New 2,400 TPD Cement plant

GUYANA

Technical proposal n° D21-6008-E

18/06/2021

SATAREM

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1. General description

1.1. Project name

GUYANA - 2 400 TPD CEMENT PLANT

1.2. Production capacity and product standards

- Clinker output : 2,500 t/d
- Clinker output : 768,000 t/a

1.3. Main technical and economical indexes

- Dry process production line with Ø4×60m rotary kiln equipped with double string 5-stage cyclone preheater and S-RSP precalciner system.
- Heat consumption of clinker: ≤ 740 kcal/kg

1.4. Raw materials and fuels

- Raw material as following:
  - Limestone LG

Component	Minimum (%)	Maximum (%)	Average (%)	Standard Deviation
SiO2	2.22	37.75	13.96	4.6
Al2O3	0.83	9.32	4.36	1.56
Fe2O3	0.36	5.82	1.96	0.70
CaO	31.4	53.00	44.2	3.42
MgO	0.28	19.18	1.42	1.11
SO3	0.05	0.40	0.20	0.14
Na2O	0.01	1.09	0.08	0.07
K2O	0.12	2.36	1.22	0.46
TiO2	0.05	0.59	0.24	0.08
P2O5	0.02	0.22	0.09	0.03
Mn2O3	0.03	0.53	0.10	0.05
CaCO3	56.07	94.64	78.92	6.11
CaSO4	0.085	0.68	0.34	0.24
Loss I	15.96	43.39	32.33	4.09

  - Limestone HG

Component	Minimum (%)	Maximum (%)	Average (%)	Standard Deviation
SiO2	1.70	6.39	3.25	1.147
Al2O3	0.27	1.39	0.60	0.33
Fe2O3	0.08	0.82	0.31	0.22
CaO	50.32	53.97	52.73	1.21
MgO	0.61	0.74	0.69	0.04
SO3	0.05	0.06	0.05	0
Na2O	0.04	0.05	0.05	0
K2O	0.17	0.56	0.31	0.11
TiO2	0.03	0.12	0.06	0.02
P2O5	0.04	0.08	0.06	0.01
Mn2O5	0.03	0.12	0.04	0.03
CaCO3	89.86	96.38	94.17	2.16
CaSO4	0.085	0.102	0.085	0
Loss I	39.68	42.98	41.88	1.17

- Iron Ore

Component	Average (%)
SiO2	19.2
Al2O3	3.1
Fe2O3	60.6
CaO	2.6
MgO	0.3
SO3	0.2
Na2O	0.6
K2O	0.2
TiO2	0.1
P2O5	0.12
Mn2O3	0.05
CaCO3	4.6
CaSO4	0.35
Loss I	10.0

- Gypsum

Component	Minimum (%)	Maximum (%)	Average (%)
SO3	34.0	42.0	38.0

- Corrective Sand

Component	Average (%)
SiO2	75.1
Al2O3	10.9
Fe2O3	2.1
CaO	3.2
MgO	0.5
SO3	0.6
Na2O	0.4
K2O	0.7
TiO2	0.2
P2O5	0.08
Mn2O3	0.05
CaCO3	5.7
CaSO4	1.0
Loss I	7

- Pozzolan

Component	Minimum (%)	Maximum (%)	Average (%)	Standard Deviation
SiO2	66	74.0	69.29	2.2
Al2O3	12.2	14	13.09	1.1
Fe2O3	1.3	2.2	1.75	0.5
CaO	1.5	2.5	1.93	0.7
MgO	0.45	0.8	0.63	0.4
SO3	0.15	0.55	0.36	0.2
Na2O	3.0	4.6	3.88	0.3
K2O	3.5	5.7	4.62	0.2
TiO2	0.2	0.3	0.26	0.01
P2O5	0.06	0.09	0.07	0.02
Mn2O3	0.05	0.15	0.09	0.3
CaCO3	2.7	4.5	3.44	1.3
CaSO4	0.25	1.0	0.61	0.3
Loss I	2.0	4.0	2.9	0.6

- Fuel

Fuel considered for the project: Natural gas or petcoke

- Natural Gas

Component	%
Methane (CH_4)	95.08
Ethane (C_2H_6)	2.14
Propane (C_3H_8)	0.29
Butane (C_4H_{10})	0.11
Pentane (C_5H_{12})	0.04
Hexane (C_6H_{14})	0.01
Nitrogen (N_2)	1.94
Carbon Dioxide (CO_2)	0.39

LHV of 8,540 kcal/Nm3

- Petcoke

Bulk Density ton/m^3	LHV, kcal/kg	HGI	Moisture	TPH
0.8	7,6	35	0,1	15

1.5. Natural conditions

- Location
  - Guyana
  - 75-150 km from Capital City of Georgetown.
- Elevation above sea level :
  - 100 m above sea level
- Temperature annual :
  - Max: 22°C
  - Min: 17.5°C
  - Average: 19.5°C
- Average Relative Humidity : 86%
- Average Monthly Rainfall:
  - 180 mm
- Wind
  - Average speed: 3.6km/h
  - Maximum speed: 7.2 km/h
  - Design wind velocity: 100 km/h
  - Direction: S, SSW
- Snow load: no

1.6. Project boundary

Project boundary as turnkey includes the cement process production line from quarry crusher to the packing system.

Project contract includes basic design and engineering design of process, electricity, instrument, communication, computer, equipment procurement, civil work, installation and commissioning. Outside facilities such as outside road, power supply source, water supply source and outside communication etc. are not included

1.7. Design and engineering standards

Satarem is ISO 9001:2000 certified. We carry out design and engineering works on cement projects with very high standards. Design and engineering of this project is, in general, according to the following standards:

ISO 10721-1 : 1997	Steel structures -- Part 1: Materials and design
ISO 10721-2 : 1999	Steel structures -- Part 2: Fabrication and erection
ISO 1052 : 1982	Steels for general engineering purposes
ISO 10799 : 2001	Structural steels -- Cold-formed, welded, structural hollow sections -- Technical delivery requirements
ISO 20723 : 2004	Structural steels - Surface condition of hot-rolled sections - Delivery requirements
ISO 4995 : 2001	Hot-rolled steel sheet of structural quality
ISO 4996 : 1999	Hot-rolled steel sheet of high yield stress structural quality
ISO 4997 : 1999	Cold-reduced steel sheet of structural quality
ISO 630 : 1995	Structural steels -- Plates, wide flats, bars, sections and profiles
ISO 630-2 : 2000	Structural steels - Part 2: Technical delivery requirements for hot-finished hollow sections
ISO 657-14 : 2000	Hot-rolled steel sections -- Part 14: Hot-finished structural hollow sections -- Dimensions and sectional properties
ISO 6971 : 2002	Cranked-link drag chains of welded construction, attachments and sprockets
ISO 6972 : 2002	Cranked-link mill chains of welded construction, attachments and sprockets
ISO 7452 : 2002	Hot-rolled structural steel plates -- Tolerances on dimensions and shape
ISO 9034 : 1987	Hot-rolled structural steel wide flats -- Tolerances on dimensions and shape
ISO 9477 : 1992	High strength cast steels for general engineering and structural purposes
ISO/TR 7705 : 1991	Guidelines for specifying Charpy V-notch impact prescriptions in

	steel specifications
ISO/TR 7468 : 1981	Summary of average stress rupture properties of wrought steels for boilers and pressure vessels
ISO 11973 : 1999	Heat-resistant cast steels and alloys for general applications
ISO 14737 : 2003	Cast non-alloy and low alloy steels for general applications
ISO 4986 : 1992	Steel castings -- Magnetic particle inspection
ISO 9477 : 1992	High strength cast steels for general engineering and structural purposes
ISO 11973 : 1999	Heat-resistant cast steels and alloys for general applications
ISO 17633 : 2004	Welding consumables -- Tubular cored electrodes and rods for gas shielded and non-gas shielded metal arc welding of stainless and heat-resisting steels – Classification
ISO 3580 : 2004	Welding consumables -- Covered electrodes for manual metal arc welding of creep-resisting steels – Classification
ISO 4955 : 2005	Heat-resistant steels
ISO 17638 : 2003	Non-destructive testing of welds -- Magnetic particle testing

1.8. Performances guarantees

Raw mill guarantees	Production rate: 240 tph, 24 hours basis 190TPH, 19 hours basis Product fineness ≤12% residue 90 μ m
Clinker burning capacity	Production rate: 2400 tpd clinker Kiln availability: ≥90%（320 days/year）
Specific heat consumption for clinker burning	≤740 kcal/kg
Clinker temperature at grate cooler outlet	60°C + ambient temperature
Raw mill & kiln & cement mill dedusting equipment	Dust mission ≤30mg/Nm3
Raw meal homogenizing silo - homogenization effect	Homogenization effect ~10 : 1 Power consumption : 0.2~0.3 kWh/MT
Cement Grinding capacity	170 TPD, 24 hours basis 135 TPD, 19 hours basis
Packing plant capacity	120TPD
Mechanical equipment guarantee	Plant availability: ≥90%（320 days/year） Defect correction period for all mechanical equipment is 12 months from the date of successful commissioning All grate plates of moving bar cooler guarantee working life of 2 years All mill shell liners of cement mills guarantee working life of 3 years Wear resistant lining of all air separators guarantee working life of 3 years

2. Technology scheme

2.1. Production method

Dry-process production lines of a rotary kiln (ϕ 4 $\times$ 60m) equipped with a double string 5-stage cyclone preheater and S-RSP precalciner system
Heat consumption of the plant: ≤ 740 kcal/kg clinker without by-pass.

2.2. Production technology

2.3. Equipments list

Please refer to appendix 1 for the list of major production equipments and appendix 2 for project flow sheet.
Technical details in the equipment list are not definitive and are for information only. The equipment performance values will be confirmed after the detailed engineering.

2.4. Scope of supply

2.4.1.Scope of Supply by the Contractor

From the Raw mill facilities to the outlet of clinker silo.

1. The Contractor shall provide the process engineering design and civil engineering design for the project.

2. In addition to the major equipment list in appendix 1, the Contractor shall supply the following equipment and materials to complete a turn-key project:
    a. Mechanical equipment
    b. Electrical equipment
    c. Instrumentation
    d. Refractory materials and insulation materials for first lining
    e. Lubricants for first filling
    f. Non-standard parts necessary for normal operation of the production line, such as ducts and chutes etc.

g. Central Control Room
h. Laboratory facilities
i. Air conditioning systems for central control building (including laboratory and central control room), major electrical rooms and local control stations.
j. Communication equipment inside the plant

3. Commissioning spear parts

4. The Seller shall provide the following civil works

a. Leveling
b. Foundations for:
   - Primary crusher building
   - Limestone, clay and additives storage
   - Raw meal grinding building
   - Homo silo
   - Preheater & precalciner tower
   - Kiln
   - Cooler
   - Clinker storage
   - Cement mill building
   - Cement silos
   - Packing building
   - Central Control Room and laboratories
   - Natural gas installation
   - Electrical building
   - Compressed air building
   - Water storage and pump room

c. Buildings for:
   - Primary crusher
   - Limestone, clay and additives storage
   - Raw meal grinding
   - Preheater & precalciner tower
   - Cooler
   - Cement mill

- Packing plant
- Central Control Room and laboratories
- Electrical rooms
- Compressed air system
- Fuel pump
- Water pump
- Office building (~2400m2, excluding furniture)
- Clinic
- Electrical Workshop (~400 m2, including equipment)
- Mechanical Workshop (~800 m2, including equipment)
- Garage for plant vehicles (~300 m2, including equipment)

d. Silos

- Homo silo
- Clinker hall
- Cement silos

e. Roads

- Inside the plant

The choice between steel and concrete for the buildings will be done after the engineering.

THE SELLER WILL PROVIDE NORMAL REGULAR CIVIL WORKS. ANY SPECIAL WORK DUE TO THE NATURE OF THE SOIL SUCH AS DEEP FOUNDATIONS, SOIL REINFORCEMENT… IS NOT PART OF THE SELLER'S SCOPE AND WILL BE QUOTED AS EXTRA.

5. The Contractor shall provide the mechanical and electrical installation works

6. The Contractor shall provide training for the Owner's technical staff on site.

7. The Contractor shall provide commissioning.

2.4.2.Scope of supply by the Owner

The following items and any other facilities, machine, equipment materials, works not described above are excluded from the Contractor's scope of Supply. It is expected that those items shall be provided by the Owner himself as required for the execution and full functioning of the proposed plant.

1. The Owner shall carry out the raw materials quarry works and those outside the plant site.

2. The Owner shall carry out the project feasibility study

3. The Owner shall carry out the environmental Impact Assessment

4. The Owner shall supply the following facilities:

    a. Quarrying equipment:

Equipment	Specifications	Qty
Dump truck	42T	25
Rock drill	Max. 150mm	3
Rock drill	Max. 100mm	1
Wheel loader / excavator	$6m^3$	2
Bulldozer	220HP	2
Backhoe	$4.5m^3$	1
Mobile air compressor	$10\sim19m^3$/min ,0.7~1.2MPa	5
Rock breaker	4kJ	2

This equipment can be quoted as an option.

    b. All mobile equipment, including transporting vehicles during the operation of the plant
    c. Office facilities
    d. Bag making machines for cement packing
    e. Kitchen and dining room facilities.
    f. Perimeter wall and associated security lighting.
    g. Staff sanitary facilities.
    h. Appropriate sewage and drainage facilities.
    i. Security office.
    j. Plant access road.
    k. Water supply system and water connection to plant.
    l. Heavy fuel supply and storage

m. Electricity supply system
n. Diesel supply and storage
o. Sewage water and treatment system
p. Any and all others facilities not directly used in production line
q. All maintenance tools
r. All spare parts (for further details, please refer to appendix 4)
s. IT and Management Information System
t. Office furniture and office equipment
u. Security systems (except fire water)
v. Safety equipment
w. Medical facilities
x. All buildings not included in our proposal such as:
    - Administration building (other than office buildings as mentioned above in 2.4)
    - Canteen
    - Any social building
    - Housings for accommodations
    - Religious building
    - Car parks
    - Warehouses for spare parts, cement bags and refractory materials
    - Recreation facilities
    - Greening of the plant

2.5. Process description

For further information, please refer to the process flow sheets drawings in appendix 2.

2.5.1.Raw material

Limestone

The limestone crushing shall be performed in the quarry. The limestone mined from the quarry would be loaded in 35 tons dumpers and unloaded in a concrete hopper. An inclined apron feeder will feed the limestone into an impact crusher to crush the material to -75mm size. The input size for this crusher shall be considered as 1000mm x1000 mm x 1000mm with maximum diagonal length of 1200mm. The crusher capacity will be 600t/h. The material shall be stored in a 2 x 25000 t piles. A bridge type reclaimer would be used to feed the reclaimed material to the raw mill hopper feed belt. The piles will be placed in a covered yard.

Additive and correctives

The crushed additives will be stocked in the same stacker as limestone. These additives would be separately handled by a front end loader and fed on to the reclaimed material belt through two hoppers fitted with feeders as shown in the flow diagram. The reclaimed material belt, could thus feed limestone or additives.

The limestone and the additives will then be placed in 4 different bins starting from 50 tons up to 200 tons. The feed proportion of raw material shall be controlled by variable speed apron feeder under the dump hopper.

2.5.2.Raw material grinding

Feed bins extraction

The proportioning station shall be equipped with advanced proportioning and feed control system. The mix proportion shall be set from the central room and maintained in accordance with the operative raw mix.

Each hopper shall be equipped with high and low level switches in case of RCC hoppers, in case of steel hoppers; it should be mounted on load cell with high level switch for safety in the hopper extraction needle gate. After the needle gate, apron feeder shall be installed upstream of the belt weigh feeders.

Raw material transport to mill

Raw material extracted by individual weigh feeders shall be collected on common reversible belt conveyor and transported to raw mill through another set of conveyor.

The mill feed transport shall be provided with magnetic separator and metal detector to protect the mill against tramp metal.

Drying

Kiln hot gas shall be used for drying of raw materials in the raw mill for initial start-up phase. It is required that the finished mill product moisture should not exceed 1%.

Raw meal grinding system

A Vertical Roller Mill (VRM) or ball mills has been chosen for the grinding of raw materials. The mill with a capacity of 240/190tph (depending the hourly rate, on dry basis) shall be designed with high drying and grinding efficiency the mill shall be equipped with the new generation high efficiency separator.

A vibro-feeder followed with bucket elevator shall be provided for material re-circulation after the mill The mill shall be designed for low-pressure drop of the mill and low power consumption. The mill shall be equipped with planetary gearbox.

Mill exhaust gas shall be de-dusted in multiple cyclone battery. Exit gas from cyclones shall be transported by mill induced draft fan to common Bag house type filter cleaning the mill and kiln exhaust gases. Cleaned gas from Bag house filter will be transported by Bag house filter ID fan to the stack. The raw mill and kiln system gas transport shall be designed as 3-fan system

Finished product from the raw mill shall meet fineness of 12% residue on 90-micron sieve and 1.0% residue on 212-micron sieve.

Raw mill product collection

Raw mill product shall be collected at the bottom of the cyclones and at the Bag house extraction. The raw meal from the Bag house filter hoppers shall be collected by a system of air slides conveyors and transported to bucket elevator feeding the raw mill product to the top of the homogenizing silo.

During direct kiln operation (raw mill shut condition) mod, the bag house filter product will be collected in separate storage bin. The bin shall be sized to hold enough bag house dust for two hours of direct operation.

Raw mill de-dusting

As mentioned above raw mill main gas stream will be de-dusted through a battery of high efficiency low-pressure drop cyclones and in a bag house filter. All other material transfer points and including homogenizing silo will be de-dusted by suitably sized fabric nuisance filters. The mill kiln system shall be de-dusted by Bag house fabric filter designed to achieve clean gas dust content below 30mg/Nm3. For other auxiliaries, suitable number of bag filters shall be provided to maintain the clean gas content of the complete area less than 30 mg/Nm3.
An automatic sampling device shall be installed after the system for continuous sampling.

Raw meal grinding and storage

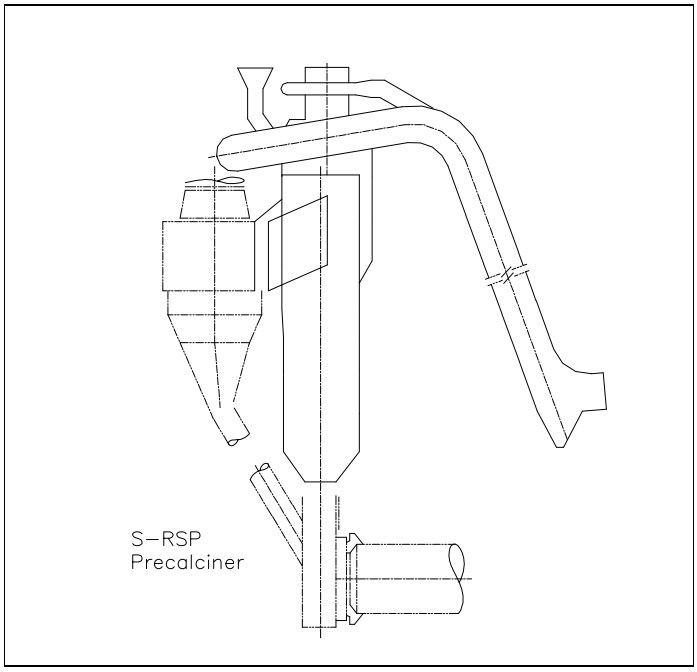
Blending and homogenizing of raw meal will be performed to minimize the variations in chemistry of raw meal. For this an inverted cone type-blending silo with a design-blending ratio of 10:1 with higher extraction efficiency is considered.
The silo roof shall be provided with fully covered shed. The raw meal transport arrangement shall ensure feeding raw meal properly distributed all around the silo. The silo aeration blower's aeration is to be located in silo bottom house. Emptying of the silos must be ensured by appropriate design of silo bottom and aeration system. A silo level indication system shall be installed.

The transport system as well as the homogenizing silos shall be de-dusted by using pulse jet filter, which shall be designed for clean gas dust content less than 30 m3/Nm3.

2.5.3. Kiln and related Systems

2.5.3.1. Clinker burning

The burning and cooling system mainly consists of a high efficiency low pressure drop 5-stage cyclone preheater, a S-RSP precalciner, a rotary kiln of Ø4×60m and a SAT grate cooler. The capacity is 2,400t/d of clinker with a specific heat consumption of 740kcal/kg clinker. There are two cyclones for each stage of the preheater. All cyclones are specially designed to ensure low pressure drop and good heat exchange. The S-RSP precalciner is an improved version of RSP system developed by Satarem. With its clean gas pre-combustion chamber and slow swirling action, S-RSP precalciner ensures most efficient combustion and it is very flexible in terms of fuel types and quality.



The rotary kiln of Ø4×60m is equipped with a 600kW motor and is designed to operate at 3.0-3.5rpm. Dual type burners (Natural gas, petcoke) will be used for kiln and precalciner. Part or all exhaust gas of around 300°C from preheater is introduced into raw mill for raw material drying. The exhaust gas from preheater is cooled to 120~150°C in the conditioning tower and then enters into the baghouse at kiln end. Cleaned gas emitted through the stack to atmosphere with dust content ≤30mg/Nm3.

2.5.3.2. Clinker cooling

Clinker from rotary kiln is cooled in a high efficiency SAT moving bar cooler developed by Satarem. Effective grate area is 90m2. Satarem is worldwide famous for its grate cooling technologies. The SAT grate cooler will be equipped with one static inlet section with 2 high pressure fans, 2 hydraulic driven grates, 9 cooler fans for grate 1 and grate 2, a hammer clinker breaker, and Satarem's special double slide valves for sealing undergrate hoppers. Over-size clinker is crushed by the hammer crusher to below 30mm size. Discharge clinker temperature is ≤60°C plus ambient temperature. The grate cooler is designed to take over accidental overload up to 30%.

The cooled clinker is transported into a circular clinker storage by means of pan conveyor. Exhaust gas from clinker cooler is partially drawn to kiln as secondary air and partially introduced to precalciner through tertiary air duct. The rest will be vented to a baghouse at kiln discharge before discharged to the atmosphere. Emission from clinker cooler baghouse will has dust content≤30mg/Nm3.

2.5.4.Clinker storage & conveying

A clinker silo of capacity 30,000 t shall be provided. The clinker silo shall have large diameter with conical tent roof and will be built in concrete. The silo shall have a center shaft with multiple discharge gates. Clinker Silos shall be fully covered and water proof. The silos roof shall have completely covered shed. Gypsum and clinker from respective storages will be proportionally discharged by weight feeders to a belt conveyor to cement mill plant. The cement mill system consists of 3 closed-circuit systems with 3 sets of Ø4.2 x 13m SAT mills and 3 sets of SAT high efficiency separators. The capacity is 3 × 100t/h. Ground material discharged from the mill is transported to the SAT separator by means of bucket elevator and air slides. At the same time, gas from mill is led into SAT separator. The coarse particles discharged through air locking valves return to mill via air slide for regrinding; Fine product separated by the separator is introduced with gas flow into bag filter. Cleaned air is then vented to the atmosphere. Product cement is conveyed into cement silos by means of air slides and bucket elevator.

2.5.5.Cement Bulk Loading and Packing

2.5.5.1. Cement storage and bulk loading

Four cement silos, two for OPC and two for pozzolanic cement, are proposed with a total capacity of 10,000 tons (2,500t each). At the bottom of silos aeration boxes are installed to facilitate cement discharging. The air for discharging is supplied by air blowers.

There is one set of discharger at the side of each silo for bulk cement loading.

2.5.5.2. Cement packing, storage & delivery

Product cement is transported from cement silos to bucket elevator via air slide, then it is fed into middle bins with load cells through vibrating screens, and discharged to a fully automatic 8-spout packer. For bags loading onto trucks, 4 manual bag loaders will be provided. There are totally 2 sets of rotary packer with capacity of 120t/h each (50Kg per bag). The bagged cement is conveyed via belt conveyor, bag cleaner, electronic belt weigher, etc. to trucks for delivery, or stored in the product storehouse.

Bagged cement is weighed by an electronic belt weigher, thus makes the system automatically adjust the cement weigh of coming bag according to feedback information. Around 20% of cement dispatch will be in bulk or big bags and 80% of cement in bags.

3. Electric power

SATAREM will use IEC standards. All the electrical and electronic equipments will be supplied with their quality certification.

3.1. Power Supply and Distribution

3.1.1. Power supply source

Electric power required by the whole plant will be supplied in double circuits from the electric power transformer substation nearby and the new power generation.

Each circuit of the power incoming line is designed to undertake 80% of the whole plant power load. In case failure happens to one of the circuit or it is in maintenance, another circuit is able to take over the power load of the main production line in whole plant.

3.1.2. Voltage grade

Power supply	4.16kV AC
Medium-voltage power distribution	4.16kV AC
Medium-voltage motor	4.16kV AC
Low-voltage power distribution	480V AC
Low-voltage motor	480V/220V AC
Lighting	220V AC
Voltage of operation power supply for general voltage step-down substation	220V DC

3.1.3. Power load

Installed capacity of the power driven equipment in the whole plant	24,000 kW
Calculated load of the whole plant	18,289 kW
Annual power consumption	130×10^6 kWh
6.6 kV lateral power factor after compensation	>0.92

3.1.4. Allowable voltage drop

The voltage drop of the main feeder lines from central MV switchboard to the departmental load centers shall not exceed 2%.

The total allowable voltage drop from the load center substation to any load shall not exceed 3% for power and lighting circuits.

During the starting of the motors, the allowable voltage drop shall not exceed 10%.

3.1.5.General voltage step-down substation

Refer to the high voltage single line system diagram for the main tie lines and power distribution system of the general voltage step down substation. Sectionalized single bus-bar (outside bridge tie lines) is applied to the main tie lines of the system.
Secondary lateral 4.16 kV is of sectionalized single bus-bar.

Each of the high voltage power driven equipment is distributed with 4.16 kV power in radiated mode.
Outdoor layout mode is adopted for the general voltage step-down substations.

3.1.6.Reactive power compensation

Capacitors will be used to compensate for the reactive power. Large constant speed motors equal or higher than 1000kW will be equipped with adequately sized individual capacitor banks connected to the motor feeders. The LV main distribution boards will be equipped adjustable reactive power compensation. The improved power factor will be over 0.92.

3.1.7.Thunder protection and earthing

Thunder and earthing protection will be installed according to local regulations. All earthing units for the whole plant shall be connected into an earthing network by galvanized flat steel.

3.1.8.Operation and monitoring

Complex automation control system with micro-processor protection is applied. The operation of primary and secondary power distribution equipment of the sub-stations, and the monitoring of various operating status signal and failure alarm of the system is able to be performed from the central control room.

3.2. Plant electrical drives

3.2.1.Plant power distribution

The power transformer in each power substation and the high voltage motor in the plant are supplied with 4.16 kV power in radiated mode from a general voltage step-down substation. It supplies to limestone crushing plant and raw material storage halls thanks and also supplies to the rest of the plant. The low voltage power distribution equipment in the power substation supplies power to electrical rooms for all motors and power driven equipment in the plant in radiated mode.

3.2.2.Electrical Rooms

There will be 6 electrical rooms as follow:

Electrical room	Power supply scope
1) Quarry and crushing plant electrical room	▪ Limestone crushing plant ▪ Limestone quarry ▪ Belt conveyors
2) Raw material handling electrical room	▪ Raw mix preblending ▪ Stackers and reclaimers ▪ Belt conveyors ▪ Raw material proportioning hoppers
3) Raw meal grinding	▪ Raw material grinding ▪ Exhaust gas treatment ▪ Homogenizing silo
4) Preheater	▪ Kiln feeding system ▪ Pre-heater ▪ Kiln ▪ Compressor air station ▪ Central control room (Spare power supply)
5) Kiln cooler	▪ Grate cooler ▪ Central control room ▪ Clinker storage ▪ Clinker dispatching
6) Solid Fuel	▪ Fuel ▪ Waste water treatment

3.2.3.Motors and motor control

1) Motor selection and starting

Motors with a power capacity of above 250 kW will adopt 4.16 kV. Motors ≤ 250 kW will be 480V. Selection of wound motors and squirrel-cage motors should depend on start-up condition. Wound motors will be started by liquid starters and squirrel-cage motors will be directly started under rate-voltage.

2) Motor speed control

In general, all motors require variable speed control will be AC motors, including kiln main drive and large fans' motors. Speed of AC motors is adjusted by digital frequency converters.

3) Local control

Most motors are equipped with local start/stop push-buttons and lockable isolation switches.

4) Lubrication

All motors equal or above 45 kW will have lubrication nipples.

5) Vibration sensors

All motors above 250 kW will have vibration sensors for continuous monitoring.

3.2.4.Control level and mode

The equipment of main production process inside plant is controlled by PLCs. The control of main process flow, from material transportation to cement silo, is operated in the central control room. Monitoring of the status of each equipment and failure alarming can be performed in the central control room. Other auxiliary equipment is controlled at the local site.

Individual equipment controlled by PLC is equipped with operating box by the side of it. The selective switch with the key, which can be switched on to the position of control, null, local site, is installed in the box.

In case of central control mode is used, start-up and shut-up of each group motor is completed in interlocking method in the control room in accordance with the preset program and requirement of process flow and equipment protection.

If the local site control mode is used, start-up and shut down can be operated individually by the side of the equipment. It is favorable for the test run of individual equipment.

At the null position, the equipment cannot be started-up in central control room or at local site, in order to keep maintenance personnel in safety.

While in case of failure, emergency shut down can be operated both in central control room and by the side of equipment.

3.3. Lighting system

For lighting system and other auxiliary power users, like sockets, independent distribution systems from electrical rooms with suitable capacity and low voltage distribution switch boards will be provided.

Lighting intensity levels are indicated in the following table.

Area	Lighting intensity (Lux)	Lighting types
Open Yard, Conveyors, Platforms	50	High Pressure Sodium
Remote Controlled Process Areas	120	High Pressure Sodium
Staircases, Walkways	50	Mercury-vapor Lamp
Electrical Equipment Rooms	250	Fluorescent
Central Control Room	250	Fluorescent
Stores for Various Diverse Goods	120	Mercury-vapor Lamp
Continuously Occupied Working Places in Process Area	120	High Pressure Sodium

Some lighting will be equipped with battery packs for emergency lighting such as in power sub-stations, electrical rooms and central control room.

All outdoor lighting fixtures are of IP56.

3.4. Technical specifications

- Assembled design all the switches and instrument converters etc…are installed in the panel.
- Breaker breaking current: minimum 50 kA (confirmed at a later stage)
- Power distribution system: TN –S
- The power cables and control cables separated in the panel
- Control method that is assembling priority
- Cable connecting from bottom connectors.

3.4.1.MCC control system

- Breaker status, voltage and overload signal: DI
- Main contactor status: DI
- Start: DO
- Local starting signal : DI

3.4.2.Local maintenance switches

To stop the equipment at local any time, it is for emergency stop.

3.4.3.Start / stop control switch

All the motors, valves and magnetic valves etc… are installed the local switches beside the equipment. The whole plant has the uniform labels for the start / stop switches and location indication.

3.4.4.Motor

3.4.4.1. Motor type and starting mode

- If the motor power needed is equal to or more than 250kW, 4.16 kV high voltage motors will be used to supply power. Otherwise, 480V low voltage motor is in service. To guarantee the satiability of power supply, the diesel motors are equipped with 4.16 kV wound motors and the liquid variable resistor that will reduce the start-up current lower than 1.8Ie. Low voltage motor except the special requirements is installed a squirrel cage motor and the full voltage starting up directly.

- To require the variable speed motor using AC motor. The control panel is a digital variable frequency control unit.

3.4.4.2. Specifications

- Heavy load, IEC standard and continuity operation S1.
- High efficiency / low consumption
- Motor being F insulation grade and B temperature increasing grade (80 °C)
- Connection box that is water-proof and dust-proof and has cable sleeve with ground connector.
- Two ends installed insulation boxes with the uniform label
    - P≥500 kW motor equipped 6 pieces of PT100 heat resistors（3 pieces for stand-by ）
    - Every three PT100 heat resistors connected to be series and output to the computer system
- All motors designed to start-up 6 times per hour without exceeding the temperature limit.
- Middle voltage motor equipped with anti-condensed heater.
- Protection grade：IP54 for motors for indoor motors, IP55 for outdoor motors.

3.4.5.Wound motor start-up device

Wound motor start-up device is used a liquid variable resistor which is designed for starting up 3 times per hour under cooling status.

The starter is equipped electric control unit and emergency manual operation system. All have indications.

The start-up current is lower 2.5 times of the maximum current.

3.5. Cables

3.5.1.Cable installation

Cables are laid on the groove or bridge. The outdoor cables are used the groove. If using the bridge, the cables are laid on along the buildings, equipment structures or setting the columns if needed. The bridges and support structures are zinc coated.

Power cable and signal cable are laid down by layers.

3.5.2.Cable types

Cable insulation grade:

Voltage	Insulation voltage	Insulation materials	Core	Conductor	Protection
380 V	1000 V	XLPE	1,3,4,5, etc.	Cu	PVC
4.16 kV	10000 V	XLPE	1,3	Cu	PVC

Conductor minimum cross section area：

- Control circuit: 1.5 mm^2
- Power and lighting circuit: 1.5 mm^2

4. Process measuring and control

4.1. Control mode and level of hierarchy

An advanced Distributed Control System (DCS) is used for central monitoring, operating and automation control of the main process system for the whole plant. The proposed system (from ABB, SIEMENS, YOKOGAWA or ICER) features an open architecture, flexibility, and compatibility with existing systems. Design of this DCS is with the objectives to maintain all production equipment in the optimal state, guarantee high product quality, reduce power consumption, ensure safe operation and increase labor productivity. The modular structure of the system, both for hardware and for software, makes the system highly flexible for changes and future extension.

The main functions of the DCS system are organized into the following hierarchy levels:

Level 3 Management information system
Level 2 Central supervision and control
Level 1 Local control
Level 0 Instrumentation

For some key measuring and control equipment, the most advanced instruments in the world will be used to satisfy the need of production process, such as DCS, x ray fluorometric analysis instrument, kiln infrared scanning thermometric device, burning temperature measure device, on-line air analysis instrument, on-line measure instrument of dust, mill load detecting instrument etc.

4.2. DCS hardware

DCS hardware mainly consists of an engineer station, 4 operator stations 4 field control stations, I/O modules and communication bus as below (actual hardware quantity may change according to final system set up):

Item	Description	Qty
1	Human Interface Station (OS)	4
2	Engineering Workstation	1
3	Printers (1 Laser and 2 Color)	4
4	Field Control Station	4
5	Analog I/O Equipment	

	- Analog Inputs (4 to 20mA)	700
	- Analog Outputs (4 to 20mA)	200
6	Digital I/O Equipment	
	- Digital Inputs	4,000
	- Digital Outputs	2,000
7	Communications Cable	6,000m
	- For inside new plant and for connection to new limestone crushing plant	

The engineer station and operator station are located in the central control room in the central control building. There are 4 field control stations for this project. They are located at the local control room for limestone and either in the electrical room or in the central control room for the kiln and cooler.

4.3. Functions of DCS

4.3.1.Central supervision

The Operator Stations (4pcs.) consist of:

Standard PC, CPU Intel Core i7, Flat screen 22", 8 GB SDRAM Memory, Hard drive 320GB keyboard, mouse, Windows 11, MS-Office 11, Ethernet controller, WiFi 802.11g/b.

Brand and operation system will be specified at a later stage because they will be taken from the latest technologies available on the market at that time.

Main functions of OS are as follow:

- Provide the operators with complete information on process states (operation status, problems, failure) by showing the mimic diagrams on color display;
- Guide the operators in making stop/start, process adjustments and other operation decisions by putting at their disposal reference values and information regarding the process;
- Enable direct control of plant operation by means of motor control groups, servomotors, control loops etc.;
- Perform start/stop, man/auto, set-point +/- commands;
- Perform functional commands and digital inputs etc.;
- Display of alarms, events and trends;

- Process data storage
- Printing of reports etc.

The Engineering Workstation (1pcs.) consists of:

Standard PC, CPU Intel Core i7, Flat screen 22", 8 GB SDRAM Memory, Hard drive 320GB keyboard, mouse, Windows 11, MS-Office 11, Ethernet controller, WiFi 802.11g/b.

Brand and operation system will be specified at a later stage because they will be taken from the latest technologies available on the market at that time.

Main functions of Engineering Workstation are as follow:

- Perform all functions of OS
- On-line modification of process control programs
- Programming for process control
- On-line and background maintenance works for DCS
- Application software configuration
- Downloading of applications and information
- Higher level control functions according DCS system configuration

4.3.2.Local control

Each Field Control Station (FCS) consists of:

- Processor cards with dual-redundant configuration (2 pcs of CPU and 2 power supplies for each processor card)
- communication modules
- digital input/output modules
- analogue input/output modules
- extension couples

Main functions of PCS system are:

- Handling of control and interlocking of sequences/motors
- Monitoring of process equipment operation

- Analogue signals read out and limits detection
- Handling of PID control functions
- Transmission to the central supervision level of the digital and analog signals

4.3.3.Network system

The DCS uses Vnet/IP protocol with optical fibre link for communication between Level 1 and Level 2. It uses FOUNDATION Fieldbus with coaxial cables for local area networks and communication between Level 0 and Level 1.

4.3.4.Uninterruptible Power Supply (UPS)

To avoid information loses at power failure, main equipment of the DCS is protected by an Uninterruptible Power Supply (UPS).

4.3.5.DCS Software

DCS software is based on WINDOWS 11 and covers these functions of different levels as follow:

1) Central supervision level

   a. Dynamic process flow chart display.
   b. Process parameter alarm and automatic record.
   c. Historical data storage and trend display.
   d. Report generating and printing.
   e. Remote mode operating and auto-control mainly include:
      - Raw material quality control system
      - Optimize control of burning system
      - Raw material silo level control system
      - EP and Bag house waste gas measuring and analyzing system

The software gives clear messages of different levels of process parameters, faults and alarms. Timing for process data updating and refreshing of screen displays is <2s.

2) Maintenance level

a. Messages point out selectively the origin of the faults for identification of system, process or equipment problems
b. Display of the applications with updating of logical and numerical values for system diagnosis

3) Engineering level

a. Creation or modification on-line of mimics, messages, new parameters, interlocking, etc.
b. Creation or modifications of the applications may be loaded into the processing units from operator stations or engineering workstation
c. Print out of documentation of all applications

4) Management level

a. Collect and store all necessary data from plant automation system for analyses and reports;
b. Collect and store all important data from whole process;
c. Compute statistics and analyses on process and production performance
d. Provide remote control and monitoring functions
e. Provide security control functions

4.4. Process control system equipment

4.4.1.Process control station

The process control system of the whole plant is designed to adopt to the PLC system and remote I/O modules using on motor control, alarm processing and circuit adjustment.

According to the general drawing of the production department, the system will be assembled as the follows:

a. PLC1 Utilities & Pretreatment of raw materials including:

- 1 PLC- Processor is located in the electricity room
- 2 Distributed I/O station

- 10 Digital input module, 32-channel, 24 VDC
- 5 Digital output module, 32-channel,24 VDC
- 8 Analog input module, 8-channel, 4-20mA
- 1 Analog output module, 8-channel, 4-20mA

b. PLC2 Raw mill grinding system (Including raw materials preparation , limestone and other raw materials bed) including:

- 1 PLC- Processor is located in the electricity room of raw mill
- 2 Distributed I/O station
- 9 Digital input module, 32-channel, 24 VDC
- 5 Digital output module, 32-channel,24 VDC
- 7 Analog input module, 8-channel, 4-20mA
- 4 Analog output module, 8-channel, 4-20mA

c. PLC3 Preheater & Clinker Cooling including:

- 1 PLC- Processor located in the electrical room of the kiln head
- 6 Distributed I/O station
- 18 Digital input module, 32-channel, 24 VDC
- 9 Digital output module, 32-channel,24 VDC
- 21 Analog input module, 8-channel, 4-20mA
- 6 Analog output module, 8-channel, 4-20mA

d. PLC4 Quarry Zone including:

- 1 PLC- Processor
- 1 Control unit including internal wire connection and power supply
- 1 Analog input module, 8-channel, 4-20mA
- 2 Digital input module, 8-channel, 4-20mA
- 1 Digital output module, 4-channel, 4-20mA

- Operators

Operator's stations are face of control room operators who can control department equipment. Hardware including :

1	PC control station Each PC including CPU Intel Core i7, Monitor 22", Memory 8 GB SDRAM, Hard Disk 320GB Keyboard, Mouse, Windows 11, MS-Office 11, Ethernet controller, WiFi 802.11g/b.
1 set	Network equipment
2	PC Operator station Each PC including CPU Intel Core i7, Monitor 22", Memory 8 GB SDRAM, Hard Disk 320GB Keyboard, Mouse, Windows 11, MS-Office 11, Ethernet controller, WiFi 802.11g/b.
1	Event / alarm report printer EPSON LQ1600KIII
1	Color printer (HP Photosmart C6380)

Brand and operation system will be specified at a later stage because they will be taken from the latest technologies available on the market at that time.

- Process control system function descriptions

Process control is including operator's stations and programming controllers (PLC) for motors, alarm processing, circuit control and process sampling etc….

- Operator's station

  - Functions
    - Monitor
    - Control
    - Alarm processing
    - Report

  These functions can be controlled by any operator's stations

  - For diagram definition for each department：
    - Process flow diagram
    - Start / stop diagram
    - PID circuit diagram
    - Alarm / event monitoring diagram
    - Trend curve diagram
    - Report
  - Features

- Each operator dynamic indication number: >5000
- Trend curve number: 1000
- Minimum trendy curve scanning cycle: 4 times
- Dynamic process flow diagram: 1000
- According to real loading , the system parameters is more priority than the following parameters
  - Order from HMI to PLC maxi. time: 500 ms
  - Maximum scanning cycle: 300 ms
  - Alarm generation: 1 sec
  - To HMI response signal: 1 sec
  - Analog sampling frequency: Min. 500 ms, max. 3s
  - Diagram refreshing: <1sec
- On-line creating and changing diagrams, reports and trend groups.

- Engineer's station

  Features are including hardware selection and assembly, internal connection and start-up, finishing software installation and tests in accordance with engineering requirements.

  Each department includes:

  - System data warehouse creation
  - Process diagram creation
  - Start / stop diagram creation
  - Start / stop sequence, PID circuit, analog and switch diagram
  - Alarm diagram assembly
  - Trend curve diagram assembly
  - Report assembly

- Process control station (PLC)

- Functions
  - Motor and equipment control (single or all sets)
  - Process quantity sampling
  - PID circuit
  - Alarm processing
  - With operator's station communication
  - With other PLC communication

- Features
  - All PLC on-line or off-line including upload or download program are through high speed data network.
  - Analog and switch scanning cycle time:
    - Analog scanning cycle: less than 500ms
    - Switch scanning cycle: less than 50ms
    - Event alarm 2 times per second.
    - Switch alarm response time: 1/100 s.

4.4.2.Kiln shell temperature measurement

The infrared temperature scanning system of kiln shell carries out the analysis and process through the infrared detector collecting the surface temperature. And then the data will be showed as diagrams and digitals that can give us the important information such as the surface temperature distribution of kiln shell, etc.

a. System hardware

Brand and operation system will be specified at a later stage because they will be taken from the latest technologies available on the market at that time.

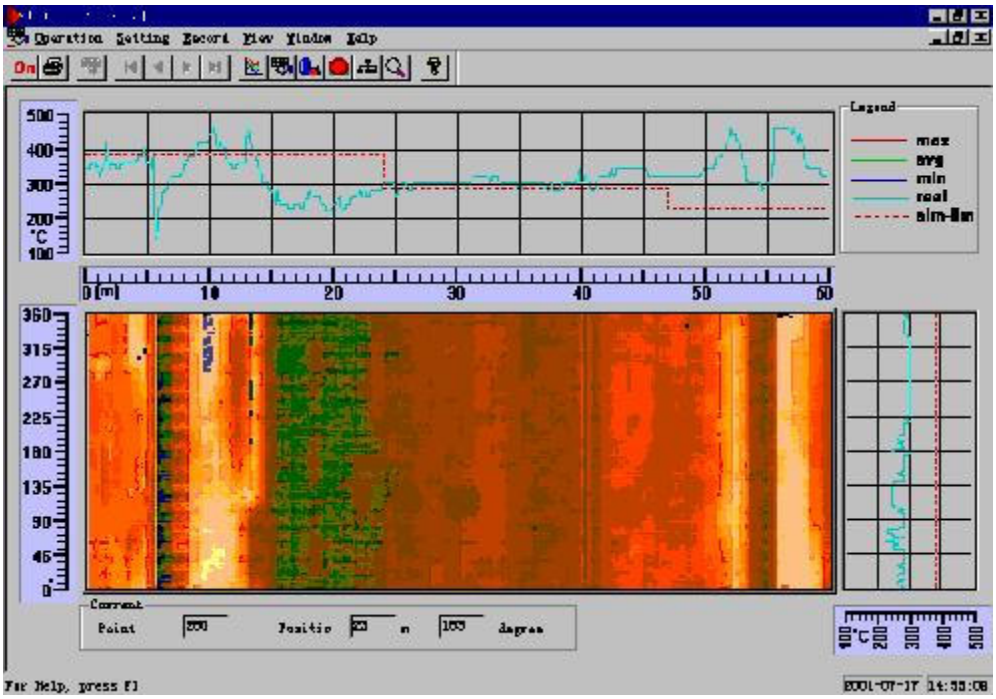
- CPU: Intel Core i7
- RAM：8 GB above
- Hard disk：320 GB
- 22"CRT

- Display card: AGP (24 bits true color)
- Standard Ethernet card (with BNC connector)
- Operation system: Windows 11 (with maintenance 5 pads)

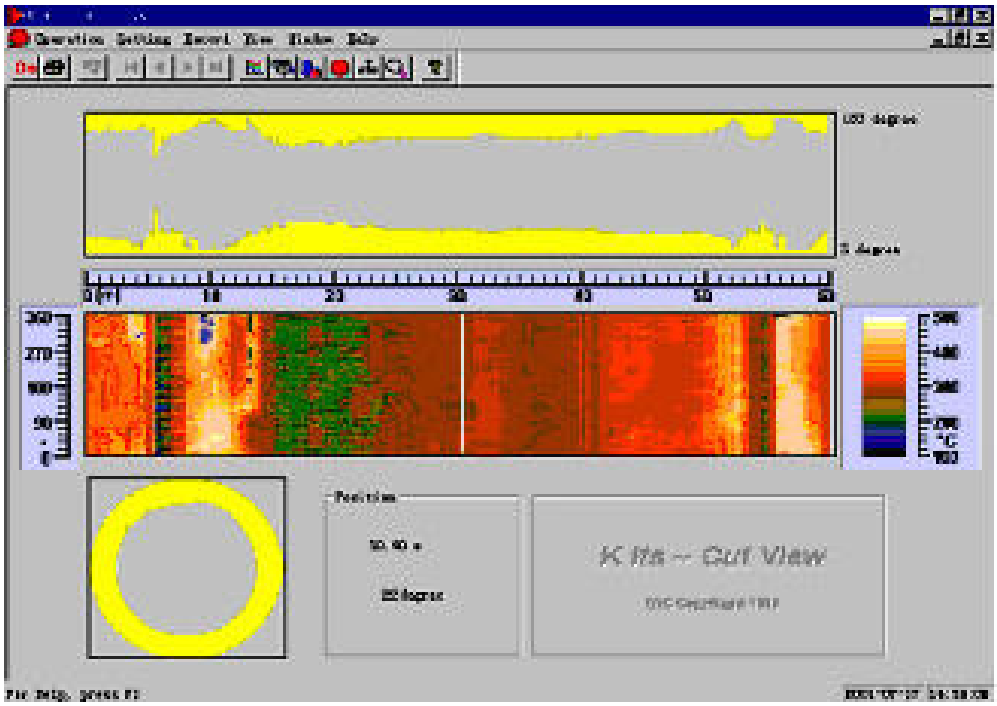
b. Software

- Temperature distribution heat diagram
- 2-dimension diagram
- 3-dimension diagram
- Kiln shell direction temperature: maxi., mini., and average valve curves.
- Kiln shaft and shell direction temperature curves.
- Point temperature function
- Kiln shell surface temperature settings and temperature alarm settings
- Alarm list
- Kiln shaft and shell direction section diagram
- Historical records
- Parts of heat diagram magnification
- Graph printing
- Password setting
- On-line helps
- Auxiliary function

Example of temperature distribution heat diagram



Example of linear temperature curve for kiln shaft and shell direction



c. Industry TV system

Location	Type Low Temp.(LT) High Temp. (HT)	Automatic magnifying	Automatic scanning
Kiln burning zone	HT	No	No
Grate cooler	HT	No	No

Camera is color type.

In control room, two monitors are installed. Burning zone camera is fixed focus and automatic iris with protection cover. Water / air cooling cover is used to protect camera. It also equips with “failure – safety” return device.

4.5. Instrumentation

4.5.1.General ranges of instrument signals

The analogical measuring signals:	4...20 mA, 24 V DC
The digital PLC input/output signals:	
Input signals:	24 V DC
Output signals	AC

4.5.2.Temperature measurement

Thermo-couples are used for temperature measurement between 0...1050 °C. Output signal is 4...20 mA with galvanic isolation. Converters are located in the heads of thermo-couples.

- Pressure measurement

Differential Pressure transmitters are used for pressure measurement. Working principle: ceramic cell. Output signal 4...20mA with galvanic isolation.

- Gas analyzers

Various gas analyzers as below

Gas	**Analyzer's type**
Oxygen (O_2)	paramagnetic direct measurement
Carbon monoxide (CO)	NDIR
NOx	Ultra-violet method

Gas treatment and analyzing equipment are used metal shells for local installation

1 set of analyzing equipment is installed for measuring C3 cyclone outlet O2, CO and NO.

- Sampling tube with water cooling and compressed air cleaning: 1 set
- A set of extraction device for automatic return and pulling sampler's head out.
- Water cooling control panel: 1 set
- Water tank: 1 set
- Cooler: 1 set
- Pre-treatment unit: 1 set
- Gas sampling unit: 1 set
- Gas monitor unit: 1 set
- Gas analyzer: including
    - O2 analyzer
    - CO/NO analyzer
- Gas testing bottles: 1 set

Room temperature gas analyzer

1 set of CO analyzing equipment is used for kiln feed end dust collector CO monitoring

- Dry sampling tube without water cooling located on kiln feed end: 1 set
- Pre-treatment unit: 1 set
- CO analyzer: 1 set
- Gas testing bottles: 1 set
    - Continuous level measurement

Ultrasonic sensors with transducers are used for continuous level measurement.

- IO-boxes

All local distributed control such as speed sensors, belt drift switches, rope switches are equipped with IO boxes with connectors and PLC input/output modules.

- Closed circuit TV systems

There will be at least 6 CCTVs including 2 high temperature CCTVs for kiln combustion and grate cooler monitoring. All other CCTVs will be of swiveling type with remote scanning control. Four monitors with one CCTV control panel will be installed in central control room.

- Kiln shell temperature scanner

A Raytak CS100 kiln scanner is included in this offer. This system is equipped with its own interface and software. A computer system inside central control room is designated for display of kiln shell temperature. Refractory management software and kiln shell cooling fan option is also included.

- Local instruments

    - All outdoor electrical equipment protection grade: IP65
    - All transmitters' output signal within:
        - Analog signal： 4-20 mA·DC
        - Digital signal： 24 V·DC

According to the production situation, production line and equipment are installed thermometers, pressure gauges, flow meters, level sensors and speed meters etc…

Instruments

- Speed monitor using contact switch, 2—phase。
- Limit switch with plastic protection cover and fast speed connector, 2—phase
- Pressure transmitter using diaphragm type precision of 1 % full range resolution 0.1 % 2—phase
- Temperature measurement
    - Thermocouple with flange adjusted by bolts, K type
    - PT100 heat resistor: Pt type, 3—phase

- Temperature transmitter that is linear and program type, precision of 1% full range, resolution 0.2 %, reappearance < 0.5 %

- Flow rate measurement
  - Flow meters, precision<1 %
  - Flow measurement: magnetic type, precision ± 0.5%.
- Continuity level measurement meter
  - Load cell
  - Radar level meter
  - Ultra sound level meter
- Linear measurement signal, precision<1 %
- Level switch
  - Capacitor type
- Vibration measurement: 230 VAC power supply, output signal 4-20 mA

5. Civil Works

5.1 Building Design

Building design and decoration design comply with the local construction codes.

5.2 Foundation engineering

Bored concrete cast-in-site pile is adopted to some big load building such as pre-homogenizing stock pile, homogenizing silos, preheating tower frame, rotary kiln pier, cooler, clinker silos and cement silos etc.
Independent footing of case-in-site reinforced concrete pile is adopted to the general building footing of crushing system, gallery, proportioning station, raw material grinding room, cement grinding room and packing room etc. Equipment foundation applies solid structure foundation.
Independent foundation or strip footing on natural ground is applied to auxiliary facilities and other workshop.

5.3 Structure selection

Pre-homogenizing stock pile of limestone and clay mixing material applies steel pillar and light steel roof structure.

Cast-in-site reinforced concrete structure is applied to limestone silos, proportioning silos, homogenizing silos, clinker silos, gypsum silos and cement silos etc

Steel structure is adopted for preheating tower frame.

Steel structure is applied to all conveyor galleries.

Cast-in-site reinforced concrete structure is used for other buildings.

5.4 Topographic operations

- Identify the locations of the works which will be the object of a document signed by both parties
- Soil drilling and testing

- Installation of leveling markers near the plant and within the plant site's border.
- Realization of a map indicating the location of these markers and their dimensions with destination to the client (2 copies).
- Issuance of the topographical studies on schedule in order to determine the necessary modifications to the project, and therefore to avoid any demolition of already executed works.
- Geotechnical studies of the site for the design of civil engineering works.

5.5 Works implementation modes

5.5.1 Excavation works

5.5.1.1 Mass excavation

- Wide and deep excavations
- Excavations in the water table, lowering

5.5.1.2 Excavations in cuts, in gutters and wells

- Wide and deep excavation
- Exhaustion
- Under pipe drainage
- Bottom consolidation

5.5.1.3 Pipes and miscellaneous installation

- Pipe Handling
- Review of pipes before installation
- Pipes cutting
- Pipes installation in cuts
- Assembly and seals installation
- Pipe installation tolerance

5.5.2 Cuts digging

- Pipe coating
- Backfill cover
- Backfill excavations for structures built on site

5.5.2.1 Concrete

- Composition:

  SATAREM will present to the client its proposals and its study on the composition of concrete sand, medium and large aggregates, cement and water, thirty calendar days before the schedule work date. The composition will have to meet the mechanical resistance requirements.

- Consistency
- Water content proportionning
- Compositions displaying
- Additives

5.5.2.2 Formwork & Scaffolding

- Types of forms:
  - Formwork smooth
  - Ordinary formwork
- Respect to various constraints:
  - Tolerances in dimensions
  - Deformation
  - Sealing
  - Formwork
  - Shifts formwork
  - Sliding formwork
  - Aspect
  - Formworks holes and gaps to allow
  - Care formwork before concreting

- Cleanliness
- Cleaning
- Humidification
- Coating of oil
- Maintenance

- <u>Supply and implementation of reinforcement</u>
  - Area of use of round smooth
  - Area of use with high adhesion
  - Supply of steel Fe E24
  - Shaping frames
  - Establishing and setting
  - Tolerances implementation
  - Minimum distance of reinforcing walls formwork
  - Junction frames
  - Verification of the installation's reinforcement

- <u>Transport and implementation of concrete:</u>
  - Spill
  - Reprise concreting
  - Tightening of concrete
  - Conservation and cure concrete

5.5.2.3 Mortar

- <u>Composition</u>

- M1 mortar for internal waterproof coating
- M2 mortar coating for ordinary interior or exterior
- M3 mortar: Floor screeds and paving

- Coatings
  - Surface preparation
  - Production of coatings
  - Coated wire
- Screeds
  - Screeds ordinary
  - Screeds incorporated
- Masonry
  - Rubble masonry and stone:
    - Ordinary rubble
    - Carved stone
    - Bricks and cement agglomerates
    - Floors
- Large works
  - Bays lighting type "glass tiles"
  - Massifs Foundation Equipment
  - Paving on earth-full:
    - Hedgehog
    - Concrete Form
    - Regular tread

- Terrace Waterproofing
- Storm water runs terraces
- Expansion joints Crane

5.5.3 Second work

- Metal
  - Constructive
  - Protection against corrosion
  - Protection by paint
  - Protection galvanization
  - Protected by epoxy resin

- Floor and wall
  - Quality of materials
  - Storage Handling
  - Execution of tiles on floors
  - Running the installation of ceramic products on walls
  - Hardware-Locks
  - Glazing
  - Painting
  - Ventilation
  - Cleaning sites

5.6 Tests and Inspections

All materials will be tested with technical specifications below:

5.6.1 Tests on cement

An essay by delivery of 20 t will be made.

5.6.2 Testing on aggregates

- Sand for mortar and concrete:
  - Nature
  - Granulometry
- Medium and large aggregates for concrete
  - Granularity
  - Cleanliness
  - Attrition
- Storage of aggregates
- Reception of aggregates:
  - Cleanliness
- Tests:
  - A measure of the equivalent sand cubic meters by fifty (50 m^3)
  - Control of particle size by one hundred cubic meters (100 m^3)
  - A trial of silica content by fifty cubic meters (50 m^3)

5.7 Works inspection

- Supply of tools and instruments necessary for the verification of building , testing construction and inspection of drawings, calculations or measurements

- Supply of all reasonable labor and materials necessary for a suitable site inspection and testing site that may be required
- Supply of means of transport may be necessary to visit the site.

Study and Control of Concrete

General supply

SATAREM shall be subject to the supply of the Journal of the common requirements of the Ministry of Equipment and the requirements of technical specifications:

- Strength of Concrete
- Events Study
- Proof of convenience

Tests of control

The control tests are designed to control the intrinsic resistance of concrete to make it. Control testing will be performed on samples taken at the mixer and kept under standard conditions.

Test information for assessing, with the best possible approximation, the resistance of the concrete structure.

- Tests for resistance:

  Compression

  Traction

- Tests for consistency

  Tolerance on the mix of aggregate and cement

- Testing of pipelines Gravity:

The tests will be carried out on sections of pipeline between two consecutive views. For pipelines of more than 1000 ml of length, the leakage tests will, at most a tenth of the total length of pipes.

5.8 Calculations and Drawings

The steel works will be designed, calculated and applied according to the latest editions of the regulations and requirements below:

- Rules for design of structures in steel CM66
- Unified Technical Document (O.T.U)
- Local standards
- Guide drawings
- Plans Downhill loads and seals
- Plans for completion: all plans will have a numbering depending on the model supplied by the client.

5.9 Buildings safety

Included in the calculations:

- Permanent loads, Overload or operating test, Overload climate, Variations in temperature
- Methods of justification: Test conditions, mounting conditions
- Safety factor: Safety factors relating to the foundations, structures and structures shall conform to standards.
- Calculation:

- Steel quality:
    - Rolled steel bolted construction
    - Steel bolts
    - Rolled steel for construction
    - Electrodes
- Assembly :
    - Workshop: bolted or welded
    - On site: bolted
- Siding, Roofing and Planking:
    - Types of Coverage & Siding
    - Accessories & Installation
- Descents water
- Planking:
    - Grating
    - Ribbed plate or bladed

5.10 Methods of Execution of Works

- The frame is designed in standard profiles, and PRS
- The main structure will be bolted or welded
- The secondary structures, demountable (by necessity of operation) will be temporary or bolted.
- All elements of buildings should be designed so that all sides in contact with the atmosphere can be painted.
- The profiles will be selected and arranged to present the maximum resistance to corrosion.
- The Structural steel including decking, stairs, ladders, railings, door frames, etc…

- Protection against fire: flame-resistant irons will be specified in terms of details.

Execution in the Workshop

- Tolerances: In accordance with current standards.
- Squareness, Leveling, dressage, tracing
- Bending, folding, stamping
- Forging
- Cutting
- Drilling holes

Welded Construction

SATAREM will present a list of welding (welding procedures, qualification of welders, material certificates and electrodes) .The welding is done manually at the arc with coated metal electrodes or semi-automatic CO2 gas or automatically under flux:

Welding program for:

- Part of structure
- Each type of joint
- Each cord

Parts Preparation

Execution of documents

Execution of welding

Inspection of welds:

- Visual
- Penetrant
- Radiographic examination of welds end to end of the components involved in the resistance of

the whole workshop or assembly

Running in place:

- Tolerances: In accordance with current standards.

Mounting place

- Featured
- Bolting
- Checking foundations
- Choice of lifting
- Alignment
- Setting and Timing

Surface treatment

- Sandblasting of steel SA 2 ½
- Immediately after blasting, a primary layer of chlorinated rubber Rust 8 to 40 microns thick.
- After 24 hours, in a first layer of chlorinated rubber rust than 40 microns thick
- After 24 hours, an intermediate layer of chlorinated rubber to 40 microns thick
- A finishing coat of chlorinated rubber, 40 microns thick
- The colors of these 4 layers of paint must be different
- The thickness of all layers of paint after drying: 160 microns

6. Water Supply and Drainage

The water supply of the cement plant includes production water (including auxiliary production water), equipment cooling water, living fresh water etc.

The source of water supply is not included in this project. All water works (piping, water supply, drainage,…) between the carry and the intermediate station are not included. All water works between the intermediate station and the main plant are not included. Water treatment and sewage system are also not included.

Circular water is used for process equipment cooling water, and waste water is discharged.

Production waste water, sanitary sewage and laboratory waste water are discharged directly after being properly treated in the waste water treatment plant.

7. Environment protection

The proposal complies with relevant national environment protection standard of Europe. During basic design, local national environment protection standard will be strictly performed.

In the project the emission of dust and harmful gas complies with Europe standard.

Emission	Maximum emission (mg/Nm^3)
Dust content	30
SO_2	200
NO_2	500

8. Training

8.1 Training objective

Training's objective is to provide the Owner's personnel with sufficient knowledge and skills on the works of respective categories, which shall be required for the operation, maintenance and control of the plant. Training shall cover all facets of plant and machinery including mechanical equipment, electrical equipment, control and automation equipment, laboratory and quality control.

The language of training shall be in English.

The Contractor has to arrange qualified, experience and sufficient trainers for the training. All the training materials and equipment for the classroom training shall be arranged by the Contractor.

8.2 Means of Training

During the execution of the Works, the Contractor provides assistance for the instruction and training of operation and maintenance personnel appointed by the Owner of the plant. Based on training experience gained from cement plants built in recent years, the following types of training should be adopted for the Project:

- Training will be arranged and carried out by the Contractor
- The Contractor will make an overall planning and all-round consideration, arrange various training rationally according to the requirement of the Owner and actual progress situation of the project to guarantee training quality and finish all training work on time
- Proposed training methodology is based on two-pronged approach as follows:
    1. "Off Site" Training, the place of training shall be outside plant site.
    2. "On Site" Training, the place of training shall at plant site.

8.2.1 Off site theory training

The Contractor will provide all necessary instruction material for this purpose such as manuals, booklets, pamphlets, drawings, sketches, models, pictures, photos, color slides, films, etc. This instruction material

will become the property of the Owner. This training will take place at the Contractor's offices. The trainee ought to obtain following knowledge in theory knowledge train stage:

a) Technological process of the workshop, characteristic of the equipment, operation, safeguards.
b) Chemical foundation of cement craft and basic theories.
c) Function of the system operation parameter of quality control, adjustment and processing of alarm signal.
d) Relation between the system opening and stopping and interlocking.
e) Support and distribute electricity and electrical machinery.
f) Automation control and control software.
g) Safety education
The off-site theory training shall be finished prior to proceed for off-site practical training.

8.2.2 Off site practical training

This training will take place at operative plants, which have similar technology. At this stage, the trainee should take part to the practical operation and learn to deal with emergencies. The trainee should obtain and consolidate the following knowledge through studying:

a) Steps of turns on and turns off the equipment.
Adjustment of the craft parameter of normal operation and dealing with the emergency.
b) Operating the equipment steadily and dealing with the malfunction.
c) Quality control training comprising the examination of physical and chemical testing and the organization and management of the plant.
d) Routine maintenance, know the keystone of patrol and deal with the fault.
The off-site training schedule shall be as agreed between owner and contractor. However this training is intended to be finished 5 months before the no-load test of the project

8.2.3 On-site training

On-site training will include training during erection and commissioning. This shall be carried out before & during the No-Load test/Load testing & commissioning period. Attendant, security, testing personnel should be trained with own work mainly and obtain the following knowledge through training:

a) Knowing the process flow of the plant. On-the-spot pertinence study. Knowing the process flow of relevant posts.
b) Knowing the equipment construction. Knowing automatic control performance and working techniques.
c) Learning the starting schemes, the working techniques, turning on and off. Knowing the normal running and the crash handling method.
d) Learning the safety rules.
e) Learning the maintenance of equipment.
f) Familiar with the system of maintenance.

8.3 Training Plan

With the consideration of simplification of structure and staff, great attention should be paid to rationalizing the personnel's structure when employing personnel. Especially for technicians of important technical positions such as process technique, quality control, computer, automation, equipment maintenance, etc., a certain proportion of excellent technical personnel with rich practical experience should be employed as backbone of the enterprise to ensure the enterprise starts smoothly and leads onto normal operation within a short time.

This training plan is involving in all positions from administration, production to maintenance, including various technical personnel, CCR operators, workshop operators, quality control workers and mechanical & electrical maintenance workers. In this plan, basic requirements for personnel's qualification will be raised according to different professions.

8.3.1 Process Technology

Personnel in these positions should have graduated from college or higher in cement technology; meanwhile, more than half of them should have practical experience. The basic contents that should be known and mastered as key points include:

- The characteristics of the technological process of production
- The balance relation and basic parameters of air and materials of the system
- Key technological process parameters and key control links of the system
- Tracking, analyzing, controlling materials charge mixture and quality of every link of the complete system, etc.

- Basic fundamentals of DCS control system
- Logical relations between complete process system and equipment interlocking control
- Basic operation method and skills of every system in central control room
- Analyzing and judging real-time information during operating period
- Mutual action and inherent law between key elements of process equipment and key elements of production quality procedure

The major form of training technical process personnel is lecture and practice, and asking and answering question. After the training finishes, these trainees have a better understanding of the central points of dry cement production process technology, basic skills and methods of adjusting and controlling the output and quality of every system link, basic technique of analyzing, judging and settling process problems

8.3.2 Operator in Center Control Room (CCR)

Operators in CCR should have graduated from senior specialized middle school or higher. People who graduated from college in cement technology or has operating experiences in this position have priority.
The training of Central Control Room Personnel includes Operators of Crushers, Stacker & reclaimers, Raw Mill System, Kiln Burning System. The main training will be carried out in similar modern domestic large-scale cement plant. The basic procedures are:

- Safety education and introduction of general conditions after entering the plant;
- Technical personnel of the plant introduce the technological conditions of the production process;
- Visit CCR and answer questions;
- Teaching the fundamentals of cement production technology
- Teaching about the major equipment and fundamentals of cement production
- Going to plant to get familiar with the process and characteristics of every section, the running status of the equipment and master the equipment interlocking relations of the system preliminarily;
- Lecture on equipment groups start-stop sequence, interlocking and other basic information related to system operation by CCR operators;
- Demonstration and explanation of keyboard, operation, various screen data displays, etc.;
- Explanation on system operation, adjusting parameters, alarm parameter control, etc.;

- Following relevant personnel to attend daily work to get familiar with actual operation (in form of question-answer and explanation)
- Perform operation under the instruction of operators of the plant;
- Rotating to practice in different positions;
- Examination.

The purpose of this above-mentioned training and practice is to enable trainees to:

- Get familiar with production process and technical sequences
- Understand the operational fundamentals of equipment
- Learn to check and read various indications and alarms
- Judge and settle different breakdowns and problems
- Master operating skills of the system.

8.3.3 Quality Control

Personnel engaged in quality control should have graduated from college or higher in cement technology or chemistry. Those who have practical experience have priority.

Quality Control Personnel includes Technical Personnel & Quality Inspection Personnel.

The main training will be carried out in similar modern large-scale cement plant. The basic procedures are :

- Teaching cement production process and related quality control, visiting the production in the plants according to the process flow;
- Teaching basic theory of quality control;
- Teaching the use (fundamentals) of each kind of equipment, instrument and implements in the laboratory, their operation and experimenting in-groups;
- Following technician and skilled workers of the production line, and practicing quality control procedure under their guidance;
- Professional Examination

During the complete course of training, the trained workers must accept training strictly according to prescribed contents, technical personnel can take part in training selectively according to specific

conditions. In addition, they can interchange with or seek advice from technical personnel of the plant directly to know the quality control mode of the enterprise, etc.
The purpose of this above-mentioned training and practice is to enable trainees to expertly master the basic operating skills of quality control within the scope of their own duty.

8.3.4 Computer & Automation Engineer

Personnel in these positions should have graduated from college or higher in relevant specialty; meanwhile, more than half of them should have rich practical experiences.

The training will be carried out in similar, modern large-scale cement plants. The basic procedures are:

- Teaching cement production technological process and its control fundamentals;
- Visiting the production in the plant according to process flow and central control room in the cement plant;
- Getting to know automatic control facilities and control methods;
- Getting to know the computer software of the control system;
- Getting to know each large, basic module of the automatic control system;
- Following relevant personnel to attend daily work to get familiar with and seek advice about maintenance and fixing breakdowns of the computer (automation) system, etc.

The major training form is two-way interchange. This kind of training form will help trainees to master the use and maintenance of the computer (automation) system in a cement plant.

8.3.5 Maintenance Personnel (Mechanical & Electrical)

Mechanical Technical Personnel in these positions should have graduated from college or higher in mechanics; meanwhile, more than one third of them should have practical experiences.

Electrical Technical Personnel in these positions should have graduated from college or higher in relevant specialty. Meanwhile, more than half of them should have practical experiences.

Maintenance Workers Personnel in these positions should have graduated from senior middle school or higher. Meanwhile, more than half of them should have graduated from technical school or senior specialized middle school or hold practical experience in these two fields.

It will be arranged before the no load test because at that time the project enters into the latter stage of equipment erection and early stage of testing.

Means of training shall be a combination of theory and practice. Firstly, the contractor's technician of different profession will hold lectures on principle knowledge, the trainees shall be sent to construction teams to receive designated practice after necessary safety introductions. Focus of this stage is to enable these trainees to be familiar with structure and fundamentals of mechanical & electrical equipment at site, various construction drawings and basic maintenance skills. Training for different teams should continue until all trainees understand all specified courses and proper examinations are required for trainees during this period.

At the stage of no-load test run and commissioning, trainees shall attend specific commissioning and trouble shooting activity under the instruction of contractor's technicians so that they understand the characteristics of equipment operation and skills of resolving normal problems.

8.3.6 Production Equipment Operators

Personnel in these positions should have graduated from senior middle school or higher. The training will be carried out in large-scale modernized cement plant.

- Safety education and introduction of general conditions after entering into the plant;
- Teaching cement production process and equipment fundamentals;
- Teaching and visit of production according to technical sequences;
- Teaching production process, characteristics, start-stop sequence, communication method with CCR, etc. of each production section;
- Teaching equipment control, process control, completing control record and basic position duty;
- Following relevant personnel to attend daily work to get familiar with the principles of the positions;
- Rotating to practice in different positions;
- Examination

The purpose of the above training and practice is to enable trainees to:

- Get familiar with cement production technology, equipment of the production system and production post duty
- Master basic methods and skills of equipment control and process control
- Learn to analyze, judge and settle normal production process breakdowns

8.3.7 Special Training Contents

For special equipment of the project, the contractor should not only train the related personnel of the Owner during the erection course, but also should arrange key mechanics, control room and site operators of the Owner to go to cement plants where there is the same kind of equipment to receive short-term specialized training:

For the sub-item of important technology and equipment, the contractor will make special plans for training lectures given by supervisors combining with different links of erection, testing and commissioning. They will arrange the process personnel, mechanical & electrical personnel and related site operators to take part to the training and receive supervisors' lectures. The primary planned items include:

- Operation and use of rotary kiln
- Operation, use, fixing breakdown and maintenance of raw mill
- Introduction, erection, testing, operating essentials of DCS system of this project

8.4 Training period

The off-site training (theory and Practical both) plan takes 1~2 months and is planned to finish 5 months before the no-load test of the complete line. The on-site training is mainly for Maintenance and operation Personnel. They will enter into equipment erection, non-load testing, commissioning. After equipment interlocking is done, the system enters into stage of commissioning. At this time, all production and maintenance personnel of the Owner go to their job post and this means that the training work finishes. From trial production with load to the expiration of the contract, we will continue to provide free technical guidance and service to the trainees of the Owner, to help them to comply with their tasks as soon as possible.

8.5 Training Plan Chart

8.5.1 Off-site training plan chart

The following table illustrates about the minimum coverage of training imparted to the owner personnel, as per contractor assumption. However owner shall increase or reduce the training personnel as per his need, subject to the unit rate for each category offered by the Contractor.

N°	Profession	N° of trainees	Period (hours)	
			Off-site theory	Off-site practical
1	Mine process technological personnel	1	1x40	1x150
2	Process technological personnel	2	2x40	2x150
3	CCR Operator of raw meal system, kiln burning system	8	8x40	8x150
4	Chemical engineer	1	1x40	1x150
5	Quality inspection worker	2	2x40	2x150
6	Computer & automation engineer	2	2x40	2x150
7	Mechanical & Electrical engineer	2	2x40	2x150
8	Mechanical & Electrical maintenance worker	5	5x40	5x150
9	Production equipment operator	2	2x40	2x150
10	Important device maintenance personnel	2	2x40	2x150

8.5.2 On-site training plan chart

The following table illustrates about the minimum coverage of training imparted to the Owner's personnel, as per the Contractor's assumption. However the Owner shall increase or reduce the number of trainer's day as per his need, subject to the unit rate for each category of training offered by the Contractor.

N°	Profession	N° of trainees	Period (hours)	
			On-site theory	On-site practical
Engineer level training				
1	Production processes	2	2x2	#
2	Mechanical and electrical maintenance process	4 (2 each)	4x3	#
3	Software programming	1	1x3	#
Operator level training				
1	Process filters (EP)	1	1x2	#
2	Stacker and reclaimer	1	1x2	#
3	Crusher	2	2x2	#
4	Mill	1	1x2	#
5	Clinker cooler	1	1x2	#
6	Process filters (bag filter)	1	1x2	#
7	Vertical gear box of VRM	1	1x2	#
8	Other gearbox	1	1x2	#
9	Kiln and pre-heater	1	1x3	#
10	Weigh feeders, flow meter, load cell, belt scale and weigh-bridge	1	1x2	#
11	Fans, compressors and blowers	1	1x2	#
12	Bucket elevator and pan conveyor	1	1x2	#
13	Belt conveyor	1	1x2	#
14	MV switch-gear	1	1x2	#
15	HT drives (VVVF drive)	1	1x2	#
16	ESP (electrical aspect)	1	1x2	#
17	Transformers	1	1x2	#
18	Gas analyzer	1	1x2	#
19	All field instruments	1	1x2	#
20	MV motors	1	1x2	#

Note:

- (#) The on-site practice period depends on the relevant equipment erection time.
- The number and days of on-site trainer considered by the contractor shall be as indicated in the above table. The owner's personnel (trainee) number can be according to the Owner requirement.
- The training content and item can be adjusted according to the site status.

8.6 Responsibility of the Contractor and the Owner at each training Stage

	Owner	Contractor
Off-site theory and Practical training	Organize trainee whom meet the demands. Bear the trainee's accommodation, food and transportation expenses outside contractor's country. Bear the trainee's salary, pocket expenses Bear medical treatment, medical and international travel insurance expenses of owner personnel. Visa, Passport and Other matters that correlated with training except that the contractor bears.	Arrange the teaching material, CD, stationery, document, handouts etc. Bear the trainee's accommodation, food and transportation expenses within contractor's country for the purpose of training. Safety appliances required during off-site practical training Arrange sufficient, qualified and experience teachers and language. Arrange the training place with all accessories like furniture, computer, printers and other peripherals. Check and rate the trainee. Give feedback of trainee to Owner
On-site theory and practical training	Organize trainee whom meet the demands. Bear the trainee's accommodation, food and transportation expenses. Bear the trainee's salary, pocket expenses, medical treatment and insurance. Safety and security of the Owner's personnel Appoint the administrative staff of trainees. Arrange the training place equipped with furniture and basic training room facility. Other matters that correlated with training except that the contractor bears.	Arrange the teaching material, CD, stationery, document, handouts etc. Bear the trainer's accommodation, food and transportation expenses. Check and rate the trainee Give feedback of trainee to owner.

9. Construction Schedule

Please refer to appendix 3: "Project Construction schedule".

SATAREM

Appendix 1

EQUIPMENT LIST

EQUIPMENT LIST

	Project name	2400TPD		Revision	0
	Sub-section	312-limestone crusher		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
312 HP 01	Receiving hopper	1	3 500		
	Material: limestone, Capacity: 15M3				
312 AF 10	Apron feeder	1	57 390		
	Spec.: B1600×12000,Inclination: 20°				
	Feeding material : Limestone				
	Bulk density : 1.45t/m^3				
	Capacity: 420 t/h				
	Grain size: ≤1000X1000X1000mm				
	Speed: m/s				
312AF10-M	Motor (Frequency control)	1	381	55	
	Power: 55kW ,Voltage: 380V				
	Protection grade: IP55				
312AF10-P	Reducer	1			
	Type:				
	Gear Ratio:				
312 CV 01	Scrapper	1	100		
	Type : PC18D18				
312 HC 01	Hammer crusher	1	69 550		
	Type : PCF1818				
	Capacity:350~400 t/h				
	Material : Limestone				
	Moisture content: ≤5%				
	Max. feed size: ≤1000x1200x1000mm				
	Production size (95%): 20~45mm				
312HC 01-M	Motor :YRKK500-6	1			
	Power:560kW, Speed:987r/min				
	Voltage: 6000V				
	Protection grade: IP55				
312HC 01-a	hydraulic oil station pump	1			
	motor:Y132M-4, Power:7.5kW				
312 BC 01	Belt Conveyor	1	29 500		
	Type: DTII-B1200				
	Spec.: B1200×120000mm (Level)				
	Capacity: 800 t/h				
	Material: Limestone				
	Bulk density : 1.45t/m^3				
	Speed: 1.6m/s, Inclination: 13.2°				
	Tension device: Vehicle				
312BC01-M	Motor ::Y280S-4	1	535		
	Power: 75kW			75	
	Voltage: 380V				
	Protection grade: IP55				
312BC01-P	Reducer	1			
	Type:				
312BC01-a	Protector	1			
	Pull cord switch				
	Zero speed switch				
	Sway switch	1		2,2	
312 BC 02	Belt Conveyor	1	24 580		
	Type: DTII-B1200				
	Spec.: B1200×100000mm				
	Capacity: 800 t/h				
	Material: Limestone , Bulk density : 1.45t/m3				
	Speed: 1.60m/s, Inclination: 13.2 °				
	Tension device: Vehicle				
312BC02-M	Motor :Y280S-4	1		75	
	Power: 75kW,Voltage: 380V				
	Protection grade: IP55				
312BC02-P	Reducer:	1			
	Type:ZQ1000-I				
312BC02-a	Protector	1			
	Pull cord switch				
	Zero speed switch				
	Sway switch				
312 BF 01	Bag Filter	1	200		
	Type:LCPMGS-64-5				
	Capacity: 223,00 m^3/h	1	8 300		0,46
	Gross filter area: 248m^2				
	Filtering air speed: ≤1.2m/min				
	Outlet dust concentration: ≤30mg/Nm3				
	Loss pressure :1200-1500 Pa				
	Compressed air pressure: 0.5--0.7 MPa				
	Compressed air consumption: 1.5Nm3/min				
312 FV 01	Flap valve				

EQUIPMENT LIST

	Project name	2400TPD		Revision	0
	Sub-section	312-limestone crusher		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
	400 x 400 mm				
312 FN 01	Centrifugal fan	1	1 155		
	Type:9-26№11.2D: 45°				
	Capacity: 22300 m^3/h				
	Full pressure: 3000Pa				
	Working temperature ：20℃				
	Rotation speed： 960rpm				
312FN01-M	Motor:Y132M-4, Power:37kW	1	388		
	Voltage: 380V				
	Protection grade: IP55				
312FN01-a	Manual valve (fan inlet)				
312 BF02	Bag Filter				
	Type:LQM32-4				
	Capacity: 5,000 m^3/h	1	3 200		0,34
	Gross filter area: 60m^2				
	Filtering air speed: ≤1.2m/min				
	Outlet dust concentration: ≤30mg/Nm3				
	Loss pressure :1200-1500 Pa				
	Compressed air pressure: 0.5--0.7 MPa				
	Compressed air consumption: 0.34Nm3/min				
312 FV 02	Tipping valve				
	300 x 300 mm				
312 FN 02	Centrifugal fan:4-72-4.5A	1	100		
	Capacity: 5,000 m^3/h	1set			
	Full pressure: 3000Pa				
	Working temperature ：20℃				
	Rotation speed： 1450rpm				
312FN02-M	Motor	1			
	Power:7.5kW				
	Voltage: 380V			7,5	
	Protection grade: IP55				
312FN02-a	Manual valve (fan inlet)				
312 BC03	Belt Conveyor:B1200×220000mm	1	54 100		
	Capacity: 800 t/h				
	Material: Limestone , Bulk density： 1.45t/m3				
	Speed: 1.60m/s, Inclination: 13.2 °				
312BC03-M	Motor ::Y315M-4	1	1 048	132	
	Power: 132kW				
	Voltage: 380V				
312BC003-P	Reducer:	1			
	Type:				
312 EH 01	Electric hoist:CD2-35D:	1	900		
	Capacity: 2t				
312 BF 03	Bag Filter	1	200		
	Type:LCPMGS-64-5				
	Capacity: 223,00 m^3/h	1	8 300		0,46
	Gross filter area: 248m^2				
	Filtering air speed: ≤1.2m/min				
	Outlet dust concentration: ≤30mg/Nm3				
	Loss pressure :1200-1500 Pa				
	Compressed air pressure: 0.5--0.7 MPa				
	Compressed air consumption: 1.5Nm3/min				
312 FN 03	Centrifugal fan	1	1 155		
	Type:9-26№11.2D右45°				
	Capacity: 22300 m^3/h				
	Full pressure: 3000Pa				
	Working temperature ：20℃				
	Rotation speed： 960rpm				
312 BC 03	Belt Conveyor	1	24 580		
	Type: DTII-B1200				
	Spec.: B1200×100000mm				
	Capacity: 800 t/h				
	Material: Limestone , Bulk density： 1.45t/m3				
	Speed: 1.60m/s, Inclination: 13.2 °				
	Tension device: Vehicle				
312 BC 04	Belt Conveyor	1	24 580		
	Type: DTII-B1200				
	Spec.: B1200×100000mm				
	Capacity: 800 t/h				
	Material: Limestone , Bulk density： 1.45t/m3				
	Speed: 1.60m/s, Inclination: 13.2 °				
	Tension device: Vehicle				
312ST1	Stacker	1			
	Capacity 1900TPD				
312RE1	Reclaimer	1			

EQUIPMENT LIST

	Project name	2400TPD		Revision	0
	Sub-section	312-limestone crusher		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
	Capacity: 500TPD				
312HP4	Emergency hopper	1			
	Capacity 10m3				
312AC01	Air collector	1			
	volume:1m3; pressure:0.8Mpa				

EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	315- Limestone HG preblending		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
315AF1	Apron feeder	1	65 000		
	WB1800×7000mm				
	Feeding material : Limestone				
	Bulk density：1.45t/m^3				
	Capacity: 420 t/h				
	Grain size: ≤1000X1000X1000mm				
	Speed: m/s				
315AF1-P	REDURE	1			
	KDAB500-355-A				
315AF1-M	Motor	1	500	37	
	YVP280S-8				
	Power: 37kW				
315PC1	hammer crusher	1	69 000		
	PCF1818				
	output: 350～400t/h				
	motor	1	8 000	560	
	YRKK500-6				
	power：560kW,voltage：6000v				
315BF1	bag filter	1	8 300		
	LCPMGS-64-5				
	Capacity: 22300 m3/h				
315FN1	FAN	1	1 155		
	9-26№11.2D 45°				
	Capacity: 23959 m3/h				
	Pressure: 3031Pa				
	speed: 960r/min				
	motor	1	388	37	
	Y250M2-6				
	power：37kW				
315MB1	manual butterfly	1			
	DN700				
315 BC1	belt conveyor	1	21 600		
	Spec.: B1000×88000mm (Level)				
	Capacity: 600 t/h				
	Material: Limestone				
	Bulk density：1.45t/m^3				
	Speed: 1.6m/s,angel: 0°				
315BC1-M	Motor ::Y280S-4	1	535	75	
	Power: 75kW				
	Voltage: 380V				
315RE1	RECLEIMER qg300/38	1	220 000	150	
	Capacity : 300t/h				
	Total power：150KW				
315RE1-p	Reducer				
315RE1-m	Motor				
315BC2	belt conveyor	1	23 100		
	Spec.: B1000×98000mm (Level)				
	Capacity: 600 t/h				
	Material: Limestone				
	Bulk density：1.45t/m^3				
	Speed: 1.6m/s,angel: 0°				
315BC2-M	Motor ::Y280S-4	1	535	75	
	Power: 75kW				
	Voltage: 380V				
315BC3	belt conveyor	1	20 500		
	Spec.: B1000×85000mm (Level)				
	Capacity: 600 t/h				
	Material: Limestone				
	Bulk density：1.45t/m^3				
	Speed: 1.6m/s,angel: 0°				

EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	315- Limestone HG preblending		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
315BC3-M	Motor :Y280S-4	1		75	
	Power:75kw				
	Voltage: 380V				
315BF2	bag filter	1	1 670		
	HMC-64				
	Capacity: 4200m3/h				
315BF2-M	FAN motor	1			
	power:3.0kW				
315EH1	electric hoist	1	900		
	CD15-12D				
315EH1-M	MOTOR	1		3	
	Power: 3kw				
315BS1	Blending stacker	1			
	Type : DB850/22.5				
	Material : limestone				
	Capacity : 850t/h				
	Total power : 160KW				
	Grain size : ≤75mm(90%)				
	Bulk density : 1.37 t/m3				
315RC1	Reclaimer	1			
	Type : QG300/38				
	Material : limestone				
	Capacity : 300t/h				
	Total power : 150KW				
	Grain size : ≤75mm(90%)				

EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	382 pozzolan crushing		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
382 AF1	Apron feeder	1	12 600		
	Type: B800×8000mm				
	Width of apron: 800mm				
	Inclination: 20°				
	Feeding material : Additive				
	Capacity: 200t/h				
	Grain size: ≤1000X1000X1000mm				
	Speed: 0.025-0.075m/s				
382AF1-M	Motor (Frequency control)	1	560	55	
	Type :Y315S-8				
	Power : 55kW				
	Rotation speed: 740r/min				
382 HP1	Receiving hopper	1	6 000		
	Capacity: 30 m^3				
382RC1	Roller Crusher	1	24 000		
	Type:				
	Capacity: 150t/h				
	Material : Additive				
	Max. feed size: ≤600x600x600mm				
	Production size (80%): ＜30mm				
382RC1-M	Motor	1		160	
	Power:160kW				
	Voltage: 6600V				
	Protection grade: IP55				
382 BC1	Belt conveyor	1	5 600		
	Type: DTII:B800×16000mm (Level)				
	Capacity: 200 t/h				
	Material: Additive;Bulk Density: 0.8t/m3				
	Speed:1.25 m/s, Angle:				
382BC1-M	Motor	1	122	11	
	Type:Y160M-4				
	Power: 11kW				
	Voltage : 380V IP55				
382 BF1	Bag Filter	1	3 200		0,55
	Type:LQM32-4				
	Capacity: 5000 m^3/h				
	Gross filter area:60 m^2				
	Filtering air speed: ≤1.2m/min				
	Outlet dust concentration: ≤30mg/Nm3				
	Loss pressure :1200-1500 Pa				
	Compressed air pressure: 0.5--0.7 MPa				
	Compressed air consumption: 0.55Nm3/min				
382FV1	Flap valve	1	100	1,1	
	400 x 400 mm				
	Motor Power: 1.1KW				
382 FN 1	Fan	1	1 000		
	Type:				
	Capacity: 5500m^3/h				
	Full pressure: 3000Pa				
	Rotation speed:1450r/min				
382FN1-M	Motor	1		55	
	Type:				
	Power:55kW				
	Voltage : 380V IP55				
382FN1-a	Manual valve (fan inlet)	1			
	Type:				
382 BC2	Belt conveyor	1	18 000		
	Type: DTII				

EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	382 pozzolan crushing		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
	Spec.:B800×98000mm (Level)				
	Capacity: 300 t/h				
	Material: Additive				
	Bulk Density: 1.3t/m^3				
	Speed:1.25 m/s				
	Angle:15				
	Tension device: Vehicle				
382BC2-M	Motor	1	381	7,5	
	Type:Y250M-4				
	Power: 7.5kW				
	Voltage : 380V IP55				
382BC2-P	Reducer				
	Type:				
382BC2-a	Protector				
	Pull cord switch	1set			
	Zero speed switch	1set			
	Sway switch	1set			
382BF2~4	Bag Filter	3	9 600		
	Type:LQM32-4				
	Capacity: 5000 m^3/h				
	Gross filter area:60 m^2				
	Filtering air speed: ≤1.2m/min				
	Outlet dust concentration: ≤30mg/Nm3				
	Loss pressure :1200-1500 Pa				
	Compressed air pressure: 0.5--0.7 MPa				
	Compressed air consumption: 0.55Nm3/min				
	Flap valve				
	400 x 400 mm				
	Motor Power: 1.1KW				
382FN2~4	Fan	3			
	Type:				
	Capacity: 5500m^3/h				
	Full pressure: 3000Pa				
	Rotation speed:1450r/min				
382FN2~4M	Motor	3		22,50	
	Type:				
	Power:7.5kW				
	Voltage : 380V IP55				
382NG1~7	SLIDE GATE	7	560		
	400x400MM				
382VF1~7	VIBRATING FEEDER	7	630		

EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	511 main dust conlector		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
511 BF1	Bag Filter	1	260 000		0,51
	Type:				
	Capacity: 450000 m^3/h				
	Gross filter area: m^2				
	Filtering air speed: ≤1.2m/min				
	Outlet dust concentration: ≤30mg/Nm3				
	Loss pressure :1200-1500 Pa				
	Compressed air pressure: 0.5--0.7 MPa				
	Compressed air consumption: 0.51Nm3/min				
511SC1	screw conveyor	2	15 200		
	LS500x26000				
511SC1-M	Motor				
	power：11kw				
511AS1	Air slide	1	8 600		
	XZ500x32750MM				
511FN1	air Slide fan	1			
	Capacity: 2600 m^3/h				
	Loss pressure：5600 Pa				
511FN1-m	motor				
	power：7.5kw				
511FN2	Bag Filter FAN	1	19 400		
	type:Y4-73No.28D				
	Capacity:480000m3/h				
	pressure:1800Pa				
	speed:593r/min				
	cool water consumption1~1.5m3/h				
	work temperature: 150℃,max: 250℃				
511FN2-V	valve	1			
	Φ2800mm				
511FN2-E	electric actuator	1			
	ST+RS432				
511FN2-M	MOTOR	1	4 650	400,00	
	TYPE:YKK500-10				
	power：400kw				

EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	411 Raw meal feeding		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
411 HP1	Receiving hopper:Φ7×10m	1	26 000		
	Capacity:400 m3 （HG limestone ）				
411HP2	Receiving hopper:Φ5×10m		16 000		
	Capacity:200 m3 LG limestone ）				
411HP3	Receiving hopper:Φ5×10m		16 000		
	Capacity:200 m3 （IRON ORE ）				
411HP4	Receiving hopper:Φ5×10m		16 000		
	Capacity:200 m3 （SAND ）				
411RG1	single rod gate:(Limestone)	1			
	specfication:600x600				
411RG2	single rod gate:(Limestone)	1			
	specfication:600x600				
411RG3	single rod gate:（IRON ORE ）	1			
	specfication:400x400				
411RG4	single rod gate:（SAND ）	1			
	specfication:400x400				
411WF1	weigh belt feeder(LG Limestone)				
	Capacity:30~200t/h	1	3 200		
	belt width 1200mm,length:6000mm				
411WF2	weigh belt feeder(HG Limestone)				
	Capacity:30~60t/h	1	2 600		
	belt width 800mm,length:6000mm				
411WF3	weigh belt feeder(iron ore)				
	Capacity:5~60t/h	1	2 000		
	belt width 800mm,length:6000mm				
411WF4	weigh belt feeder(sand)	1	2 000		
	Capacity:5~60t/h				
	belt width 800mm,length:6000mm				
411BC1	Belt Conveyor	1			
	Type: DTII-B800				
	Spec.: B800×98500mm				
	Capacity: 350 t/h				
	Material: Raw Meal				
	Bulk density ： 1.45t/m^3				
	Speed: 1.6m/s				
	Inclination: 13.5				
	Tension device: Screw				
411BC1-M	Motor Y250M-4	1	381	55	
	Power: 55kW				
	Voltage: 380V				
	Protection grade: IP55				
411BC1-P	Reducer	1			
	Type:				
411BC1-a	Protector	1			
	Pull cord switch				
	Zero speed switch				
	Sway switch				
411 BF1	Bag Filter	1	3 200		0,34
	Type:LQM32-4				
	Capacity: 5,000 m^3/h				
	Gross filter area: 60m^2				
	Filtering air speed: ≤1.2m/min				
	Outlet dust concentration: ≤30mg/Nm3				
	Loss pressure :1200-1500 Pa				
	Compressed air pressure: 0.5--0.7 MPa				
	Compressed air consumption: 0.34Nm3/min				
411 FV 1	Flap valve	1	100		
	200 x 200 mm				

EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	411 Raw meal feeding		Date	18/06/2021
411 FN 1	Centrifugal fan	1set	500		
	Type: 4-72-4.5A				
	Capacity: 5,000 m^3/h				
	Full pressure: 3000Pa				
	Working temperature ：20℃	1			
	Rotation speed： 1450rpm				
411FN1-M	Motor			8	
	Power:7.5kW				
	Voltage: 380V				
	Protection grade: IP55				
411FN1-a	Manual valve (fan inlet)				
411 BF2	Bag Filter	1	3 200		0,34
	Type:LQM32-4				
	Capacity: 5,000 m^3/h				
	Gross filter area: 60m^2				
	Filtering air speed: ≤1.2m/min				
	Outlet dust concentration: ≤30mg/Nm3				
	Loss pressure :1200-1500 Pa				
	Compressed air pressure: 0.5--0.7 MPa				
	Compressed air consumption: 0.34Nm3/min				
411 FV2	Flap valve	1	100		
	200 x 200 mm				
411 FN2	Centrifugal fan	1set	500		
	Type: 4-72-4.5A				
	Capacity: 5,000 m^3/h				
	Full pressure: 3000Pa				
	Working temperature ：20℃	1			
	Rotation speed： 1450rpm				
411FN2-M	Motor			8	
	Power:7.5kW				
	Voltage: 380V				
	Protection grade: IP55				
411FN2-a	Manual valve (fan inlet)				
411 MS1	Magnet over belt	1	1 000		
411 BC2	Belt Conveyor	1	4 320		
	Type: DTII-B800				
	Spec.: B800×18000mm (Level)				
	Capacity: 350t/h				
	Material: Raw Meal				
	Bulk density ： 1.45t/m^3				
	Speed: 1.25m/s				
	Inclination: °				
	Tension device: Screw				
411BC2-M	Motor	1		11	
	Power: 11kW				
	Voltage: 380V				
	Protection grade: IP55				
411BC2-P	Reducer	1			
	Type:				
411BC2-a	Protector	1			
	Pull cord switch				
	Zero speed switch				
	Sway switch				
411 EH 1	Electric hoist CD2-25D	1	750		
	Capacity: 2 t				
411LD1	level detector	2	100		
	Measure distance:0~15m				
411 LD2	Level detector	2	100		
	4-20 mA				

EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	422 Raw grinding(ball mill)		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
422 RE1	Rotary extractor	1	1 200		
	260 t/h				
422RE1-M	Motor	1		5,5	
	Power:3.0kW				
	Voltage :380V IP55				
422RM1	Vertical roller mill				
	type: MLS3626	1	330 440		
	Capacity:190 t/h				
	(Finess of Normal hard materials andproduct :15% left on 90um seive)				
	Feed size: ≤90 mm				
	Feed moisture : ≤10 %				
	Product moisture : ≤0.5%				
	Inlet gas tem. ≤350℃				
	Outlet gas tem. : 80~90℃				
422MD1	Main Motor	1	11 500	1900	
	Type:YRKK710-6				
	Power: 1900 kW				
422MG1	MAIN GEAR	1	32 000		
	type:				
422MD2	Auxilary motor				
	type: Y 225M -4	1	500	45	
	Power: 45 kw				
	Voltage: 380V				
422 WP1	Mill water injection system	1	500		
	10 Bar, 10 m3/h				
422CN1～CN4	Cyclone	4	30 500		
	Capacity：390000m3／h(approx.)				
	Diameter:4500mm				
422 RA1～RA4	Rotary feeder	4	1 080		
	Diameter:400mm				
	Power:3kW				
	Capacity:150 t/h				
422 RD1	Gas regulating damper	4	100		
422AS1	Air slide	1	2 820		
	XZ500x20000mm				
	Capacity:150 t/h				
422FN1	Air slide FAN	1	96		
	9-19No4.5A				
422FN1-M	Motor：$Y132S_2$-2,	1	72	7,5	
	7.5KW				
422 FN2	Mill recycle fan	1	36 000		
	Type:				
	Capacity: 400000 m^3/h				
	Full pressure: 9000Pa				
	Working temperature ：85℃				
	Rotation speed :				
422FN2-M	Motor:YKK630-6 1400kW 6000V	1	14 000		
	Power:1400kW				
	Voltage: 6000V				
	Protection grade: IP55				
422SD2	Electrical valve (fan inlet)	2	1 200		
	2972x743mm				
	XYA-10G-T2	1			
422 MS1	Magnet overbelt	1	1 000		
422 MT1	Metal detector	1	500		

EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	422 Raw grinding(ball mill)		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
422RM1	raw mill	1			
	Φ4.6x(9.5+3.5)m				
	Capacity: 190 t/h				
422RM1-m	YRKK900-8	1		3 550	
422RM1-P	REDURE				
	JS150-B-F2 MFY350	1			
	2、when we consider one with power hourly rate (5 hours/day)				
422RM1	vertical mill.	1			
	TRM36.4				
	Capacity: 170~260 /h				
422RM1-m	YRKK900-8	1		3 550	
	power：2240kw				
422RM1-P	REDURE				

EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	732 Cement bulk loading		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
732BF1	Dedusting filter	2	3 240		0,14
	Type:HMC48				
	Capacity: 3200m^3/h				
	Outlet dust content:≤30 mg/m^3				
	Gross filter area: 36m2				
	Resistance: 1200Pa				
	Compressed air consumption: 0.14Nm3/min				
	Compressed air pressure:0.5~0.7MPa				
732 FV1	Flap valve	2	200		
732FN1	Fan	2	400		
	Type：				
	Air flow：3200 m^3/h				
	Pressure： 3000Pa				
	Rotate speed: 2900r/min				
732FN1-M	Motor	2	68	6,00	
	Type：Y100L-2				
	Power：3.0KW				
	Rotate speed ：2900r/min				
732FN1-a	Manual valve	2			
732 LA1	Truck loading spout	2	560	6,00	
	Capacity:160T				
	Type:SZJ-Ⅱ				
	compandor mistrackingdistance: 1.5-2.5m				
	Power:3KW				
	Weigh scale: installed above ground				
732 WB1	Weighbridge	1	12 800		
	Capacity:80t				
	Size：approx 3.4mx18m				
	Weigh scale: installed above ground				
732 WB2	Weighbridge	1	12 800		
	Capacity:80t				
	Size：approx 3.2mx18m				
	Weigh scale: installed above ground				

EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	752 weighting trucks		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
752 WB1	Weighbridge	1	7 670		
	Capacity:80t				
	Size： approx 3.4mx18m				
	Weigh scale: installed above ground				
752 WB2	Weighbridge	1	7 670		
	Capacity:80t				
	Size： approx 3.2mx18m				
	Weigh scale: installed above ground				

EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	885 PETCOKE handling and petcoke mill		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
885 RG11	single rod gate	1	114		
	Type:300×300mm				
	Capacity: 60 t/h				
	Material: Raw Coal				
885MV1	magnetic vibration-actuated feeder	1	560		
	type :GZF4				
	Capacity: 60 t/h				
885 MV1-M	Motor	1		30	
	Power: 30 kW				
	Voltage: 380V				
	Speed： 1450r/min				
885 JC1	Jaw crusher	1	6 500		
	Type：400x600				
	Capacity: 20~75 t/h				
885 JC1-M	Motor				
	TYPE:Y250M-8	1	391	30	
	Power: 30 kW				
	Speed： 730r/min				
885BC1	Belt conveyor	1	18 600		
	Type: DTII-B650x125000mm				
	Capacity: 100t/h				
	Material: Raw Coal				
	Bulk density：0.7t/m^3				
	Speed: 1.6m/s				
	Inclination:12				
885BC1-M	Motor Y250M-6	1	395	37	
	Power: 37kW				
	Voltage: 380V				
885BF1	Dedusting filter	1	2 940		0,48
	Type:HMC-48				
	Capacity: 3200m^3/h				
	Outlet dust content:≤30 mg/m^3				
	Gross filter area: 32m2				
	Resistance: 1200~1770Pa				
	Compressed air consumption: 0.24Nm3/min				
	Compressed air pressure:0.5~0.7MPa				
885FV1	Flap valve:200X200mm	1	40		
885FN1	Fan	1	960		
	Type：				
	Air flow：3500 m^3/h				
	Pressure： 3000Pa				
	Rotate speed: 1450r/min				
885FN1-M	Motor	1		6,00	
	Power：5.5kW				
	Rotate speed ：1450r/min				
885HP1	raw coal silo：Φ5x15000mm,	1	14 500		
	VOLUME: 275M3				
885RG2	single rod gate	1	114		
	Type:300×300mm				
	Capacity: 60 t/h				
	Material: Raw Coal				
885WF1	BELT weigh feeder	1	240		
	type :5				
	Capacity: 60 t/h				
885BC2	Belt conveyor	1	1 320		
	Type: DTII-B650x14000mm				
	Capacity: 100t/h				
	Material: Raw Coal				
	Bulk density：0.7t/m^3				
	Speed: 1.6m/s				
	Inclination:12				
885PM1	Air swept petcoke mill	1	137 000		
	₵ 3.2×(6.5+2)m				
	Capacity:20t/h				
	fineness:3~5%(80μm)				
	raw coal moisture ：≤12%				
	Water content of product：≤1.0%				
	inlet air temperature:300℃				
	Speed:16.9r/min				
	water consumption :2t/h				
	cool water :3.5t/h				

EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	885 PETCOKE handling and petcoke mill		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
	Filling rate : 23.5%				
885PM1-M1	main motor:YRKK560-8	1		710,00	
	POWER:710KW				
	Speed: 740rpm				
	voltage:6000v				
885PM1-P1	main redure:JDX630	1			
	ratio: i=5				
885PM1-M2	auxiliary motor:Y200L-8	1		15,00	
	POWER:15KW				
	voltage:380v				
885AG1	auxiliary gear:YNS555-90-ⅡR	1			
	main bearing lubrication : NC-25S				
	cool water :1.5m3/h				
885AG1-M1	oil pump motor : Y100L1-4	1		2,20	
	Power: 2.2KW				
885AG1-M2	oil pump motor : Y90L-4	2		3,00	
	Power: 1.5KW				
885EH1	electrical heater : SRY2-220/2	2		4,00	
	Power: 2KW				
885SP1	PETCOKE seperator	1	8600		
	Type : MX700A				
	Volume : 42000~50000m3/h				
	output : 20t/h				
885SP1-M	motor（Frequency conversion）	1		30,00	
	YPT200L-4				
	Power: 30KW				
885SP1-P	GEAR:B2SV-2	1			
885LV1	Lock wind valve	1			
885EV1	prevent explosion valve	1			
885SC1	Screw conveyor	1	1750		
	LS400×10500mm				
	output : 30t/h				
885SC1-M	motor	1		5,50	
	Power: 5.5KW				
	Bag fillter	1	26500		
	type : LPM8C-950M				
	Handling volume : 57000 m3/h				
	Filtering area : 950 m2				
	compress air consumption 2.4 Nm3/min				2,40
885FN2	coal mill fan	1	2 980		
	M9-26 No13.5D				
	Handling volume : 51876 m3/h				
	Speed : 1450r/min				
	pressure : 8434Pa				
	motor of fan				
885FN2-M	Motoro : Y315L-4	1	1 120	185,00	
	Power: 185KW				
	voltage : 380v				
885BV1	electrical buterfly valve : ZKYVb-0.05	1			
	DN800				
885CB1	pet coke bin:(for kiln)	1	12 300		
	Ø4000mm				
	reserve volume 40t	1	12 300		
885BC2	pet coke bin:(for precalciner)				
	Ø4000mm				
	reserve volume 40t				
885LC1	load cell:0～30t	6	60		
885RW1	rotary weigher	1			
	Capacity:1～15t/h				
885RW1-m1	motor	1	67	5,50	
	Y132S1-2, power :5.5kw				
885RW2					
	Capacity:1～15t/h				
885RW1-m2		1		5,50	
	Y160M2-8, power :5.5kw				

EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	885 PETCOKE handling and petcoke mill		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
885FP1~2	fuler pump	2			
	F-K M200				
885FP1~2-M	Motor	2		30,00	
	power: 15kw				
885RB1	Roots blower(for kiln)	1	2380,00		
	JAS190				
	air volume: 45.8m3/min				
	air pressure:58.8kPA				
	speed: 1450 rpm				
	cool water :10-13l/min				
885RB1-M1	motor	1		75,00	
	type:Y280S-4				
	power: 75kw				
885RB2	Roots blower(for precalciner)	2	5400,00		
	JAS200				
885RB1-M2	motor				
	type:Y280M-4 (One set is standby)	1		90,00	
	power: 90kw				
885EH1	electric hoist	1	520,00		
	type:CD3-9D				
	Lifting weights:3t				
	Lifting height: 9m				
885EH1	Lifting motor	1		4,50	
	POWER: 4.5KW				
885BF3	bag fillter	1	2 400		
	type:LCPM32-3				
	Handling volume ： 6900 m3/h				
	Filtering area ： 93 m2				
	compress air consumption 2.4 Nm3/min				
885FN3	fan	1	213		
	4-72No.5A				
	air volume:7728m3/h				
	SPEED:2900r/min				
885FN3-M	motor	1	125	15	
	type:Y160M2-2				
	POWER: 15KW				
885TK1	CO2 TANK	20	300		

EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	422 Raw grinding		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
422 RE1	Rotary extractor	1	1 200		
	260 t/h				
422RE1-M	Motor	1		5,5	
	Power:3.0kW				
	Voltage :380V IP55				
422RM1	raw mill (ball mill)				
	type: Ø4.6x13.5m	1	476 000		
	Capacity:195 t/h				
	(Finess of Normal hard materials andproduct :15% left on 90um seive)				
	Feed size: ≤90 mm				
	Feed moisture : ≤10 %				
	Product moisture : ≤0.5%				
	Inlet gas tem. ≤350℃				
	Outlet gas tem. : 80~90℃				
422MD1	Main Motor	1	11 500	3550	
	Type:YRKK				
	Power: 3550 kW				
422MG1	MAIN GEAR	1	32 000		
	type:				
422MD2	Auxilary motor				
	type: Y 225M -4	1	500	45	
	Power: 45 kw				
	Voltage: 380V				
422 WP1	Mill water injection system	1	500		
	10 Bar, 10 m3/h				
422sp1	O-SEPA seperator	1	21 400		
	N2500				
	Capacity ： 200T／h				
422SP1-M					
	POWER :132KW				
422CN1～CN4	Cyclone	4	30 500		
	Capacity ： 390000m3／h(approx.)				
	Diameter:4500mm				
422 RA1～RA4	Rotary feeder	4	1 080		
	Diameter:400mm				
	Power:3kW				
	Capacity:150 t/h				
422 RD1	Gas regulating damper	4	100		
422AS1	Air slide	1	2 820		
	XZ500x20000mm				
	Capacity:150 t/h				
422FN1	Air slide FAN	1	96		
	9-19No4.5A				
422FN1-M	Motor ： $Y132S_2$-2,	1	72	7,5	
	7.5KW				
422 FN2	Mill recycle fan	1	36 000		
	Type:				

EQUIPMENT LIST					
	Project name	**2400TPD**		**Revision**	**0**
	Sub-section	**422 Raw grinding**		**Date**	**18/06/2021**
	Capacity: 400000 m^3/h				
	Full pressure: 9000Pa				
	Working temperature ：85℃				
	Rotation speed :				
422FN2-M	Motor:YKK630-6	1	14 000		
	Power:1400kW				
	Voltage: 6000V				
	Protection grade: IP55				
422SD2	Electrical valve (fan inlet)	2	1 200		
	2972x743mm				
	XYA-10G-T2	1			
422 MS1	Magnet overbelt	1	1 000		
422 MT1	Metal detector	1	500		

EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	441 /521 Raw Meal Homogenizing&Kiln		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
441 BE1	Belt bucket elevator	1	49 000		
	Type:TGD630x63850m				
	Capacity：260t／h				
	Material: Raw Meal				
	Bulk density:0.8t/m3				
	Bucket speed:				
441BE1-M1	Motor	1	634	220	
	Type: Y280M-4				
	Power:90kW				
441BE1-P	Reducer	1			
	Type:B3DH7-50,i=50				
441BE1-M2	Auxiliary motor	1			
	Type:				
	Power: 2.2kw				
441BE1-a	Fluid coupling	1			
441 AS 1	Silo feed airslide	1	1 400		
	Spec.: B400×18000mm				
	Inclination: 8°				
	Capacity: 220 t/h				
441FN1	Air slide fan	1	100		
	Capacity：1,500 m3/h, 6 kPa				
	Power:				
441 BL1	Distribution device：Φ1200	1	1 000		
	Capacity:220 t/h				
	Pressure:49KPa				
	(Include:Inlet/out silencer, Air filter, Safety valve, Pressure meter ,Cut-off valve, Check valve, etc)				
441 AS 2~7	Air slide	6	3 200		
	Spec.: B250×6000mm(Level)				
	Inclination: 8°				
	Capacity: 250 t/h				
441FN2	Air slide FAN	1	90		
	Capacity：1800 m3/h, 6 kPa				
	Power:				
441 BF 1	Bag Filter	1	5 280		
	Type:LPM32-5				
	Capacity: 10,000 m^3/h				
	Gross filter area: 119m^2				
	Filtering air speed: ≤1.2m/min				
	Outlet dust concentration: ≤30mg/Nm3				
	Loss pressure :1200-1500 Pa				
	Compressed air pressure: 0.5--0.7 MPa				
	Compressed air consumption: 0.46Nm3/min				
441 FV 1	Flap valve	1	100		
	300 x 300 mm				
441 FN 3	Centrifugal fan	1set	500		
	Type:				
	Capacity: 10,000 m^3/h				
	Full pressure: 3000Pa				
	Working temperature ：20℃				
	Rotation speed：1450rpm				
441FN1-M	Motor	1	100	15	
	Power:15kW				
	Voltage: 380V				
	Protection grade: IP55				
441FN1-a	Manual valve (fan inlet)				
441 LD1	HI-HI level detector	1	100		
	Measure distance:0~15m				

EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	441 /521 Raw Meal Homogenizing&Kiln		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
441 LD2	Level detector	1	100		
	4-20 mA				
441 EH1	electric hoist:CD5x65D	1	1 200		
	Capacity: 5t				
441 SG1~7	Manual knife gate	6	350		
	Size: 400 x 400 mm				
441 SQ1~7	Extraction valve	6	350		
441 BF2	Bag Filter	1	4 200		
	Type:LPM32-4				
	Capacity: 6000 m^3/h				
	Gross filter area: 96m^2				
	Filtering air speed: ≤1.2m/min				
	Outlet dust concentration: ≤30mg/Nm3				
	Loss pressure :1200-1500 Pa				
	Compressed air pressure: 0.5--0.7 MPa				
	Compressed air consumption: 0.46Nm3/min				
441 RF2	Rotary feeder	1	500		
	300 x 300 mm				
441 FN 4	Centrifugal fan	1set	500		
	Type:				
	Capacity: 6600 m^3/h				
	Full pressure: 3000Pa				
	Working temperature ：20℃				
	Rotation speed： 1450rpm				
441FN4-M	Motor	1	125	15	
	Power:15kW				
	Voltage: 380V				
	Protection grade: IP55				
441FN4-a	Manual valve (fan inlet)		100		
441 MB1	Filter dust metering bin	1	10 000		
	Capacity: 90m3				
441LC1	Load cells	3	45		
	3 x 10 t				
441 KG1	Manual knife gate	1	100		
	Size: 400 x 400 mm				
441AS3	Air slide system of the silo	1 set	12 000		
	aera of aeration box:52m2	1 set			
	discharging valuve at the bottom silo	1 set			
	Air slide B250X3000mm	6			
441FN5	axial flow fan		58		
	T35-11No5.6				
	VOLUME:12239M3/H				
441FN5-M	Motor:Y90S-4,1.1KW,1450RPM		22		
521 AS1	air slide	1	1 200		
	Spec.: B400 ×15000mm(Level)				
	Inclination: 8°				
	Capacity: 300 t/h	1			
521FN1	Air slide fan				
	Capacity： 900m3/h, 6 kPa				
	Power:	1	120		
521 CW1	FLOW meter				
	Type：				
	Capacity:20~250 t/h	1			
	Material: Mixed Raw Meal				
521CW1-M	Motor				
	Power:				
	Voltage :380V IP55	1			
521AT1	COMPRESSED air tank	1	700		
	Type :C-2.0/0.8				
	volume:2.0m3				
	pressure:0.8MPa				

EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	441 /521 Raw Meal Homogenizing&Kiln		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
521BL1~2	Roots blower	2	1120		
	Type：JAS150				
	Air flow：23.8m^3/min				
	Pressure：68.6kPa				
521BL1~2-M	Motor	2		90,00	
	Type：Y225M-4				
	Power：45kW				
	Rotary speed：1450r/min				
521BF1	Bag Filter	1	3 200		
	Type:LQM32-4				
	Capacity: 5,000 m^3/h				
	Gross filter area: 60m^2				
	Filtering air speed: ≤1.2m/min				
	Outlet dust concentration: ≤30mg/Nm3				
	Loss pressure :1200-1500 Pa				
	Compressed air pressure: 0.5--0.7 MPa				
	Compressed air consumption: 0.34Nm3/min				
521FV1	Flap valve	1			
	200 x 200 mm				
	Centrifugal fan				
521FN1	Type: 4-72-4.5A	1	500		
	Capacity: 5,000 m^3/h				
	Full pressure: 3000Pa				
	Working temperature ：20℃				
	Rotation speed：1450rpm				
521FN1-M	Motor	1			
	Power:7.5kW				
	Voltage: 380V				
	Protection grade: IP55				
521EH1	Hoist	1			

EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	531 Preheater(WITH Precalciner)		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
531 BF1	Bag Filter	1	2 280		
	Type:LQM32-4				
	Capacity: 5,000 m^3/h				
	Gross filter area: 69m^2				
	Filtering air speed: ≤1.2m/min				
	Outlet dust concentration: ≤30mg/Nm3				
	Loss pressure :1200-1500 Pa				
	air pressure: 0.5--0.7 MPa				
	air consumption: 0.34Nm3/min				
531 FV	Flap valve	1	100		
	300 x 300 mm				
531 FN	Centrifugal fan	1set	500		
	Type: 4-72-4.5A				
	Capacity: 5,000 m^3/h				
	Full pressure: 3000Pa				
	Working temperature ：20℃				
	Rotation speed： 1450rpm				
531FN10-	Motor	1	79	7,5	
	Power:7.5kW				
	Voltage: 380V				
	Protection grade: IP55				
531FN10-	Manual valve (fan inlet)				
531 EH1	Bucket elevator electric hoist	1	1 500		
	Capacity: 5 t				
531 BE1	Belt bucket elevator	1	56 000		
	Type:TGD630x94500m				
	Capacity ： 260 t／h				
	Height ： 94.5m				
	Material: Raw Meal				
	Bulk density:0.8t/m3				
	Bucket speed:				
531BE1-	Motor	1	912		
	Type: Y315S-4				
	Power:110kW,SPEED: 1480rpm				
531BE1-P	Reducer	1	1 200		
	Type: i=50				
531BE1-	Auxiliary motor	1		3,00	
	Type:				
	Power:3.0kw				
531BE1-a	Fluid coupling	1			
531DG 1	Pneumatic diverter gate	1	100		
	500 x 500 mm				
531 GA	Preheater outlet gas analyzer	2	200		
	Type: analyzer 4 form for gas				
531 EL1	Passenger lift	1	5 000		
	Capacity ： 3t				
531PR 1	Preheater with calciner	1Set	325 000		
	Capacity: 2400t/d				
	(Include :Feeding pipe of each cyclone,Discharing				
	cyclone C1: 2-Φ4560mm				
	cyclone C2: 1-Φ6460mm				

EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	531 Preheater(WITH Precalciner)		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
	cyclone C3: 1-Φ6460mm				
	cyclone C4: 1-Φ6760mm				
	cyclone C5: 1-Φ6760mm				
	calciner: 1-Φ5060x30000mm				
531FV1~	Flap valve	5	500		
	800 x 800 mm				
531SG1~	Pneumatic knife gate	2	200		
	500 x 500 mm				
531DG 2	Pneumatic diverter gate	1	100		
	400 x 400 mm				
531 AB1	Air blaster	1	1 500		
	Type:				
	Working pressure: 0.6～0.8MPa				
531 BU1	calciner Burner	1	3 640		
	Fuel oil				
	Capacity：5 t/h				
531 FN6	Fan for Fuel oil burner	1	500		
531 FN7	Fan for Coal or petcoke burner	1	500		
531 KR1	Kiln riser pipe	1	8 000		
531AT1	COMPRESSED air tank	1	700		
	Type :C-2.0/0.8				
	volume:2.0m3				
	pressure:0.8MPa				
531AC1	air cannon				
	type：BB4-20--30	12	240		
	PREssure:0.8MPa				
	type：KT100-D	12	180		
	PREssure:0.8MPa				
531GA1	Two-way gate	1	550		
	Type：YFC-50-I				
	Size：700×700 mm				
531GA1-	Electric actuator	1			
	Power：0.75kW				
531HT1	humidifier tower.	1	124 000		
	CZSΦ8.5x30m				
	Capacity:400000~468000m3/h				
	INLET temperature：300~330℃				
	outlet temperature：120~150℃				
	water spray amount ：20t/h				
531LS1	screw conveyor(reversible)	1	1 650		
	ϕ600x5000mm				
	speed:43r/min				
531LS1-	reducer motor	1		5,50	
	XWD5.5-6-1/35				
	power:5.5kW				
	speed:43r/min				
531FN8	high temperature fan(kiln ID fan)	1	42 000		
	W6-2x30No.31F				
	Capacity:400000m3/h				
	air pressure:7500Pa				
	speed：900r/min				
	work remperature:330℃,max:450				
531FN8-	main motor	1	9 650	1400,00	
	type:YKK630-6				

EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	531 Preheater(WITH Precalciner)		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
	power:1400kW				
	work voltage:6000V				
531FN8-	Auxiliary preach motor	1		11,00	
	XWD11-7-1/29				
	power:11kW				
531OP1	thin oil pump	1			
	XYZ-10G-T2				
531OP1-	MOTOR	2		1,10	
	YS7124-4				
	power:0.55kW				
531OP1-	ELECTRIC heater	1		1,00	
	power:1.0kW				
531LD1		1			
531FV2		1			
531RV1	ROTARY VALVE 400X400	1	450		

EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	541-Rotary kiln		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
541 BU1	Main burner	1	13 640		
	Capacity：4.8 t/h fuel oil or 7.4 t/h coal				
541BU1M	Motor	1		1,1	
	Type：				
	Power： 1.1kw				
	Voltage: 380V IP55				
541 KL1	Rotary kiln	1	434 700		
	Type： Φ4.0x60m				
	Design Capacity：2500t/d				
	Inclination： 4%（sine）				
	Rotation speed of kiln:				
	Main driver: 0～5 r/min				
	Auxiliary driver：6.5r/h				
	Support quantity: 3				
	Sealing type of kiln outlet : Scales sealed				
	Sealing type of kiln inlet :				
	Cooling of kiln outlet: Wind cooling				
	Driving type: Single driving				
	Oil pump station for catch wheel	1			
	Type：				
	Catch wheel type: Hydraulic catch wheel				
	Cooling water consumption for each				
	support: 2.5 m3/h×3				
541 MD1	Kiln drive	1	6 000	315,00	
	Type:Frequency control				
	Power： 315 kW				
	Rating rotation speed:1000r/min				
	Voltage： 380V				
	Starting torque：≥2.5 times rated				
	Speed-adjusting scope ：				
	150～1000 r/min				
541GA2	gas analyser	1			
541 FN1	Kiln shell cooling axial fans	6	600		
	VOLUME:15000M3/H				
541 FN1-M	Motor for fan	6		33,00	
	Type:Y132S_1-2				
	Power: 5.5kW				
	Speed: 2900r/min				
541 FN2	Kiln inlet cooling fan	1	450		
	Type:4-72No3.6A				
	Press:1531Pa				
	Volume:3015m^3/h				
541FN2-M	MOTOR	1		7,50	
	power: 7.5kw				
	speed:				
541 FN3	Kiln outlet cooling fan	1	450		
	type				
	Volume:3015m^3/h				
541FN2-M	MOTOR	1		7,50	
	power: 7.5kw				
	speed:				
541TD1	Tertiary air	1	35 000		
	Φ2100 mm				
541 SD1	Tertiary air Shut off damper	1	1 500		
	diameter: Φ2100 mm				
	Max.working temperature:850℃				
	Traveling range:2100mm (up or down)				
541CR1	Cycloid reduce				
	BW141A-17×11-1.5kW				
	Ratio:187				
541 SK1	KILN camera	1	100		
541 SK2	Cooler camera	1	100		
541 FN4	Primary air fan	1	720		
	Capacity： 9,000 m3/h , 40 kPa				
	Power:				
	Voltage: 380V				
	Speed:				
541 FN4-m	motor	1		15,00	
	Power:15kw				
541FN5	Cooling fan	1	450		
	Type:4-72No3.6A				
	Press:1531Pa				
	Volume:3015m^3/h				
541FN5-m	motor	1		7,50	
	Power:7.5kw				
541AB1	air blaster	8	240		
541 BU1	KILN Burner	1	3 640		
	petcoke				
	Capacity： 6 t/h				
541BL1	ROOTS blower	1	900		
541BL2	ROOTS blower	1	900		

EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	561 clinker cooler		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
561 SB1	Shock blaster	10	1 500		
	Type:				
	Working pressure: 0.6～0.8MPa				
561 HC1	kiln Head cover	1Set	35 000		
	Speed： 1450r/min				
561 EH1	Brickwork electric hoist	1	900		
	Capacity: 5 t				
561 EH2	Crusher electric hoist	1	2 000		
	Capacity: 20 t				
561 GC1	Grate cooler	1	181 000		
	Type：				
	Capacity： 2400 t/d				
	Effective area ：62 m^2				
	Stroke： mm				
	Times： times/min				
	Temperature of inlet material:1370 ℃				
	Temperature of outlet material：				
	ambient temp.＋65℃+suction temperature of fans				
561GC1-M1	motor				
	type：YTSP250M-6, power：37KW	1			
	Speed:985rpm, voltage：380v				
561GC1-P1	REDURE	1			
561GC1-M2	motor	1			
	type：YTSP250M-6, power：37KW				
	Speed:985rpm, voltage：380v				
561GC1-P2	REDURE	1			
561 GQ1-a	Hydraulic System for Cooler	1			
561 GQ1-b	Lubrication System for Cooler	1			
	Type:				
	Capacity:				
	Pressure:				
561 HK 1	CLINKER Crusher	1	25 000		
	Spec.：Φ920 x3000				
	Linear velocity of hammer tip：				
	Water consumption for cooling :4.5m^3/h				
	Outlet material size：＜25				
561HK1-M	Motor	1			
	Type ： YRW315M-8				
	Voltage：380 V				
	Power ： 75 kW				
	Speed：740 r/min				
561 RD1	Gas regulating damper	1	100		
	diameter: Φ1000 mm				
561 CN1~2	Cyclone	1	5 000		
	diameter: Φ4500 mm				
	Working Temperature :400 ℃				
561 FV1~2	Flap valve	1	100		
	400 x 400 mm				
561 FN2	Set of axial air fan	1Set	1 200		
	Type:				
	Air volume： m^3/h				
	Air pressure： 460Pa				
561 FN2-M	Motor	4		44	
	Power: 44 kW				
	Rotation speed: 1450r/min				

EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	561 clinker cooler		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
561HE1	Air-air heat exchanger	1	157 000		
	Inlet temp.: 300℃(normal)				
	350℃(max.)				
	Outlet temp.: 150℃(normal)				
	200℃(max.)				
	Air volume：202500 Nm^3/h (normal)				
561FN1	Cooling Fan	1	3 750		
	Type:AFL9-19No13D right180°				
	Air flow：20100m^3/h				
	Pressure:10400Pa				
561FN1-M1	Motor:YVP280M-4, Power：90kW	1	634	90	
	Electric adjust valve	1			
	Size:DN560				
	Electric Actuator				
561FN2	Cooling Fan	1	3 750		
	Type:AFL9-19No13D left0°				
	Air flow：20100m^3/h				
	Pressure:10400Pa				
561FN2-M2	Motor:YVP280M-4	1	634	90	
	Power：90kW				
	Electric adjust valve	1			
	Size:DN560				
	Electric Actuator				
561FN3	Cooling Fan	1	3 770		
	Type:AFL7-21No12.5D				
	Air flow：27500m^3/h				
	Pressure:7500Pa				
561FN3-M3	Motor:YVP280M-4	1	634	90	
	Power：90kW				
	Electric adjust valve	1			
	Size:DN710				
	Electric Actuator	1			
	Type:BS-60				
561FN4	Cooling Fan	1	4 710		
	Type:AFL6-30No13D				
	Air flow：34400m^3/h				
	Pressure:6600Pa				
561FN4-M4	Motor:YVP280M-4	1	634	90	
	Power(功率)：90kW				
	Electric adjust valve	1			
	Size:DN700				
	Electric Actuator	1			
	Type:BS-60				
561FN5	Cooling Fan	1	5 220		
	Type:AFL6-45No12D				
	Air flow：55100m^3/h				
	Pressure:6000Pa				
561FN5-M5	Motor:YVP315M-4	1	1 048	132	
	Power：132kW				
	Electric adjust valve	1			
	Size:DN900				
	Electric Actuator	1			
	Typ:BS-160				
561FN6	Cooling Fan	1	3 980		
	Type:AFL6-31No12D				
	Air flow：25700m^3/h				
	Pressure:5600Pa				
561FN6-M6	Motor:YVP250M-4	1	381	55	

EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	561 clinker cooler		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
	Power：55kW				
	Electric adjust valve: Size:DN900				
	Electric Actuator: Type:BS-160				
561FN7	Cooling Fan				
	Type:AFL6-31No11D	1	2 990		
	Air flow：22600m^3/h				
	Pressure:4300Pa				
561FN7-M7	Motor:YVP225S-4	1	294	37	
	Power：37kW				
	Electric adjust valve: Size:DN900				
	Electric Actuator: Type:BS-160				
561FN8	Cooling Fan				
	Type:AFL5-48No10D	1	2 570		
	Air flow：27300m^3/h				
	Pressure:3700Pa				
561FN8-M8	Motor:YVP225M-4	1	327	45	
	Power：45kW				
	Electric adjust valve: Size:DN900				
	Electric Actuator: Type:BS-160				
561FN9~17	Cooling fan	9	11 250		
	Type:AFZ40-12№18A				
	Air flow：20000m^3/h				
	Pressure:294Pa	9	3 600		
	Motor:YVF2-250M-8				
	Power：30kW				
	Rotary speed：730r/min				
	Screw conveyorLS400X12000	1	1 500		
	Electric high temperature butterfly valve				
	DN3100				
561BF1	BAG filter	1	180 000		
	Air flow：300000m3/h				
561FN18	Fan	1	24 200		
	Type：Y4-73No25D				
	Air Flow： 330000m³/h				
	Pressure：-3793Pa				
	Rotate direction				
	Dust concentration：30mg/Nm³				
	Rotary speed：580r/min				
	Cooling water：1~1.5m³/h				
561FN18-M	Motor				
	Type：YKK45-10	1	3 900		
	Power：280kW				
	Voltage：6000V				
	Adjust Valve				
	Size：DN2100mm				
561EA1	Electric actuator				
	Type：B+RS800				
	Output torque：8000N.m				
	Inputting signal：4~20mA				
	Voltage：380V				
	Manual butterfly valve				
	Type：DN600				
561AC1	Apron Conveyor	1	110 000		
	B800x96000MM				
	Capacity:150t/h, max 250t/h				
	Inclination:40°				
	Velocity:0.3m/s				

EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	561 clinker cooler		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
561AC1-M	Motor	1	1600	75	
	Type:				
	Power：75kW				
	Voltage：				
	Rotary speed：1500r/min				
561AC1-P	Reducer	1			
	Type:B4SH14				
	Ratio：33.42				
	Power:79kW				

EQUIPMENT LIST					
	Project name	2400 TPD		Revision	0
	Sub-section	571 Clinker transport		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
571 BC1	BELT conveyor	1	18 000		
	Type:				
	Spec.: B800×65400mm (Level)				
	Capacity: 100 t/h				
	Material: Clinker				
	Bulk density：1.45t/m^3				
	Speed: 1.65m/s				
	Inclination: 0°				
571 BC1-M	Motor	1		37	
	Power: 37 Kw				
	Voltage: 380V				
	Speed： 1480 r/min				
571 BC1-P	Reducer	1			
	Type：				
	Speed ratio：				
	Nominal power ： kW				
571 BC2	BELT conveyor	1	13 200		
	Type:				
	Spec.: B800×45400mm (Level)				
	Capacity: 100 t/h				
	Material: Clinker				
	Bulk density：1.45t/m^3				
	Speed: 1.25m/s				
	Inclination: -10°				
571 BC2-M	Motor	1		30	
	Power: 30 kW				
	Voltage: 380V				
	Speed： r/min				
571 BC2-P	Reducer	1			
	Type：				
	Speed ratio：				
	Nominal power ： kW				
571BF1~3	Bag filter	3	9 600		
	Type:LQM32-6				
	Capacity: 6000m^3/h				
	Outlet dust content:≤30 mg/m^3				
	Gross filter area: m2				
	Resistance: 1200~1770Pa				
	Compressed air consumption: 0.46Nm3/min				
	Compressed air pressure:0.5~0.7MPa				
	Bag number:				
571 FV1~3	Flap valve	3	100		
	300 x 300 mm				
571FN1~3	Fan	3	1 200		
	Type：				
	Air flow：6000m^3/h				
	Pressure： 3000Pa				
	Rotate speed: 1450r/min				
571FN1~3-M	Motor	3		45	
	Type：				
	Power：15kW				
	Rotate speed ：1450r/min				
571FN1~3-a	Manual valve	1			
571BF4	Bag filter	1	3 200		1,5
	Type:HMC32-5				
	Capacity: 5000m^3/h				
	Outlet dust content:≤30 mg/m^3				
	Gross filter area: 60m2				
	Resistance: 1200~1770Pa				
	Compressed air consumption: 1.5Nm3/min				
	Compressed air pressure:0.5~0.7MPa				
	Bag number:320				
571 FV 4	Flap valve	1	100		
	300 x 300 mm				
571FN4	Fan	1	420		
	Type：				
	Air flow：5000m^3/h				

EQUIPMENT LIST					
	Project name	2400 TPD		Revision	0
	Sub-section	571 Clinker transport		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
	Pressure : 3000Pa				
	Rotate speed: 1450r/min				
571FN4-M	Motor	1		15	
	Type :				
	Power : 15kW				
	Rotate speed : 1450r/min				
571FN4-a	Manual valve	1			
571BF5	Bag filter	1	3 200		1,5
	Type:HMC32-5				
	Capacity: 5000m^3/h				
	Outlet dust content:≤30 mg/m^3				
	Gross filter area: 60m2				
	Resistance: 1200~1770Pa				
	Compressed air consumption: 1.5Nm3/min				
	Compressed air pressure:0.5~0.7MPa				
	Bag number:320				
571 FV 5	Flap valve	1	100		
	300 x 300 mm				
571FN5	Fan	1	420		
	Type :				
	Air flow : 5000m^3/h				
	Pressure : 3000Pa				
	Rotate speed: 1450r/min				
571FN5-M	Motor	1		37	
	Type :				
	Power : 15kW				
	Rotate speed : 1450r/min				
571FN5-a	Manual valve	1			
571BF6	Bag filter	1	8 280		0,46
	Type:HMC32-5				
	Capacity: 5000m^3/h				
	Outlet dust content:≤30 mg/m^3				
	Gross filter area: 60m2				
	Resistance: 1200~1770Pa				
	Compressed air consumption: 1.5Nm3/min				
	Compressed air pressure:0.5~0.7MPa				
	Bag number:320				
571 FV 6	Flap valve	1	100		
	300 x 300 mm				
571FN6	Fan	1	1 000		
	Type :				
	Air flow : 5000m^3/h				
	Pressure : 3000Pa				
	Rotate speed: 1450r/min				
571FN6-M	Motor	1		30	
	Type :				
	Power : 15kW				
	Rotate speed : 1450r/min				
571FN46a	Manual valve	1			
571 EH1	Electric hoist	1	1 500		
	Capacity: 5 t				
571 EH2	Electric hoist	1	1 500		
	Capacity: 5 t				
571 LD1~5	HI-HI level detector	5	500		
	4-20 mA				
571 NG1~10	Manual needle gate	10	1 000		
	400 x 400 mm				
571 SG1~10	Sector gate	10	1 200		
	Capacity:300 t/h				
	Size:400 x 400 mm				
	Pneumatic				
571SG1~10-M	MOTOR	8			

EQUIPMENT LIST					
	Project name	2400 TPD		Revision	0
	Sub-section	572/574 CLINKER SORAGE AND Cement mill bins feed		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
572 BC1	Belt conveyor	1	21 490		
	Type: DTII-B650x 135,000mm				
	Capacity: 200 t/h				
	Material: Clinker				
	Bulk density ： 1.45t/m^3				
	Speed: 1.25m/s				
	Inclination: 15 °				
	height=13m				
572BC1-M	Motor Y225S-4	1	294	37	
	Power: 37kW				
	Voltage: 380V				
572 BC2	Belt conveyor	1	39 760		
	Type: DTII-B650x 246,000mm				
	Capacity: 200 t/h				
	Material: Clinker				
	Bulk density ： 1.45t/m^3				
	Speed: 1.25m/s				
	Inclination: 15 °				
	height=16m				
572BC12M	Motor Y280S-4	1	535	75	
	Power: 75kW				
	Voltage: 380V				
	SPEED: 1480RPM				
572RV1	SINGLE rod value	18	1 800		
	400x400				
572SG1	electric-sector gate	18	1 960		
	400X400				
	Capacity:60T/h				
	Linear Motor	18	360		
	Type ： DT500-30				
	Power:0.75kW				
572BF1	Bag filter	1	3 200		
	Type:LQM32-6				
	Capacity: 6000m^3/h				
572BC3	Belt conveyor	1	13 800		
	Type: DTII- B650x 86800mm				
	Capacity: 200 t/h				
	Material: Clinker				
	Bulk density ： 1.45t/m^3				
	Speed: 1.25m/s	2	253x2	30x2	
	Inclination: 12 °				
	height ： 800mm				
572BC3-m	Motor Y200L-4				
	Power: 30kW				
	Voltage: 380V				
	SPEED: 1480rpm				
574HP1	clinker storage bin	1	16 000		
	Ø7.0x8000mm				

EQUIPMENT LIST					
	Project name	2400 TPD		Revision	0
	Sub-section	572/574 CLINKER SORAGE AND Cement mill bins feed		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
	Capacity: 450t				
	Bulk density：1.45t/m^3				
574HP2	limestone storage bin	1	8 900		
	Ø5.0x7000mm				
	Capacity: 175t				
	Bulk density：1.45t/m3				
574HP3	pozzolan storage bin	1			
	Ø5.0x5500mm		6 900		
	Capacity: 100t				
	Bulk density：0.8t/m^3				
574HP4	gypsum storage bin	1			
	Ø5.0x5500mm		7 200		
	Capacity: 150t				
	Bulk density：1.3t/m^3				
574BC1	Belt conveyor（reversible）	1	1 980		
	Type: DTII- B650x 12500mm				
	Capacity: 200 t/h				
	Material: Clinker				
	Bulk density：1.45t/m^3				
	Speed: 1.25m/s				
	Inclination: 0 °				
574BC1-M	Motor Y132S-4	1	68	5,5	
	Power: 5.5kW				
	Voltage: 380V				
	SPEED: 1440rpm				
574BC2	Belt conveyor（reversible）	1	1 680		
	Type: DTII- B650x 8100mm				
	Capacity: 200 t/h				
	Material: Clinker				
	Bulk density：1.45t/m^3				
	Speed: 1.25m/s				
	Inclination: 0 °				
574BC2-M	Motor Y132S-4	1	68	5,5	
	Power: 5.5kW				
	Voltage: 380V				
	SPEED: 1440rpm				
574NG1~4	PIN gate	4	320		
	400x400				
574 WF1	Belt weigh feeder	1	2 400		
	Type：BQ1000—12				
	Capacity：13～130t／h				
	Width：1000mm				
	Length：1200mm				
	Speed：0.4m／s				
	Bulk density：1.45t/m3				
	Material: Clinker				
574WF1-M	Motor	1		5,50	
	Power:5.5kW				
	Voltage :380V IP55				

EQUIPMENT LIST					
	Project name	2400 TPD		Revision	0
	Sub-section	572/574 CLINKER SORAGE AND Cement mill bins feed		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
574WF2	Belt weigh feeder	1	1 200		
	Type：BQ800—12				
	Capacity：13～60t／h				
	Width：800mm				
	Length：1200mm				
	Speed：0.4m／s				
	Bulk density：0.8t/m3				
	Material: POZZOLAN				
574WF2-M	Motor	1		3,00	
	Power:3.0kW				
	Voltage :380V IP55				
574WF3	Belt weigh feeder	1	1 200		
	Type：BQ800—12				
	Capacity：13～60t／h				
	Width：800mm				
	Length：1200mm				
	Speed：0.4m／s				
	Bulk density：0.8t/m3				
	Material: Limestone				
574WF3-M	Motor	1		3	
	Power:3.0kW				
	Voltage :380V IP55				
574WF4	Belt weigh feeder	1	1 000		
	Type：BQ650—12				
	Capacity：5~20t／h				
	Width：650mm				
	Length：1200mm				
	Speed：0.4m／s				
	Bulk density：0.8t/m3				
	Material: gypsum				
574WF4-M	Motor	1		3,00	
	Power:3.0kW				
	Voltage :380V IP55				
574BC3	Belt conveyor				
	Type: DTII- B800x 103750mm	14260			
	Capacity: 200 t/h				
	Material: Clinker				
	Bulk density：1.45t/m^3				
	Speed: 1.6m/s				
	Inclination: 12°				
574BC3-M	Motor Y200L-4	1	253	30	
	Power: 30kW				
	Voltage: 380V				
	SPEED: 1440rpm				

EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	622 Cement grinding(vertical)		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
622 VM1	Vertical mill	1	530 000		
	TYPE:OK364				
	Capacity:120t/h				
	consumption of water ： 8m3/h				
622VM1-M 1	main motor	1	14 000	4200,00	
	YRKK1000-8				
	Power: 4200kW				
622 VM1-M 2	Hydraulic system motor:Y225M-4	1	327	45,00	
	Power: 45kW				
622VM1-P	main gear ： MFY355-A	1	38 000		
622DF1	Double Flap Valve				
	800X800				
622AS1	AIR slide :XZ500 x2500mm(FOR CEMENT)	1	125		
	Capacity ： 127,t/h,I=6%				
622FN1	Fan:XQI5.4	1			
	Gas Flow ： 463 m^3/h				
622BE1	BUCKET ELEVATOR	1	41 650		
	type ： NSE500X28900mm				
	Capacity ： 480T/h,				
622BE1-M	MOTOR	1	535		
	TYPE ： Y280-4				
	POWER:75KW				
622BE1-P	GEAR	1	860		
622EH1	Bucket elevator electric hoist	1	720	1,10	
	2t				
622SE1	O-SEPA SEPERATOR	1	21 400		
	type ： N2500				
	Capacity ： 90~150t/h,				
622SE1-M	motor:	1	132		
	POWER: 132KW				
622CN1~4	Cyclone	4	30 000		
	ϕ:5m				
	Capacity ： 170000m3/h				
622BF1	BAG filter :HMDC128-2×10	1	67 000		12,00
	Capacity ： 180000m3/h				
	consumption of compressed air:12Nm3/min				
622FN3	centrifugal fan	1	2 600		
	Y5-47-11No.23D	1			
	VOLUME:185000m3/h				
	pressure:4003 Pa				
622FN3-M	motor: ： YKK450-6	1	8 000	500,00	
	Power: 500kW				
	SPEED: 990r/min				
622AS2	AIR slide :XZ500 x4000mm(FOR CEMENT)	1	320		
	Capacity ： 127,t/h,I=6%				
622FN2	fan	1	2 320		
	Y5-47-11No.23D				
	VOLUME:185000m3/h				
	pressure:4003 Pa				
622BF2	BAG filter :HMDC128-8	1	12 600		
	Capacity ： 70000m3/h				
	consumption of compressed air:4.8m3/H				
	Total Filter Area:1258M2				
622FN4	Fan	1	2 600		
	Type ： 2100 SI BB24 : 45°				
	Gas Flow ： 78000m^3/h				
	Total pressure ： 5500 Pa				
	Speed ： 1480 r/min				
	WATER: 0.8～1.2 t/h				
622FN4-M	motor	1	1 590	160,00	
	type ： Y355M1-6				
	power ： 160kw				

EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	622 Cement grinding(vertical)		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
622LD1	Electric butterfly valve	1	165		
	WATER: 0.8～1.2 t/h				
622FN6-M	motor	1	1 590	160	
	type：Y355M1-6				
	power：160kw				
622LD2	Electric butterfly valve	1	165		

EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	622 Cement grinding (Horizontal)		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
622 CM1	cement mill Ø4.2x13m	1	380 000		
	HFCG120-45				
	Capacity:110～120t/h				
	consumption of water：8m3/h				
622 CM1-M 1	main motor	1	13 000	3550,00	
	YRKK1000-8				
	Power: 3550kW				
622 CM1-M 2	Hydraulic system motor:Y225M-4	1	327	45,00	
	Power: 45kW				
622CM1-P	main gear ：MFY355-A	1	36 000		
622DF1	Double Flap Valve				
	800X800				
622AS1	AIR slide :XZ500 x2500mm(FOR CEMENT)	1	125		
	Capacity：127,t/h,I=6%				
622FN1	Fan:XQI5.4	1			
	Gas Flow风量：463 m^3/h				
622BE1	BUCKET ELEVATOR	1	41 650		
	type ：N5E500X28900mm				
	Capacity：480T/h,				
622BE1-M	MOTOR	1	535		
	TYPE ：Y280-4				
	POWER:75KW				
622BE1-P	GEAR	1	860		
622SE1	O-SEPA SEPERATOR	1	21 400		
	type： N2500				
	Capacity：90~150t/h,				
622SE1-M	motor:	1	132		
	POWER: 132KW				
622BF1	BAG filter :HMDC128-2×10	1	67 000		12,00
	Capacity：180000m3/h				
	consumption of compressed air:12Nm3/min				
622FN3	centrifugal fan	1	2 600		
	Y5-47-11No.23D	1			
	VOLUME:185000m3/h				
	pressure:4003 Pa				
622FN3-M	motor:：YKK450-6	1	8 000	500,00	
	Power: 500kW				
	SPEED: 990r/min				
622AS2	AIR slide :XZ500 x4000mm(FOR CEMENT)	1	320		
	Capacity：127,t/h,I=6%				
622AS3	AIR slide :XZ500 x15600mm(FOR CEMENT)	1	820		
	Capacity：127,t/h,I=6%				
622FN4	Fan	1			
622AS4	AIR slide :XZ500 x45600mm(FOR CEMENT)	1	3 600		
	Capacity：127,t/h,I=6%				
622FN5	Fan	1			
622BF2	BAG filter :HMDC128-8	1			
	Capacity：70000m3/h				
	consumption of compressed air:4.8m3/H				
	Total Filter Area:1258M2				
622FN6	Fan	1	2 320		
	Type：2100 SI BB24 45				
	Gas Flow：78000m^3/h				
	Total pressure ：5500 Pa				
	Speed ： 1480 r/min				
	WATER: 0.8～1.2 t/h				
622FN6-M	motor	1	1 590	160,00	
	type：Y355M1-6				
	power：160kw				
622LD2	Electric butterfly valve	1	165		
NOTE	THE following is for cement vertical mill				
622VM1	vertical mill	1	530 000		
	TYPE:OK364				
	Capacity: 120 t/h				
622VM1-M	motor	1	12 000	4200,00	
	power： 4200kw				
	when cement mill is considered one with power hourly rate (5 hours/day)				
622VM1	cement mill	1			

EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	622 Cement grinding (Horizontal)		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
	ϕ4.2×15m （with seperator, 42.5P.C cement, with roll squeezer and hierarchical thrasher				
	Capacity: 160±10t/h				
622VM1-M	motor：YRKK1000-8	1			
	power： 4000 kw				
	speed： 740rpm				
622VMI-P	MAIN GEAR	1			
	JS160-B				

EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	715 /716 Cement storage silo and transport		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
715 BE1	Belt bucket elevator	1	21374	90,00	
	Type:TDG630 x 56000mm				
	Capacity ： 250 t／h				
	Height ： 56m				
	Material: Cement				
	Bulk density:1.45t/m3				
	Bucket speed: 31m/min				
715BE1-M	Motor	1			
	Type:				
	Power:90kW				
715BE1-P	Reducer	1			
	Type:				
	Power: kW				
715BE1-M2	Auxiliary motor	1			
	Type:				
	Power:				
715BE1-a	Fluid coupling	1			
715BF1~2	Dedusting filter	2	2360		0.24 x 2
	Type:HMC80				
	Capacity: 5000m^3/h				
	Outlet dust content:≤30 mg/m^3				
	Gross filter area: 60m2				
	Resistance: 1200~1500Pa				
	Compressed air consumption: 0.24Nm3/min				
	Compressed air pressure:0.5~0.7MPa				
	Bag number:80				
715 FV 1~2	Flap valve	2			
	300 x 300 mm				
715FN1~2	Fan	2			
	Type:4-72No.4A				
	Air flow ： 5000m^3/h				
	Pressure ： 3000Pa				
715FN1~2-M	Motor	2		5.5 x 2	
	Type ：				
	Power ： 5.5kW				
	Rotate speed ： r/min				
715FN1~2-a	Manual valve	2			
715BF3~4	Dedusting filter	2	6400		0,48
	Type:HMC80				
	Capacity: 5000m^3/h				
	Outlet dust content:≤30 mg/m^3				
	Gross filter area: 60m2				
	Resistance: 1200~1500Pa				
	Compressed air consumption: 0.24Nm3/min				
	Compressed air pressure:0.5~0.7MPa				
	Bag number:80				
715 FV3~4	Tipping valve	2			
	300 x 300 mm				
715FN3~4	Fan	2	600		
	Type ： :4-72No.4A				
	Air flow ： 5000m^3/h				
	Pressure ： 3000Pa				
715FN3~4-M	Motor	2	136	11	
	Type ： Y132S-4				
	Power ： 5.5kW				

EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	715 /716 Cement storage silo and transport		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
	Rotate speed ：1450 r/min				
715FN3~4-a	Manual valve	1			
715AS1	Air slide	1	2620		
	Type:XZ500 x 27800mm(horizontal distance)				
	Inclination: 8°				
	Capacity: 170 t/h				
715FN6	FAN	1	65		
	9-19No4A				
	Air flow ：1800m^3/h				
715FN7	FAN	1			
	9-19No6.3A				
	Air flow ：3200m^3/h				
715 FV 6	Manual valve	2			
	200x 200 mm				
715AS2	aeration box system of the silo	2	24 000		
	aera of aeration box:52m2	2 set			
	discharging valuve at the bottom silo	2 set			
	Air slide B250X3000mm	12			
	Measuring accuracy ：≤±1‰				
715RS1	blower-Roots(for blending silo)	2	2660		
	Type ： MJL150b				
	Air flow ：14.8m^3/min				
	Pressure ：58.8 kPa				
	(Including inlet silencer, outlet silencer, safety valve,				
	stop valve, t-joint, buffer-type pressure meter,				
	Cooling Water Content				
	TWMPRETURE〈30°C,FOLW :8~13 l/min				
715DE1~4	Silo discharge equipment	4	4800		
	Material density:0.8 t/m^3				
	capacity: 200 t/h				
715SG1	Aeration Screw gate	4			
	Size: B400 mm				
	Cap.:200 t/h				
715GA	Aeration turn on/off gate	4			
	Cap.:200 t/h				
715 BL1~6	Aeration blower(for ring sector)	2	394 x2		
	Type: Roots blower MJL150b				
	Capacity:13.7 m3/min				
	Pressure:78.4KPa				
	Rotation speed:1450 r/min				
	(Include:Inlet/out silencer, Air filter, Safety valve, Pressure meter ,Cut-off valve, Check valve, etc)				
715BL1~6-M	Motor	2		30 X2	
	Type:				
	Power:30KW				
	Voltage :380V IP55				
715 LD01	HI-HI level detector	1			
715 LD02	Level detector. Continu	1			
	Radar. 4-20 mA				
715 LD03	HI-HI level detector	1			
715 LD04	Level detector. Continu	1			

EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	715 /716 Cement storage silo and transport		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
	Radar. 4-20 mA				
715 LD05	HI-HI level detector	1			
715 LD06	Level detector. Continu	1			
	Radar. 4-20 mA				
715 LD07	HI-HI level detector	1			
715 LD08	Level detector. Continu	1			
	Radar. 4-20 mA				
715 SG1~6	Manual knife gate	6			
	300x 300 mm				
715 SM1~2	Screw sampler	2			
715LS1~2	bulk load	2	650		
	ZSQ150-00				
	Capacity: 120 t/h				
716AS1	Air slide				
	Type:XZ630 x 53160mm	1	18200		
	Inclination: 6				
	Capacity: 250 t/h				
716FN1	FAN of Air slide	1			
	9-19No6.3A				
	Air flow：3200m^3/h				
716FN2	FAN of Air slide	1			
	9-19No6.3A				
	Air flow：3200m^3/h				

EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	721/722 Packing plant and truck loading		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
721 BE1	Belt bucket elevator	2	23 600		
	Type:Type:NE150				
	Capacity：160 t／h				
	Height：18m				
	Material: Cement,Bulk density:1.0t/m3				
721 BE1-M1	Motor	2		44	
	Type:				
	Power:22kW				
721 BE1-P	Reducer	2			
	Type:				
	Power: kW				
721 VS1	Vibrating screen	2	1 600		
	type:DZS(ZN)-160,				
	Frequency:960times/min				
	Material: cement				
	Mesh deminsion:				
721 VS1-M	Vibration motor	2		2,20	
	Type:				
	Power: 1.1 kW				
721LC1	Set of load cells for storage bin	3	60		
	max.load ： 35000 kg				
	weighing section ：30000 kg				
721RF1	Rotary feeder： 400x400	2	320		
	Capacity:120t				
721DV1-M	XWD4-17-2.2	2			
	power：2.2 Kw				
721 PM1	Rotary packer	2	12000		
	Type:BHYW(ZN)-8, rotary type				
	Capacity:120t				
	Feeding material: cement				
	Rotary speed: 0~6.0 r/min				
	Single package weighing accuracy：50+0.6-0.2 kg(95%)				
	number of spout: 8				
	Gas source pressure :0.1～0.2MPa				
721 PM1-M1	Motor of frequency (for main drive)	2			
	Type: Y112M-4				
	Power: 4 kW				
	speed: 1450 r/min				
721 PM1-P1	Reducer	2			
	Type: XLDV-4				
721 PM1-M2	discharge motor	16			
	Type: Y112M-4				
	Power: 4 kW , speed: 1450 r/min				
721 BC1	Bag evacuation belt:	2	450		
	Spec.: B650 x 1500mm				
	Capacity: 120 t/h				
	Speed: 0.8m/s, Speed: 0.8m/s				
721BC1-M	Motor	2		4,4	
	Power: 2.2kW; Voltage: 380V				
721BC2	Bag cleaning system	2	450		
	Spec.: B650 x 1500mm				
721 BN1	Bag cleaning system	2			
721 BN1 01	Fan and acc	2		4,40	
	Type:9-19-4A		200		
	pressure: 4672Pa ,1616m3/h				
	Air flow：1616m3/h				
	Power：2.2kW				
721SK1	Sidekicks machine	2	240		
	power ：1.1kw				
721SB1	Send bag machine	2	600	4,4	
	power ：2.2kw				
721CW1	Check weigher	2	180	1,5	
	B700X1200MM				
	power ：0.75kw				
721BD1	Bag destroyer device	2	600	4,4	
	power ：2.2kw				

EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	721/722 Packing plant and truck loading		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
	drive screen drum ：1.10 kW				
721BC3	Bag evacuation belt:	2	1 450	6	
	Spec.: B800 x 5000mm				
	Capacity: 120 t/h, power 3 kw				
	（with 2 Pear type feeder discharge）				
721BC4	bag Belt conveyor （plat）	1	2 100	4	
	B800x8500mm				
	Capacity: 120 t/h ; Speed: 1.0m/s				
	（with 1 Pear type feeder discharge）				
721BC4-M	Motor	1			
	Power: 4kW				
	Voltage: 380V				
721BD1	Bag Diverter	2	250	1,1	
	Capacity: 120 t/h;Power: 0.55kW				
721BC5	bag Belt conveyor （plat）				
	B800x28500mm	1	6 300	7,5	
	Capacity: 120 t/h ; Speed: 1.0m/s				
721BC5-M	Motor				
	power 7.5kw	1			
721BF1	Dedusting filter	2	19 920		3,00
	Type:JLPM5B-310				
	Capacity: 22300m^3/h				
	Outlet dust content:≤30 mg/m^3				
	Gross filter area: 310m2				
	Resistance: 1200~1770Pa				
	Compressed air consumption: 1.5Nm3/min				
	Compressed air pressure:0.5~0.7MPa				
721 FV 1	Flap valve	2			
	300 x 300 mm				
721FN1	Dedusting fan	2			
	Type:9-26No11.2D				
	Air flow ：21963m^3/h				
	Pressure ： 3140Pa				
721FN1-M	Motor	2		60,00	
	Type ：				
	Power ：30kW				
	Rotate speed ：960 r/min				
721FN1-a	Manual valve	2			
721RF1	300 x 300 mm	2	500		
721 BI1	Surge bin	2	10 000		
	15 m3				
721 BT1	Bag jamming control	2	200		
	Photoelectric sensor				
721 BW1	Bag weighing system	1	100		
721 DG1	Pneumatic diverter gate	1	200		
	500 x 500 mm				
721 EE1	Instrumentation	1	100		
721 EH1	Bucket elevator electric hoist	1	720	1,10	
	2 t				
	Power ：1.1kW				
721 EH2	Empty bag electric hoist	1	720	1,10	
	2 t				
	Power ：1.1kW				
721 LD1	HI-HI level detector	1	15		
721 LD2	Level detector. Continu	1	20		
	Radar. 4-20 mA				
721 RD1	Fan inlet damper	2			
	D. 630 mm				
721 SC1	Screw Conveyor	2	2 640		
	Type ： LS20010500mm				
	Capacity:40 t/h				
721 SC1-M	Reducer motor	2		10,00	
	Power: 5 kW 380V				
	Speed: 45 r/min				
721 SG1~2	Manual knife gate	2	120		
	300 x 300 mm				
721 SQ1~2	Dosing valve	2			

EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	721/722 Packing plant and truck loading		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
	160 t/h				
	DN 400. Continuous				
721BF2	Bag fillter	2	3 700		0,40
	type : HMC-64				
	Capacity: 4200m3/h				
	Gross filter area: 48m2				
	Compressed air consumption: 0.2m3/min				
721BF2-M	MOTOR	2	6		
	Power: 3 kW , 380V				
721AT1	Compressed Air Tank				
	C4-0.8,volume : 4m3	1	1 260		
722 LM1	Truck loader	1	1 120		
	Type: XYD100/6501000				
	Capacity : 150t/h				
	Trip : 12m				
	Belt speed : 1.0 m/s				
	Vertica lifting speed of windlass: 8 m/min				
	The level walking speed of complete complete machine : 12.56 m/min				
	Change the scope of paragraph swing: -30° ~ -10°				
722 LM1-M1	Motor roller for belt conveyor	2	440	8,00	
	Power : 4 kW 380V				
722 LM1-M2	Motor for windlass	2	150	2,20	
	Power : 1.1 kW 380v				
722 LM1-M3	Motor for running gear of Loader	2	100	4,40	
	Power : 2.2 kW 380v				
722 LM2	Truck loader	2	1 120		
	Type: XYD100/6501000				
	Capacity : 150t/h				
	Trip : 12m				
	Belt speed : 1.0 m/s				
	Vertica lifting speed of windlass: 8 m/min				
	The level walking speed of complete complete machine : 12.56 m/min				
	Change the scope of paragraph swing: -30° ~ -10°				
722 LM2-M1	Motor roller for belt conveyor	2	400	8,00	
	Power : 4 kW 380V				
722 LM2-M2	Motor for windlass	2	150	2,20	
	Power : 1.1 kW 380v				
722 LM2-M3	Motor for running gear of Loader	2	100	4,40	
	Power : 2.2 kW 380v				

EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	885 PETCOKE handling and mill (vertical)		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
885 RG11	single rod gate	1	114		
	Type:300×300mm				
	Capacity: 60 t/h				
	Material: Raw Coal				
885MV1	magnetic vibration-actuated feeder	1	560		
	type :GZF4				
	Capacity: 60 t/h				
885 MV1-M	Motor	1		30	
	Power: 30 kW				
	Voltage: 380V				
	Speed： 1450r/min				
885 JC1	Jaw crusher	1	6 500		
	Type ：400x600				
	Capacity: 20~75 t/h				
885 JC1-M	Motor				
	TYPE:Y250M-8	1	391	30	
	Power: 30 kW				
	Speed： 730r/min				
885BC1	Belt conveyor	1	18 600		
	Type: DTII-B650x125000mm				
	Capacity: 100t/h				
	Material: Raw Coal				
	Bulk density ：0.7t/m^3				
	Speed: 1.6m/s				
	Inclination:12				
885BC1-M	Motor Y250M-6	1	395	37	
	Power: 37kW				
	Voltage: 380V				
885BF1	Dedusting filter	1	2 940		0,48
	Type:HMC-48				
	Capacity: 3200m^3/h				
	Outlet dust content:≤30 mg/m^3				
	Gross filter area: 32m2				
	Resistance: 1200~1770Pa				
	Compressed air consumption: 0.24Nm3/min				
	Compressed air pressure:0.5~0.7MPa				
885FV1	Flap valve:200X200mm	1	40		
885FN1	Fan	1	960		
	Type ：				
	Air flow ：3500 m^3/h				
	Pressure ： 3000Pa				
	Rotate speed: 1450r/min				
885FN1-M	Motor	1		6,00	
	Power ：5.5kW				
	Rotate speed ：1450r/min				
885HP1	raw coal silo ：Φ5x15000mm,	1	14 500		
	VOLUME: 275M3				
885RG2	single rod gate	1	114		
	Type:300×300mm				
	Capacity: 60 t/h				
	Material: Raw Coal				
885WF1	BELT weigh feeder	1	240		
	type :5				
	Capacity: 60 t/h				
885BC2	Belt conveyor	1	1 320		
	Type: DTII-B650x14000mm				
	Capacity: 100t/h				

EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	885 PETCOKE handling and mill (vertical)		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
	Material: PETCOKE				
	Bulk density：0.7t/m^3				
	Speed: 1.6m/s				
	Inclination:12				
885PM1	petcoke mill (vertical mill)	1	137 000		
	MPF1713				
	Capacity:20t/h				
	fineness:3~5%(80μm)				
	raw coal moisture ：≤12%				
	Water content of product：≤1.0%				
	inlet air temperature:300℃				
	Speed:16.9r/min				
	cool water :3.5t/h				
	Filling rate : 23.5%				
885PM1-M1	main motor:YRKK560-8	1		710,00	
	POWER:710KW				
	Speed: 740rpm				
	voltage:6000v				
885PM1-P1	main redure:JDX630	1			
	ratio: i=5				
885PM1-M2	auxiliary motor:Y200L-8	1		15,00	
	POWER:15KW				
	voltage:380v				
885AG1	auxiliary gear:YNS555-90-ⅡR	1			
	main bearing lubrication：NC-25S				
	cool water :1.5m3/h				
885AG1-M1	oil pump motor：Y100L1-4	1		2,20	
	Power: 2.2KW				
885AG1-M2	oil pump motor：Y90L-4	2		3,00	
	Power: 1.5KW				
885EH1	electrical heater：SRY2-220/2	2		4,00	
	Power: 2KW				
885SP1	PETCOKE seperator	1	8600		
	Type：MX700A				
	Volume：42000~50000m3/h				
	output：20t/h				
885SP1-M	motor（Frequency conversion）	1		30,00	
	YPT200L-4				
	Power: 30KW				
885SP1-P	GEAR:B2SV-2	1			
885LV1	Lock wind valve	1			
885EV1	prevent explosion valve	1			
885SC1	Screw conveyor	1	1750		
	LS400×10500mm				
	output：30t/h				
885SC1-M	motor	1		5,50	
	Power: 5.5KW				
885RF1-M	Motor：Y100L-4	1		2,20	
	Power: 2.2KW				
	Bag fillter	1	26500		
	type：LPM8C-950M				
	Handling volume：57000 m3/h				
	Filtering area：950 m2				
	compress air consumption 2.4 Nm3/min				2,40
885FN2	coal mill fan	1	2 980		

EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	885 PETCOKE handling and mill (vertical)		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
	M9-26 No13.5D				
	Handling volume ： 51876 m3/h				
	Speed ： 1450r/min				
	pressure ： 8434Pa				
	motor of fan				
885FN2-M	Motoro ： Y315L-4	1	1 120	185,00	
	Power: 185KW				
	voltage ： 380v				
885BV1	electrical buterfly valve ： ZKYVb-0.05	1			
	DN800				
885CB1	pet coke bin:(for kiln)	1	12 300		
	Ø4000mm				
	reserve volume 40t	1	12 300		
885BC2	pet coke bin:(for precalciner)				
	Ø4000mm				
	reserve volume 40t				
885LC1	load cell:0～30t	6	60		
885RW1	rotary weigher	1			
	Capacity:1～15t/h				
885RW1-m1	motor	1	67	5,50	
	Y132S1-2, power :5.5kw				
885RW2					
	Capacity:1～15t/h				
885RW1-m2		1		5,50	
	Y160M2-8, power :5.5kw				
885FP1~2	fuler pump	2			
	F-K M200				
885FP1~2-M	Motor	2		30,00	
	power: 15kw				
885RB1	Roots blower(for kiln)	1	2380,00		
	JAS190				
	air volume: 45.8m3/min				
	air pressure:58.8kPA				
	speed: 1450 rpm				
	cool water :10-13l/min				
885RB1-M1	motor	1		75,00	
	type:Y280S-4				
	power: 75kw				
885RB2	Roots blower(for precalciner)	2	5400,00		
	JAS200				
885RB1-M2	motor				
	type:Y280M-4 (One set is standby)	1		90,00	
	power: 90kw				
885EH1	electric hoist	1	520,00		
	type:CD3-9D				
	Lifting weights:3t				
	Lifting height: 9m				
885EH1	Lifting motor	1		4,50	
	POWER: 4.5KW				
885BF3	bag fillter	1	2 400		
	type:LCPM32-3				
	Handling volume ： 6900 m3/h				
	Filtering area ： 93 m2				
	compress air consumption 2.4 Nm3/min				

EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	885 PETCOKE handling and mill (vertical)		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
885FN3	fan	1	213		
	4-72No.5A				
	air volume:7728m3/h				
	SPEED:2900r/min				
885FN3-M	motor	1	125	15	
	type:Y160M2-2				
	POWER: 15KW				
885TK1	CO2 TANK	20	300		

EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	821 Compressor rooms		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
821 AD1~3	Air dryer for cement sect	3	2 600		
	Type:				
	Capacity ： 15 m^3/min				
	Pressure: 1.0 Mpa				
821 AD 1-M	Motor	3		9	
	Power: 3Kw				
	Voltage: 380 V IP55				
	Cooling water consumption: 2.5t/h				
821 AT1~3	Air tank	3	4 800		
	Type : C-4/0.8Mpa				
	Volume : 4m^3				
	Diameter :				
	Pressure: 0.8 Mpa				
821 AP1~4	Screw Air Compressor(wind cooling)	4	9 600		
	Type:				
	Capacity : 22.3m^3/min				
	Pressure ：0.85 MPa				
	Temperature at outlet: ≤40℃				
	Cooling water consumption:4.4t/h				
821AP1~4-M	Moter	4		528,00	
	Type ： Y315M-2				
	Power: 132 kW				
	Speed: 1480r/min				
	Voltage: 380 V IP55				
821 ME1 00	Mechanical elements	7			
821 ME1 01	Ventilation ducts				
821 ME1 02	Piping and accessories				
821 ME1 03	Seal, glue				
821 ME1 04	Anchors, fasteners				
821GV1	Globe valvesJ 41T-16	7			
	DN40				
821CV1	Check valve H41T-16	7			
	DN80				
821GV1	Gate valves:Z45T-10	7			
	DN100				
821PM1	pressure meter Y150	7			

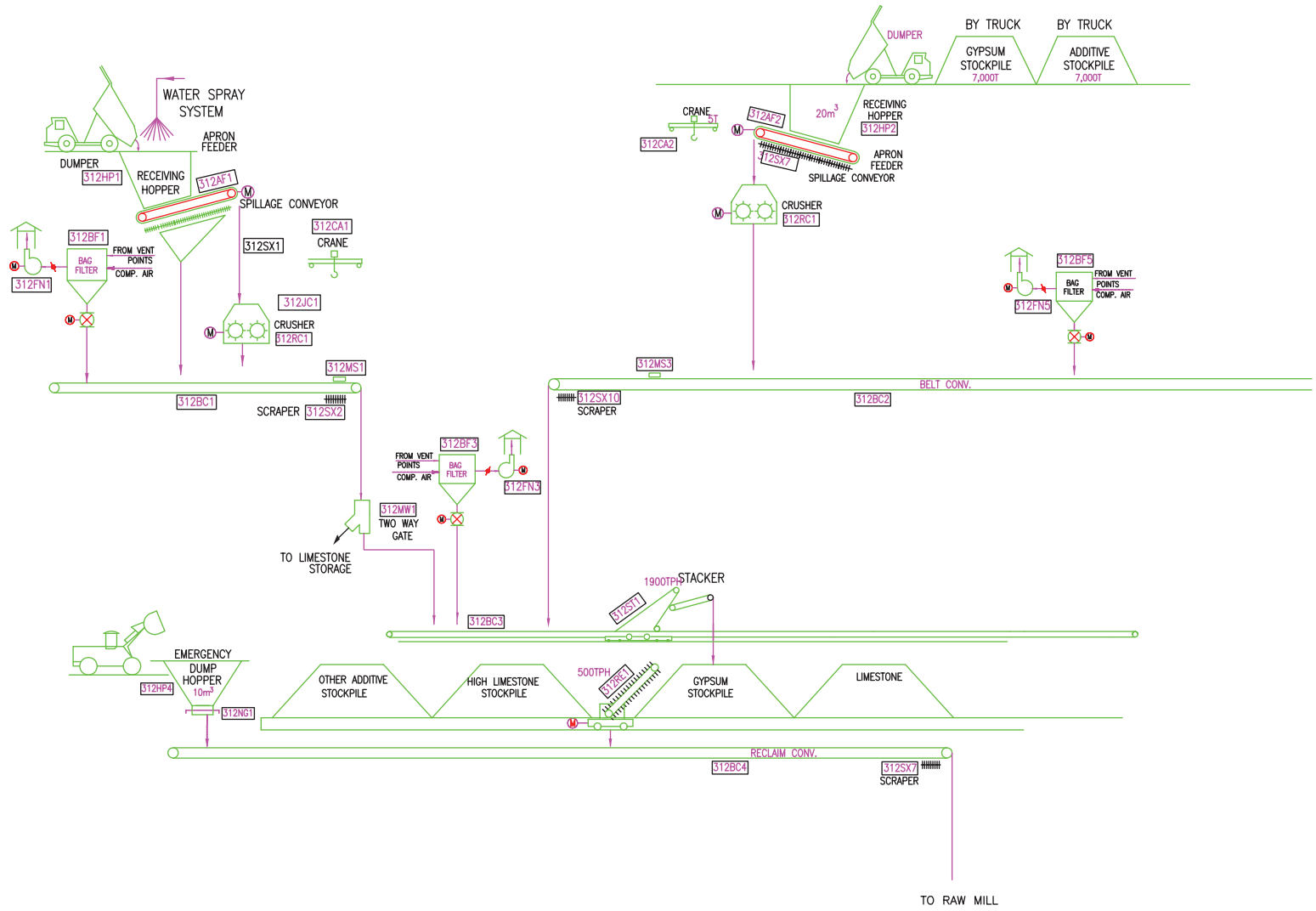
EQUIPMENT LIST					
	Project name	2400TPD		Revision	0
	Sub-section	890 alternative Fuel		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
890 EH 1	Electric hoist	1	680		
	Type:CD2-5D,2T				
890 FP01	Pumping system	1	1 500		
	Precalciner				
890 FP01 01	Pump	1	1 000		
	Screw pump				
	Type ： SMH210R46E6.7				
	Capacity: 8m3/h				
	pressure:4MPa				
	Inlet size:80mm				
	Outlet size:65mm				
890 FP01 01-M1	Motor	1		18,5	
	Type ： YB180M-4B3-18.5 kw				
	380V/50Hz IP55				
	Power:18.5 kw				
890 FP01 02	Electric heater	1	3 000		
	9m3/h, Inlet: 50℃, Outlet: 120℃				
	Power:				
890 FP02	Pumping system		1 500		
	Kiln				
890 FP02 01	Pump	1	1 000		
	Screw pump				
	Type ： SMH210R46E6.7				
	Capacity: 8m3/h				
	pressure: 4 MPa				
	Inlet size:80mm				
	Outlet size:65mm				
890 FP02 01-M1	Motor	1		18,5	
	Type ： YB180M-4B3-18.5 kw				
	380V/50Hz IP55				
	Power:18.5 kw				
890 FP02 02	Electric heater	1	3 000		
	9m3/h, Inlet: 50℃, Outlet: 120℃				
	Power:				
890 FT 01	Fuel oil tank	1	25 000		
	2000 m3				
	diameter:14m				
	height:14m				
890 FT01 02	Level detector	3	100		
890 FT01 03	Electric heater at the outlet	3	100		
890 FT01 04	Foam injection system	3	100		
890 FT01 05	Shell cooling system	3	100		
890 ME01	Mechanical elements				
890 ME01 01	Piping and accessories				
890 ME01 02	Seal, glue				
890 ME01 03	Anchors, fasteners				
890 ME01 04	Pipe tracing system				
890 ME01 05	Insulation				

EQUIPMENT LIST					
	Project name	2400 TPD		Revision	0
	Sub-section	833/834 Water COOLING AND supply		Date	18/06/2021
Item n°	Technical specification	Qty	Weight (kg)	Power (kW)	Comp. Air (m3/min)
833 EH01	Electric hoist	1	680		
	Type:CD2-5D, 2T				
833 ME01	Mechanical elements				
833 ME01 01	Piping and accessories				
833 ME01 02	Seal, glue				
833 ME01 03	Anchors, fasteners				
833 WP01	Injection pumping	1	119		
	Water pump				
	22 m3/h, 10 Bar				
	Type：IS65-40-315B				
	Speed: 1450r/min				
833 WP01-M1	Motor	1		22	
	Power:22 kw				
833 WP02	Injection pumping	1	119		
	Water pump				
	22 m3/h, 10 Bar				
	Type：IS65-40-315B				
	Speed: 1450r/min				
833 WP02-M1	Motor	1		22	
	Power:22 kw				
833 WP03	Injection pumping	1	119		
	Water pump				
	22 m3/h, 10 Bar				
	Type：IS65-40-315B				
	Speed: 1450r/min				
833 WP03-M1	Motor	1		22	
	Power:22 kw				
833 WP04	Injection pumping	1	119		
	Water pump				
	22 m3/h, 10 Bar				
	Type：IS65-40-315B				
	Speed: 1450r/min				
833 WP04-M1	Motor	1		22	
	Power:22 kw				
833 WT01	Water tank	1	7 000		
	Volume:75m3				
833 WT01 01	Chiller and fan	1	100		
833 WT01 02	Level detector	1	40		

SATAREM

Appendix 2

FLOWSHEET



PRELIMINARY

NOT FOR CONSTRUCTION

NO.	DATE	REVISION	BY	APP.	APP.
8					
7					
6					
5					
4					
3					
2					
1					

CLIENT APPROVAL

	APPROVED BY	DATE
DRAWN	DAVID	18-06-2021
DESIGNED		
CHECKED		
APPROVED		
APPROVED		

SCALE: N.T.S.

SATAREM

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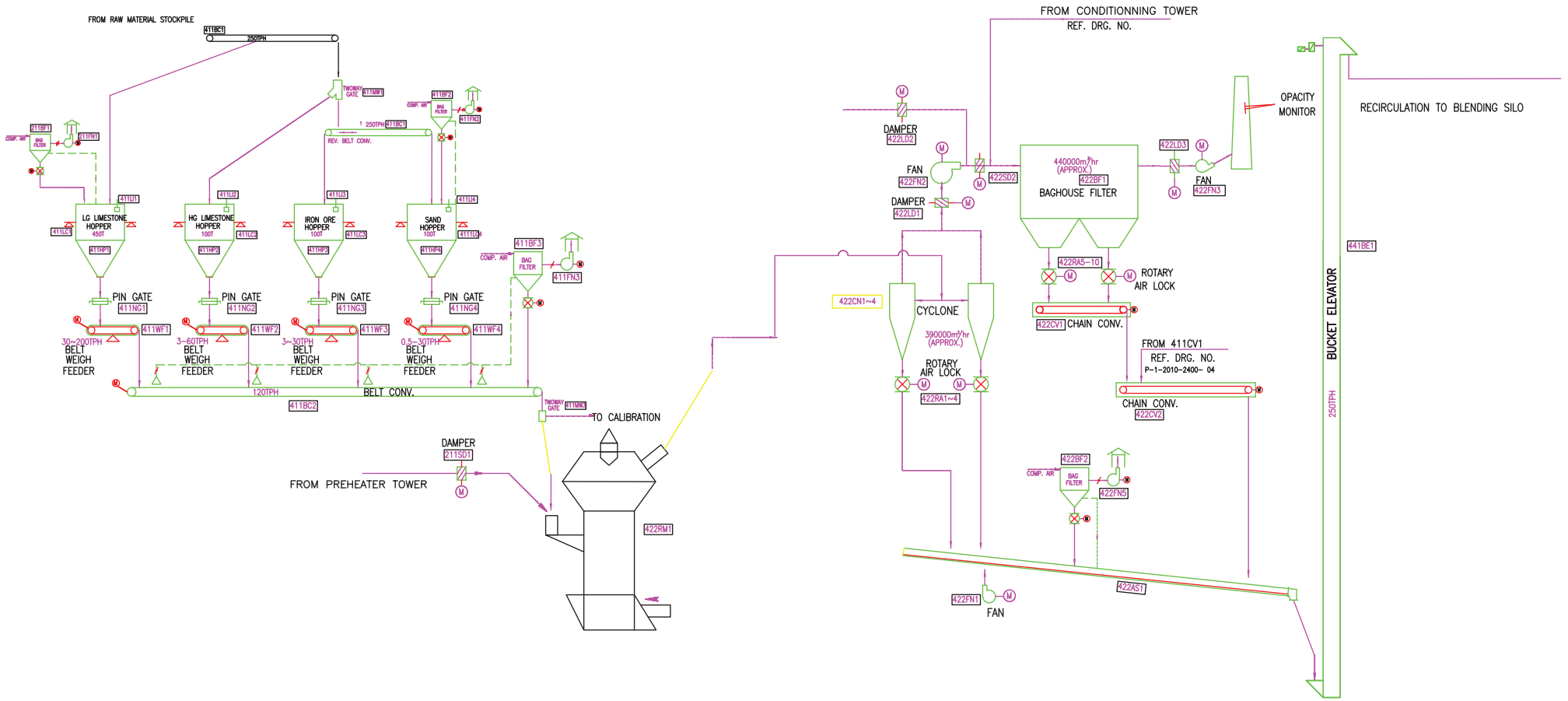
GUYANA - 2400 TPD – NEW CEMENT PLANT

RAW MATERIAL CRUSHING AND STORAGE

LAST EDITED:	SHEET SIZE: A1	PROJECTION:	DWG No. P-1-2010-2400- 01	REV. 08

REALISE PAR UN PRODUIT AUTODESK A BUT EDUCATIF



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DRAWN	DAVID	18 - 06 - 2021	
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SATAREM

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GUYANA - 2400 TPD – NEW CEMENT PLANT

RAW GRINDING (VERTICAL MILL)

LAST EDITED:	SHEET SIZE:	PROJECTION:	DWG No.	REV.
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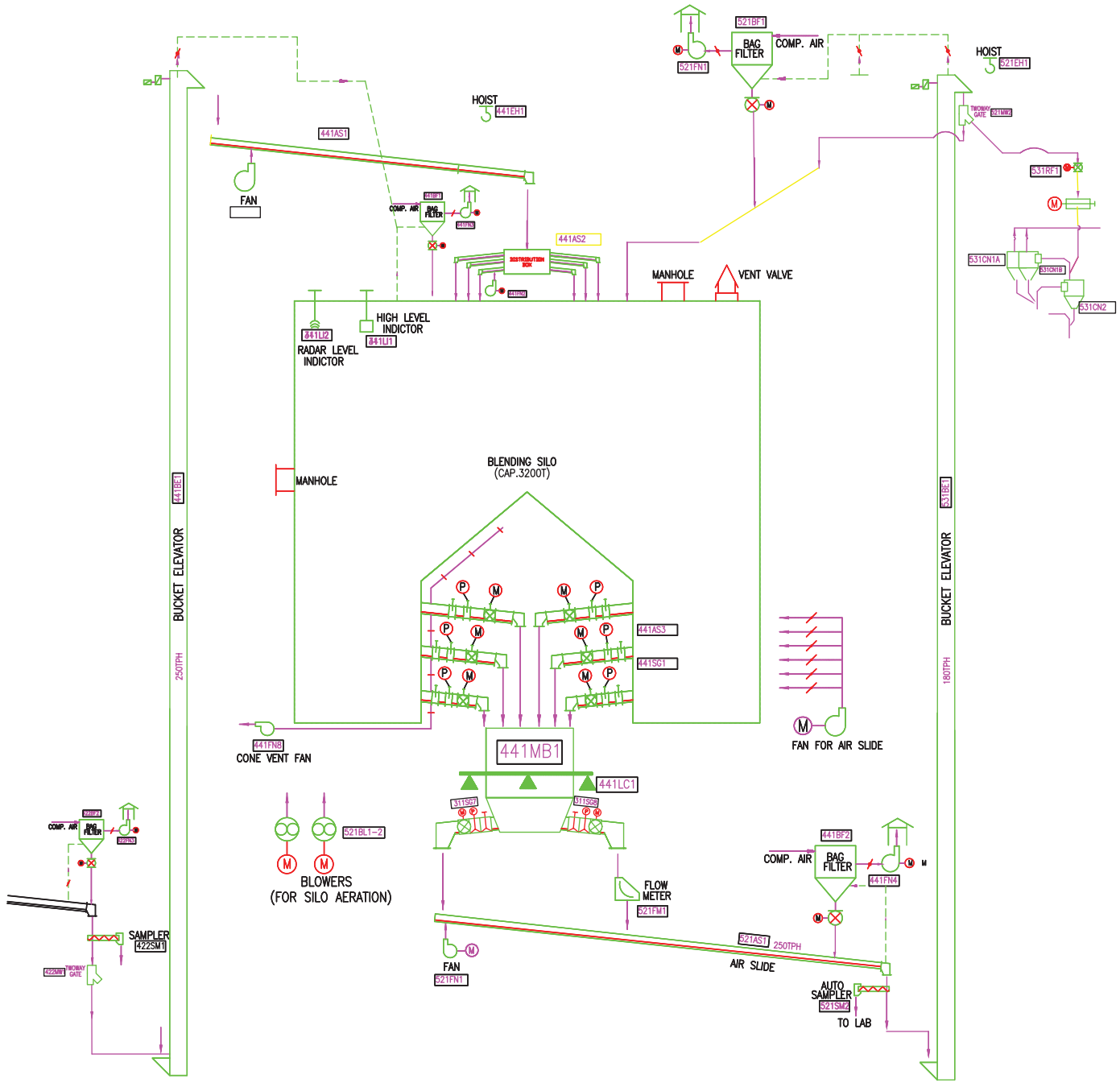

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GUYANA - 2400 TPD – NEW CEMENT PLANT

BLENDING SYSTEM

LAST EDITED:	SHEET SIZE: A1	PROJECTION:	DWG No.	REV.
			P-1-2010-2400-03	0

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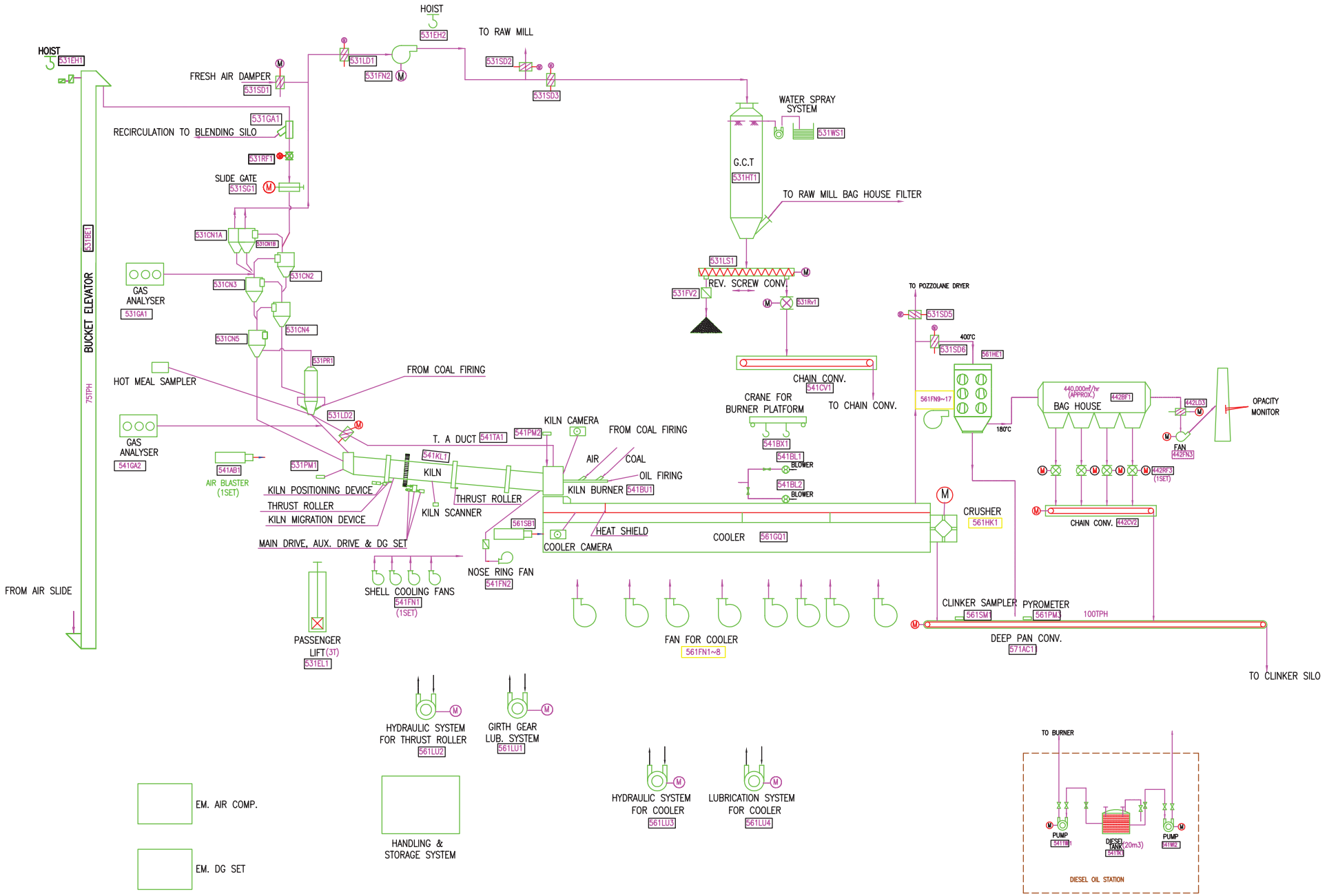

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GUYANA - 2400 TPD – NEW CEMENT PLANT

PREHEATER, KILN AND COOLER

LAST EDITED:	SHEET SIZE:	PROJECTION:	DWG No.	REV.
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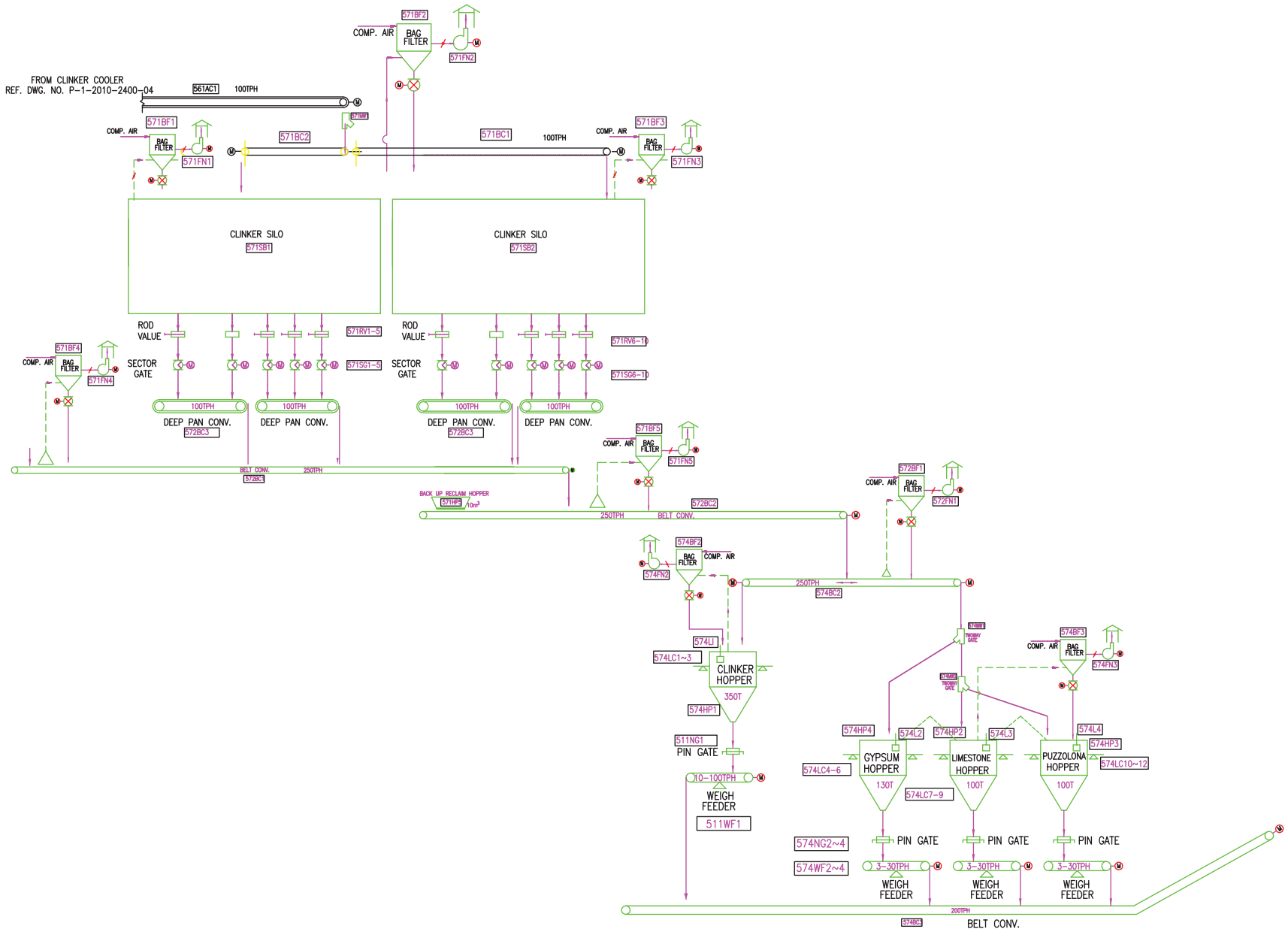

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GUYANA - 2400 TPD – NEW CEMENT PLANT

CLINKER STORAGE

LAST EDITED:	SHEET SIZE: A1	PROJECTION:	DWG No.	REV.
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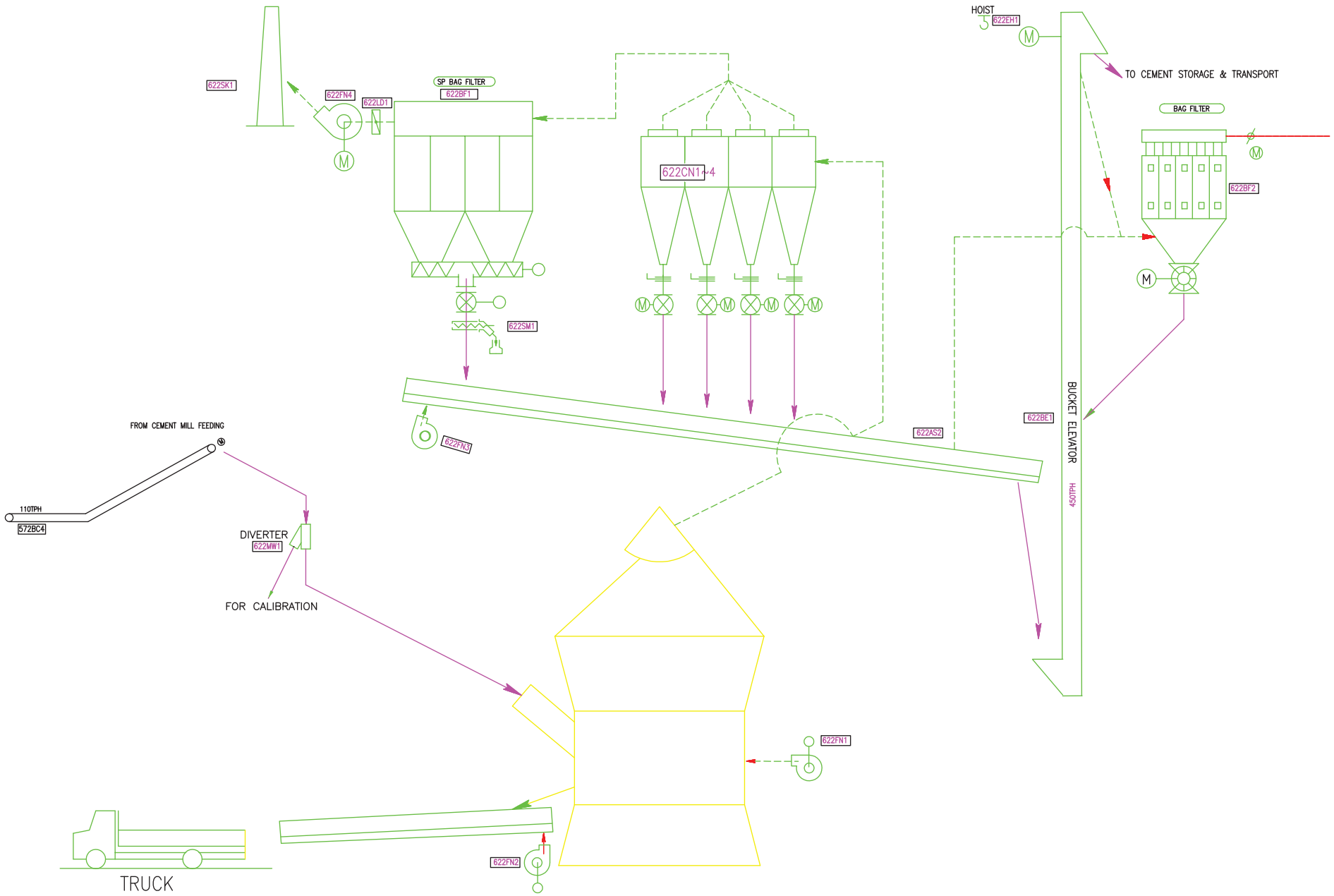

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GUYANA - 2400 TPD – NEW CEMENT PLANT

CEMENT GRINDING (VERTICAL MILL)

LAST EDITED:	SHEET SIZE:	PROJECTION:	DWG No.	REV.
	A1		P-1-2010-2400-06A	0

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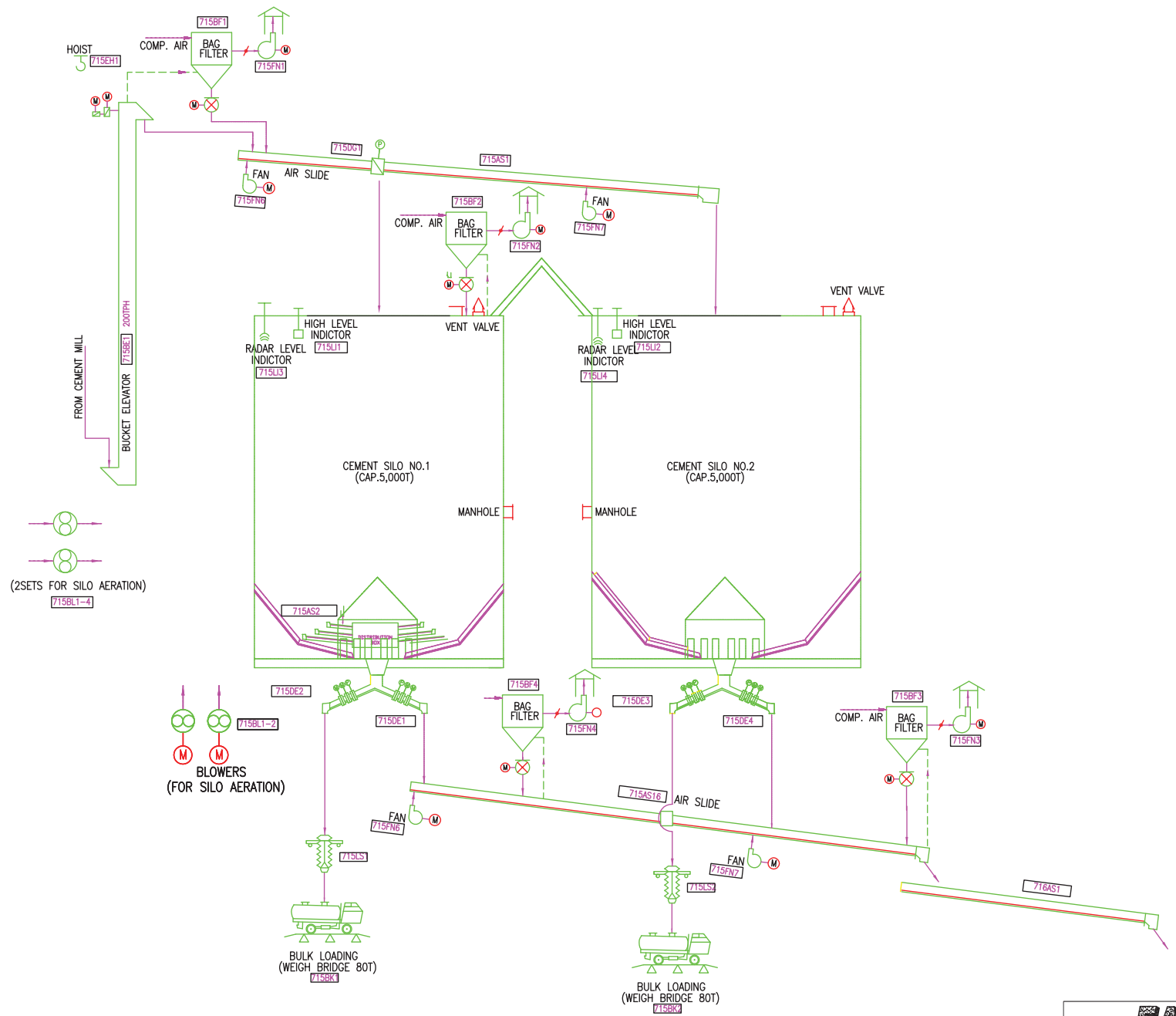

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GUYANA - 2400 TPD – NEW CEMENT PLANT

CEMENT STORAGE & TRANSPORT

LAST EDITED:	SHEET SIZE:	PROJECTION:	DWG No.	REV.
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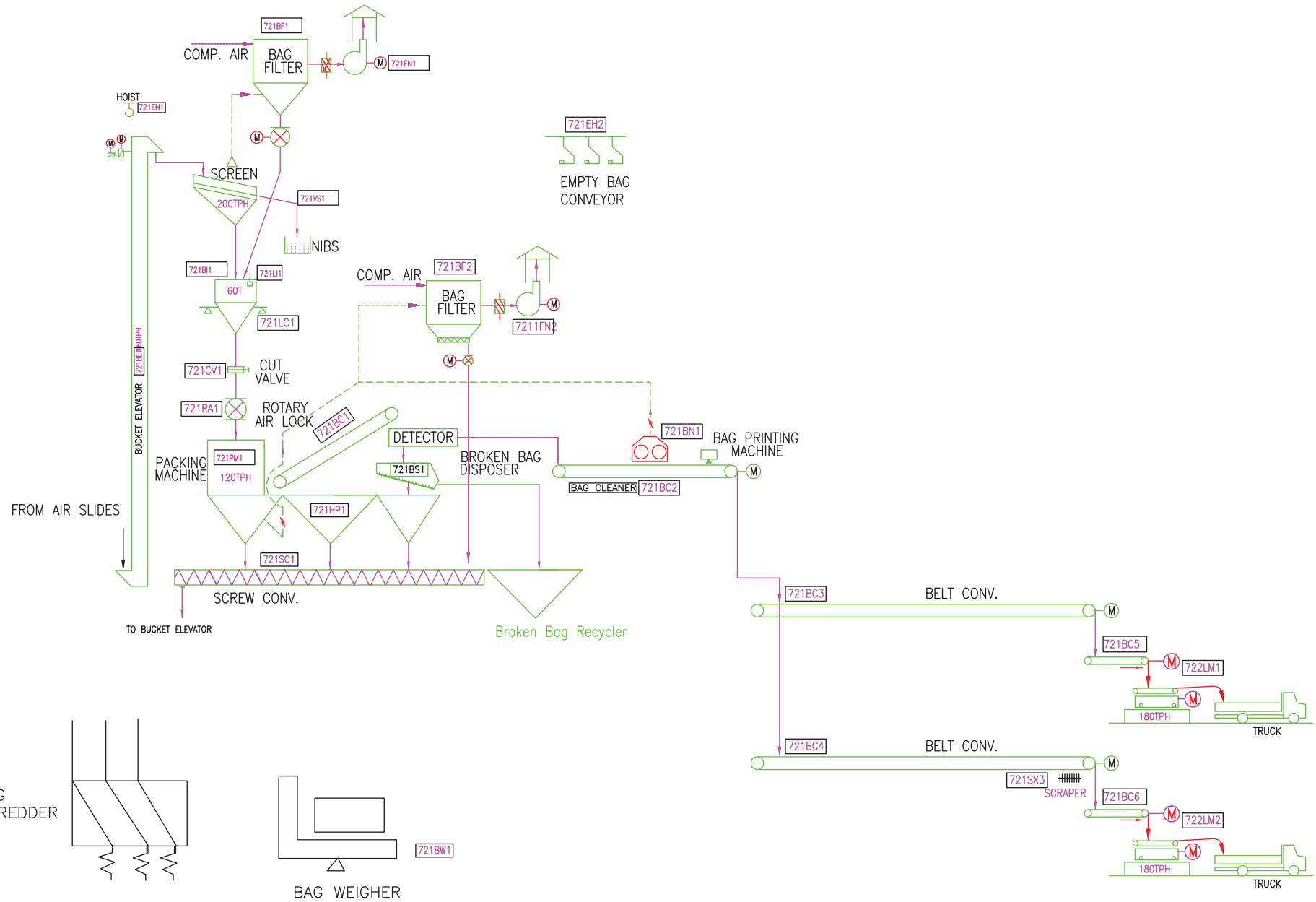

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GUYANA - 2400 TPD – NEW CEMENT PLANT

CEMENT PACKING SYSTEM

LAST EDITED:	SHEET SIZE: A1	PROJECTION:	DWG No.	REV.
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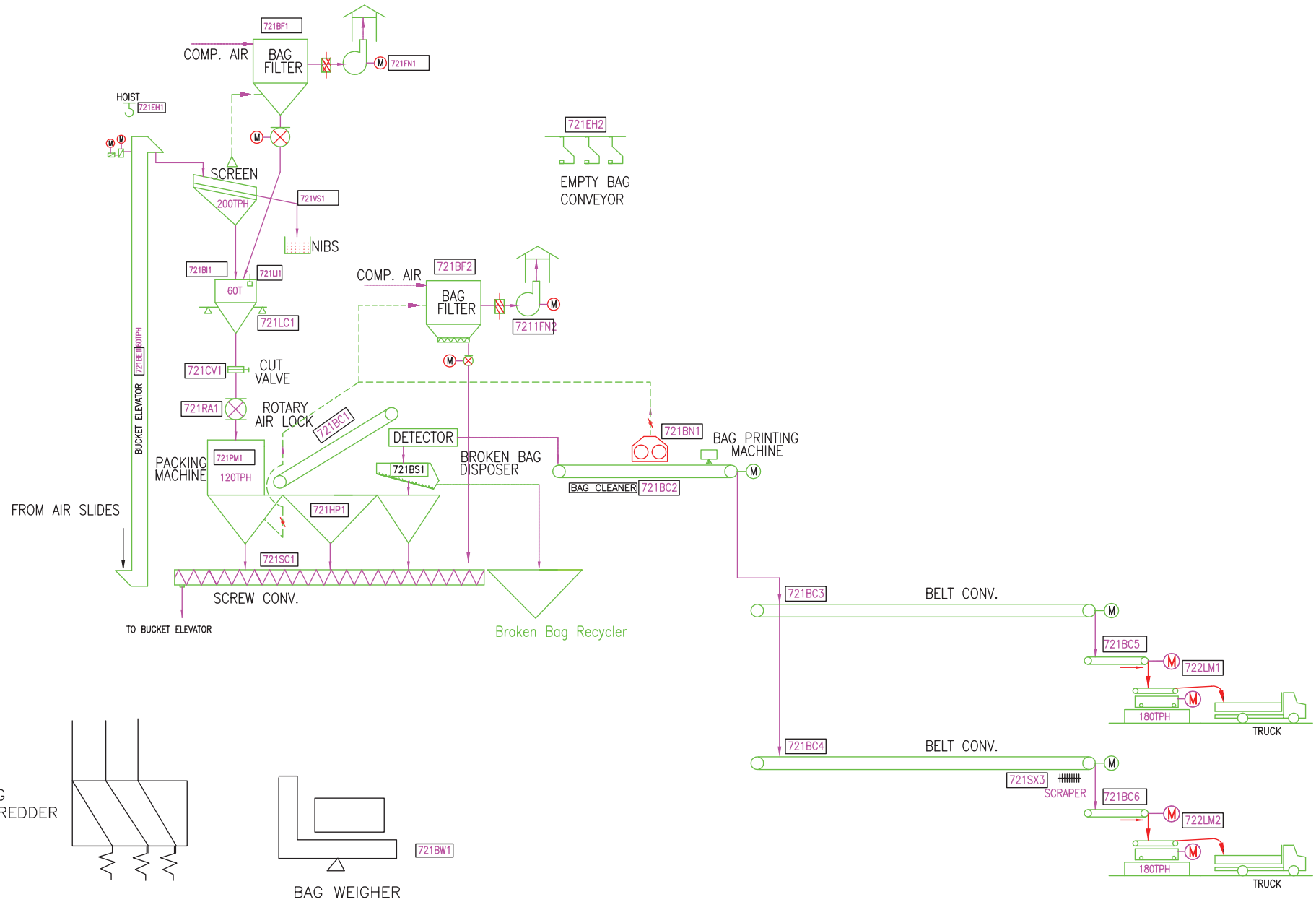

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GUYANA - 2400 TPD – NEW CEMENT PLANT

CEMENT PACKING SYSTEM

LAST EDITED:	SHEET SIZE: A1	PROJECTION:	DWG No.	REV.
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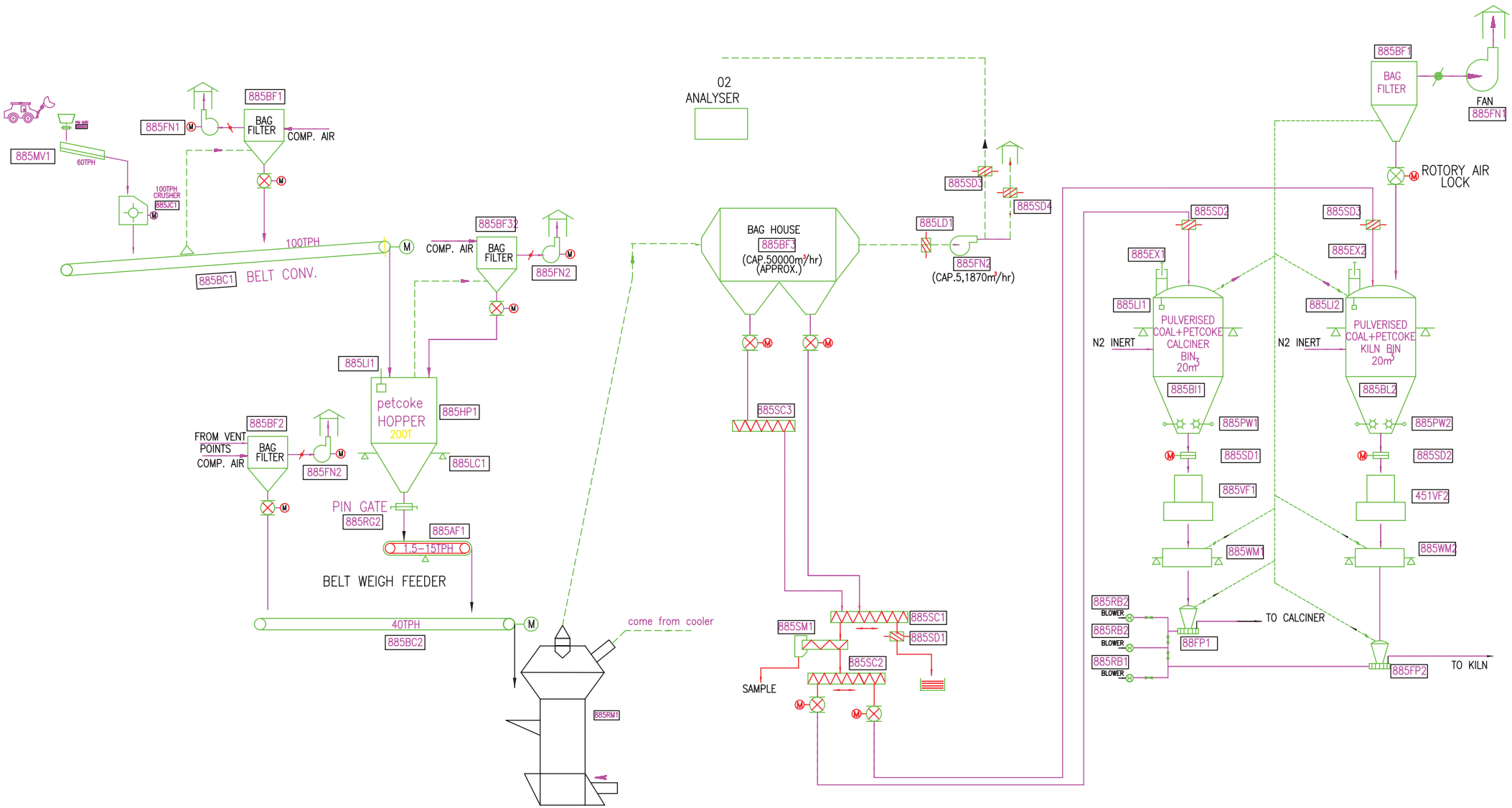

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GUYANA - 2400 TPD – NEW CEMENT PLANT

PETCOKE CRUSHER and PETCOKE MILL

LAST EDITED:	SHEET SIZE:	PROJECTION:	DWG No.	REV.
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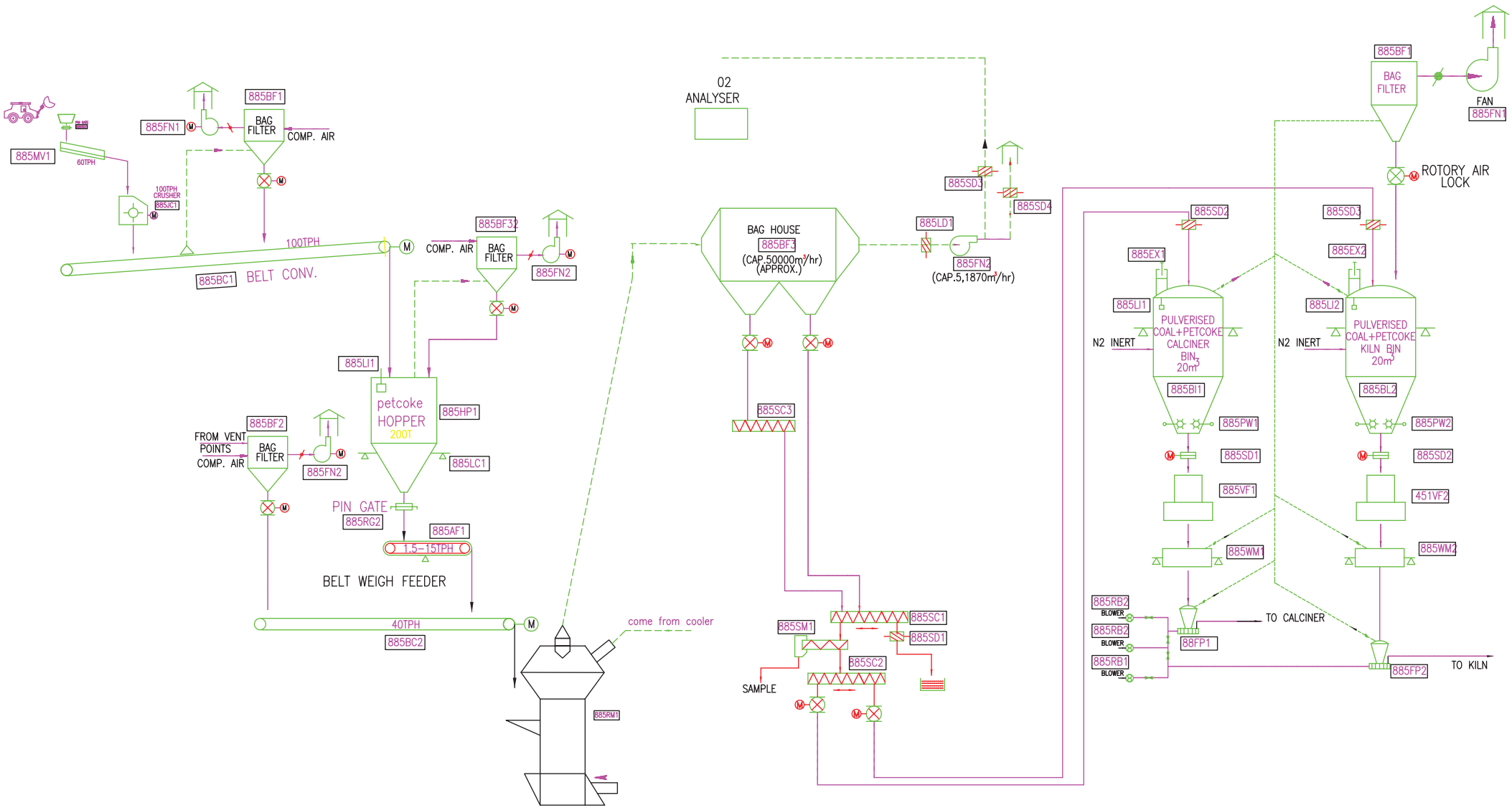

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GUYANA - 2400 TPD – NEW CEMENT PLANT

PETCOKE CRUSHER and PETCOKE MILL

LAST EDITED:	SHEET SIZE: A1	PROJECTION:	DWG No.	REV.
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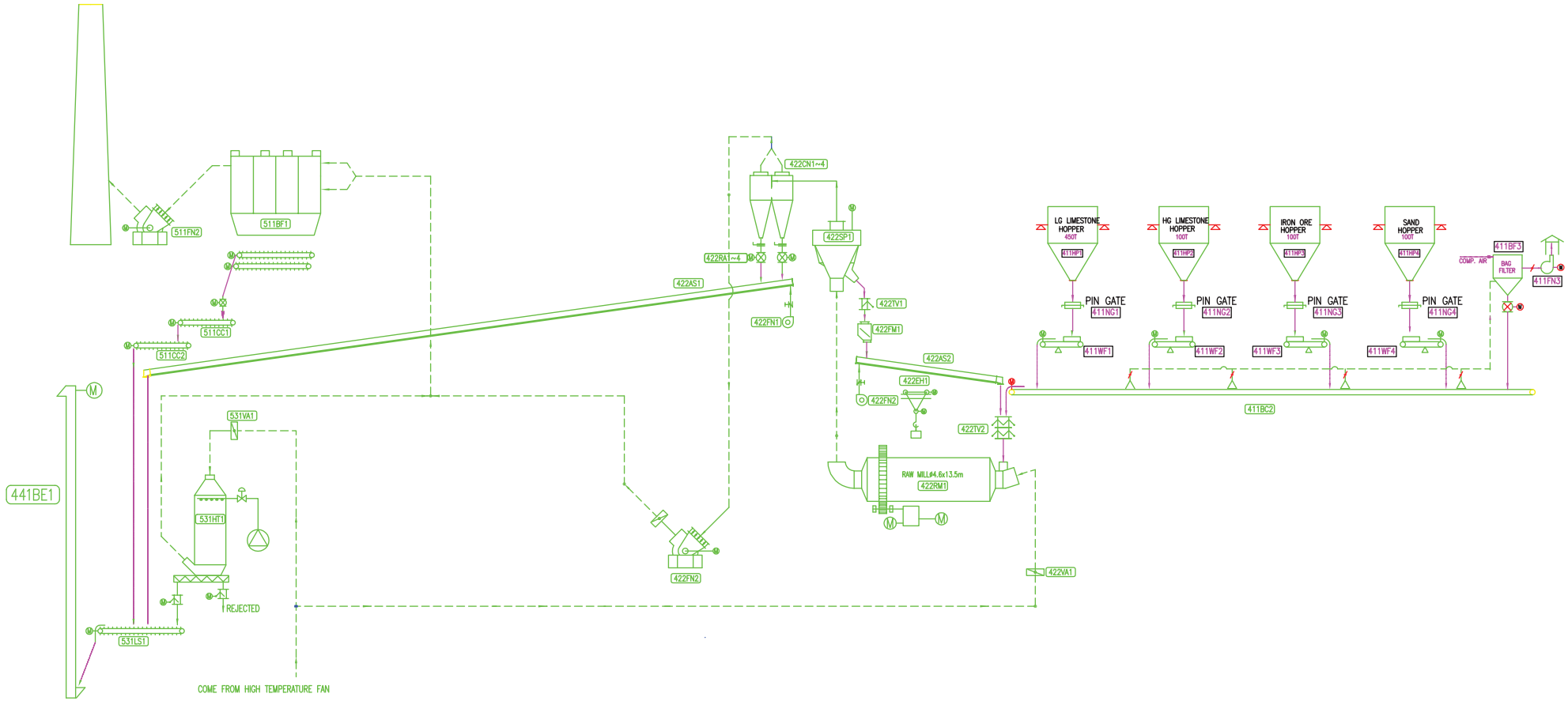

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GUYANA - 2400 TPD – NEW CEMENT PLANT

RAW GRINDING(BALL MILL)

LAST EDITED:	SHEET SIZE:	PROJECTION:	DWG No.	REV.
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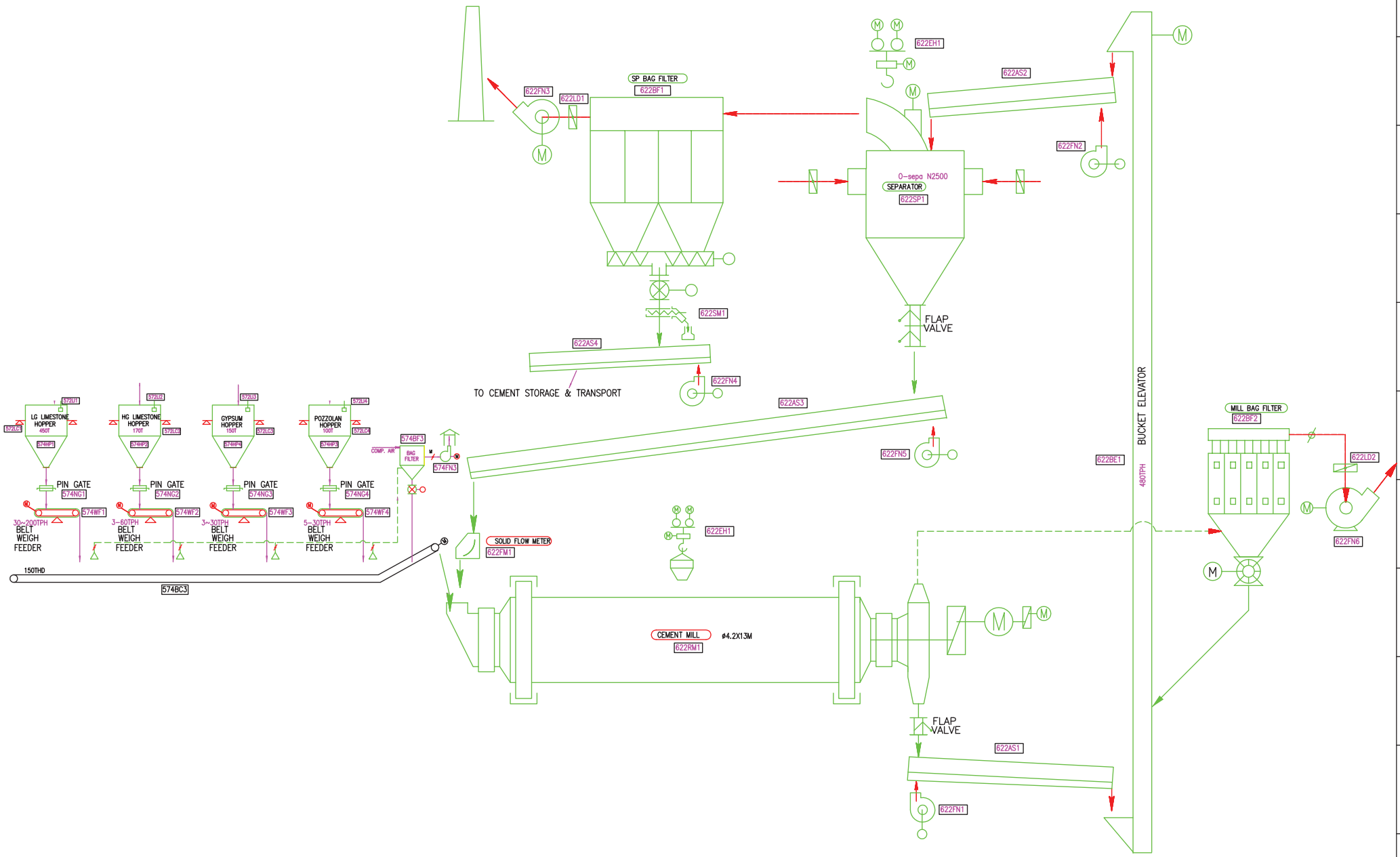

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GUYANA - 2400 TPD – NEW CEMENT PLANT

CEMENT GRINDING SYSTEM (BALL MILL)

LAST EDITED:	SHEET SIZE: A1	PROJECTION:	DWG No.	REV.
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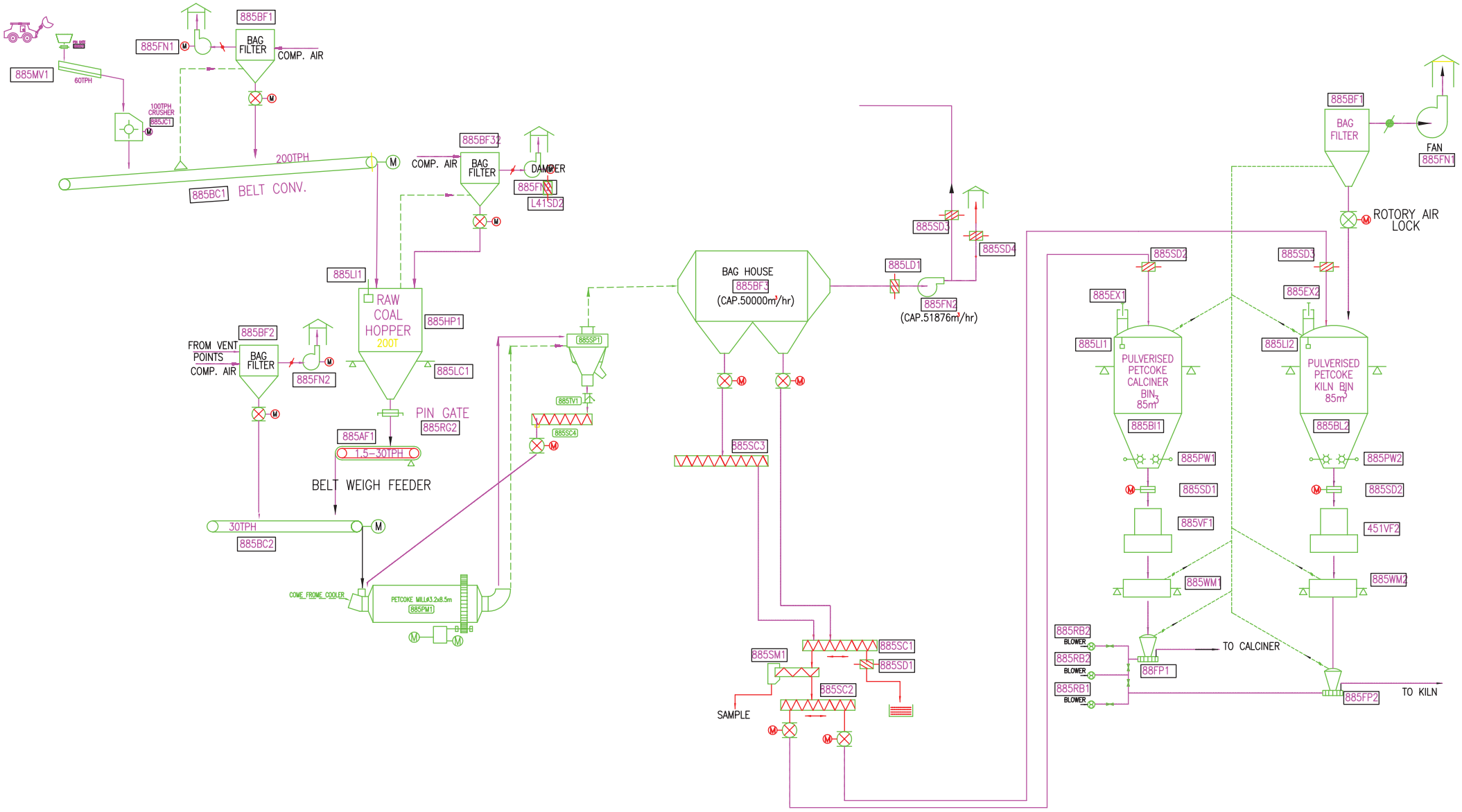

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GUYANA - 2400 TPD – NEW CEMENT PLANT

PET COKE CRUSHER and PETCOKE MILL

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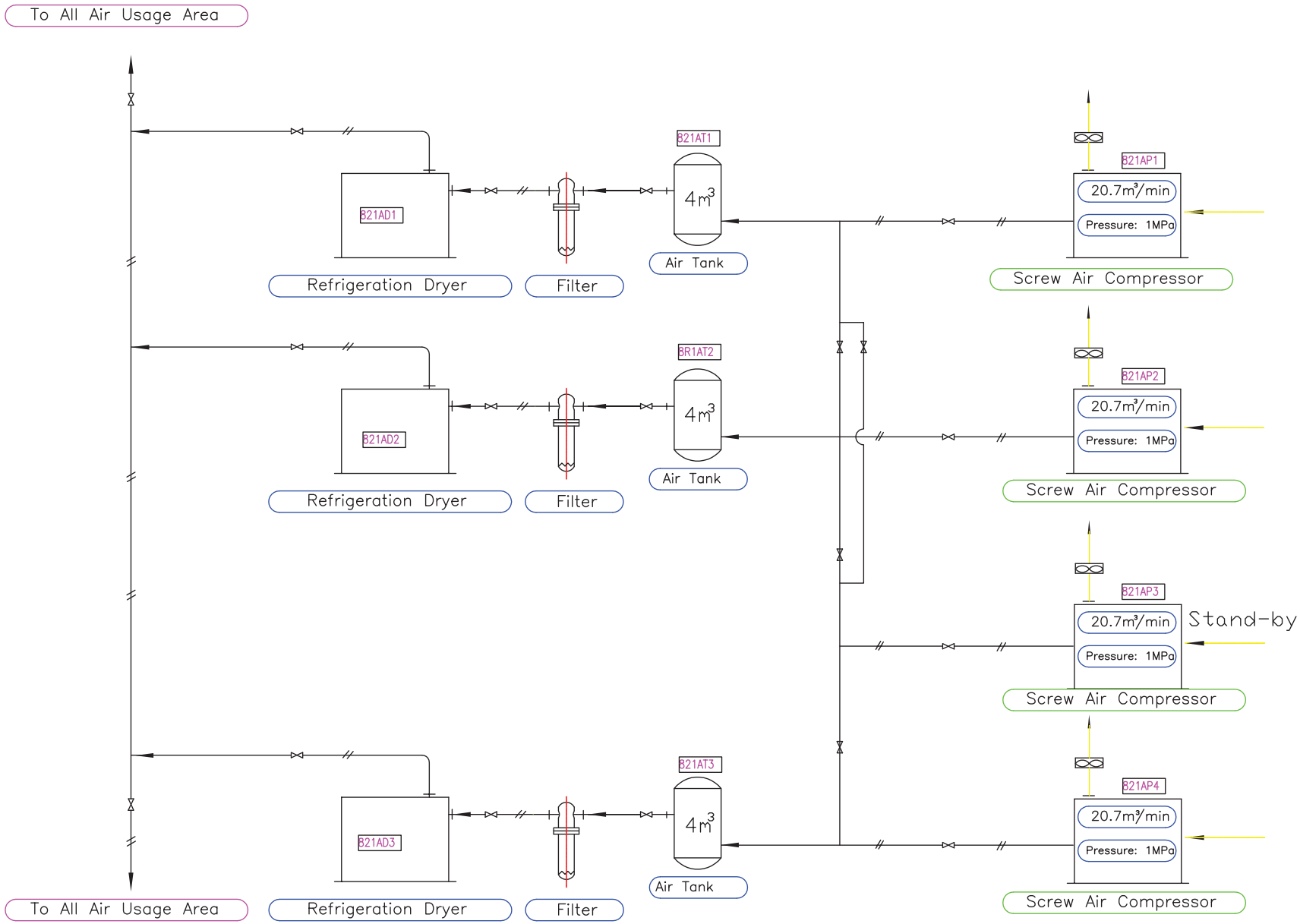

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GUYANA - 2400 TPD – NEW CEMENT PLANT
COMPRESS AIR SYSTEM

LAST EDITED:	SHEET SIZE: A1	PROJECTION:	DWG No. P-1-2010-2400-10	REV. 0

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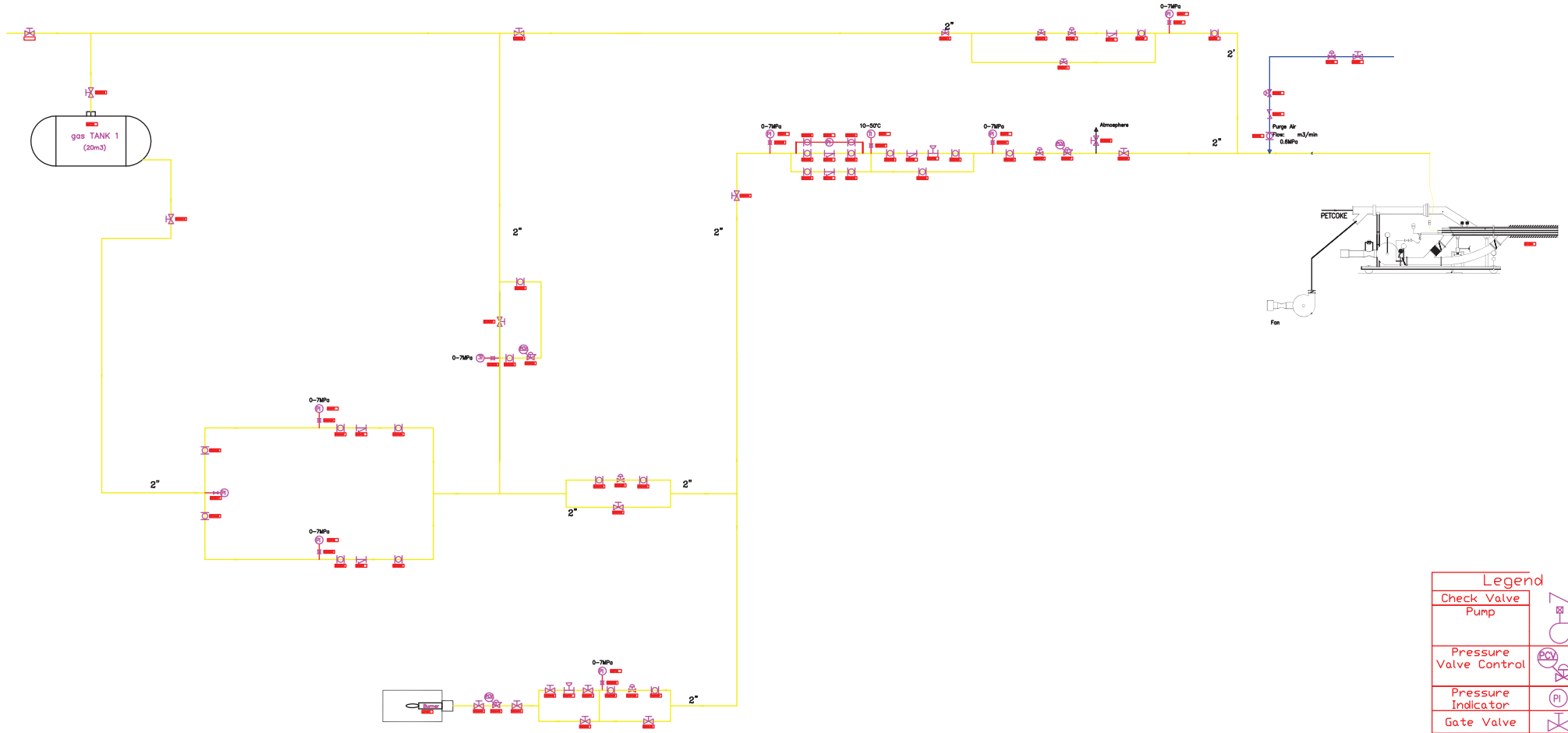

Legend	
Check Valve	
Pump	
Pressure Valve Control	PCV
Pressure Indicator	PI
Gate Valve	
Pressure Transmitter	PT
Y Strainer	
Flow Meter	FM
Temperature Indicator	TI
On/Off Valve	
Natural GAS	
Ball Valve	

NOTE:

(1) Air Service To Actuators

Compressed Air
6Bar
Clean-dry & Oil-free

Typ Solenoid
For All Actuators

(2) Pipe: ASTM-A-53 Gr. B Sch80 Seamless Carbon Steel

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GUYANA - 2400 TPD – NEW CEMENT PLANT

natural gas SYSTEM

LAST EDITED:	SHEET SIZE:	PROJECTION:	DWG No.	REV.
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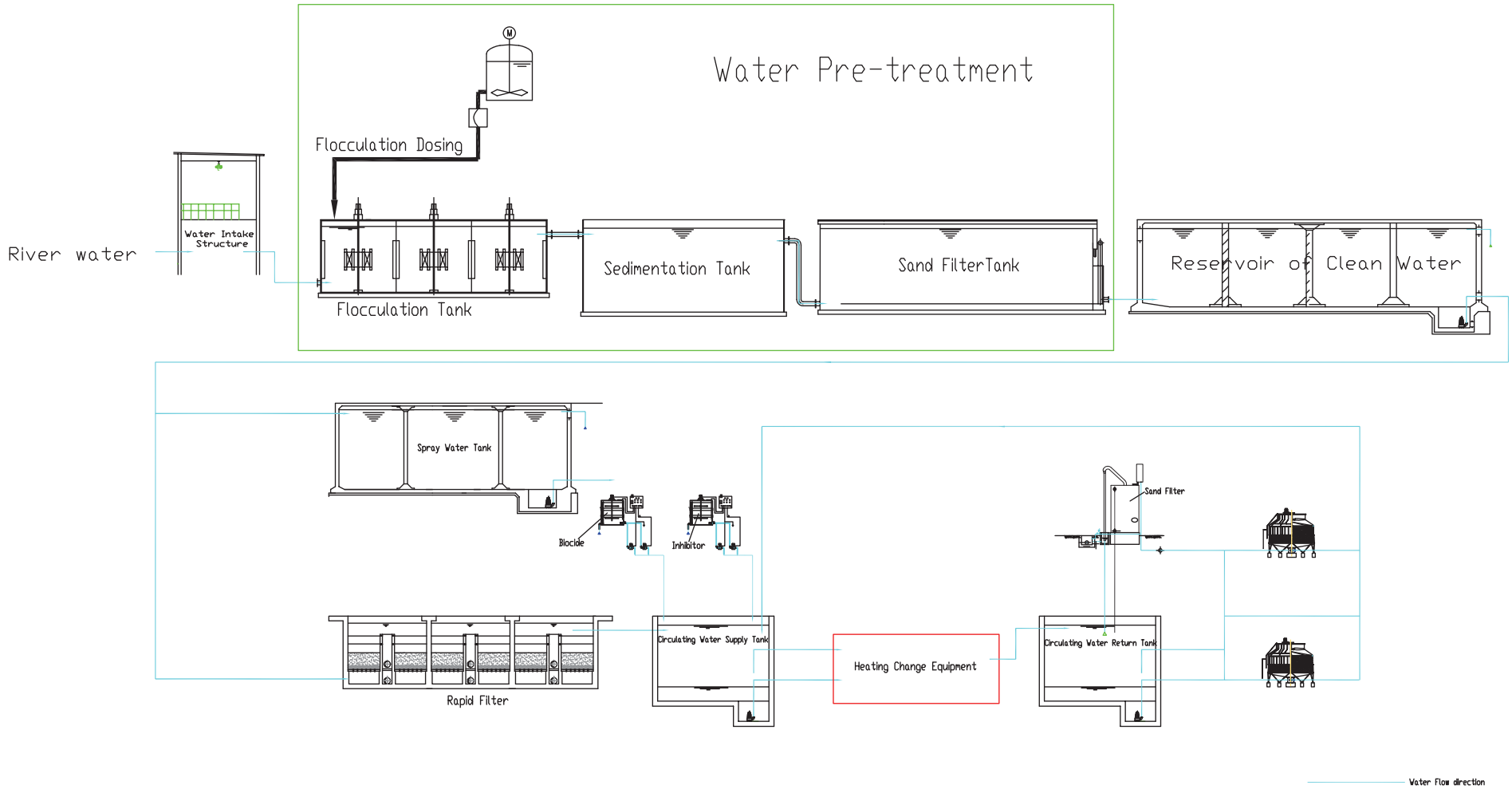

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GUYANA - 2400 TPD – NEW CEMENT PLANT

Process Water SUPLY

LAST EDITED:	SHEET SIZE: A1	PROJECTION:	DWG No.	REV.
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REALISE PAR UN PRODUIT AUTODESK A BUT EDUCATIF

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Appendix 3

CONSTRUCTION SCHEDULE

SATAREM

New Cement Plant Turnkey
2400TPD CK in Guyana

Total time turnkey:

24 Months