

THE SUGAR TECHNOLOGISTS ASSOCIATION OF INDIA

SCHEDULE OF MACHINERY

Season 1991-92

U.P. State Sugar Corporation Ltd.

Unit: Doiwala (Dehradun)

Capacity in Qtls. Of cane per day

a) 25000 Qtls.

I-MILLING PLANT

(Where the factory has more than one milling tandem, the particulars required under items 1 to 5 should be given for each tandem.)

1 Cane Unloader and Cane Carrier

a) Cane Unloader

3 Nos. each of 2.5 Ton/trip capacity Gantry

length 45 Mtr

Cross Speer 24 Mtr

Height of lift 8 Mtr

Speed hoisting 9 Mtr/min

Holding 9 Mtr/min.

Long travel 15 Mtr/min.

Cross travel 15 Mtr/min

b) Cane Carrier

i) Size width & length between centres

i) Width 1.700 meters. Length 55 meter including 37 meter. Horizontal length Chain 3 travels, 150.0 mm pitch

ii) Drive (HP, if separate drive

ii) Drive electric motor of 37 KW RPM 1470 V.F.D. Control.

iii) Cut cane carrier

iii) Gear U- 1400, 30:1

Rake type carrier chain block type 229 mm pitch rake width 1680 mm Drive 40 HP motor, 1440 RPM. VFD control

2 Preparation of Cane

a) Cane Knives State number of sets, No. Of blade in each set and particulars of drive specifying RPM, HP for each set

a) Cane chopper having 30 Nos. hard faced knives Drive 120 BHP 600 RPM slip ring motor.

Fly wheel single on tail end swing dia. 1500 mm

b) mm

Cane leveller having 36 Nos. hard faced knives Drive 250 BHP, 600 RPM slip ring motor

Fly wheel both side swing dia. 1600 mm

b) Particulars of other cane preparatory equipment if any

b) Fibrizor having 48 Nos. fixed hammers with domite tips.

Drive Triveni Make 500 mm dia steam turbine HP700 /1000 swing dia 1600 mm

Gear Box ratio 8:1

3 Mills:

State number of mills and each mills the diameter & length of rollers in mm.

Four nos. Three roller mills with grooved underfeed rollers & Donnelly type chutes, Roller Size 900 mm x 1700 mm length.

- 4 Drive for Crusher and mills.
- a) If turbine are used, state number, type & HP of each and the Unit driven by each .. Four Nos. Steam turbines each 350 BHP at 80% or its rated speed when supplied with steam at normal parameters. Each turbine is provided with suitable reduction gear to run the Mill rollers at 4.5 RPM
400 BHP with one over load valve open, 450 BHP with both over load valve open
Double reduction gear box
- b) Gearing Details
- i) 1&4 Mill C.S.C 630 HP 500/750 RPM 750/29.80
- ii) 2&3 Mill SDN 560, HP 500 RPM 750/29.80
- c) Transmission Gear detail
- | Teeth | Module | face | Width | PRM output |
|-----------|--------|------|-------|------------|
| Pinion 23 | 30 | | 478 | 29.80 |
| Gear 152 | 30 | | 478 | 4.50 |
- d) Hydraulic System
- Edward Hydraulic Accumulators 37 Lit Capacity
Hydraulic load in T/meter length
Hydraulic Ram dia 360 mm
Hydraulic load per meter length of roller 215.44 Ton
- 5 Imbibitions
- i) State whether water used is hot or cold and arrangements for weighting the water
- ii) State the imbibitions scheme followed
- i) Hot water is used. On One automatic weighting scale of 2.5 tons/tip for 25 tips/hour.
- ii) Compound imbibitions scheme

II- CLARIFICATION PLANT

- 6 Measurement of Weighment Juice
- Weighing equipment state number type and weighing capacity per charge of each tank and arrangement provided for recording quantity of juice weighed
- i) One no. Automatic juice weighing scale of capacity 6.5 tonnes per tip with a recorder to record no. Of tips.
- 7 Juice Heater:
- State number type and heating surface (in Sq.m) each and purpose for which is used
- Six high velocity vertical Juice Heaters:
- i) 170 sq.m H.S each for raw and sulphited juice.- 4 Nos.
- ii) 170 sq.m H.S., One no. Clear juice heater
- iii) 170sq.m. H.S. One no. Vapour line juice heater
- 8 Juice Sulphitation Unit
- State number, type & working capacity in cubic meter of each
- One No. Continuous juice sulphiter of KCP Design
Working capacity- 14.5 cu.m
- 9 Subsiders:
- a) Continuous subside number and cubic content, dia. and no. Of compartment of each and make
- b) One no. Continuous clarifier of type Repi Dorr 444 of KCP makes capacity 4100 cu.m. Dia. 9.15 Meter No. Co compartment-4
- (b) Milk of Lime Preparation
- One lime slaker capable of slaking about 1200 Kgof quick lime per hr. a rake type/other proven design lime classifier. Two milk of lime storage tanks of about 150 HL capacity each

10 Sulphur Gas Plant

- a) Sulphur furnace State no. Of furnace and tray area in sq. Meter) for each furnace
- b Air Compressor- State no. Type and capacity in cubic meter displacement per minutes) Kg. Per sq.m

- a Four continuous type sulphur furnace each of 0.65 sq. Mtr. Tray areas.
Four rotary air compressors.
i) 2 Nos. Of capacity 600 cu. Mt. Per hour at 1.0 Kg/cm² g pressure.
ii) 2 Nos. Of capacity 300 cu. Mt per hour at 1.0 Kg/cm² g pressure.

III-EVAPORATOR & BOILING PLANT

- 11 Evaporators the vassel from which vapour are bled should be specified stating the use of which the bled vapours are put.

One quadruple effect evaporator in which vapours are bled from 1st body and used for heating. 2nd body and connection juice heater and sulphated juice heater.

- a) State the heating surface pre-evaporator, or vapour cell, if any

There is one double effect pre-evaporator. It consists 1st effect a rising film evaporator of H.S. 800 sq.m. With inbuilt J.H of H.S. 60 sq.m. 800 sq.m. and 2nd effect a conventional type vapour cell of H.S. 950 sq.m. The vapour of 1st effect is bled to.

- i) Pans for low grade m/c. boiling
ii Juice heaters for sulphited juice heating
iii 2nd effect i.e. vapour cell & vapours of 2nd effect on bled to:
i-Pans for high grade m/c.
ii-Juice heaters for correction juice heating
iii-1st body of quadruple effect evaporation

- b State number & for each evaporator the number of vassal of the total heating surface of each vassal in sq. meter

Pre evaporator:
1st effect- 800 sq.m.
60 sq.m (I.B.J.H)
2nd effect- 950 sq.m.

Quadruple effect
1st effect - 600 sq.m
2nd effect - 440 sq.m
3rd effect - 440 sq.m
4th effect - 440 sq.m

12 Syrup Treatment Plant

Sulphur tanks-State number and working capacity (in cu. Meter.)

One continuous syrup sulphitation Unit of 5 M³ working capacity.

- 13 Syrup storage- State number of tanks and capacities (in cu. Meter) of each.

Four Nos. Of syrup storage tanks of capacity 18 M³

- 14 Molasses storage (Process) State number of tanks & capacity in cu. Meter of each.

Ten number of molasses tanks of capacity 18 M³

15 Vacuum Pans

State number of pans of each type e.g. coil or calandria low head or with mechanical circulars and for each pan state the normal strike capacity (in cu. Meter) and the total heating surface (in square meter)

Five nos. Of low head rapid boiling calandria type vacuum pans of 42 M³ normal strike capacity each. The H.S. of each pan is 280 sq.m.

16 **Condensation Plant**

a **Condensers-** State number type and diameter and height (in mm also give particulars of pans and evaporators connected to each condenser:-

One no. Multijet condenser for evaporator set.

Dia. 1370 mm

Height 2450 mm

ii Five nos. Singe entry SS condenser for pan

b **Injection Water Pump-** State no. Type and capacity (in H.L. per hour) for each

Seven nos. Of centrifugal type injection water pump each of capacity 9000 H.L. per hour

c **Water Cooling System**

i) **Spray Pump:** State no. Type and capacity in H.L. per hour for each

Two nos. Of centrifugal type spray pumps each of capacity 27000 H.L. per hour.

ii) **Spray Pond:** State no of nozzles

One spray pond no. of nozzles 400

IV- COOLING, CURING AND DRYING PLANT

17 **Crystallizer:** State nos. Of crystallizer of each type (open, semi-closed or closed. And for each crystallizer give the normal massecuite capacity in cubic meter and type of massecuite cooled. Give particulars of heat exchanger element used (type & cooling surface and the no. Of crystallizer in which they are fitted

Nine nos. Out of which

For A.M/c.

3 nos. Of open batch type horizontal air cooled crystallizer each of capacity 45.5 cu. Meter.

For B. M/c.

3 Nos. Of open batch type horizontal water cooled crystallizer each of capacity 45.5 cu. Meter.

For C M/c.

2 Nos. Of open batch type horizontal air cooled receiving crystallizer each of capacity 45.5 cu. Meter.

One no. Continuous type vertical water cooled crystallizer of capacity 10.5 cu. Meter per hour ant total holding capacity 231 cu. Meter for 22 hours.

For drives of each air cooled crystallizer and electrical motor of 15 HP and 1450 RPM has been provided (gear ratio of radicon 20:1.

For each water cooled crystallizer an electrical motor of 15 HP and 1450 RPM has been provided (gear ratio of radicon 60:1.

For vertical crystallizer one electrical motor of 15 HP and 1450 RPM for each shell with radicon gear ratio 50:1.

HEAT EXCHANGER

Type- Water cooled/heated for vertical crystallizer. Cooling- 315 sq. Meter

Re-heating 45 sq. meter

- 18 Seed Crystallizer Mention.
Number and capacity (in Cu. Meter) for each
- 19 Centrifugal Machine:
State No. Of machines used as for worker and after working separately for each type of massecuite and mention separately their basket dia. & height in mm. RPM & type of device e.g. belt, water or electric and whether operated Sami-automatic or completely automatic.
- 20 R.O/D.M.Plant
- 21 Sugar Dryers:
(State No. & Type) e.g. regulators, Grass hopper, Cooling tower etc. heating and
- i Total 4 nos. Of seed crystallizer out of which 3 nos. Vacuum crystallizer of capacity 28cu.meter
1 no. Horizontal crystallizer of capacity 28cu.meter
- ii) Vacuum crystallizer & Seed crystallizer Drive-Electrical Motor (TEFC)
H.P. - 10, RPM - 1450, Gear ratio 20:1
- Total 14 nos. Of centrifugal machine out of which
7 Nos. Are of continuous type (For B & C m/c)
7 Nos. Are of self discharged fully automatic type. (For A m/c)
For A- M/c
- a A Fore Worker – No.3
Basket size – Height – dia.
Steep cone 965 mm x 1245 mm
Capacity 650 Kgs/change
- b A-After worker: No.3
Basket Size – Height – dia.
Steep cone 965 mm x 1245 mm
Capacity 650 Kgs/change
- c Fore A-Fore & after worker common No.1
Basket Size – Height – dia.
Steep cone 965 mm x 1245 mm
Capacity 650 Kgs/change
For B-M/c
No.1
Basket size dia.- 1100 mm
Capacity- 12 tonnes/hr
For C-M/c
- a C-Fore worker
No.4
Basket size-dia. 1100 mm
Capacity- 12 tonnes/hr
- a C-After worker
No.1
Basket size-dia. 1100 mm
Capacity- 12 tonnes/hr
Also there is one common continuous machine used as B/fore worker and C-after worker
D.M.Plant of 15 M³ Per Hr Capacity
- Grass Hoppers.
Total Nos. -4

total surface in sq. meter) in case of hopper drier its width & length

One single tray conveyor Grass hopper of 1.5 m, width 6 meter length under the A for worker centrifugal One single tray conveyor grass hopper of 1.5 m. Width & 6 Mtrs. Length under the A-after worker centrifugal Two multi tray grass hopper each 1.5 M width & 12 M length each driven by TEFC electric motor with hot & cold air blowers

- 22 Sugar Elevator & Grader:
Type and size & number of Decks.

Two M.S. cased elevators each to deliver 15 tonnes per hour sugar from hopper.

STEAM & POWER PLANT

23 BOILERS:

- a Boiler: State number type of boiler & for each boiler its working pressure (in Kg. Per sq. Meter) super heater heating surface and degree of super heater and details of Soot blowers.
- b Feed Water treatment:
Give particulars of arrangements if any for softening or otherwise treating the feed water entering Boilers.
- c Economiser and feed water heater give particulars stating type and heating surface
- d Auxiliary Fuel: Give particulars of arrangements for burning auxiliary fuel, if any, i.e. Crude oil, molasses etc.
- e Chimney: State if of bricks or steel and give diameter and height also type of draught (e.g. forced induced or natural) and give particulars of the fans.

Two Boilers each of 32 tons/hr steam generation capacity, spreader stoker with dumping grate furnace. Working pressure 32 Kg/cm².g. Super heater heating surface 94.4 M² each. Steam operated hand controlled soot blowing equipment min 3 soot blowers for each boiler also arrangement for economiser & Super heater soot blowing

De-internalisation Plant is provided with two filter Units, One cation exchange resin unit & one Anion exchange resin unit, for treatment of water for boilers.

Economiser (H.S. 215.1M²) is provided in each boiler for feed water heating to give min. Rise of 50°C.

Nil

One common M.S. Chimney of 3 M dia. At the top & 40 M height. Each boiler is provided with a I.D. Fan & F.D. fan, min. Discharge cap. Of 25% higher than theoretical flue gas quantity.

24 POWER PLANT

- a State number of prime movers stating for each.
- i) The purpose for which used
- ii) If any turbine is also used state its type number of stages and conditions of inlet and outlet.

One turbo alternator set of 2500 KW at 0.8 power factor

For providing the power to complete plant One steam turbine (multistage) for driving alternator. Steam inlet pressure/temp. Is 32 Kg/cm².g 360°C and 1.5 Kg/cm².g exhaust pressure.

- b State number of electric Generator stating for each
- i D.C. or A.C.
- ii Voltage & Make
- iii Purpose for which used lifting only for development of Power in factory
- iv If A.C. Power factor of phase & frequency
- v Maximum demand in KW during the season & Off season
- 25 Make of Plant: State name of machinery
- 26 Final molasses storage tank state number, type & capacity of each tank (Whether steel or masonry)
- 27 Effluent disposal-Give particulars of arrangement for disposal of factory effluent
- 28 Sampling equipment- Give particulars of equipment provided for sampling various juice, bagasse and other materials for analysis.
- 28 Control instruments No. & specifications.
- 29 Pumps: Type number and capacity at important station e.g. raw juice, mud filter ite, syrup, messecuite, magma & molasses pump.
- 30 E.T.P
- 3 Nos. D.G.Set (240 KW+240 KW+128 KW)
- A.C.
- 440 Volt. Each, Kirlosker make
- Developing power in the factory
- 0.9 power factory & 50 Hz frequency
- Season 2500 KW, Off season 240 KW
- The K.C.P. Ltd. MADRAS
- 3 Nos. Steel molasses storage tank each of capacity 3000M³
- One effluent treatment plant capacity 1000 M³ day for treating of waste water of factory erected by M/S Utility Equipment & Management Pvt. Ltd. New Delhi
- Manual sampling is done for analysis of juice, bagasse & other material.
- Thermometer, pressure gauge, vacuum gauge, temps. & pressure recorders, steam, water flow meters at all important stations.
- Juice pump- 4 Nos. Capacity 180M³/hr each
- Mud Filtrate Pump - 4 Nos. Capacity 30M³/hr each
- Syrup extr. Pump 2 Nos. Capacity 40M³/hr each
- Melter pump- 2 Nos. Capacity 30 M³/hr each
- Magma/Massecuite pumps 12 nos.
- 1 Nos. - 30 ton/hr
- 2 Nos. - 40 ton/hr
- 5 Nos. - 20 ton/hr
- Molasses pump - 12 Nos.
- 4 Nos. - 30 M³/hr
- 8 Nos. - 10 M³/hr
- Condensate pump 15 Nos.
- 9 Nos. - 12 M³/hr
- 2 Nos. - 20 M³/hr
- 1 No. - 40 M³/hr
- 3 Nos. - 60 M³/hr
- ETP of suitable capacity consisting of Bar Screen chamber, Oil & grease trap, Equalization Tank with diffused aeration pH correction tank Primary clarifier, Aeration Tank, Secondary Clarifier, Multi Grade Filter, Activated carbon Filter, Sludge drying bed

I hereby declare that all the details given in this return are true to the Best of my knowledge

CHIEF CHEMIST

14.09.2023

CHIEF ENGINEER