

## SHRI VENKATESH KRUPA SUGAR MILLS LTD., MAHARASHTRA.

### BACKGROUND

- The complete State of the Art energy efficient sugar plant of 2500 TCD capacity was executed by SEDL on EPC basis in 2010-11.

### DESIGN PARAMETERS

Plant Capacity	:	2500 TCD
Pol % Cane	:	≥ 14.5
Fibre % Cane	:	≤ 15.0
Preparatory Index	:	88+
Whole Reduced Extraction	:	95%
RBHR	:	≥90
Steam % Cane	:	30%
Sugar Colour	:	<80 IU



### HIGHLIGHTS OF THE PROJECT

- ◆ **The plant was designed for 2500 TCD and is running at a capacity of 3500 TCD** without any addition in the equipment. **Boiler Capacity is 45 Ton/hr.**
- ◆ The plant is most optimally designed model plant of SEDL to operate with highest efficiencies for producing commercial white sugar by double sulphitation process but is operating on **Single Sulphitation** to produce white sugar of **colour less than 80** with sugar of following grain sizes:  
**M-30 - 55-60%                      S-30 - 30-35%                      L-30 - 10%**
- ◆ The mills are designed supported with planetary gearing mechanism with high efficiency and low transmission losses. **Present Power Consumption is 21-22 unit on cane.**
- ◆ The designed Steam Consumption of the process house is **30% on cane.**
- ◆ This project is highly cost effective in terms of CAPEX as the plant is very compact, consolidated in small foot print area, all the equipment and machinery is installed outdoor, thus saving building costs. Most of the equipment are self-supported skirt mounted minimizing the requirement of structural steel.
- ◆ Extraction plant i.e milling tandem is supplied with shaft mounted individual planetary drives of very high torque offering very high degree of flexibility in crush rate with improved efficiency with significantly low power consumption.
- ◆ The plant is designed for Zero External Water Requirement during on-season and Minimum Water Requirement during raw sugar processing in off-season.

### TECHNICAL DETAILS - AT A GLANCE

#### 1. MILLING PLANT

##### 1.1. Cane Unloading Devices:

- ◆ Three Bridges with two trolleys for trucks & tractors, with sling bar system – two motion type. For 2500 TCD capacity.
- ◆ Feeder table of 6 x 8 m (2 Nos.) for 2500 TCD.

##### 1.2. Cane Conveying/Preparation:

- ◆ Cane Carrier for capacity of 2500 TCD with Cane Leveller.
- ◆ A set of Cane Chopper and Swing Hammer Fibriser/ with 96 hammers and installed power of 1000 kW on fibriser (500 kW x 2 No.).
- ◆ Prepared Cane Rake Elevator 2040 mm, 16 m length.
- ◆ Automatic cane feeding control system.



##### 1.3. Milling Plant:

- ◆ 3 Nos., Three roller mills, 910 mm (33") diameter x 1725 mm (66") long with Grooved Under Feed Roller having 100% diameter of mill roller. Each mill driven by AC VFD Motors and Planetary Gear Boxes.

- ◆ The provision to install one zero & 5th mill of same size & specifications for 3500 TCD capacity.
- ◆ Installed Power on mills is as follows:



Description	INSTALLED POWER		
	1 <sup>ST</sup> MILL	2 <sup>ND</sup> MILL	3 <sup>RD</sup> MILL
Top Roller	218 HP	180 HP	180 HP
Discharge Roller	150 HP	150 HP	150 HP
Feed Roller	150 HP	150 HP	150 HP

- ◆ Hot Water Imbibition System.
- ◆ Rotary Screen (1800 mm dia x 2970 mm length).
- ◆ Suitable Mill Control System provided for optimum mill performance.

#### 1.4. Mill House Crane and Gantry:

- ◆ One three motion electrically operated overhead travelling crane having one grab of 25 ton SWL capacity with trolley complete with crane gantry provided.

#### 1.5. Bagasse Conveying System:

- ◆ The Bagasse Conveying System consisting of Rake type Bagasse Elevator and Main Bagasse Carrier to convey bagasse to the boiler.
- ◆ The bagasse belt conveyor installed to carry excess bagasse to yard and a return bagasse belt conveyor shall be installed for feeding bagasse to the boiler from the bagasse yard.

## 2. SUGAR PROCESSING PLANT

### 2.1. Clarification Plant (Double Sulphitation Process):

- ◆ Juice Mass Flow Measuring System suitable for 3500 TCD capacity.
- ◆ This raw juice is heated in Direct Contact Heaters before sending for clarification.
- ◆ One Juice Sulphiter for juice sulphitation.
- ◆ One rotary cane mud Vacuum Filter suitable for along with accessories like mud belt conveyors, mud bin, bagacillo cyclone, mud mixtures etc. provided.
- ◆ Lime slaker along with lime tanks, rake type grit conveyor with vibro screen provided for preparation of Milk of Lime.
- ◆ Three sulphur burners for burning standard quality sulphur to produce SO<sub>2</sub> for juice & syrup application.

### 2.2. Evaporator Station:

- ◆ Quadruple type Evaporator station with all Falling Film bodies (4 No. x 1000 m<sup>2</sup> Working + 1 no. x 1000 m<sup>2</sup> standby).
- ◆ The syrup obtained is sent to Syrup Sulphiter for syrup sulphitation (60 HL).
- ◆ Condensate Flash Vessel System with PHE shall be provided for utilisation of hot condensate vapours into the Evaporator System (suitable for 2500 TCD).

### 2.3. Pan Station:

- ◆ Molasses Storage Tanks provided to store molasses and melt etc at the pan floor.
- ◆ The Vacuum Continuous Pans provided for 'A', 'B' & 'C' massecuite crystallisation with bottom mounted circulator in all chambers, receiving crystallizers cum pug mills.
- ◆ Vacuum Crystallisers for the storage of 'A', 'B' & 'C' massecuite grain (30 t).
- ◆ Single entry Condensers to create vacuum in the Pans and Evaporators.
- ◆ Spray Pond along with suitable pumping system for cooling hot condenser water.



### 2.4. Cooling, Curing and Grading Station:

- ◆ Batch Type Centrifugal machines with AC Drive for curing of 'A' & 'B' massecuite. (1250 kg/charge).
- ◆ Continuous Centrifugal Machines for curing of 'C' Massecuite along with accessories. (1100 mm dia).
- ◆ Magma Mixers along with accessories for mixing 'B' & 'C' Sugar with water/syrup.
- ◆ Direct Contact type molasses conditioners.

### 2.5. 'B & C' Sugar Melting:

- ◆ Direct Contact type melter for melting 'A', 'B' & 'C' sugar.
- ◆ The Melt is screened and pumped to the Melt storage tank at Pan Floor for Crystallisation.

- ◆ Fluidized bed dryer with rori removal arrangement.
- ◆ Sugar Grader complete with distributor, drive for distributor.
- ◆ Auto weighing machines with 20 MT silo.
- ◆ Electronic load cell type, automatic sugar weighing machines to weigh 100/50 kg sugar for bagging, at the bottom of each sugar bin.
- ◆ Automatic bag stitching machines with slat conveyor.

### 2.6. Final Molasses Handling & Storage System:

- ◆ Final Molasses Storage Tank supplied along with overhead tank to supply molasses to tanker directly by gravity.

## 3. STEAM GENERATION PLANT

### 3.1. Boiler Specifications:

- ◆ Quantity : 1 No.
- ◆ MCR (Maximum Continuous Rating) Evaporation : 45 t/h
- ◆ Pressure at Super Heater outlet : 45 kg/cm<sup>2</sup>(g)
- ◆ Temperature of super heater outlet : 500°C ± 5°C
- ◆ Type of grate : Dumping Grate
- ◆ Fuel : Bagasse with 50% moisture

### 3.2. Boiler Accessories:

- ◆ Induced Draft Fan (1 No.) Forced Draft Fan (1 No.)
- ◆ Secondary Air Fan (Hot Air) (1 No.) RCC Chimney
- ◆ Boiler Feed Water Tank De-aerator
- ◆ Economiser Boiler Feed Water Pumps
- ◆ DM Water Treatment Plant Dust collector with emission level of 500 – 600 mg/nm<sup>3</sup>
- ◆ Microprocessor based Instrumentation & Controls.

## 4. POWER GENERATION PLANT

### 4.1. Turbo Alternator Set:

- ◆ **One Back Pressure type turbo alternator set of 7.0 MW** at 0.8 power factor with synchronising and control equipment for synchronising with grid and D.G. Sets.
- ◆ This turbine is operational at reduced capacity so as to meet the captive requirement.

## 5. MISCELLANEOUS

- ◆ Water Conservation System supplied so that no external water is required for the operation of the Sugar Plant during the season.
- ◆ The Automation System with DCS Control provided.
- ◆ DCS for Boilers and Power Plant supplied.
- ◆ Supporting Structure.
- ◆ Necessary Piping .
- ◆ Final Painting.
- ◆ Insulation & Lagging.
- ◆ Electricals for Power Generation and distribution within the plant.
- ◆ Hot and Cold Water Service Tanks.

## ACHIEVED RESULT

PARAMETERS	UNITS
Crushing Capacity	3500TCD
Steam % on Cane	31.5%



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