

ภาคผนวก

TECHNICAL SPECIFICATIONS

1. FRUIT RECEPTION & FFB STORAGE HOPPERS

1.1 FRUIT LOADING RAMPS / STORAGE HOPPERS

To supply and install one (1) unit elevated loading ramp divided into 8 bays shall be constructed as Shown in the drawing.

Number of bays	: 8 bay.
Capacity per bay.	: 25 tons FFB.
Ramp apron	: 40 m x 50 m reinforce concrete slab 200 mm. thk.
Slope of steel hopper	: 27 degrees.
Sloping deck columns.	: 250 x 125 mm 29.6 kg/m. WF.
Control system	: "VICKER'S" System hydraulic operated with control valves Complete with One (1) set power pack to service 8 bay.
Deck	: The top hopper shall be 6 mm. Thk plate with 1.5 m. Wide Bottom.
Hopper supporting Beams.	: 250 x 125 mm. 29.6 kg/m WF.
Operating deck beams	: 250 x 125 mm. 29.6 kg/m WF.
Roofing	: Cooler bond sheet.
Platform	: An operating platform shall be installation along the entire Length of the hopper.
Stairway	: A Stairway from the ground to the operating platform and a stairway from Operating platform to the ramp top shall be provided at one end of the ramp.
Painting	: The underside of the ramp shell be painted with two (2) Coats of approved primer while the top surface need not be painted.

1.2 RAIL TRACKS

One (1) complete rail track system shall be supplied and installed for One (1) Sterilizers between the Loading ramp, the sterilizers and the process building.

Quantity.	: Two (2) rail tracks.
Size of rail track.	: 12 kg/m
Rail gauges.	: 800 mm.
Sleeper.	: M/S channel of 100 mm. x 50 mm. x 6 mm. UB.
Distance between sleepers.	: 700 mm c/c.

2. STERILIZER STATION.

2.1 STERILIZER.

A Single door for first phase shell be provided and installed.

Quantity	: single door sterilizer.
Capacity	: 8 cages @ 5 tons FFB / cage.
Dimension	: 2700 mm. Dia. x 27,500 mm. Length.
Clutch doors	: Quick opening and closing type mounted on roller, bearings on a Rigidly supported hinge.
Working pressure.	: 3.5 kg/cm ²
Rail track	: 9 mm. x 75 mm. x 150 mm M/S unequal angle to be cross stitch welded To be ware liner at every 150 mm. intervals.
Steam Spreader	: Pipe SCH 40. 10" Dia. C/w Steam nozzle holder plate 19 mm.
Supporting Saddles.	: 1 no fix and 5 no movable saddle to be fabricated from 15 thk M/S Plate. Base plate for all saddles to be 20 mm thk M/S plate and Extension roller to be 65 mm. Dia. M/S shaft.
Fittings	: Two (2) x 150 mm bore steam inlet flange c/w non return valve. : Six (6) x 100 mm bore steam Exchange flange : One (1) x 65 mm bore flange for safety valve : Two (2) x 12 mm BSPT socket for pressure gauge : Two (2) x 150 mm thermometer 20 –200 °C
Painting	: Internal surface of the sterilizer shell be wire Brushed and to be Painted with one (1) layer. The external surface shell be wire brushed and painted with One (1) coat of head resistance paint.
Insulation	: The entire sterilizer shall be lagged with 50 mm thk x 60 kg/m ³ Rockwall Slabs and caddied with 0.5 mm. plain aluminum sheets
Testing	: Upon complete Installation of the sterilizer, it shall be hydrostatical Tested to 7.03 kg/cm ² pressure and to be certified by the machinery Department Regulations in all respect.
Regulatory Approvals	: All relevant in all approvals are to be applied for by the contractor.

2.2 STERILIZER CATWALK

One (1) unit sterilizer catwalk spanning from the sterilizer shell be constructed for the maintenance of the steam and exhaust valves spanning from the sterilizer. The catwalk shall be completed with ladder and hand railings for access from both sides.

2.3 STERILIZER BLOW DOWN CHAMBER.

One (1) unit blow down chamber shall be fabricated and install for the two (2) sterilizer with following Specification.

Quantity	: One (1) unit.
Shell plate	: M/S plate of 6 mm thk x 1500 mm dia. X 5100 mm. Height.
Foundation	: 8 x 15 mm dia. x 300 mm. long foudation bolts cast in to concrete
Drainage	: Condensate drain pipe from the blow down to the drain pit shall be Laid in covered trench or culvert of 200 mm dia.

2.4 STERILIZER CAGES.

twenty four (24) unit FFB cage shall be Fabricated and supplied with the following specifications.

Quantity	: 24 units.
Capacity	: @ 5 tons FFB / Cage.
Construction	: Full welded steel construction.
Side plate	: M/S 6 mm thk. X 3000 mm.
End & bottom plate	: M/S 9 mm thk and bottom plate perforation of 10 mm dia. x 70 mm
Wheel	: 450 mm. dia. Cast steel.
Axles	: M/S polished bar C/W bearing journal.
Bearing	: Bronze Bush. Or Bearing

3. THRESHING STATION.

3.1 FFB bunch conveyer

One (1) unit inclined FFB bunch conveyer shall be provided and install to receive the FFB from the Tipper Hopper and conveyor to the Thresher machine

Type	: Scrapper bar
Capacity Type	: 30 ton FFB/hr
Chain	: 40,000 lbs. Pitch 6" solid pin conveyor chain
Sprocket	: 18 teeth Pitch 6" heavy duty cast iron sprocket
Driver	: 15 kw. SUMITOMO CYCLODRIVE gear motor
Complete with	: Access catwalk along the entire length of conveyor support structure and Outlet chute

3.2 rotary drum

One (1) rotary drum bunch thresher shall be provided and install with the following specifications

Quantity	: One (1) unit
Capacity	: 30 tons FFB / hr
Dimension	: 2000 mm dia x 4700 mm long
Shaft	: Din.4140 (SCM 4) Steel tensile. To machined all over to give "step down " Diameter and will not be less than 200 mm. in diameter. All key ways to be in accordance with BS 46 part 1 or subsequent Issue. And to be secured to the shaft by 12mm counter sunk set screws, suitably recessed to avoid boss restriction.
Main Drum Bosses	: 300 mm dia. steel bar of M/S : Fitting tolerance of the boss bore and shall dia. Will not exceed +/-0.01 : Key fitting to be of dead size fit on the sliders but will have a clearance of at least 0.01 on the top. : Bosses will be shrunk on to the shaft and secure to prevent longitudinal Movement by fitting 2780 mm dia. Locking nuts which are to be provided With a "c" spanner fitting and three 16mm high tensile socket screws to Prevent rotation.
Drum Shaft	: To be mounted on heavy duty roller bearings.
Spider Arm	: Spider arm will be fabricated from 150mm x 75mm x 18.3 kg/m Channel Suitably spaced with 9mm thk M/S plate : Mounting plates of the spider arms will be welded in place to an oversized Dimension and machined finish on the rim concentric with the center boss M/S rings of at least 25mm thk X 187mm and to be secured to the spider arm by high tensile steel studs of ultimate tensile steel strength of 7000 /7800 kg/m ²
Center Boss	: Pass completely through the spider and to be secured by fillet. Weld of Not less than 12 mm.
Drum Ring Flat Bar	: M/S flat bar of 12mm X 65mm to be attached to the drum by welding : Maximum spacing of 50 mm will be allowed between the tees of the Drum by welding. Maximum spacing of 50 mm. Will be allowed Between the tees of the successive bars.
Top platforms	: M/S chequered plate of 4.5 mm thk.
Stairs	: Open Gide type.
Hand rails	: To specifications.
Access Doors	: 3 hinged access doors on each side coupling with a suitable locking Device.

Side claddings	: M/S plate of 4.5 mm thk.
Driver	: 15 kw. SUMITOMO CYCLODRIVE gear motor
Testing	: After assembly, all the ancillary components of the drum will be Statically balances before assembly of the thresher.

3.2 SCREW CONVEYOR

One (1) unit screw conveyor shall be fitted under the threshing machine discharge aperture to collect And convey the stripped fruits from the threshing machine to the bottom cross conveyor. Or fruit elevators.

Quantity	: One (1) unit.
Dimensions	: 500 mm. dia
Type	: Worm screw
Shell plate	: 4.5 mm M/S plate
Ware liner	: 6.0 mm M/S plate
Worm of the screw	: 6 mm M/S plate
Shaft	: Hollow shaft dia 75 mm SCH 40
Bearings	: flange bearings fitted at the driving end : Hanger bearings fitted at 3000 mm. intervals
Drive	: 2.2 kW. SUMITOMO gear motor c/w flexible coupling.

3.3 Twin chained fruit elevator

One (1) unit twin chained fruit elevator shall be supplied and installed to transport the fruit from the Thresher to the fruit distributing conveyor above the digester. Specification as below:-

Type	: Twin chain type.
Capacity	: @ 30 tons FFB / hr
Chain	: Renold 20,000 lbs.x 4" pitch breaking strength solid pin type
Bucket	: M/S steel 600 x 250 x 300 x 4 mm thk.
Drive	: 5.5 kW / SUMITOMO CYCLODRIVE gear motor via Duplex transmission chain.
Sprocket	: 10 teeth x 4" pitch cast iron wheel
Bearing	: Top to be of 75 dia Plummer block. : Bottom to be of 75 dia NTN take up bearing.
Ware liner	: 9 mm thk x 40 M/S flat bar
Accessories	: Chain tension adjusting device at the lower section of the elevator. : Sliding type inspection door maintenance platform, handrail, provision : Provision for lifting ring.

3.4 empty bunch conveyor

One (1) unit horizontal empty bunch conveyor shall be supplied and installation to receive the empty Bunches from the horizontal empty bunch conveyor and to convey then to empty bunch storage area.

Type	: Scraper bar.
Capacity	: 25 tones empty bunches / hr.
Chain	: Renold twin chain 15,000 lbs.x 4" pitch tensile strength solid pin with Attachment on 1 side. Scraper spaced every 6 th link with bolt High tensile. C/W spring washer and double nut,
Spocket	: 12 teeth x 4" pitch.
Driver	: 7.5 kW / 43 rpm / SUMITOMO CYCLODRIVE gear motor via Duplex chain.
Complete with	: Access catwalk along the entire length of the conveyor, Support Structure, outlet chutes, Driven from the end c/w platform at top Last supporting structure

4. PRESSING STATION.

4.1 PRESS STRUCTURE.

One (1) unit press steel structure shall be provide and installed for the service of :-

- A. One (1) fruit elevators.
- B. Two (2) digester.
- C. Two (2) screws press.
- D. One (1) overflow fruit elevator.
- E. One (1) crude oil gutter ect.

The support structure shall be of 250 x 125 x 7.5 t WF section, The platform of 4.5 mm.Thk. Chequered plate with handrail and ladder ect.

4.2 FRUIT DISTRIBUTING CONVEYOR.

One (1) unit Fruit distributing conveyor. To conveyor fruit from the top cross conveyor in to the digester And the surplus fruit to an overflow fruit conveyor.

Diameter	: 400 mm.
Type	: Worm screw
Shell plate	: 4.5 mm M/S plate
Wear lining plate	: 4.5 mm M/S plate
Worm of the screw	: 6 mm M/S plate
Shaft	: Hollow shaft dia 75 mm SCH 40

4.3 OVERFLOW FRUIT CONVEYOR:

One (1) overflow fruit conveyor for conveying the fruit back to thresher for recycling.

Diameter	: 300 mm.
Type	: Worm screw
Shell plate	: 4.5 mm M/S plate
Wear lining plate	: 4.5 mm M/S plate
Worm of the screw	: 6 mm M/S plate
Shaft	: Hollow shaft dia 75 mm SCH 40
Drive	: 4 kW / 54 rpm. SUMITOMO CYCLODRIVE gear motors c/w flexible coupling.

4.4 CRUDE OIL GUTTER.

One (1) 250 mm dia 6 mm. M/S plate to fabricated for crude oil gutter receive oil from the 2 unit

Screw press and c/w hot water dilution.

4.5 SAND TRAP TANK

One (1) sand trap to receive crude oil from the crude oil gutter to precipitate

The sand particles before overflow to vibrating screen

Capacity	: +/- 5m ³
Type	: cylindrical with conical bottom
Size	: 1.5m Ø X 2.5m
Construction	: welded construction of 6mm thk M/S plate
Complete	: 25 mm Ø hot water pipe Overflow tray

4.6 CRUDE OIL TANK

one (1) unit crude oil tank to receive crude oil from vibrating screen and to Pump to CST via pre - cleaner cyclone

Capacity.	: +/- 8m ³
Type	: Rectangular S.S
Dimension	: 1.5X 3m X 1.5m
Construction	: Welded construction with 3mm thk M/S plate Suitably covered and stiffened c/w drain pipe and overflow pipe

5. CLARIFICATION STATION

5.1 CRUDE OIL PUMP.

Two (2) unit's crude oil pumps shall be supplied and installed to pump the crude oil to send cyclone then to continuous setting tank

Make	: TAKI S/S pump
Capacity	: 30 m ³ / hr x 30 head
Drive	: 10 HP x 1500 rpm TEFC motor with V-belt pulley
Sealing	: Grand packing seal

5.2 CONTINUOUS SETTLING TANK

One (1) unit continuous settling tank to decantation of oil and sludge

Capacity	: 100m ³
Dimension	: 4m dia x 6m height
Type	: Cylindrical, vertical with 8mm M/S conical bottom
Construction	: Fabricated from 6mm thk M/S plate
Insulation	: 50mm thk 60 kg/ m ³ rock wool with 0.5mm thk aluminum sheet Cladding
Accessories	: Direct steam heating coil of Sch 40 M/S pipe - Thermometer - Oil skimmer and sludge drain pipe

5.3 CLEAN OIL TANK

One (1) unit crude oil tank to receive the skim oil or sludge from continuous setting tank for heating

Capacity	: 20m ³
Dimension	: 3m dia x 3m height
Type	: Cylindrical, vertical with conical bottom
Construction	: Fabricated from 6mm thk M/S plate
Insulation	: 50mm thk 60 kg/ m ³ rock wool with 0.5mm thk aluminum sheet cladding
Accessories	: 50mm steam heating coil of c/w steam trap - Thermometer - Outlet pipe and drain pipe

5.4 SLUDGE BUFFER TANK

One (1) unit sludge tank to receive the skim oil or sludge from continuous setting tank for heating

Capacity	: 20m ³
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187/19 Moo 1, Watpho-Bangyai rd. Amphoe Mueang SuratThani Province.

Dimension	: 3m dia x 3m height
Type	: Cylindrical, vertical with conical bottom
Construction	: Fabricated from 6mm thk M/S plate
Insulation	: 50mm thk 60 kg/ m ³ rock wool with 0.5mm thk aluminum sheet cladding
Accessories	: 50mm steam heating coil of c/w steam trap - Thermometer - Outlet pipe and drain pipe

5.5 SLUDGE BALANCE TANK

One (1) unit sludge holding tank shall be provided and installed to receive sludge discharge from the sludge buffers tank to decanter.

Capacity	: 3 m ³
Dimension	: 1.5m Dia. x 1.5m
Type	: Circle
Construction	: Fabricated from 3mm thk S/S
Insulation	: 50mm thk 60 kg/ m ³ rock wool with 0.5mm thk aluminum sheet cladding
Accessories	: Direct steam heating coil of M/S Sch 40 pipe 150 mm dia. Thermometer

5.6 HOT WATER TANK

One (1) unit hot water tank shall be provided and installed

Capacity	: 4.5m ³
Dimension	: 1.5m x 2m x 1.5m
Type	: Rectangular
Construction	: 4.5 mm thk M/S
Accessories	: Direct steam heating coil of M/S Sch 40 pipe 100mm dia Thermometer

5.7 CLARIFICATION STATION STRUCTURE

One (1) clarification support structure, platform, catwalk, access stairs, support base for 1 units Decanter And oil dryer / pump sets.

5.8 RECLAIMED OIL TANK / PUMP

A. One (1) unit reclaimed oil tank to receive the light phase from sludge separator then pump back to CST

Capacity	: 3 m ³
Dimension	: 1.5m Dia. x 1.5m
Type	: Circle
Construction	: Fabricated from 4.5mm thk M/S
Insulation	: 50mm thk 60 kg/ m ³ rock wool with 0.5mm thk aluminum sheet cladding
Accessories	: Direct steam heating coil of M/S Sch 40 pipe 150 mm dia. Thermo

B. One (1) unit sludge or reclaimed oil pump to the sludge or oil back to the CST and holding tank

Make	: TAKI pump
Type	: M/S pump
Capacity	: 20m ³ / hr X 20 head
Drive	: 5.5 HP X 1500 rpm TEFC motor with V-belt pulley
Sealing	: Grand packing seal
Complete with	: level control switch

5.9 STERILIZER FAT PIT / PUMP

To supply and install One (1) unit fat pit pump sets

Make	: TAKI pump
Type	: S/S centrifugal pump
Capacity	: 20m ³ / hr X 15m head
Drive	: 5.5 HP X 1450 rpm TEFC motor with V-belt pulley
Sealing	: Grand packing seal
Complete with	: level control switch

6. STORAGE TANK.

6.1 OIL STORAGE TANK

One (1) units of palm oil storage tank of M/S welded construction shall be supplied

Capacity	: 1500 ton of CPO
Bottom Plate	: 10mm M/S plate
Shell Plate	: 1 to 2 course - 8mm : 3 to 7 course - 6mm : Roof plate - 4.5mm thk flab
Complete with	: External spiral access ladder and internal monkey ladder : 500 dia roof manhole with cover : Roof perimeter c/w handrail round : 600 dia side manhole at 1 st stage : 150dialent pipe at top of dome : Sounding pipe : M/S float level indicator : Steam heating coils and steam traps

6.2 DISPATCH OIL PUMP

One (1) dispatch oil pump to pump the oil from oil storage tank to oil tanker

Make	: TAKI pump or equivalent
Type	: Centrifugal or MTP.OB3 M/S pump
Capacity	: 60m ³ / hr X 10m head
Drive	: 7.5 HP X 1500 rpm TEFC motor via pulley with remote control Electrical on / off switch

6.3 OIL LOADING SHED

One (1) oil loading shed with sufficient height, platform, staircase and handrail to facilitate loading of One Tankers a time

7. DEPERICARPING STATION

7.1 CAKE BREAKER CONVEYOR

One (1) worm screw type cake breaker conveyors shall be provided and installed to receive the cake Discharge from the presses and break it up before discharging it to the depericarper

Diameter	: 750mm
Shall Plate	: 6mm M/S Plate
Liner	: 6mm M/S Plate
Screw	: 6mm M/S Plate
Shaft	: 75mm dia Sch 80 hollow shaft
Hang Bearing	: Bronzing bush
Drive	: 15 KW / 56 rpm SUMITOMO CYCLODRIVE gear motor c/w Chin Coupling
Accessories	: A catwalk and maintenance platform of 600mm wide along the Entire length of the conveyor

7.2 DEPERICARPER

One (1) vertical column type pneumatic depericarper shall be provided and installed for the separation of Fiber and nut from the press cake

Capacity	: Min. 30 tons FFB/hr
Type	: Pneumatic induced
Shall Plate	: 6mm M/S Plate
Accessories	: Inlet chute : One adjustable side for varying cross sectional area : Transparent inspection windows : Outlet chute to polishing drum

7.3 nut polishing drum

One (1) nut polishing drum shall be incorporated. The nuts shall fall through the holes provided towards the end of the nut polishing drum to a nut auger, larger particles such as stones, bunches, stalks etc. shall overflow from the nut polishing drum, Scrolls to be fitted to guide stones etc. out

Dimension	: +/- 1100mm dia X 3000mm
Shell Plate	: 12mm M/S plate
Drive	: 3.7 KW / 24 rpm SUMITOMO CYCLODRIVE gear motor c/w Chin Coupling

7.4 Pneumatic fiber transport systems

One (1) pneumatic fiber transport systems shall be provided and installed to convey the fiber separated from the depericarper to fiber cyclones

Capacity	: 6 tones fiber / hr
Demeter	: +/- 650mm dia
Ducting Thickness	: 6mm M/S plate
Accessories	: 2 suitable manholes for cleaning

7.5 Fiber cyclone

One (1) fiber cyclone shall be provided and installed

Capacity	: 6 tones fiber / hr
Type	: Induces draught type
Shell Plate	: 6mm thk M/S plate
Line Plate	: 6mm thk M/S plate
Accessories for each cyclone	: Interconnecting ducting between cyclone and fan : One airlock rotating sluice 800mm dia(no canvass) : 2.2 KW / 32 rpm SUMITOMO CYCLODRIVE geared motor c/w flexible coupling : Supporting steel structure, platform and access ladder : Renewable wear liner of 9mm thk at the cylindrical section of the cyclone : Two suitable manholes : One fiber cyclone fan fiber cyclone fan specification
Capacity	: 19,500 CFM
Static Pressure	: 200mm WG
Fan Speed	: 1144 rpm
Drive	: Elect rim motor 50HP X 1500 rpm c/w v-belt pulley

7.6 FIBER / SHELL CONVEYOR

One (1) unit fiber / shell conveyor shall be provided and installed to convey fiber from fiber cyclone and a small portion of shell from shell bin to boiler fuel

Diameter	: 600mm
Type	: Full flight screw
Capacity	: 90 ton FFB/ hr
Shell Plate	: 6mm thk M/S plate
Liner Plate	: 6mm thk M/S plate
Screw Blade	: 6MM thk M/S plate
Drive	: 7.5 KW/ 52 rpm SUMITOMO CYCLODRIVE geared motor c/w flexible coupling Complete with Discharge chute to Boiler fuel distributing Conveyor. Supporting structure walkway.

7.7 BOILER FUEL DISTRIBUTING CONVEYOR

One (1) boiler fuel distributing conveyor shall be provided and installed to receive fuel from fiber/ shell conveyor and distribute it to the 1 boilers

Type	: Scrapper bar (Twin chain)
Capacity	: 90 ton FFB/hr
Shell Plate	: 6MM thk M/S plate
Scrapper Bar	: 6MM thk M/S plate
Drive	: 7.5 KW / 42 rpm SUMITOMO CYCLODRIVE geared motor c/w flexible coupling Motor C/W chain drive
Complete with	: Walkway, support structure, outlet chute

8. KERNEL RECOVERY STATION.

.1 BELT ELEVATOR.

One (1) unit Belt elevator to conveying nut from nut polishing drum separator to nut storage Hopper shall be provided and installed. The system shall be fabricated and supplied with the Following specifications as below;-

Model	: Belt type.
Capacity	: 6 tons of cracked mixture / hr
Drive	: 3.7 KW / 60-100 rpm SUMITOMO CYCLODRIVE geared motor c/w flexible coupling V belt 250 mm. V belt x 5 thk.
Buckets	: M/S steel buckets

8.2 NUT SILO

One (1) cylindrical type nut silo shall be provided and installed to store the wet nuts

Model	: Cylindrical Type
Shell Plate	: 6 mm M/S plate
Accessories	: Outlet chutes to four (4) roller mills underneath each silo : Provide vibratory feeder to discharge at fixed rate of nut 5 tons/hr each chute.

8.3 CRACKED MIXTURE CONVEYOR NO.1

One (1) cracked mixture conveyor shall be provided and installed to convey the cracked mixture from the

Ripple mill to the cracked mixture elevator

Diameter	: 300mm
Type	: Full flight screw
Capacity	: 6 tons of cracked mixture / hr
Shell Plate	: 4.5mm thk M/S plate
Screw Blade Plate	: 6 mm thk M/S plate
Shell Plate	: 6mm thk M/S plate
Shaft	: Hollow pipe 65 dia Sch 40
Drive	: 2.2 KW / 53 rpm SUMITOMO CYCLODRIVE geared motor c/w flexible coupling

8.4 CRACKED MIXTURE ELEVATOR

One (1) cracked mixture elevator shall be provided and installed to convey cracked mixture conveyor no.1

To separating system

Model	: Belt
Capacity	: 4.5 tons of cracked mixture / hr
Drive	: 3.7 KW / 60-100 rpm SUMITOMO CYCLODRIVE geared motor c/w flexible coupling
V belt	: 250 mm. V belt x 5 thk.
Buckets	: M/S steel buckets
Accessories	: Adequate amount of buckets made from 3mm thk M/S plate : Maintenance platform

8.5 CRACKED MIXTURE CONVEYOR

One (1) upper cracked mixture conveyor shall be provide and installed to conveyor cracked mixture from the cracked mixture to the cracked mixture separating systems

Diameter	: 300mm
Type	: Auger full flight screw
Capacity	: 6 tons of cracked mixture / hr
Shaft	: Hollow pipe 65 dia Sch 40
Drive	: 2.2 KW / 53 rpm SUMITOMO CYCLODRIVE geared motor c/w flexible coupling.

8.6 CRACKED MIXTURE SEPARATING SYSTEM

Two (2) cracked mixture separating system shall be provide and installed

Type	: Two stage vertical column pneumatic suction type
Capacity	: 6 tons of cracked mixture / hr
Column Plate	: 4.5mm M/S plate
Ducting Plate	: 4.5mm M/S plate
Accessories	: Inlet chute : Adjustable damper in the separating column : Inspection doors : Ducting and Cyclones : Two air locks rotating sluice 380mm dia for 1 st and 2 nd stage c/w 1.1 KW / 30 rpm SUMITOMO CYCLODRIVE geared motor c/w flexible coupling. : Two centrifugal fan of Phoenix LF15 Class II c/w 20 HP X 1500 rpm TEFC Motor with v-belt drive

Light particles from 1st stage separating column shall be sucked away and be deposited into the shell hopper.

Provision shall be made for by-passing the shall directly into the fiber / shell conveyor. The heavy particles such as stones shall be separated from the kernel and dropped out at the base of the column

The mixture from the 1st stage separating column shall be let into the 2nd stage separating column via a rotary valve
Kernels from the 2nd stage separating column are allowed to drop from the base of the column directly to the kernel conveyor or elevator while broken kernels drop into a clay bath further recovery of the kernels

8.7 CLAYBATH

To supply and install one (1) unit 1 pump clay bath separator for the separation of kernels and shall

Capacity	: 4 tons cracked mixture / hr
Pump size	: 75 dia. X MTP-Ni-pump
Motor	: 10HP X V.-belt pump
Dewater screen	: 1200mm X 1500mm long S/S perforated screen

Cyclone	: M/S material
Casing	: M/S
Chamber	: 6mm M/S tank

8.8 WET KERNEL CONVEYOR

One (1) wet kernel conveyor shall be provided and installed to convey kernel from the wet elevator to wet kernel distributing conveyor

Diameter	: 300mm
Capacity	: 3 ton wet kernel / hr
Type	: Full flight screw
Shall Plate	: 4.5mm thk M/S plate
Liner Plate	: 6mm thk M/S plate
Screw Blade Plate	: 6mm thk. M/S plate
Shaft	: Hollow pipe 65 dia Sch 40
Drive	: 2.2 KW /58 rpm SUMITOMO CYCLODRIVE geared motor c/w flexible coupling.

8.9 WET KERNEL ELEVATOR

One (1) wet kernel elevator shall be provided and installed to convey kernel from clay bath and the cracked separating to kernel silo

Capacity	: 3 ton wet kernel / hour
Model	: Belt type.
Capacity	: 6 tons of cracked mixture / hr
Drive	: 3.7 KW / 60-100 rpm SUMITOMO CYCLODRIVE geared motor c/w flexible coupling
V belt	: 250 mm. V belt x 5 thk.
Buckets	: M/S steel buckets

8.10 WET SHELL DISTRIBUTING CONVEYOR.

One (1) wet shell distributing conveyor shall be provided and installed to receive wet shell from the hydro cyclone and distribute to the elevator

Diameter	: 300mm
Capacity	: 3 ton wet kernel / hr
Type	: Full flight screw
Shall Plate	: 4.5mm thk M/S plate
Liner Plate	: 4.5mm thk M/S plate
Screw Blade Plate	: 6mm thk M/S plate

Shaft	: Hollow pipe 65 dia Sch 40
Drive	: 2.2 KW /58 rpm SUMITOMO CYCLODRIVE geared motor c/w flexible coupling.

8.11 KERNEL SILOS

One (1) circular type kernel silos shall be provided and installed to dry the kernels each silo shall be equipped with steam air heating system

Model	: Circular type
Capacity	: 20m ³
Shell Plate	: not less than 4.5mm M/S plate
Steam Air Heater	: 1 set 1 m X 200 heater with steam working pressure 3.5 kg/cm ²
Accessories each silo	: Steam trap FT ball float
	: Thermostat control for air heater
	: Phoenix centrifugal fan 270 SWSI Class 11, 12,000 CFM
	: 1600 rpm fan speed, 20 HP electric motor with v-belt pulley
	: Cleaning hole for heating element, platform & ladder
	: Cleaning door for cone for ease of cleaning
	: Inverted cone bottom c/w chute c/w rotor feeder

8.12 PNEUMATIC SHELL TRANSPORT SYSTEM

One (1) pneumatic wet shell transport system shall be provided and installed Horizontal Circular Column.

Quantity	: One
Size	: 250 dia
Shell Plate	: 6mm M/S plate
Complete with	: Inlet and Outlet chutes
Fan	
Quantity	: One
Type	: Centrifugal
Drive	: Elect rim motor 25 HP c/w v-belt pulley

8.13 Shell Screw conveyor.

One (1) unit shell elevator shall be provided and installed to convey shell from the shell transport system

Model	: Screw type
Capacity	: 3 ton wet kernel / hr
Drive	: 2.2 KW /58 rpm SUMITOMO CYCLODRIVE geared motor c/w flexible coupling.

8.14 DRY KERNEL CONVEYOR

One (1) dry kernel conveyor shall be provided and installed to receive kernels from the two kernel silo and direct the kernels to the de-fiber winnower column

Diameter	: 300mm
Type	: Full flight screw
Capacity	: 5 ton shell / hr
Shell Plate	: 4.5mm thk M/S plate
Liner Plate	: 4.5mm thk M/S plate
Screw Blade Plate	: 6mm thk M/S plate
Shaft	: Hollow pipe 65 dia Sch 40
Drive	: 2.2 KW /58 rpm SUMITOMO CYCLODRIVE geared motor c/w flexible coupling.

8.15 KERNEL TRANSPORTATION SYSTEM

One (1) unit kernel transportation system to receive the kernel from the de-fiber winnower to the kernel storage bunker

Vertical Circular Column

Quantity	: One (1)
Size of Pipe	: 250 dia pipe
Fan	: Centrifugal X 20 HP c/w v-belt pulley
Cyclone	: 1m dia X 1.5m long
Airlock	: 350 dia c/w drive unit

8.16 KERNEL STORAGE BUNKER

Quantity	: One
Model	: Cylindrical type
Capacity	: 100 tons
Dimension	: 4.5m dia X 6m high
Construction	: The main supporting column shall be UB beam, channel and angles M/S : Thk side plate would be 4.5mm thk M/S plate and 8mm thk bottom taper section : Outlet chute with horizontal sliding door type (height chute from floor : 4.5mm. : The roof covers to be 3mm thk : Provided with ladder from the floor level and interior ladder

9. BOILER HOUSE

9.1 WATER SOFTENER

The water softener is use to soften the raw water the boiler usage

Capacity	: 2 X 30m ³ / hr each
Resin volume	: 450 liter
Resin make	: Relate CFA
Type of Regenerate	: NaCl
Operation	: Manually operated by two nos. 3" dia and 3" nos. 2" dia chrome ball valve
Frontal Piping	: G.I. pipe class "B"
Brine Injection	: By ejector
Material	: 6mm thk M/S
Coating	: Internal – Wire bush with Epoxy paint External - Wire bush with two coat of primer / finish coat

9.2 WATER SOFTENER BOOSTER PUMP

Two (2) units booster pump set, one to operate and one to stand-by shall be supplied and installed for the transfer of filtered water through the softener

Make	: Taki pump
Type	: Centrifugal end suction
Model	: 180 X 65 X 50 X 160 X 163mm
Capacity	: 25m ³ / hr X 25m head
Pump Speed	: 2890 rpm
Drive	: 2.2 HP X 2900 rpm TEFC motor

9.3 DEAERATOR / PUMP SET

The Dearator is to remove the oxygen before being being fed to the boiler

Capacity	: 45m ³ / hr
Type	: Vacuum spray
Material	: M/S plate
Accessories	: Spray nozzle, float valve, vent valve, relief valve, waste level gauge, manometer, control valve, Sihi pump etc.

9.4 DEAERATOR FEED TANK

One (1) overhead deaerator tank for heating up water for deaerator use

Capacity	: 12m ³ M/S tank
Height	: 5m
Tank plate	: 6mm M/S plate
Complete with	: Water level indicator
	: Water float valve
	: Live steam pipe
	: Support structure

9.5 CHEMICAL DOSING PUMP

One (1) simplex type chemical dosing pump for dosing of chemical into boiler feed water

Capacity	: 100 ml / hr
Type	: Simplex
Pressure	: 40 bar max.
Complete with	: 400 liter PVC tank

9.6 BOILER WATER STORAGE TANK

One (1) unit Boiler water storage to store the softened water for boiler use

Capacity	: 40 m ³
Type	: Vertical cylinder M/s tank with internal painted with Epoxy paint
Shell plate	: 6, 4.5 mm M/S plate
Roof Cover	: 3mm M/S plate
Accessories	: Water level indicator
	Float valve control
	Low level alarm system
	Drain valve etc.

10. POWER HOUSE

10.1 BACK PRESSURE RECEIVER

One (1) back pressure receiver shall be supplied and installed

Dimension	: +/- 1200m X 6000mm
Working Pressure	: 3.5 kg/c m ³
Material	: Boiler plate ASTM A-516
Insulation	: 50mm thk X 60 kg/m rock wool c/w 0.5 aluminum cladding
Complete with	: Inlet and outlet pads for processing use

11. RAW WATER TREATMENT PLANT

11.1 RAW WATER PUMP

Two (2) 30 ton /hr raw water pump set to pump the river water to water storage reservoir shell supplied and installed

Make	: Taki pump
Type	: Centrifugal end suction
Capacity	: 30m ³ /hr
Head	: 20m
Drive	: 20 HP X 2900 rpm TEFC motor
Material	: C.I casing, M.S shaft

11.2 RAW WATER PUMP

Two (2) 25 ton /hr water pump, one operating and the other standby to pump the water from the water reservoir to the water clarifiers

Make	: Taki pump
Type	: Centrifugal end suction
Capacity	: 25m ³ /hr
Head	: 25m
Drive	: 10 HP X 2900 rpm TEFC motor
Material	: C.I casing, M/S shaft

11.3 CHEMICAL FEED SYSTEM

One (1) unit Duplex dosing pump to feed alum, soda ash solution and flocculent and into the raw water line

Brand	: N .feeder
Type	: Centrifugal end suction
Capacity	: 100 ml /hr
Complete with	: PVC tube Foot valve strainer Fiber glass tank Electric agitator

11.4 WATER CLARIFIER

One (1) water clarifier of M/S construction should be supplied and installed to clarify raw water

Type	: Vertical flow sludge type
Capacity	: 120 m ³
Complete with	: Drain pipe, discharge pipe, operating platform, ladder and handrail : Valves for sampling, water sludge.

11.5 CLARIFIER WATER TANK

One (1) 30 m³ capacity clarify water tank of 6mm thk M/S construction to receive the water from water clarifier

11.6 BOOSTER PUMP FOR SAND FILTER

Two (2) booster pump, one operating and the other standby to transfer the clarified water through the sand filter and up to an elevated storage tank

Make	: Taki pump.
Type	: Centrifugal end suction
Capacity	: 30 m ³ /hr
Head	: 30m
Drive	: 10 HP X 2900 rpm TEFC motor
Material	: C.I casing, S.S shaft

11.5 SAND FILTER

Two (2) vertical pressure and filter shall be supplied and installed

Capacity	: 30 m ³ /hr
Design Pressure	: 3.5 kg/c m ³
Shall Plate	: 8mm M/S plate
Lining	: Epoxy paint

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