raised in PH - Creation of employment Opportunities &amp; skill development</b>											
	Village Damodarpur	Adoption of Adivasi football team for boys and girls & development of their Football ground	15 nos. boys & 15 nos. girls	Partially done	Skill development/vocational training in trades	10nos.	Done	Skill development/vocational training in trades	10	Done	30.2	40.3
		Training & Employment of local youth in own company	10 nos.	Done								
	**Training & employment of 38 local peoples instead of 30 peoples has been done till date											
	Village Simultala/Shekhpur	Training & Employment of local youth in own company	10 nos.	Done	Skill development/vocational training in trades	10 nos.	done	Skill development/vocational training in trades	10 nos.	done	26.2	34.0
	**Training & employment of 34 local peoples instead of 30 peoples has been done till date											
	Village Ikra/Balanpur	Training & Employment of local youth in own company	10 nos.	Done	Skill development/vocational training in trades	10 nos.	done	Skill development/vocational training in trades	10 nos.	Done	26.2	28.0
	** Training & employment of 28 local peoples instead of 30 peoples has been done till date											

S. No.	Particulars	Physical activity and action plan	UOM	Status	Physical activity and action plan	UOM	Status	Physical activity and action plan	UOM	Status	Tentative Budget (In Lakhs)	Total expenses till date
		To be implemented in 1 <sup>st</sup> year			To be implemented in 2 <sup>nd</sup> Year			To be implemented in 3 <sup>rd</sup> Year				
	Village Akhalpur	Training & Employment of local youth in own company	10 nos.	Done	Skill development/vocational training in trades	10 nos.	Done	Skill development/vocational training in trades	10 nos.		26.2	34.0
		** Training & employment of 34 local peoples instead of 30 peoples has been done till date										
	Village Benali				Skill development/vocational training in trades	10 nos.	Done	Skill development/vocational training in trades	10 nos.	Done	25	
2.	<b>Concern Raised in PH - Infrastructure Development &amp; provision of drinking water facilities in nearby areas viz., development of roads, local schools</b>											
	Village Damodarpur	Construction of Adivasi community temple	1 nos.	Done	RO drinking water for villagers through tanker	1 no.	Done	Installation of solar lights	10 nos.		61	58.2
		Construction of community toilet for villagers	6 nos.	Done	Repairing of internal roads	400 m	Done	RO drinking water for villagers through tanker	1 no.	Done		
		Provision of RO drinking water for villagers through tanker	1 no.	Done								
	Village	Construction of	2 with 6	Done	Construction of	400 m	Partially	RO drinking	1 no.	Done	67	47.2

S. N o.	Particulars	Physical activity and action plan	UOM	Status	Physical activity and action plan	UOM	Status	Physical activity and action plan	UOM	Status	Tentative Budget (In Lakhs)	Total expenses till date
		To be implemented in 1 <sup>st</sup> year			To be implemented in 2 <sup>nd</sup> Year			To be implemented in 3 <sup>rd</sup> Year				
	Simultala/Shekhpur	Community toilet	toilets each		drainage system and connect with main drain		done	water for villagers through tanker				
		Construction of bath ghat	1 no.	Done	RO drinking water for villagers through tanker	1 no.	Done					
		Provision of RO drinking water for villagers through tanker	1 no.	Done								
	Village Ikra/Balanpur	Construction of well for drinking water	1 no.	Done	Construction of cycle stand shed in Govt. High school	1		Provision of computer	3 nos.	Done	14.1	11.5
		Construction of lunch shed in Govt. primary school	1 no					Provision of printer	1 no.	Done		
		Construction of cultural stage	1 nos.	Partially done				Installation of LED lights in villages	10 nos.	Done		
								Distribution of furniture(Tables & Chairs) in Govt Primary	30 nos.	Done		

S. N o.	Particulars	Physical activity and action plan	UOM	Status	Physical activity and action plan	UOM	Status	Physical activity and action plan	UOM	Status	Tentative Budget (In Lakhs)	Total expenses till date
		To be implemented in 1 <sup>st</sup> year			To be implemented in 2 <sup>nd</sup> Year			To be implemented in 3 <sup>rd</sup> Year				
								school				
	Village Akhalpur	Construction of toilet in Govt. Primary School	2 closed toilets with 3 urinals	Done	Construction of borewell for drinking water in Govt. Primary School	1 no.	Done	Installation of solar light	5 nos.		19.0	26.9
		Construction of boundary wall of Muslim Cementry	1000 m	Done	Construction of public toilet in Hermitage	5 closed toilets						
	Village Benali	Renovation of Govt. School	1 no.	Done	Distribution of furniture in school (Tables & Chairs)	20 nos.		Repairing of internal road	700 m		15.5	12.6
	Others							Development of roads opposite to plant site or connecting to one pucca road from Akhalpursubvillage to Damodarpur main road	1 km (** 250 mpucca road has been done)		80	22.0

S. No.	Particulars	Physical activity and action plan	UOM	Status	Physical activity and action plan	UOM	Status	Physical activity and action plan	UOM	Status	Tentative Budget (In Lakhs)	Total expenses till date
		To be implemented in 1 <sup>st</sup> year			To be implemented in 2 <sup>nd</sup> Year			To be implemented in 3 <sup>rd</sup> Year				
3.	<b>Concern Raised in PH - Greenbelt development in nearby areas &amp; preserving local species</b>											
	Village Damodarpur	Community plantation	500 saplings	Done	Distribution of samplings and tree guard	300		Distribution of samplings and tree guard	300	Done	0.85	0.9
	Village Simultala/Shekhpur	Community plantation	600 saplings	Done	Distribution of samplings and tree guard	300		Distribution of samplings and tree guard	300	Done	0.95	1.0
	Village Ikra/Balanpur	Community plantation along with plantation in Govt. Primary School	700 saplings	Partially Done							0.55	0.6
	Village Akhalpur	Community plantation	700 saplings	Done				Distribution of samplings and tree guard	300	Done	0.8	1.0
	Village Benali	Community plantation	400 saplings					Distribution of samplings and tree guard in schools and villages	500 saplings		0.7	
4.	<b>Concern Raised in PH - Development of Health facilities</b>											

S. No.	Particulars	Physical activity and action plan	UOM	Status	Physical activity and action plan	UOM	Status	Physical activity and action plan	UOM	Status	Tentative Budget (In Lakhs)	Total expenses till date
		To be implemented in 1 <sup>st</sup> year			To be implemented in 2 <sup>nd</sup> Year			To be implemented in 3 <sup>rd</sup> Year				
	Village Damodarpur	Air-Conditioned Bolero Ambulance to Borough for villagers duly equipped with oxygen and stretcher	1 no.								10	
	Village Akhalpur				Provision of medical equipment as per the requirement of health centre	2 nos.					20	
5.	<b>Concern Raised in PH - Control of Pollution because of proposed project viz., air pollution, discharge of water, dust etc</b>											
	Village Damodarpur				Water tanker for water sprinkling on road to minimise fugitive emission during vehicular movement	2 nos.	Done				12	18.6
6.	Surroundings villagers	AC Hearse Van - for nearby villages										13.8
7.	Royal Enfield bike hand over to Asansol Durgapur Police Commissionerate											
			Company has allocated Rs. 4.36 Crores for implementing all the activities mentioned above for socio-economic development of the area								436.25	<b>372.98</b>

## Damodarpur Village

Construction of One Toilet Blocks (6 Toilets in the building Complex)



## Damodarpur Village

**Damodarpur More adjacent to Jamuria Haripur main road repairing work by heavy duty paver blocks**



# Damodarpur Village

Construction of Two Santhal Temples



# Damodarpur Village

Damodarpur Adibasi Football Team with hired Coach on monthly remuneration with all required dresses and accessories



## SIMULTALA

Renovation of One Pond by dredging and construction of Two numbers of Ghat



# SIMULTALA

Construction of Toilets and Temples



# Akhalpur Village

## Construction of Shiv Mandir



## Akhalpur Village

### Construction of Boundary Wall of Kabristan



## Akhalpur Village

### Construction of Bathing Ghat





**AC Hearse Van for nearby villages**



**Supply of R.O drinking water**

# Royal Enfield Bike Hand Over to Asansol Durgapur Police Commissionerate



To: \_\_\_\_\_ Date: 29.04.2023

M/s. Super Shikhi Foundation

Near One Suburbia

Jamshed.

Subj: Release balance amount cheque for Rs 32,37,930/- in name of SG Automobiles.

Dear Sir,

With reference to your purchase order for JDHO vehicle of Royal Enfield (Class: 331 Kaddish) for ON Price of 2,25,793 each (total Value 22,57,930) and advance payment was made for Rs 10,00,000/-

We please to inform you that your order for JDHO Class: 350 Kaddish Red vehicle is ready for delivery.

So please issue the rest amount cheque in favour of SG Automobiles for the same.

Thanking You.



**SG Automobiles**  
 Address: 27, D-1 Road (Phase 1)  
 Gurgaon, Dist. Gurgaon  
 Telephone: 8170220611 | 8111010061  
 E-mail: sgautomobiles@gmail.com

**GoDigi Finance**  
 100% Cash Loan (Secured) with reasonable EMI as per  
 M/S. Credit Finance Services Pvt. Ltd., A-11, Sector-14, Gurgaon, Haryana - 122001  
 P/C: 1845, 8001600

**Pay to the order of:** SG Automobiles

**Payable in words:** Two hundred and thirty seven thousand nine hundred thirty only ₹ 3237930/-

**Account No.:** 1845000000000000000000 **Branch:** Asansol

**Signature:** [Signature] **Stamp:** [Stamp]

**2235468 9002590584 152600 24**

## CER activity under progress

Construction of a Model School Damodar village for education to the Adivasi children's with appointment of a teacher on monthly remuneration.





# GIRIDHAN METAL PRIVATE LIMITED

Registered Office : "PREMLATA" 39, Shakespeare Sarani, 3rd Floor, Kolkata - 700 017, West Bengal, India  
 Telefax : +91 33 2289 2734 / 35 / 36, E-mail : giridhanmetal@gmail.com CIN : U27320WB2019PTC234675

## GIRIDHAN METAL PRIVATE LIMITED CORPORATE ENVIRONMENTAL POLICY

For protection of environment and sustainable development, Giridhan Metal Private Limited is committed to abide by environmental norms and various conditions stipulated by the Govt of India during approval of projects at the central as well as at the state levels. In addition to this, Giridhan Metal Private Limited acknowledge the importance of the concept of inter-dependence of all sections of society. In particular, it focuses revolves around the community residing in the immediate vicinity of its steel manufacturing plant where it seeks to actively assist in improving the quality of life.

In line with its abiding concern for preservation of the ecological balance and safeguarding the health and environment of the community, Giridhan Metal Private Limited will always actively demonstrate its firm resolves to protect the environment and its deeply committed to its reputation and respect built over the years in industry and society for its professional of management based on philosophy of the best in business ethics. Giridhan Metal Private Limited has global commitments and also the guidelines on norms and directives of different State and Central Government of India, Giridhan Metal Private Limited has formulated the following Corporate Environmental Policy & Responsibility for effective implementation across the organization in its projects and integrated steel plant. The policy shall:

- a) Be appropriate to the nature and scale of the organization's activities, products and services and adopted at the Board level. It shall be documented, implemented, maintained and communicated to all persons working for the organization and on its behalf.
- b) Define a specific organisational structure for guidance & implementation.
- c) Ensure the required commitment from top management for the allocation of sufficient financial, human, organizational infrastructure and technology resources for its implementation.
- d) Shall be integrated with all stages of the project/activity cycle of the organization.
- e) Ensure environmental performance of all projects/activities over and above the applicable statutory requirements to which organization have to comply.
- f) Shall be aligned with policies and management systems of the organization including the Environmental Management System (EMS) or other environmental performance initiatives.
- g) Shall provide for incentives for its employees for achieving corporate environmental targets that go beyond statutory compliance and disincentives for failure to achieve this.
- h) Provide for monitoring and review of corporate environmental performance along with the reporting of non-compliance.
- i) Monitoring of implantation and review shall be at the level of the Board and the guidance of the Board shall be communicated to all concerned in writing for compliance. Together these shall comprise the corporate Environmental Performance Report, and shall be included in the Organisation's Annual Report.



# GIRIDHAN METAL PRIVATE LIMITED

Registered Office : "PREMLATA" 39, Shakespeare Sarani, 3rd Floor, Kolkata - 700 017, West Bengal, India  
Telefax : +91 33 2289 2734 / 35 / 36, E-mail : [giridhanmetal@gmail.com](mailto:giridhanmetal@gmail.com) CIN : U27320WB2019PTC234675

In addition to the above, Giridhan Metal Private Limited will strive to adhere to the following elements of its Corporate Environmental Policy:

- 1) Operate the manufacturing and other facilities in compliance with all applicable laws and regulations related to environment and health & safety of employees and surrounding communities;
  - 2) Continually improve the environmental performance of organisational process and products through waste minimization and pollution abatement.
  - 3) Minimize consumption of natural resources through the reduction, reuse or recycling of materials, as much as possible.
  - 4) Encourage efficient use of energy, water and utilities
  - 5) Purchase products and services as far as possible, that do the least damage to the environment on a life cycle basis
  - 6) Promote environmental awareness among the employees and encourage them to work in environmentally responsible manner.
  - 7) Communicate the environmental commitment and performance of the organization to its clients, customers and the public.
  - 8) Develop and maintain appropriate emergency and response programs where required by legislation or where significant health, safety or environmental hazards exist.
- Develop and maintain greenery in and around its mines, plants and other project units.

## Implementation of the Corporate Policy

### *Resources, Roles and Responsibility:*

Giridhan Metal Private Limited shall have an organization structure to oversee the effective implementation of corporate Environment Policy. This structure shall define key responsibilities within the various levels of the organization for policy implementation and shall include involvement at all the levels throughout the organization. An Organization structure in this regard is shown below:

The management shall ensure availability of resources essential to implement the corporate environment policy across its all operational and project units. Resources shall include human resources, organizational infrastructure, technology and financial resources. Roles and responsibilities shall be defined and documented to facilitate the effective implementation of the environment policy.

As part of the existing Board structure, Audit & Compliance reporting team shall also oversee the environmental status inclusive of the conditions prescribed under various environmental consents and clearances, as and when obtained from various State and Central Govt authorities, as well as the corporate norms, standards and targets that exceed the legal compliance requirements.

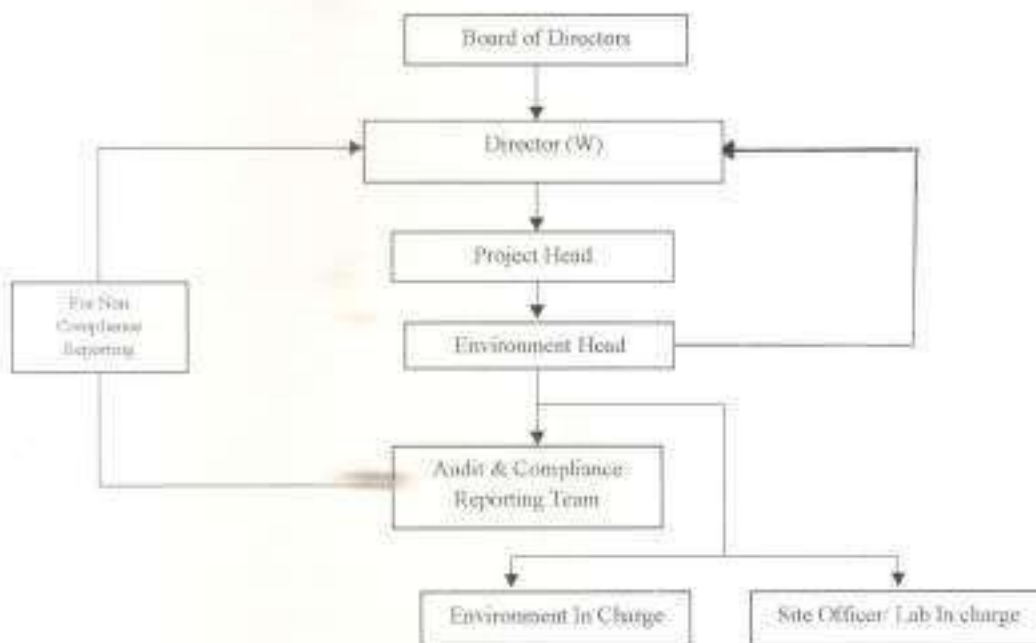
The below organizational structure Management Cell is responsible for any non-compliance/ infringement/ deviation/ violation of the environmental or forest norms under the supervision of Board of Directors.



# GIRIDHAN METAL PRIVATE LIMITED

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## Documentation:

The policy shall be made available on the Giridhan Metal Private Limited's website and also be available in hard copy. The planning, implementation and monitoring of the organizational environmental performance shall be documented. All achieved milestones will be supported by documentary evidence in the form of photographs, monitoring records and /or reports, wherever applicable.

## Transparency in the implementation of Environmental policy

Monitoring will be conducted periodically as per relevant norms framed by SPCB or MoEFCC or any other statutory authorities. It shall serve to drive accountability and transparency and provides for learning to implement in future initiatives. Giridhan Metal Private Limited shall implement a monitoring mechanism by its defined organizational structure with clear roles & responsibilities for every operational and project units by creating a register specifying all the regulatory compliances and clearance conditions that have been imposed by the Ministry or other public authorities. Giridhan Metal Private Limited shall also prepare Annual Environmental performance report and include it in its Annual Report.

The policy has been passed by the Board of Directors of Giridhan Metal Private Limited in compliance with the circular issued by Ministry of Environment, Forest and Climate Change. All issues related to Environment specifically non compliances be placed before the Board and the Head of the Plant should submit a report on the same before the ensuing meeting along with all the corrective measures taken thereon.



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Annexure - 1

## GIRIDHAN METAL PRIVATE LIMITED

### Environment Policy

Protection of environment is of prime concern and an important business objective at Giridhan Metal Private Limited. With a leading role in providing services in Manufacturing industry value chain in India, Giridhan Metal Private Limited is conscious of its responsibility towards creating, maintaining and ensuring a safe and clean environment for sustainable development. In particular Giridhan Metal Private Limited is committed to:

- 1) Operate the manufacturing and other facilities in compliance with all applicable laws and regulations related to environment and health & safety of employees and surrounding communities.
- 2) Continually improve the environmental performance of organisational process and products through waste minimization and pollution abatement.
- 3) Minimize consumption of natural resources through the reduction, reuse or recycling of materials, as much as possible.
- 4) Encourage efficient use of energy, water and utilities.
- 5) Purchase products and services as far as possible, that do the least damage to the environment on a life cycle basis.
- 6) Promote environmental awareness among the employees and encourage them to work in environmentally responsible manner.
- 7) Communicate the environmental commitment and performance of the organization to its clients, customers and the public.
- 8) Develop and maintain appropriate emergency and response programs where required by legislation or where significant health, safety or environmental hazards exist.
- 9) Develop and maintain greenery in and around its mines, plants and other project units.

Date **04 MAR 2020**

  
Sanjay Agarwal  
Director





श्रीक न्यून



उत्तर प्रदेश

ASBROKOTARY  
सबसे पहले काम करने का  
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बाद, गुलबर्गाबाद शायरी  
... 97240069751  
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व्यापार

BUSINESS  
मानविक नेटवर्क  
भारत की नं. 1 कंपनी  
... 08004109036

Hindustan Group द्वारा  
अपनी भारतीय टीम, जमीन,  
... 70909089093.

Galaxy Network  
Company द्वारा अपनी भारतीय  
... 94653416173.

फाइनेंस / लोन  
FINNANCE / LOAN  
... 08765087341.

बुधवार - पाठकों से यह अनुरोध है  
कि किसी भी पृष्ठों पर उन्हें  
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उत्तर प्रदेश

कोलकाता विश्वविद्यालय के  
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शिक्षकों के वेतन के लिए  
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सूबे में 12,604 नये मरीज मिले



उत्तर प्रदेश

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**GIRIDHAN METAL PRIVATE LIMITED**

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 Telefax : +91 33 2289 2734 / 35 / 36. E-mail : giridhanmetal@gmail.com, CIN : U27320WB2019PTC234675

Date: 24.04.2021

To,  
 The Chairman  
 Asansol Durgapur Development Authority  
 Asansol, Paschim Bardhaman, West Bengal

Ref: Environmental Clearance vide letter no. J-11011/366/2010-IA.II (I)  
 dated 08/04/2021

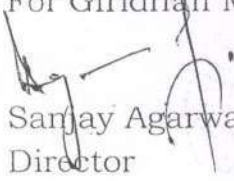
Dear Sir,

We have obtained Environmental Clearance for Expansion of our existing steel plant by expanding Sponge iron from 1,20,000 TPA to 3,18,000 TPA, MS Billets from 1,05,000 TPA to 3,72,000 TPA, Rolling Mill from 1,00,000 TPA to 3,00,000 TPA, Submerged Arc Furnace (SAF) from 15,000 TPA to 30,000 & Captive Power Plant from 16 MW to 42 MW including Waste Heat Recovery Boiler (WHRB) at Jamuria Industrial Estate, Village - Ikra & Damodarpur, Tehsil - Jamuria, District - Paschim Burdwan, West Bengal from Ministry of Environment, Forest and Climate Change, Government of India.

As per the direction contained in the aforesaid Environmental Clearance (EC), kindly receive a copy of the letter J-11011/366/2010-IA.II(I) dated 8<sup>th</sup> April, 2021.

Thanking you,

Yours faithfully  
 For Giridhan Metal Private Limited

  
 Sanjay Agarwal  
 Director



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Date: 24.04.2021

To,  
The Mayor  
Asansol Municipal Corporation  
Asansol, Paschim Bardhaman, West Bengal

Ref: Environmental Clearance vide letter no. J-11011/366/2010-IA.II (I)  
dated 08/04/2021

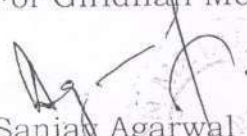
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As per the direction contained in the aforesaid Environmental Clearance (EC), kindly receive a copy of the letter J-11011/366/2010-IA.II(I) dated 8<sup>th</sup> April, 2021.

Thanking you,

Yours faithfully  
For Giridhan Metal Private Limited

  
Sanjay Agarwal  
Director





LED Display Board

Your (**Environment Clearance**) application has been **Submitted** with following details

<b>Proposal No</b>	IA/WB/IND/201973/2010
<b>Compliance ID</b>	28440041
<b>Compliance Number(For Tracking)</b>	EC/M/COMPLIANCE/28440041/2024
<b>Reporting Year</b>	2024
<b>Reporting Period</b>	01 Jun(01 Oct - 31 Mar)
<b>Submission Date</b>	01-06-2024
<b>IRO Name</b>	ARTATRANA MISHRA
<b>IRO Email</b>	jhk109@ifs.nic.in
<b>State</b>	WEST BENGAL
<b>IRO Office Address</b>	Integrated Regional Offices, Kolkata

**Note:-** SMS and E-Mail has been sent to ARTATRANA MISHRA, WEST BENGAL with Notification to Project Proponent.

# GIRIDHAN METAL PRIVATE LIMITED

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Ref No. GMPL/24-25/SPCB/09

Date: 28.09.2024

To,  
Environmental Engineer  
West Bengal Pollution Control Board  
Department of Environment, Govt. of West Bengal  
Asansol Regional Office, Kalyanpur Satellite Township Project (K.S.T.P.)  
Dr. B. C. Roy Road, P.O.-Dhadka, Asansol - 713302

**Sub: Environmental Statement for the Period 2023-24 for Giridhan Metal Private Limited**

Dear Sir,

We are hereby submitting the '**Environmental Statement**' (**Form-V**) for the FY 2023-24 for Giridhan Metal Private Limited, Jamuria Industrial Estate, Nandi, Jamuria, Paschim Bardhaman for your kind consideration.

Kindly knowledge our submission.

Thanking You.

Yours Sincerely

For **Giridhan Metal Private Limited**

  
(Authorized signatory)



Copy to:

1. The Member Secretary, WBPCB, Paribesh Bhawan, Salt Lake, Kolkata-700106

**FORM-V**

**ENVIRONMENTAL STATEMENT FOR THE FINANCIAL YEAR 2023-24**

**GIRIDHAN METAL PRIVATE LIMITED, JAMURIA**

**PART-A**

Name and address of the owner/ occupier of the industry operation or process	Mr Sanjay Agarwal (Director) Giridhan Metal Private Limited Jamuria Industrial Estate P.O.-Nandi; P.S. - Jamuria Paschim Bardhaman - 713344 (W.B.)
Industry category Primary-(STC Code) Secondary-(STC Code)	Integrated Steel Plant ---
Production capacity	318000 TPA DRI, 372300 TPA MS Billet, 300000 TPA Steel Flat & Rolled Product, 30000 TPA Fe-Mn/Si-Mn with 42 MW CPP
Year of Establishment	2020 (Production starts from Aug 2021 with 350 TPD DRI & 16 MW CPP)
Date of Last Environmental /Audit Report submitted	---

**PART B**

**WATER AND RAW MATERIAL CONSUMPTION**

**1) Water consumption m<sup>3</sup>/day**

Process	} 421 m <sup>3</sup>
Cooling	
Domestic	

Name of products	Process water consumption per unit of product output	
	During the financial year 2022-23	During the financial year 2023-24
Sponge Iron (m <sup>3</sup> /MT)	0.21	0.19
Silico Manganese (m <sup>3</sup> /MT)	0.32	0.29
Captive Power Plant ((m <sup>3</sup> /MW)	0.28	0.21
MS Billet (m <sup>3</sup> /MT)	-	0.11
Steel Flat & Rolled Product (m <sup>3</sup> /MT)	-	0.27

**2) Raw material consumption**

Sl No	Name of Raw Material	Name of the Products	Consumption of raw material	
			2022-23 (MT/Yr)	2023-24 (MT/Yr)
1	Iron Ore/Pellet	Sponge Iron	3,36,037	4,64,753
2	Coal	Sponge Iron	2,35,336	3,10,531
3	Dolomite	Sponge Iron	8,701	6,240
4	Manganese Ore	Si-Mn	46857	47,403
5	Dolomite	Si-Mn	4633	508
6	Coal	Si-Mn	21907	11,359
7	Hard Coke	Si-Mn	8410	10,556
8	Fe-Mn slag	Si-Mn	2050	25,835



9	Iron Ore/Pellet	Si-Mn	-	802
10	Quartz	Si-Mn	-	8,633
11	Coal	CFBC	2102	38,594
12	Dolochar	CFBC	-	40,124
13	Sponge/Pellet	MS Billet	-	82,706
14	Pig Iron	MS Billet	-	15,018
15	Scrap	MS Billet	-	12,651
16	Iron Ore	MS Billet	-	23,577
17	Si-Mn	MS Billet	-	216
18	Slag Metal	MS Billet	-	2,229
19	Skull Scrap	MS Billet	-	324
20	Anthracite Coal	MS Billet	-	277
21	MS Billet	Steel Flat & Rolled Product	-	90,246

**PART-C**  
**POLLUTION DISCHARGED TO ENVIRONMENT/ UNIT OF OUTPUT**  
**(PARAMETERS AS SPECIFIED IN THE CONSENT ISSUED)**

Sl No	Pollutants	Prescribed Standard (mg/l)	Quantity of Pollutants discharged (mass/day)		Concentration of Pollutants discharged (mass/volume)		Percentage of variation from prescribed standard with reasons
			FY: 2022-23	FY: 2023-24	FY: 2022-23	FY: 2023-24	
a)	Water	Standard norms (mg/l)	Kg/day		mg/lit		No deviation. All values are within the standard norms. No effluent discharge from the plant
		pH	5.5-9.5	8.61	8.20	8.61	
	Total Suspended Solids (TSS)	100	0.15	0.36	10	23.83	
	BOD	30	0.06	0.19	3.87	12.72	
	COD	250	0.19	0.78	12.33	51.83	
	Oil & Grease	10	<1.4	0.04	<1.4	2.73	
b)	AIR PM emission from Stack of	Prescribed Standard (mg/Nm <sup>3</sup> )	Kg/day		mg/Nm <sup>3</sup>		No deviation. All values are within the standard norms as pollution control equipments are maintained properly
			FY: 2022-23	FY: 2023-24	FY: 2022-23	FY: 2023-24	
	DRI 350 & 600 TPD attached with common stack through WHRB	30	82.93	121.05	14	20	
	DRI product separation house (attached with common stack)	30	12.23	40.69	7	22.50	
	DRI 350 TPD Cooler Discharge	30	6.03	11.72	6.50	16	
	DRI 360 TPD Cooler Discharge	30	-	9.75	-	11	
	Ferro Division (2x9MVA)	30	49.01	34.11	18	15	
	CPP CFBC Boiler	30	48.42	48.48	26	22	
SMS	30	-	57.11	-	6.50		



**PART-D  
HAZARDOUS WASTES**

**(AS SPECIFIED UNDER HAZARDOUS WASTES (MANAGEMENT,  
HANDLING AND TRANS BOUNDARY MOVEMENT RULES, 2008)**

The industry got consent for operation very recently and the process for getting the authorization as per Hazardous & Other Wastes (Management and Transboundary Movement) Rules, 2016 is under process.

**PART-E  
SOLID WASTE**

Sl. No.	Solid waste	Total Quantity Generated	
		FY: 2022-23	FY: 2023-24
<b>E-1: Generation from process</b>			
1	Dolochar from DRI	27961	40,124
2	Silico Manganese Slag	15339	24,356
2	SMS Slag	-	17,937
<b>E-2: Generation from Pollution Control Equipments (Tonne/year)</b>			
1	DE dust from DRI	7061	15,284
2	Ash	1906	35,196
<b>E-3: Quantity Recycled/Reutilized within the unit (Tonne/year)</b>			
1	Dolochar from DRI	27961	40,124
2	Ash	1906	5,279
3	DE dust from DRI	7061	13,194
4	SMS Slag	-	2,554
<b>E-4: Quantity Sold (Tonne/year)</b>			
NIL			
<b>E-5: Quantity Disposed</b>			
1	Si-Mn Slag	15339	24,356 (Land filling)
2	SMS Slag	-	15,383 (After metal recovery used in land filling)
3	DE dust from DRI	-	2,090 (Land filling)
4	Ash	-	29,917 (Land filling)

**PART-F**

**Characteristics of Hazardous as well as Solid wastes and their method of disposal**

Hazardous/ Solid Wastes	Characteristics	Method of disposal
Used oil	Oily	Sale to authorized recycler

**PART-G**

**Impact of the pollution abatement measures taken on conservation of natural resources and on the cost of production**

1. Roof top rain water harvesting is being implemented at the beginning of the construction stage.
2. Dolochar generated from DRI process is being/will be reused in CFBC for generation of power.
3. Waste heat of DRI plant is being used to generate power through waste heat recovery boiler.
4. Highly efficient pollution control equipments have been installed at all the operation units.
5. Raw material handling systems are equipped with efficient Dust suppression control measures.
6. Pollution dust generated from coal handling system is reused in power plant.
7. All pollution dust pneumatically conveying to a designated hopper to minimize fugitive dust.
8. Raw materials & products are conveying under fully covered condition.



## PART II

Additional measures/ investment proposal for environmental protection abatement of pollution, prevention of pollution

Environment Budgets (Planned Vs Actual) for FY 2023-24

Sl. No.	Item	Expenditure (Lakh(s) INR) Year-2023-24
1	Recurring cost for environmental protection during FY 2023-24	102.64
2	Installation of Biogas Plant	6.5
3	Installation of Effluent Treatment Plant (ETP)	270.3
4	Installation of Solar Pannel	125.9
5	Installation of Continuous Ambient Air Quality Monitoring Station (CAAQMS)	31.3
6	Installation of Electronic Display Board	1.3
	<b>Total</b>	<b>537.94</b>

## PART I

Any other particulars for improving the quality of the environment.

1. Around 50000 sq. meter area inside the plant premises is covered under paver block to minimize the fugitive dust.
2. We also doing third part environmental monitoring (quarterly) by NABL accredited as well as WBPCB recognized laboratory.
3. Water sprinkler has been installed to minimize the fugitive dust.
4. Housekeeping audit is being done each month for all units.
5. 33% area has been covered under plantation throughout the entire plant.

*Am Sundh*



**Status of commitment made during Public Hearing**

<b>Sl No</b>	<b>Issue raised by</b>	<b>Details</b>	<b>Commitment by GMPL</b>	<b>Status</b>
1	Mr Prabhat Bannerjee, Jamuria	He welcomed the proposed expansion project and requested for employment of local youth. He also requested for pollution free environment and plantation	First preference shall be given to the local youth based on their qualifications. He also told that they will arrange an industrial training centre for skill development of local youth for a period of six months. Modernized pollution control devices will be installed and the green belt will also be developed	Skill development training along with employment provided to more than 140 local youth based on their qualifications. Modernized pollution control devices has been installed along with plantation. Presently we have planted 23195 trees which covered approx. 33% area out of total plant area under plantation and we are planning for 8545 more trees which cover 40% area in a span of a year.
2	Mrs Rakhi Karmakar, Mandalpur	She appreciated M/s Giridhan Metal Private Limited for their CSR activities till now. She also requested them to continue the CSR activities	The project proponent have assured that the CSR activities shall be continued	The CSR/CER activities are going on. Till 355.98 lacs incurred towards CSR/CER activities.
3	Mr Abdul Hause, Jamuria	He welcomed the proposed expansion project and requested to the project proponent for development of local schools, surroundings roads and green belt.	The project proponent shall give school dress, school bags, tables, chairs and arrangement and build toilets for both boys and girls separately in the school premises after discussion with the concerned authorities	We have constructed a Model School with tables, chairs along with appointment of required teachers on monthly remuneration at Damodar village for education of Adivasi children.
4	Mr. Lakshmikanta Mukherjee, Benali	He welcomed the proposed expansion project and requested not to extract ground water during plant operation	The project proponent ensured that they will not draw any ground water and the required water shall be drawn from River Damodar	We have not drawn the ground water. The required water is being drawn from Damodar river & Asansol Municipality.
5	Mr. Sanjay Banerjee, Benali	He welcomed the	The project proponent	We have installed

		proposed expansion project and enquired about the control measures to be taken for air pollution	shall install modernized air pollution control devices for e.g. Bag Filter, ESP, Pug Mill, Telescopic Chute etc. in each and every dust generation point. The project proponent also ensured that the entire road of the plant premises will be concreted and the two number road sweeping machines will be engaged to clean the area	modernized air pollution control devices such as – DRI & CPP are well equipped with 5-fields ESP. Ferro Alloy plant, SMS & others dust generation points of DRI (CD, I-bin, product handling etc) are well equipped with modern & pulse jet type nag filter. Dry fog system has been installed in entire coal circuit area to control the fugitive emissions. Closed conveying system have been installed for fine dust /ash transportation. Pug Mill have been installed at ash conditioning. Telescopic chutes have installed at products & by products dispatch areas.
6	Mr. Chanchal Banerjee, Ikra	He welcomed the proposed expansion project and requested the project proponent for employment of local youth	First preference shall be given to the local youth based on their qualifications. He also told that they will arrange an industrial training center for skill development of local youth for a period of six months	Skill development training along with employment provided to more than 140 local youth based on their qualifications.
7	Mr. Sheikh Akhtar Mondal, Akhalpur	He welcomed the proposed expansion project and enquired about the action taken towards the minimization of road dust pollution during vehicle movement	Water sprinkling will be done on the road on daily basis for minimization of road pollution during vehicle movement	Water sprinkling is being done by water tanker on daily basis for minimize of road pollution during vehicle movement, it covers more than 3km area around the plant premises.
8	Mr. Pareshnath, Damodarpur	He welcomed the proposed expansion	No plant waste water will be discharged from plant	Construction of an ETP is going on. We

		project and enquired about the action taken towards management of plant waste water	premises. The project proponent will install an effluent treatment plant for treatment of plant waste water and the treated water will be re-used in plantation, sprinkling and cooling purpose	have installed oil skimmer to remove oil & filters to remove suspended solids from water. Presently the water are being recycled. No plant waste water is discharged.
9	Mr. Satyanarayan Rabani, Jamuria	He welcomed the proposed expansion project and requested to provide an ambulance for local people	The project proponent assured to donate an Ambulance for the welfare of the local people	We have donated an AC Hearse van instead of ambulance as requested by the villagers.
10	Mr. Ghanshyam Prasad Jaiswal, Jamuria	He welcomed the proposed expansion project and requested to provide the portable drinking water to the local villagers in summer season	The project proponent ensured to provide RO Drinking Water to local people during summer season	The drinking water is being provided to the local people.
11	Md. Roshan Ali, Jamuria	He welcomed the proposed expansion project and asked to maintain the roads due to movement of over weighted truck	The project proponent informed that most of the transportation shall be done through railways and road usage shall be limited. If required, on request of the concerned authority necessary measures shall be taken	Most of the transportations are being done by railways and road usage is limited, though repairing & maintenance of nearby road is being done by us.
12	Mr. Pradeep Mukherjee, Churulia	He welcomed the proposed expansion project and requested the Project Proponent to take necessary measures for abatement of pollution. He also requested for development of green belt inside as well as outside of plant premises		We have installed modernized air pollution control devices such as – DRI & CPP are well equipped with 5-fields ESP. Ferro Alloy plant, SMS & others dust generation points of DRI (CD, I-bin, product handling etc) are well equipped with modern & pulse jet type nag filter. Dry fog system has been installed in entire coal circuit area to control the fugitive emissions. Closed conveying system have been installed for fine

				<p>dust /ash transportation. Pug Mill have been installed at ash conditioning. Telescopic chutes have installed at products &amp; by products dispatch areas. Presently we covered approx. 33% area out of total plant area under plantation and we are planning to cover 40% area within next 3yyears.</p>
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