# NKANGALA DISTRICT MUNICIPALITY

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My Ref.:
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**Enquiries:** M Nembilwi **Ref.** 17/4/AEL/MP312/11/02 **Tel:** (013) 249 2016 **Email:** nembilwim@nkangaladm.gov.za


**ATMOSPHERIC EMISSION LICENCE HOLDER: SILICON SMELTERS (PTY) LTD –RAND CARBIDE**

**ATMOSPHERIC EMISSION LICENCE NO.: 17/4/AEL/MP312/11/02**

**ATMOSPHERIC EMISSION LICENCE AS CONTEMPLATED IN SECTION 43 OF THE NATIONAL ENVIRONMENTAL MANAGEMENT: AIR QUALITY ACT, 2004, (ACT NO. 39 OF 2004)**

I, Dr. T. Matoane in my capacity as General Manager: Community Development Services of Nkangala District Municipality (hereinafter referred to as "the Licensing Authority ", in terms of Section 36(1) of the National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004, hereinafter referred to as the "Act"), and as provided for in Section 40 (1) (a) of the Act, hereby grant the authorisation of the above-mentioned Atmospheric Emission Licence subject to Section 43 of the Act to the conditions specified herein.

This Atmospheric Emission Licence is issued to **Silicon Smelters (Pty) Ltd - Rand Carbide** in terms of Section 42 of the Act as amended, in respect of Listed Activity **No. 3.5, 4.5, 4.9 and 4.15.** The Atmospheric Emission Licence is issued on the basis of information provided in the company's application date 13 April 2021, information that became available during processing of the application also the site visit conducted on the 25 May 2021 and final comments received on the 04 October 2021.

The Atmospheric Emission Licence is valid for five (05) years, until **31 March 2026**. This Atmospheric Emission Licence is a renewal initiated by the facility according to Section 47 of the Act and is issued subject to the conditions and requirements set out below which form part of the Atmospheric Emission Licence and which are binding on **Silicon Smelters (Pty) Ltd –Rand Carbide** (hereinafter referred to as "the Licence Holder").

**Air Quality Officer**
Signature:_____ Date: 05-10-2021

## 1. ATMOSPHERIC EMISSION LICENCE ADMINISTRATION

| | |
|---|---|
| Name of the Licensing Authority | Nkangala District Municipality |
| Atmospheric Emission Licence Number | 17/4/AEL/MP312/11/02 |
| Atmospheric Emission Licence Issue Date | 5 October 2021 |
| Atmospheric Emission Licence Type | Atmospheric Emission Licence |
| Review Date, not later than | 31 March 2026 |

## 2. ATMOSPHERIC EMISSION LICENCE HOLDER DETAILS

| | |
|---|---|
| Enterprise Name | Silicon Smelters (Pty) Ltd –Rand Carbide |
| Enterprise Registration Number (Registration Numbers if Joint Venture) | 1998/019036/07 |
| Registered Address | Voortrekker (Old Middelburg Road or R555),and Corner of Christiaan De Wet Street<br>Emalahleni Local Municipality<br>Mpumalanga<br>1035 |
| Postal Address | P. O. Box 214<br>Emalahleni<br>1035 |
| Telephone Number (General) | 013 690 8263 |
| Industry Sector | 24101-8 (Description: Production of Ferro-alloys) |
| Name of Contact Person | Ms Kerry Beamish |
| Name of Emission Control Officer | Ms Kerry Beamish |
| Telephone Number | 013-690-8263 |
| Cell Phone Number | 082 894 5856 |
| Fax Number | 013 690 8384/8380 |
| Email Address | kerry.beamish@ferroglobe.com |
| After Hours Contact Details | 082 894 5856 |
| Land Use Zoning as per Town Planning Scheme | Industrial |

## 3. LOCATION AND EXTENT OF PLANT

### 3.1. Address of the facility

| | |
|---|---|
| Physical Address of the Premises | Cnr Voortrekker Road and Christiaan De Wet |
| Description of Site (Erf) | The surrounding land use within a 5 km radius includes various industrial, commercial, residential and mining land uses within and around the towns of eMalahleni, Jackaroo Park, Hoëveld Park, Blesboklaagte, Eskom park, Fransville and Ackerville. |
| Coordinates of Approximate Centre of Operations | Latitude:25.86 27 S<br>Longitude:- / 29.22 59 E |
| Extent (km²) | 56.281 hectares (27.4663 + 28.8147) - TOTAL PROPERTY |
| Elevation Above Mean Sea Level (m) | ~1 590 Metres Above Mean Sea Level |
| Province | Mpumalanga |
| Metropolitan/District Municipality | Nkangala District Municipality |
| Local Municipality | Emalahleni Local Municipality |
| Designated Priority Area | Highveld Priority Area |

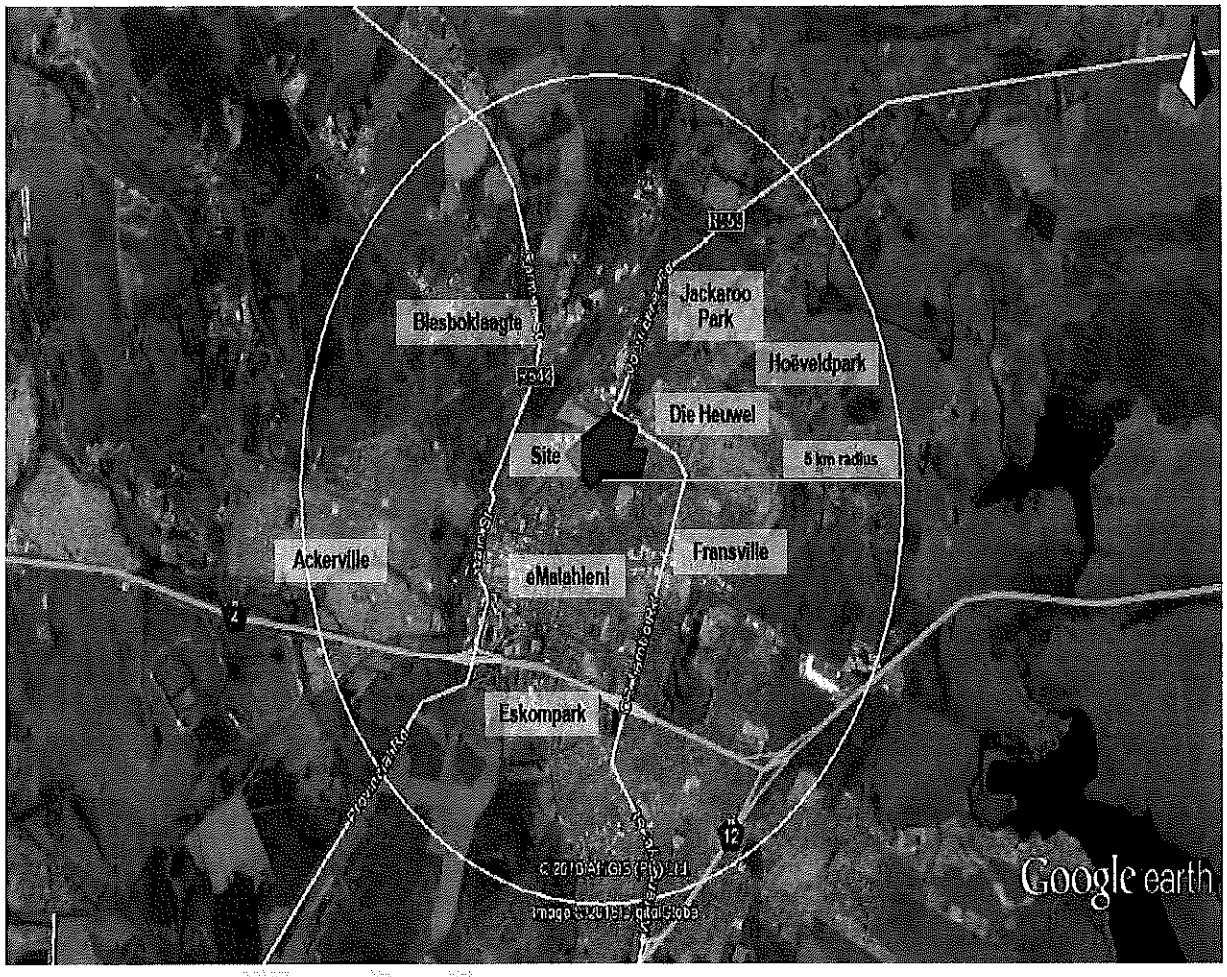



Figure 1: Location of Silicon Smelters (Pty) Ltd – Rand Carbide

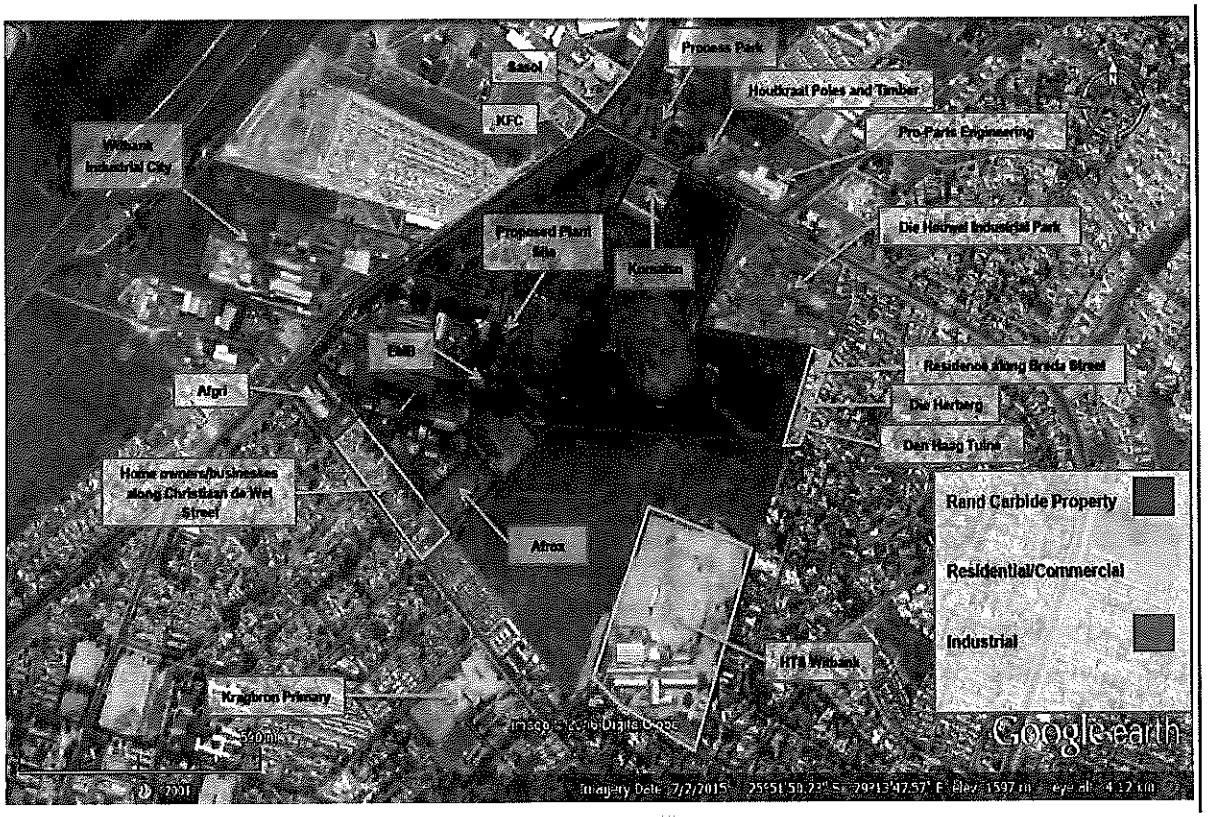



Figure 2. Land use adjacent to Silicon Smelters (Pty) Ltd – Rand Carbide

## 4. GENERAL CONDITIONS

### 4.1. Process and ownership changes

(a) The holder of the atmospheric emission licence must ensure that all unit processes and apparatus used for the purpose of undertaking the listed activity in question, and all appliances and mitigation measures for preventing or reducing atmospheric emissions, are at all times properly maintained and operated.

(b) No building, plant or site of works related to the listed activity or activities used by the licence holder shall be extended, altered or added to the listed activity without an environmental authorisation from the competent authority. The investigation, assessment and communication of potential impact of such an activity must follow the assessment procedure as prescribed in the Environmental Impact Assessment Regulations published in terms of Section 24(5) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), as amended.

(c) Any changes in processes or production increases, by the licence holder, will require prior approval by the licensing authority.

(d) Any changes to the type and quantities of input materials and products, or to production equipment and treatment facilities will require prior written approval by the licensing authority.

(e)The licence holder must, in writing, inform the licensing authority of any change of ownership of the enterprise. The licensing authority must be informed within thirty (30) working days after the change of ownership.

(f) The licence holder must immediately on cessation or decommissioning of the listed activity inform in writing the licensing authority.

### 4.2. General duty of care

(a) The holder of the Licence must, when undertaking the listed activity, adhere to the duty of care obligations as set out in section 28 of the NEMA as amended.

(b)The Licence holder must undertake the necessary measures to minimize or contain the atmospheric emissions. The measures are set out in section 28(3) of the NEMA as amended.

(c) Failure to comply with the above condition is a breach of the duty of care, and the Licence holder will be subject to the sanctions set out in section 28 of the NEMA as amended.

### 4.3. Sampling and/or analysis requirements

(a) Measurement, calculation and/or sampling and analysis shall be carried out in accordance with any nationally or internationally acceptable standard. A different method may be acceptable to the licensing authority as long as it has been consulted and agreed to the satisfactory documentation necessary in confirming the equivalent test reliability, quality and equivalence of analyses.

(b) The licence holder is responsible for quality assurance of methods and performance. Where the holder of the licence uses external laboratories for sampling or analysis, accredited laboratories shall be used.

### 4.4. General requirements for licence holder

(a) The licence holder is responsible for ensuring compliance with the conditions of this licence by any person acting on his, her or its behalf including but not limited to an employee, agent, sub-contractor or person rendering a service to the holder of the licence.

(b) The licence does not relieve the licence holder to comply with any other statutory requirements that may be applicable to the carrying on of the listed activity.

(c) A copy of the licence must be kept at the premises where the listed activity is undertaken. The licence must be made available to the Environmental Management Inspector representing the licensing authority who requests to see it.

(d) The licence holder must inform, in writing, the licensing authority of any change to its details including the name of the Emission Control Officer, postal address and/or telephonic details within fourteen (14) working days after such change has been effected.

**Special Conditions**

(e)The licence holder must attend and participate quarterly in the Nkangala District Municipal Implementation Task Team for the implementation of the Highveld Priority Air Quality Management Plan.

(f) The licence holder must annually report atmospheric emissions on the National Atmospheric Emission Inventory System (NAEIS) https://saaelip.environment.gov.za for the preceding year in terms of GNR 283 in Government Gazette 38633 of 02 April 2015.

### 4.5. Statutory obligations

The licence holder must comply with the obligations as set out in Chapter 5 of NEMAQA (Act no. 39 of 2004) as amended.

## 5. NATURE OF PROCESS

### 5.1. Process Description

**Ferroalloys Production - D FURNACE - FERRO SILICON**

Receiving of raw materials: coal, charcoal, quartz, wood chips, mill scale plus ad hoc in small quantities-barium Sulphate, strontium, silicon manganese, zircon sand.

Raw materials, upon receipt, are stockpiled on site from where the intermediate storage bunkers are fed. Batching of the raw materials takes place underneath these storage bunkers where the required ratios for each of the raw materials are weighed out and dispatched to the furnace bins.

The raw materials mixture is fed into the furnace via six feed chutes. Ferrosilicon is produced via the carbo-thermic reduction of quartz in a sub-merged arc furnace (3 phase) requiring approximately 8 000kwh to produce 1 ton of product.

Liquid metal is tapped (intermittently) from a taphole at +/-1600oC into a ladle lined with refractory material. The metal is then cast into a casting dam lined with ferrosilicon fines. The solidified product is then crushed and packed in accordance with customer requirements.

**Processing of Arsenic, antimony, Beryllium Chormium and Silicon - E FURNACE**
**NOTE - E FURNACE HAS THE CAPACITY TO PRODUCE BOTH FERROSILICON AND SILICON METAL**

The main difference in the production of Ferrosilicon vs Silicon Metal is the electrode systems and Silicon Metal does not contain millscale. For Silicon Metal production, Composite Electrodes are used and for Ferrosilicon, Paste or Soderburg Electrodes are used. A description of the two types of electrodes is attached.

**SILICON METAL PRODUCTION**

Note - Ferro-silicon or silicon metal can be produced from E Furnace

Receiving of raw materials: coal, charcoal, quartz, wood chips, lime stone.
Raw materials, upon receipt, are stockpiled on site from where the intermediate storage bunkers are fed. Batching of the raw materials takes place underneath these storage bunkers where the required ratios for each of the raw materials are weighed out and dispatched to the furnace bins.

The raw materials mixture is fed into the furnace via six feed chutes. Silicon metal is produced via the carbo-thermic reduction of quartz in a sub-merged arc furnace (3 phase) requiring approximately 12 000kWh to produce 1 ton of product.

Liquid metal is tapped (continuously) from a taphole at +/-1600oC into a ladle lined with refractory material. Silicon metal is refined during and after tapping in order to oxidize impurities like Aluminum and Calcium.

The metal is then cast into a casting pan lined with silicon fines. The solidified product is then crushed and packed in accordance with customer requirements.

**FERRO SILICON PRODUCTION**

Receiving of raw materials: coal, charcoal, quartz, wood chips, mill scale plus ad hoc in small quantities - barium Sulphate, strontium, silicon manganese, zircon sand.

Raw materials, upon receipt, is stockpiled on site from where the intermediate storage bunkers are fed. Batching of the raw materials takes place underneath these storage bunkers where the required ratios for each of the raw materials are weighed out and dispatched to the furnace bins.

The raw materials mixture is fed into the furnace via six feed chutes. Ferrosilicon is produced via the carbo-thermic reduction of quartz in a sub-merged arc furnace (3 phase) requiring approximately 8000kWh to produce 1 ton of product.

Liquid metal is tapped (intermittently) from a taphole at +/-1600oc into a ladle lined with refractory material. The metal is then cast into a casting dam lined with ferrosilicon fines. The solidified product is then crushed and packed in accordance with customer requirements.

## Ferroalloys Production - F FURNACE FERROSILICON

Receiving of raw materials: coal, charcoal, quartz, wood chips, mill scale plus ad hoc in small quantities -barium Sulphate, strontium, silicon manganese, zircon sand.

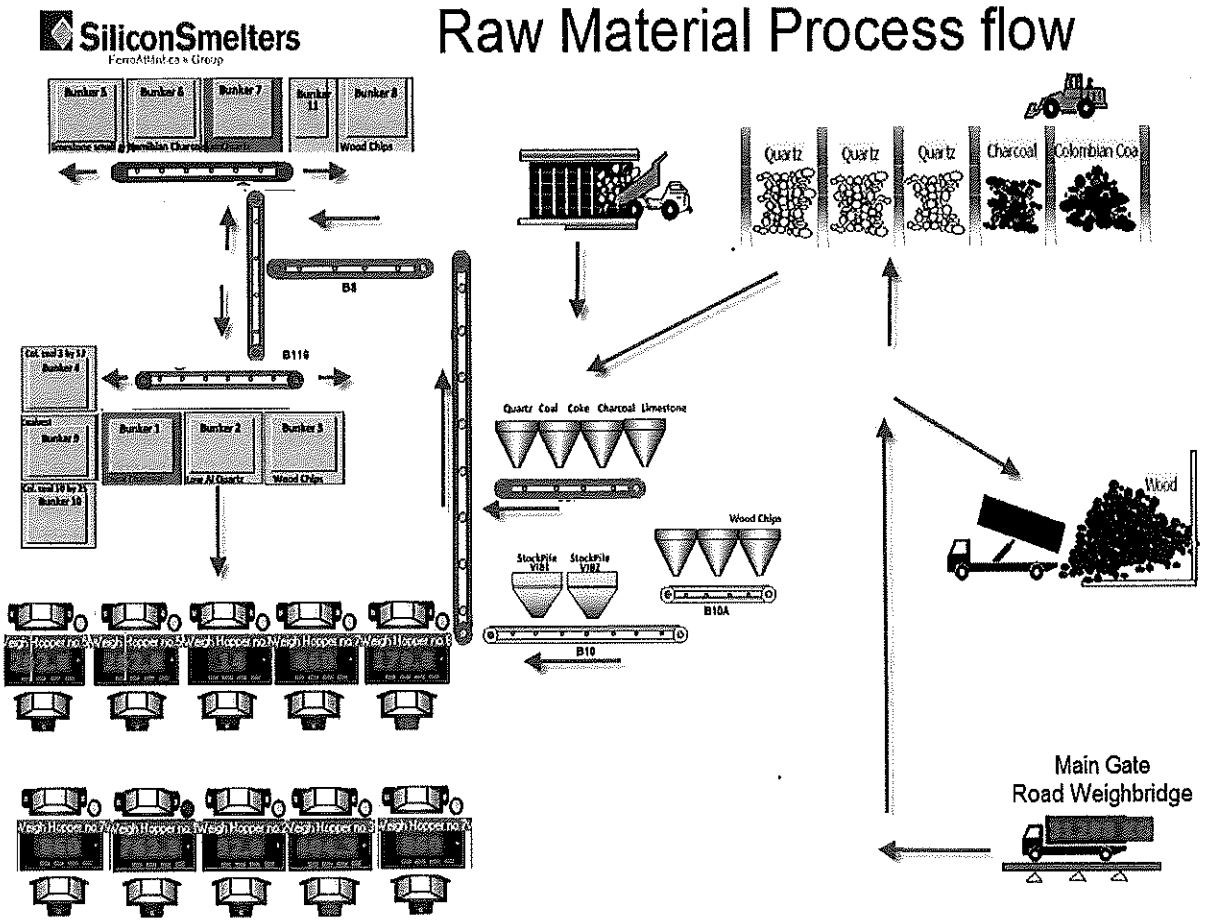
Adding raw materials to submerged arc furnace, tapping molten metal into ladles. Casting metal into dams, thereafter the material is crushed, screened and packed.

Raw materials, upon receipt, is stockpiled on site from where the intermediate storage bunkers are fed. Batching of the raw materials takes place underneath these storage bunkers where the required ratios for each of the raw materials are weighed out and dispatched to the furnace bins.

The raw materials mixture is fed into the furnace via six feed chutes. Ferrosilicon is produced via the carbo-thermic reduction of quartz in a sub-merged arc furnace (3 phase) requiring approximately 8000kWh to produce 1 ton of product.

Liquid metal is tapped (intermittently) from a taphole at +/-1600oc into a ladle lined with refractory material. The metal is then cast into a casting dam lined with ferrosilicon fines. The solidified product is then crushed and packed in accordance with customer requirements.

**All three furnaces work in a similar principle as the below Process Flow Diagrams**




## REFINING OF FERRO SILICON/ SILICON METAL

In order to render a product containing small quantities of impurities (mainly Aluminium and Calcium) it is necessary for the product to be refined in its liquid stage. This can only be done during tapping or during liquid metal treatment.

Refining is done via a ceramic plug fitted in the bottom of the ladle through which Oxygen and Nitrogen gasses are purged (low flow rates).

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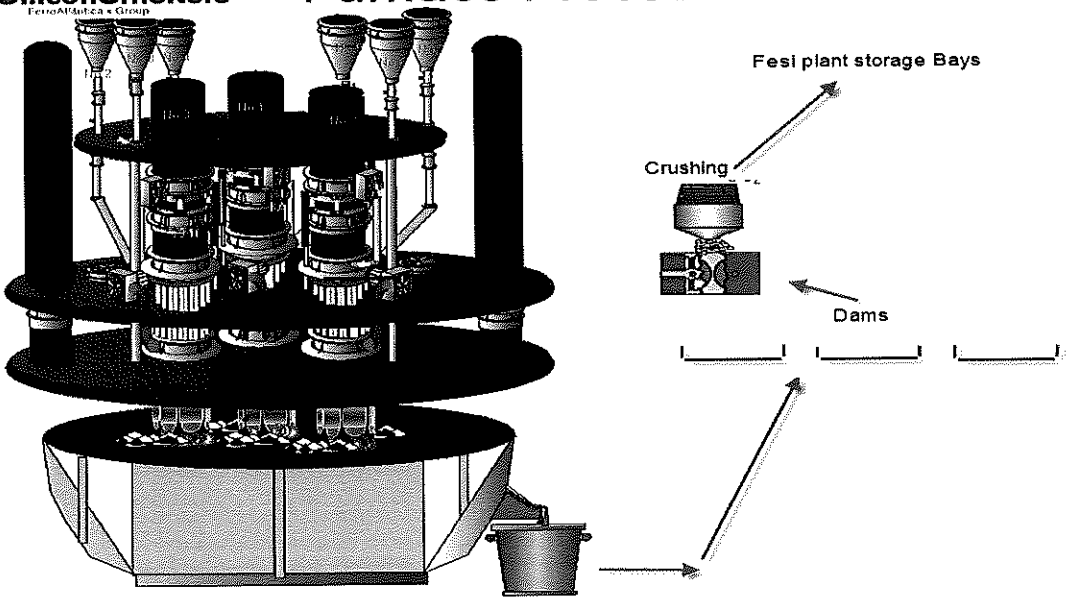
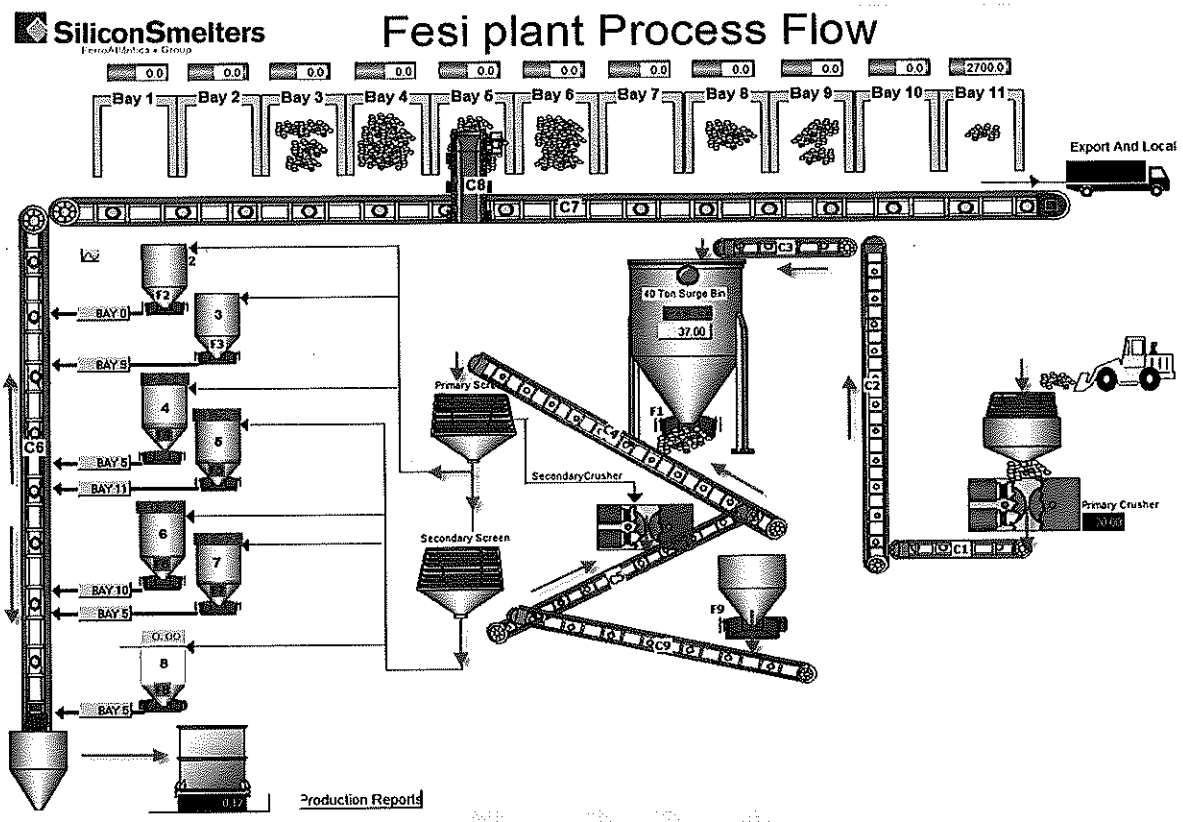
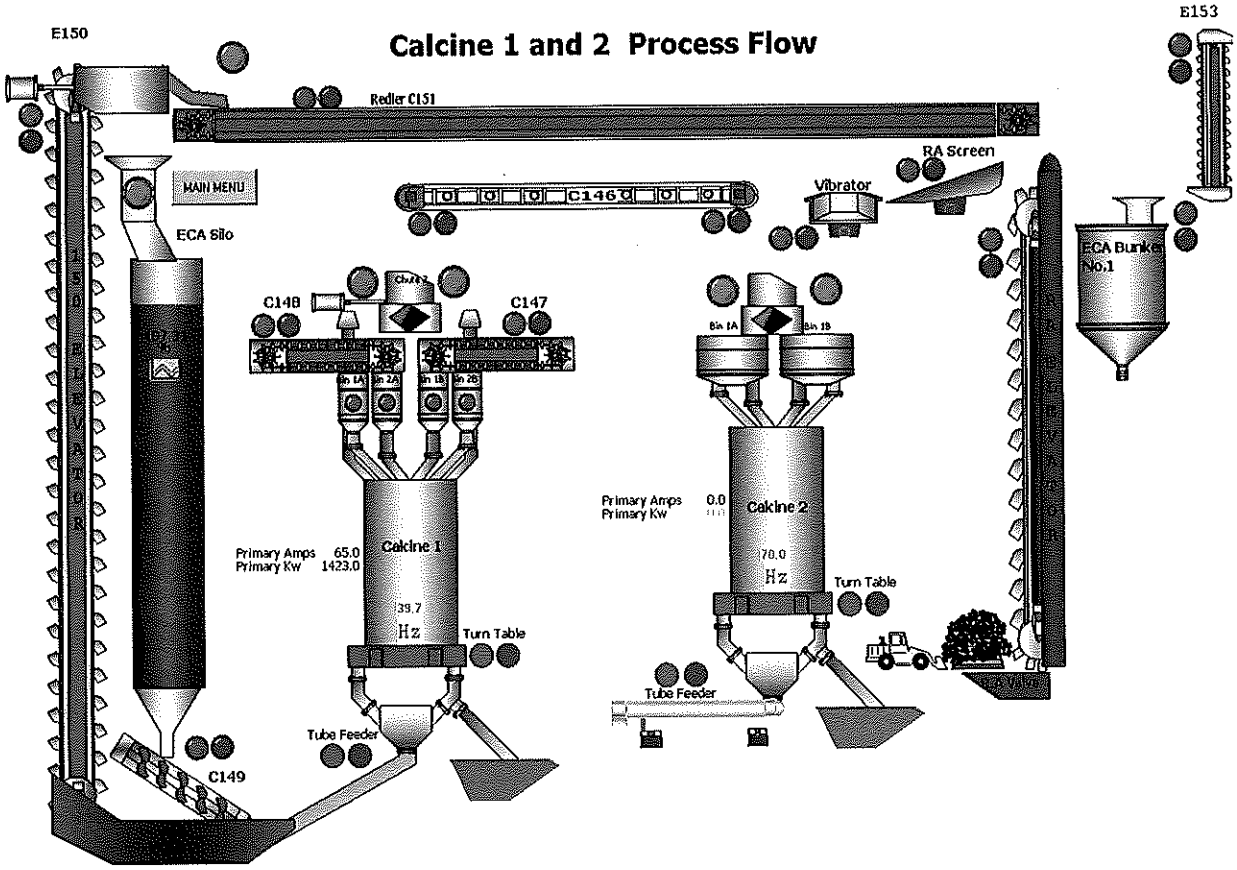
# Furnace Process Flow






## Electrode Paste production - CALCINERS 1 + 2

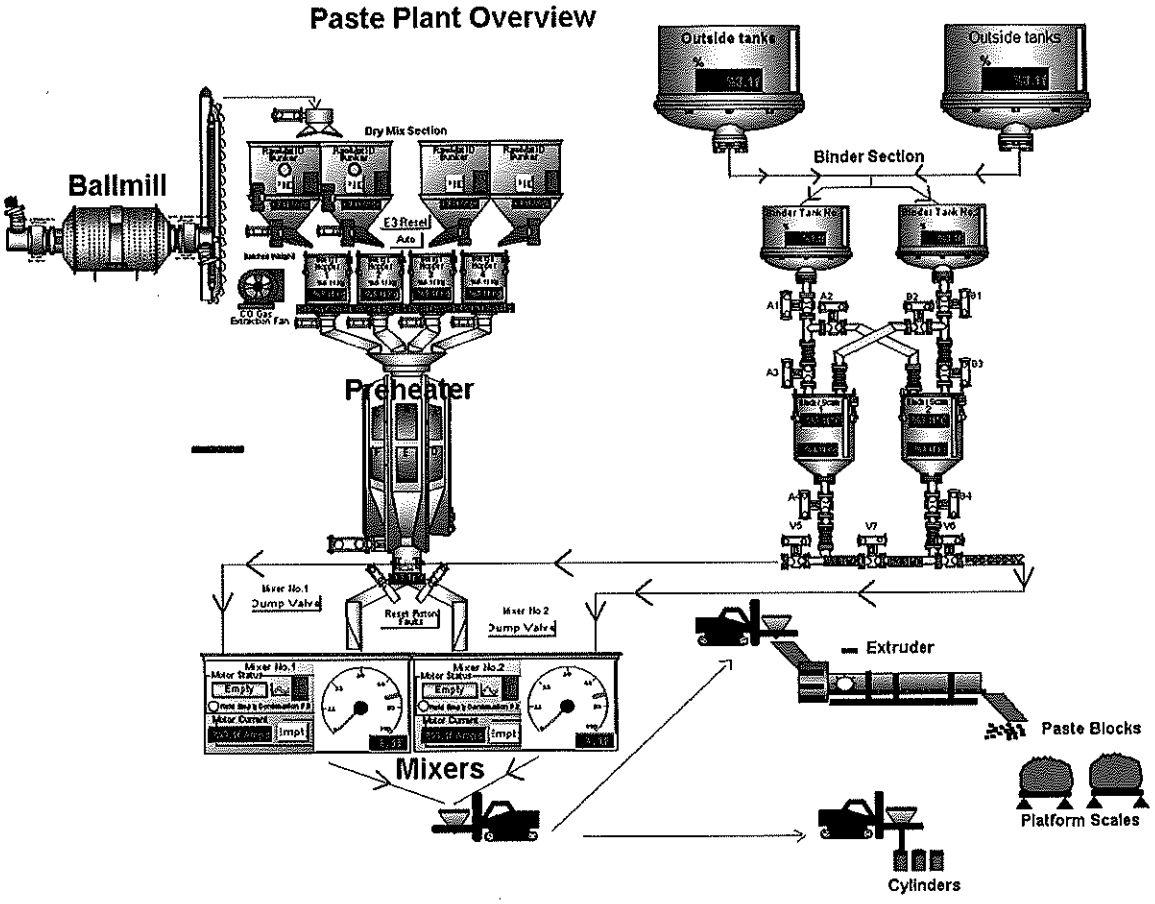
Anthracite is fed into a cylindrical furnace and heated by electrical current passing between two electrodes. The calcined anthracite is discharged from the bottom of the furnace and conveyed to storage bunkers for use in the production of paste.




**Sinter Plants - PASTE PLANT**

Tar pitch is mixed with various fractions of Electrically Calcined Anthracite (ECA) to produce paste. ECA from the two calcined furnaces are drawn from storage bunkers to three hammer mills and a ball mill.

The crushed ECA is taken via bucket conveyors to two twin deck screens where it is distributed to different bunkers holding the different ECA fraction sizes. The fractions are taken via feed chute to a dry mix scale for batch weighing. The batch is then discharged into two mixers where it is mixed with tar binder from the inside binder tanks to produce paste.




## 5.2. Facility Wide Listed Activities with Regulatory Applicability

| Rule Category | Rule Number | Rule Name & Description of the Listed Activity |
|---|---|---|
| SEC21 | SA0305 | Electrode paste production |
| SEC21 | SA0405 | Sinter plants for agglomeration of fine ores using a heating process, including sinter cooling where applicable |
| SEC21 | SA0409 | Production of alloys of iron with chromium, manganese, silicon, or vanadium, the separation of titanium slag from iron-containing minerals using heat |

| | | |
|---|---|---|
| SEC21 | SA0415 | The metallurgical production and processing of arsenic, antimony, beryllium, chromium, and silicon and their compounds by the application of heat. |

## 5.3. Unit process or processes

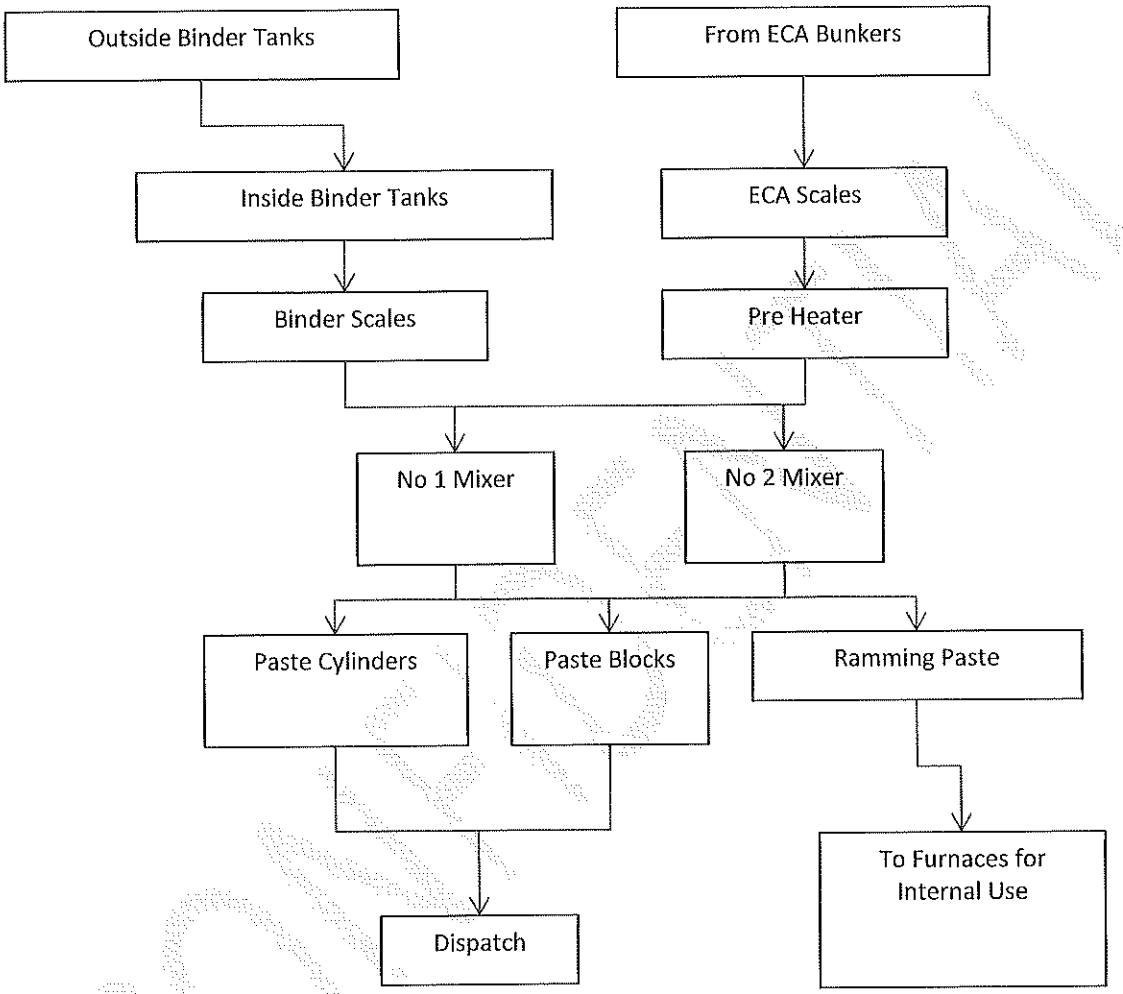
| Unit Process | Process function | Batch or Continuous Process |
|---|---|---|
| Furnace D,E and F | Production of FerroSilicon/Innoculants (FeSi) + Silicon metal | Continuous |
| Crushing | Crushing of FerroSilicon/ Innoculants (FeSi) + Silicon metal (Si) | Continuous |
| Loading | Loading of FerroSilicon/Innoculants (FeSi) + Silicon metal (Si) | Continuous |
| Calciners 1 & 2 | Produce Calcined anthracite for paste production | Continuous |
| Paste Plant | Produce Electrode Paste | Batch |
| Innoculants Plant | Milling of FeSi Innoculants to grains and powder | Batch |
| Refining Plant | Purification of FerroSilicon (FeSi) + Silicon (Si) metal | Batch |
| Final Screen | Remove fines to feed back into the process | Continuous |

## 5.4. Hours of operations

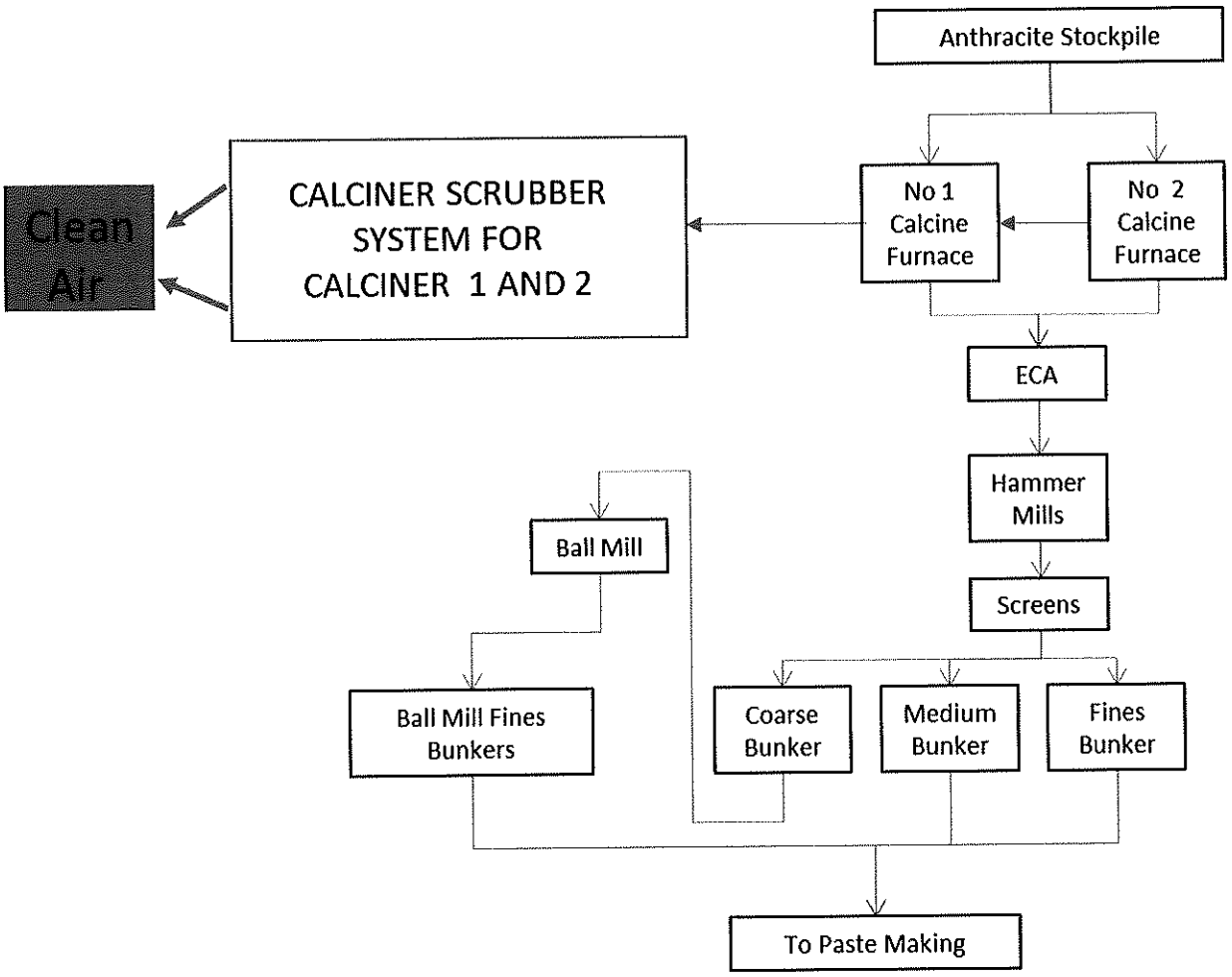
| Unit Process | Operating Hours | Days of Operation per Year |
|---|---|---|
| Furnace D,E and F | 24 hours | 365 |
| Crushing | 24 hours | 365 |
| Calciners 1 & 2 | 24 hours | 365 |
| Paste Plant | 24 hours | 365 |
| Innoculants Plant | 24 hours | 365 |
| Refining Plant | 24 hours | 365 |

## 5.5. Graphical Process Information

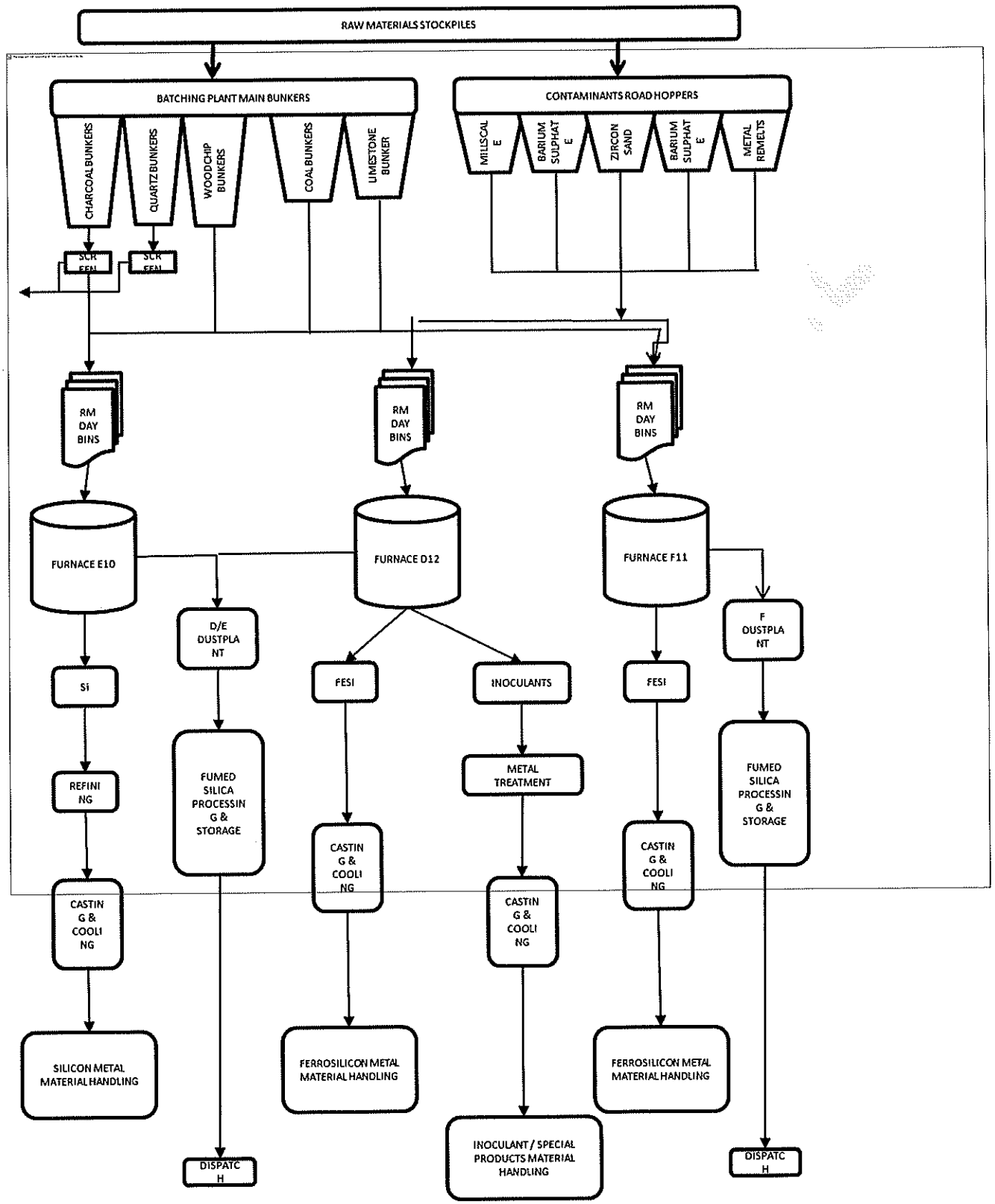
PROCESS FLOW ELECTRODE PASTE PRODUCTION



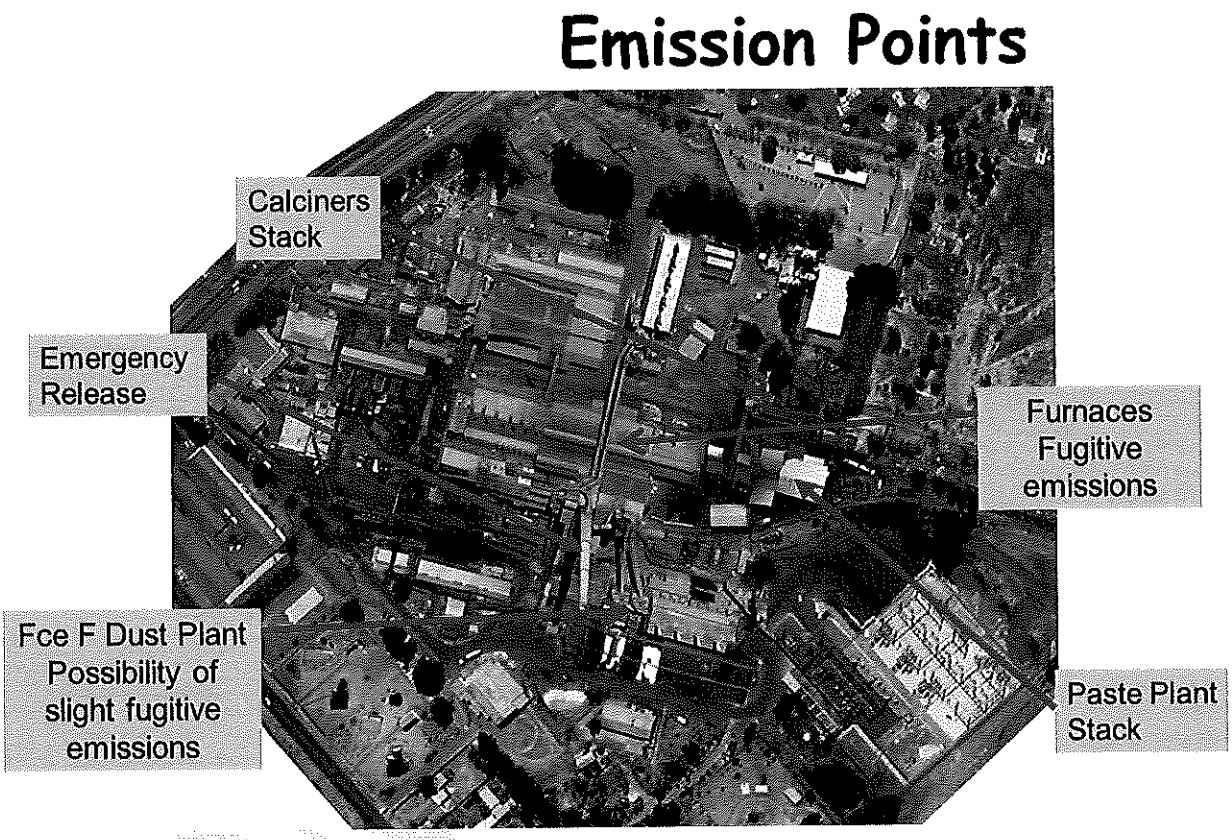
Electrically Calcined Anthracite Production



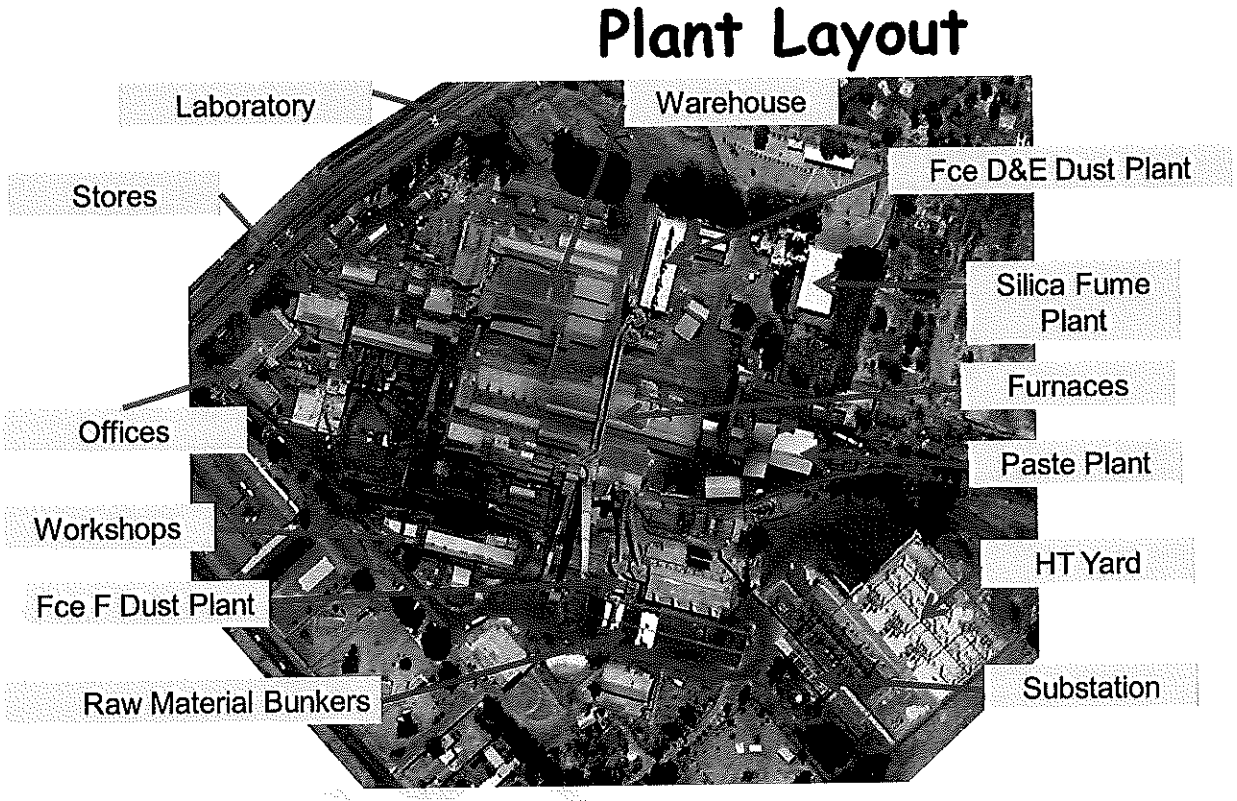
## PROCESS FLOW D, E AND F FURNACES –PRODUCTION OF SILICON METAL AND FERRO SILICON



PROCESS FLOW CHART CLEARLY INDICATING INPUTS, OUTPUTS AND EMISSIONS AT THE SITE OF WORKS INCLUDING POINT OF POTENTIAL FUGITIVE AND EMERGENCY RELEASES



SITE LAYOUT DIAGRAM (PLAN VIEW AND TO SCALE) INDICATING LOCATION OF UNIT PROCESSES, PLANTS, BUILDINGS, STACKS, STOCKPILES, AND ROADS (INCLUDE TRUE NORTH ARROW AND



## 6. RAW MATERIALS AND PRODUCTS

### 6.1.1 Raw materials used

D FURNACE –FerroSilicon/Inoculants production/Inoculants production

| Raw Material Type | Maximum Permitted Consumption Rate (Quantity) | Units (quantity/period) |
|---|---|---|
| Quartzite | 100 | Tons/day |
| Charcoal/ Coal | 65 | Tons/day |
| Woodchips | 60 | Tons/day |
| Mill scale | 20 | Tons/day |
| Barium Sulphate, Strontium, Silicon Manganese and Zircon Sand | 2 | Tons/day |

### Production rates

| Product Name | Maximum Permitted Production Capacity (Quantity) | Units (quantity/period) |
|---|---|---|
| Furnace D | 60 | Tons/day |

| By-production Name | Maximum production capacity (Quantity) | Units (quantity/ period) |
|---|---|---|
| Silica Fume | 15 | Tons/days |

### Raw materials used

F FURNACE –Ferrosilicon/Innoculants Production

| Raw Material Type | Maximum Permitted Production Capacity (Quantity) | Units (Quantity/period) |
|---|---|---|
| Quartzite | 160 | Tons/day |
| Charcoal/ Coal | 100 | Tons/day |
| Woodchips | 80 | Tons/day |
| Mill scale | 30 | Tons/day |
| Barium Sulphate, Strontium, Silicon Manganese and Zircon Sand | 2 | Tons/day |

Production rates

| Production Name | Maximum production Capacity Permitted (Quantity) | Units (Quantity/Period) |
|---|---|---|
| Furnace F Ferro Silicon | 130 | Tons/day |

| By-product Name | Maximum production Capacity Permitted (Quantity) | Units (Quantity/Period) |
|---|---|---|
| Silica Fume | 40 | Tons/day |

Raw material used

E FURNACE – Silicon Metal Production

| Raw Material Type | Maximum Permitted Production Capacity (Quantity) | Units (Quantity/Period) |
|---|---|---|
| Quartzite | 120 | Tons/day |
| Charcoal/ Coal | 90 | Tons/day |
| Woodchips | 60 | Tons/day |
| Limestone | 1 | Tons/day |

Production rates

| Production Name | Maximum Permitted Production Capacity (Quantity) | Units (Quantity/Period) |
|---|---|---|
| Furnace E Silicon | 55 | Tons/day |

| By-product Name | Maximum Permitted Production (Quantity) | Units (Quantity/Period) |
|---|---|---|
| Silica Fume | 22 | Tons/days |

Raw Material used

E FURNACE – FerroSilicon production

| Raw Material | Maximum permitted Consumption Rate (Quantity) | Units (Quantity/Period) |
|---|---|---|
| Quartzite | 100 | Tons/day |
| Charcoal/Coal | 65 | Tons/day |
| Woodchips | 60 | Tons/day |
| Millscale | 20 | Tons/day |
| Barium Sulphate, Strontium. Silicon Manganese and Zircon Sand | 2 | Tons/day |

Production rates

| Production Name | Maximum Production Capacity Permitted (Quantity) | Units (Quantity/Period) |
|---|---|---|
| Furnace E Ferro Silicon | 60 | Tons/day |

| By-product Name | Maximum Production Capacity Permitted (Quantity) | Units (Quantity/Period) |
|---|---|---|
| Silica Fume | 15 | Tons/days |

Raw Materials used

CALCINERS 1 & 2

| Raw Material Type | Maximum Production Capacity Permitted (Quantity) | Units (Quantity/Period) |
|---|---|---|
| Raw Anthracite | 120 | Tons/day |

Production rates

| Raw Material Type | Maximum Production Capacity Permitted (Quantity) | Units (Quantity/Period) |
|---|---|---|
| Calcined Anthracite | 100 | Tons/day |

| By-product Name | Maximum Production Capacity Permitted (Quantity) | Units (Quantity/Period) |
|---|---|---|
| Nil | | |

Raw materials used

Paste Plant

| Raw Material Type | Maximum Production Capacity Permitted (Quantity) | Units (Quantity/Period) |
|---|---|---|
| Electrically Calcined Anthracite | 100 | Tons/day |
| Coal Tar Pitch | 25 | Tons/day |

Production rates

| Production Name | Maximum Production Capacity Permitted (Quantity) | Units (Quantity/Period) |
|---|---|---|
| Paste | 100 | Tons/day |

| By-product Name | Maximum Production Capacity Permitted (Quantity) | Units (Quantity/Period) |
|---|---|---|
| Nil | | |

## 6.3. Materials used in energy sources

| Materials for Energy Source | Maximum Permitted Consumption Rate | Designed Consumption Rate | Actual Consumption Rate | Sulphur % | Ash % |
|---|---|---|---|---|---|
| Electricity | N/A | N/A | 682 418 226 KW/Annum | N/A | N/A |

## 6.4. Emission Units

### 6.4.1. Emission Unit - Stack Parameters (Point Source)

| EU Code | Stack Name | Latitude (decimal degrees) South | Longitude (decimal degrees) East | Height of Release Above Ground (m) | Height Above Nearby Building (m) | Diameter at Stack Tip / Vent Exit (m) | Actual Gas Exit Temperature (°C) | Actual Gas Volumetric Flow ($m^3/hr$) | Actual Gas Exit Velocity (m/s) | Emission Hours | Type of Emission (Continuous / Batch) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| B | Furnace D,E, F stack | 25°86'3885" | 29°22'52.65" | 131 | 101 | 4.1 | 200 | | | 24 | Continuous |
| G1 | Furnace F Dust Plant | 25°86'42.33" | 29°22'60.05" | 35 | 18 | 2.8 | 200 | 1 149 990 | 13.0 | 24 | Continuous |
| G2 | Furnace D+E Dust Plant | 25°86'24.67" | 29°22'60.36" | 35 | 18 | 2.8 | 200 | 1 308 764 | 11.8 | 24 | Continuous |
| H1 | Calciner 1 | 25°86'29.49" | 29°22'66.31" | 27 | 15 | 0.45 | 32,2 | 68 | 5,411 | 24 | Continuous |
| H2 | Calciner 2 | 25°86'34.18" | 29°22'65.43" | 27 | 15 | 0.45 | 32,2 | 68 | 5,41 | 24 | Continuous |
| J1 | Paste Plant Dust Control Stack 1 | 25°86'32.67" | 29°22'66.20" | 31 | 4.6 | 0.9 | 45 | 16 595 | 7.2 | 24 | Continuous |
| J2 | Paste Plant Dust | 25°86'32.62" | 29°22'65.93" | 31 | 4.6 | 0.9 | 45 | 18 746 | 8.2 | 24 | Continuous |

| EU Code | Stack Name | Latitude (decimal degrees) South | Longitude (decimal degrees) East | Height of Release Above Ground (m) | Height Above Nearby Building (m) | Diameter at Stack Tip / Vent Exit (m) | Actual Gas Exit Temperature (°C) | Actual Gas Volumetric Flow ($m^3/hr$) | Actual Gas Exit Velocity (m/s) | Emission Hours | Type of Emission (Continuous / Batch) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Control Stack 2 | | | | | | | | | | |
| J3 | Paste Plant Dust Control Stack 3 | 25°86'32.53 " | 29°22'65.58" | 31 | 4.6 | 0.6 | 40 | 10 381 | 10.2 | 24 | Continuous |

### 6.4.2. Emission Unit - Source Parameters (Area/Line Source)

| EU Code | Source name | Source description | Latitude | Longitude | Height release above ground (m) | Length of Area (m) | Width of Area (m) | Emission hours | Type of emissions |
|---|---|---|---|---|---|---|---|---|---|
| D Furnace | Furnace Building | Fugitive emissions from furnace tapping | S25°51'48.5" | E029°13'31.0" | 0 - 28 m | +/-40m | +/-30m | 24 hours | Continuous |
| E Furnace | Furnace Building | Fugitive emissions from furnace tapping | S25°51'49.2" | E029°13'32.1" | 0 - 28 m | +/-40m | +/-30m | 24 hours | Continuous |
| F Furnace | Furnace Building | Fugitive emissions from furnace tapping | S25°51'48.5" | E029°13'32.2" | 0 - 28 m | +/-40m | +/-30m | 24 hours | Continuous |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Raw Materials B9 | Transfer Point Conveyors | Conveyors transporting material | S25°51'50.2" | E029°13'32.1" | 1 - 60 m | Various | | 24 hours | Continuous |
| Historic Dump | By-product heap | Ferrosilicon and silica dust | S25°51'49.0" | E029°13'50.6" | 28 m | 150m | 250m | 24 hours | Continuous |
| Raw Materials | Stock piles | Coal, quartzite, charcoal, | S25°51'52.0" | E029°13'31.4" | 8m | +/-10m | +/-5m | 24 hours | Continuous |
| General | Access Road | Ferrosilicon sweepings | S25°51'48.3" | E029°13'26.1" | Ground | +/-2km | +/-50m | 24 hours | Continuous |

## 7. CONTROL DEVICES, EMISSION UNITS, AND REPORTING GROUPS

### 7.1. Control Devices

| Emission Unit | | | | Control Device | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Associated Source Code | Appliance / Process Equipment Number | Appliance Serial Number | Appliance Type / Description | Control devices Name and Model | Control Devices Manufacture Date | Commission Date | Date of Significant Modification / Upgrade | Device Type | Design Capacity | Minimum Control Efficiency (%) | Minimum Utilization (%) |
| (CD 0004) CD F Furnace | Electric arc furnace | C-7119.0022 | Flakt – Baghouse Filter: Furnace F Dust Plant – Main Gas Extraction | Baghouse Filter: Furnace F dust plant (main gas extraction) | 1976 | 1976 | 1987 | Baghouse | 96% | 96% | 98% |
| (CD 0005) CD D +E Furnace | Electric arc furnace | C-6123.0089 | Flakt – Baghouse Filter: Furnace D+E Dust Plant. Main gas extraction | Baghouse Filter: Furnace D+E dust plant (main gas extraction) | 1981 | 1981 | 1991 | Baghouse | 96% | 96% | 98% |
| (CD 0006) CD Paste plant | Paste plant | | Brandt Micro-pull Baghouse filter (Brandt –Jet Pulse) | BRANDT Micro-Pull Baghouse Filter (BRANDT – Jet pulse) | | 1981 | | Baghouse | 96% | 96% | 98% |

| Emission Unit | | | | Control Device | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Associated Source Code | Appliance / Process Equipment Number | Appliance Serial Number | Appliance Type / Description | Control devices Name and Model | Control Devices Manufacture Date | Commission Date | Date of Significant Modification / Upgrade | Device Type | Design Capacity | Minimum Control Efficiency (%) | Minimum Utilization (%) |
| (CD0007) CD Calciners | CD Calciners | Theisen Disintegrator 250/250 db | Wet Scrubber system for Calciners | | 2020 | 2020 | | Wet Scrubber | 98% | 95% | 95% |

## 7.2. Reporting Group / Emission Unit – Maximum Emission Rates (Under Normal Working Conditions)

| RG/EU Code | Activity | Pollutant Name | Maximum Release Rate (mg/Nm³) | Date to be achieved | Average Period (Drop-down: Instantaneous, Hourly, Daily, Monthly, Annually) | Duration of Emissions (Hours) |
|---|---|---|---|---|---|---|
| EU001 | SA0409 | $SO_2$ | 500 | Immediately | Hourly | 24 hours |
| | | $NO_x$ as $NO_2$ | 400 | Immediately | Hourly | 24 hours |
| | | PM | 50 | Immediately | Hourly | 24 hours |
| EU002 | SA0415 | PM | 20 | Immediately | Hourly | 24 hours |

| | | | | | | |
|---|---|---|---|---|---|---|
| EU003 | SA0409 | $SO_2$ | 500 | Immediately | Hourly | 24 hours |
| | | $NO_x$ as $NO_2$ | 400 | Immediately | Hourly | 24 hours |
| | | PM | 50 | Immediately | Hourly | 24 hours |
| EU004 | SA0305 | PM | 50 | Immediately | Hourly | 24 hours |
| EU005 | SA0405 | PM | 50 | Immediately | Hourly | 24 hours |
| | | $SO_2$ | 500 | Immediately | Hourly | 24 hours |
| | | $NO_x$ as $NO_2$ | 700 | Immediately | Hourly | 24 hours |
| EU006 | SA0305 | PM | 50 | Immediately | Hourly | 24 hours |
| EU007 | SA0405 | PM | 50 | Immediately | Hourly | 24 hours |
| | | $SO_2$ | 500 | Immediately | Hourly | 24 hours |
| | | $NO_x$ as $NO_2$ | 700 | Immediately | Hourly | 24 hours |

**Special requirement:**

| Section 21 Subcategory | Condition | Selection child condition (s) |
|---|---|---|
| SA0409 | The following special arrangement shall apply- | Secondary fume capture installations shall be fitted to all new furnace installations<br>(ii) Emission of Cr(VI), Mn and V from primary fume captures systems of ferrochrome, ferromanganese and ferrovanadium furnaces respectively to be measured and reported to licensing authority annually. |

## Point source – Operating Requirements

7.2.1. **Silicon Smelters- Rand Carbide** must report any noncompliance with the conditions stipulated in this Atmospheric Emission Licence

7.2.2. A copy of this AEL shall be retained at a place convenient to be produced in case the authorities would like to view it.

7.2.3. The Licence holder shall notify the Licensing Authority in writing pertaining to any upgrades or building alterations associated with the listed activity, prior taking the action.

7.2.4. The licence holder is responsible for ensuring compliance with the conditions stipulated in this AEL, including a person acting on behalf of the licence holder.

7.2.5. All records demonstrating compliance & non-compliance must be maintained and be kept for at least five (5) years.

7.2.6. Any abnormalities experienced shall be part on the normal monthly reporting and be forwarded to the Licensing Authority.

7.2.7. In the event where there is an equipment failure, malfunction or break down, the responsible person/licence holder shall reduce the load to the extent that non-compliance to the licence conditions are avoided and if it still continues, the operation shall be halted.

7.2.8. An official Air Quality Complaints Register must be developed, maintained, kept on the plant and made available for inspections.

7.2.9. The number of hours for which emissions exceeded the limit shall be reported immediately to the Licensing Authority.

7.2.10. Emissions must be measured and reported to Licensing Authority bi-annually.

7.2.11. The licence holder must at all times prevent any deviation from the normal conditions of operations that may result in emission exceedances from the specified limit values. In case there is potential of such, the loading shall be scaled down or operations shall be halted completely if there is a likelihood that continued operation may result in harm to human health and well-being or otherwise be detrimental to the environment.

7.2.12. The license holder shall be liable to prevent and mitigate against the risk of harm to human health and the environment and shall put in place measures necessary to prevent and/ or mitigate against such risks.

## 7.3. Reporting Group / Emission Unit – maximum emission rates (under start-up, maintenance and shut-down conditions)

**The following conditions must be adhered to at a minimum during start-up, maintenance and shut-down conditions:**

7.3.1 The Licence Holder must take all reasonable measures to control atmospheric emissions during start-up, maintenance and shut-down operations.

7.3.2 Normal start-up, maintenance and shut-down conditions shall not exceed a period of 48 hours. Should normal start-up, maintenance, upset and shut-down conditions exceed a period of 48 hours, section 30 of the National Environmental Management Act, 107 of 1998 (as amended) shall apply.

7.3.3 In order to put into effect section 42 of the Act, the licence holder shall, on receipt of the Atmospheric Emission Licence, undertake an investigation to measure, monitor and report on point source emissions released during start-up, maintenance and shut-down conditions.

7.3.4 In order to put into effect the provision of section 42 of the Act, the licensing Authority may from time to time review the conditions set herein and may set maximum emission limits to be adhered to by the licence holder during start-up, maintenance and shut-down conditions.

7.3.5 The licence holder shall be liable to prevent and mitigate against the risk of harm to human health and the environment and shall put in place measures necessary to prevent and/ or mitigate against such risks

## 7.4. Reporting Group / Emission Unit – emission monitoring and reporting requirements

| RG/EU Code | Activity | Pollutant | Emission Sampling / Monitoring Method | Sampling Testing Frequency | Average Monitoring Duration (Hours) | Parameters to be Measured | Parameters to be Reported | Reporting Frequency |
|---|---|---|---|---|---|---|---|---|
| EU001 | SA0409 | $SO_2$ | As per Annexure A of GN893 of 22 November 2013 | Bi-annual | As per Annexure A of GN893 of 22 November 2013 | As per Annexure A of GN893 of 22 November 2013 | As per Annexure A of GN893 of 22 November 2013 | Bi-annual |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | $NO_x$ expressed as $NO_2$ | As per Annexure A of GN893 of 22 November 2013 | Bi-annual | As per Annexure A of GN893 of 22 November 2013 | As per Annexure A of GN893 of 22 November 2013 | As per Annexure A of GN893 of 22 November 2013 | Bi-annual |
| | | PM | As per Annexure A of GN893 of 22 November 2013 | Bi-annual | As per Annexure A of GN893 of 22 November 2013 | As per Annexure A of GN893 of 22 November 2013 | As per Annexure A of GN893 of 22 November 2013 | Bi-annual |
| EU002 | SA0415 | PM | As per Annexure A of GN893 of 22 November 2013 | Bi-annual | As per Annexure A of GN893 of 22 November 2013 | As per Annexure A of GN893 of 22 November 2013 | SA0415 | Bi-annual |
| EU003 | SA0409 | $SO_2$ | As per Annexure A of GN893 of 22 November 2013 | Bi-annual | As per Annexure A of GN893 of 22 November 2013 | As per Annexure A of GN893 of 22 November 2013 | As per Annexure A of GN893 of 22 November 2013 | Bi-annual |
| | | $NO_x$ expressed as $NO_2$ | | | | | | |
| | | PM | | | | | | |
| EU004 | SA0305 | PM | As per Annexure A of GN893 of 22 November 2013 | Bi-annual | As per Annexure A of GN893 of 22 November 2013 | As per Annexure A of GN893 of 22 November 2013 | As per Annexure A of GN893 of 22 November 2013 | Bi-annual |
| EU005 | SA0405 | PM | As per Annexure A of GN893 of 22 November 2013 | Bi-annual | As per Annexure A of GN893 of 22 November 2013 | As per Annexure A of GN893 of 22 November 2013 | As per Annexure A of GN893 of 22 November 2013 | Bi-annual |
| | | $SO_2$ | | | | | | |
| | | $NO_x$ expressed as $NO_2$ | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| EU006 | SA0305 | PM | As per Annexure A of GN893 of 22 November 2013 | Bi-annual | As per Annexure A of GN893 of 22 November 2013 | As per Annexure A of GN893 of 22 November 2013 | As per Annexure A of GN893 of 22 November 2013 | Bi-annual |
| EU007 | SA0405 | PM | As per Annexure A of GN893 of 22 November 2013 | Bi-annual | As per Annexure A of GN893 of 22 November 2013 | As per Annexure A of GN893 of 22 November 2013 | As per Annexure A of GN893 of 22 November 2013 | Bi-annual |
| | | $SO_2$ | | | | | | |
| | | $NO_x$ expressed as $NO_2$ | | | | | | |

## 7.5. Reporting Group / Emission Unit (Area and/or line source) – management and mitigation measures

| RG/EU Code | Area and/or Line Source Description | Description of Specific Measures | Timeframe for Achieving Required Control Efficiency | Method of Monitoring Measures Effectiveness | Contingency Measures |
|---|---|---|---|---|---|
| Furnaces | Furnace D,E,F off-take canopies | | On going | Inspections and Fall-Out Dust Monitoring monthly | PM Cards |
| Furnaces | Dusts Plants D, E & F | | On going | Inspections and Fall-Out Dust Monitoring | Switch off furnace |
| Furnaces | Furnaces – Tap hole fume extraction | | On going | Inspections and Fall-Out Dust Monitoring | PM Cards |
| Furnaces | D-Furnace Rotating Doors | | On going | Inspections and Fall-Out Dust Monitoring | PM Cards |

| | | | | | |
|---|---|---|---|---|---|
| Furnaces | E-Furnace Rotating doors | | On going | Inspections and Fall-Out Dust Monitoring | PM Cards |
| Furnaces | F-Furnace Rotating doors | | On going | Inspections and Fall-Out Dust Monitoring | PM Cards |
| Furnaces | E-Furnace – electrode Fume Extraction system | | On going | Inspections and Fall-Out Dust Monitoring | PM Cards |
| General | Dust suppression at dump road | | On going | Inspections and Fall-Out Dust Monitoring | Water spray |
| General | Housekeeping throughout plant | | On going | Inspections and Fall-Out Dust Monitoring | Monthly cleaning contract |
| General | Housekeeping (sweeping roads) | | On going | Inspections and Fall-Out Dust Monitoring | PM Cards |
| Raw Materials | Raw material stockpiles – water spray during offloading & transfer | | On going | Inspections and Fall-Out Dust Monitoring | PM Cards |
| Crushing Plants | Furnace D,E,F off-take canopies | | On going | Inspections and Fall-Out Dust Monitoring | PM Cards |
| Inoculants Plant | Dusts Plants D, E & F | | On going | Inspections and Fall-Out Dust Monitoring | PM Cards |

**Area Source – Operating requirements**

**7.5.1.** Fall-Out-Dust Monitoring Programme should be instituted from on-set of the activity operation and a monthly report of Fall-Out-Dust Monitoring be submitted to the Licensing Authority,

**7.5.2.** The National Dust Control Regulations, Government Notice 36974 Regulation Number 827 requirements should be complied with.

**7.5.3.** Inspections of Fugitive Dust should be conducted daily.

**7.5.4.** This activity should form part of the site Air Quality Management Plan and Annual Emission Report.

**7.5.5.** An Annual Emission Report should be compiled and submitted to the Licensing Authority

.

## 7.6. Routine reporting and record-keeping

***Complaints register***

The licence holder must maintain a complaints register at its premises, and such register must be made available for inspections. The complaints register must include the following information on the complainant, namely, the name, physical address, telephone number, date and the time when the complaint was registered. The register should also provide space for noise, dust and offensive odours complaints.

Furthermore, the licence holder is to investigate and, monthly report to the licensing authority in a summarised format on the total number of complaints logged. The complaints must be reported in the following format with each component indicated as may be necessary:

**(a) Source code / name;**

**(b) Root cause analysis;**

**(c) Calculation of impacts / emissions associated with incidents and dispersion modelling of pollutants, where applicable;**

**(d) Measures implemented or to be implemented to prevent recurrence; and**

**(e) Date by which measure will be implemented.**

The licensing authority must also be provided with a copy of the complaints register. The record of a complaint must be kept for at least 5 (five) years after the complaint was made.

***Annual reporting***

The licence holder must complete and submit to the licensing authority an annual report. The report must include information for the year under review (i.e. annual year-end of the company). The report must be submitted to the licensing authority not later than 60 (sixty) days after the end of each reporting period. The annual report must include, amongst others, the following items:

(a) Pollutant emissions trend;
(b) Compliance audit report(s);
(c) Major upgrades projects (i.e. abatement equipment or process equipment); and

The holder of the licence must keep a copy of the annual report for a period of at least 5 (five) years.

***Greenhouse gas Reporting***

Reporting in terms of Section 43 (1) (l) shall be done in accordance with the National Greenhouse Gas Reporting Regulations.

## 7.7. Investigation

The following investigations are required:

| Investigation | Purpose | Completion Date |
|---|---|---|
| N/A | N/A | N/A |

## 8. DISPOSAL OF WASTE AND EFFLUENT ARISING FROM ABATEMENT EQUIPEMT CONTROL TECHNOLOGY

The disposal of any waste and effluent arising from the abatement equipment must comply with the relevant legislation and requirements of the relevant authorities

| EU Code | Stack Code | Waste / Effluent Type | Hazardous Components Present | Method of Disposal |
|---|---|---|---|---|
| N/A | N/A | N/A | N/A | N/A |

## 9. PENALTIES FOR NON-COMPLIANCE WITH LICENCE AND STATUTORY CONDITIONS AND OR REQUIREMENTS

Failure to comply with any of the licence and relevant statutory conditions and/or requirements is an offence, and licence holder, if convicted, will be subjected to those penalties as set out in section 52 of the NEM: AQA.

## 10. APPEAL OF LICENCE

10.1 The Licence Holder must notify every registered interested and affected party, in writing and within ten (10) days, of receiving the Municipal decision.

10.2 The notification referred to in 10.1. must:

10.2.1 Inform the registered interested and affected parties of the appeal procedure provided for in the Municipal Systems Act (Act 32 of 2000);

10.2.2 Advise the interested and affected parties that a copy of the Atmospheric Emission Licence and reasons for the decision will be furnished on request;

10.2.3 An appeal against the decision must be lodged in terms of Section 62 of Municipal Systems Act (Act 32 of 2000), with the Appeal Authority on the following address:

Nkangala District Municipality,
PO Box 437,
Middelburg,
1050

Tel No. 013 249 2000,
Fax No. 013 249 2173

and

10.2.4 Specify the date on which the Atmospheric Emission licence was issued.

**DR MATOANE - NKABANDE**

**GENERAL MANAGER: COMMUNITY DEVELOPMENT SERVICES**

**NKANGALA DISTRCIT MUNICIPALITY**

**Air Quality Officer**
Signature:_____

Date: 05-10-2021