

UTTAM SUCROTECH INTERNATIONAL PVT. LTD.

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CIN : U29100DL2011PTC228755

To,
The Managing Director,
M/s JGN Sugar & Biofuels Pvt. Ltd.,
District Udham Singh Nagar,
Uttarakhand

Date: 23.12.23

Kind Attention: Mr. Naveen Jhanji,

Subject: Regarding the scheduled Erection and Commissioning

Dear Sir,

Greetings from Uttam Sucrotech!

This has reference to our Agreement DT. 01.04.2023 for Project of Capacity Optimization with Efficiency Improvements in Mill & Boiling House at existing Sugar Plant of JGN Sugar & Biofuels Pvt. Ltd., Sitarganj, Uttarakhand. We would like to inform you that we have completed the erection of the plant on 31.09.2023. Trial run and commissioning of the plant is completed on 31.10.2023.

Capacity achieved at the time of commissioning and test run was 3250 TCD.

List of machines installed and upgraded is attached in Annexure A.

This is for your information and records.

Yours truly,

UTTAM SUCROTECH INTERNATIONAL PVT. LIMITED


VIVEK MISHRA

DGM – International Marketing



M/S JGN SUGAR & BIOFUELS PVT LTD,
SITARGANJ, UTTRAKHAND

UTTAM
INDIA

*Technical Offer for Capacity Optimization at 3240 TCD with
Efficiency Improvements in Mill & Boiling House at Existing
Sugar Plant*

REFERENCE: USI.CO/PR4/JGN/2022-23/128 (T) R1

DATE: 1st April, 2023

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PROJECT	Technical Offer for Capacity Optimization at 3240 TCD with Efficiency Improvements in Mill & Boiling House at Existing Sugar Plant	REV. NO:	1.0
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CONTACT DETAILS

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1 DESIGN PARAMETERS

1.1 SITE CONDITIONS

Location	:	Udham Singh Nagar, Uttrakhand
Site Altitude	:	* (Assumed)
Ambient Temperature	:	* (Assumed)
Seismic Zone	:	* Buyer to confirm
Relative Humidity	:	* (Buyer to confirm)

Above parameters to reconfirmed by Buyer.

1.2 SUGARCANE QUALITY REQUIREMENT (ASSUMED)

Pol % Cane	:	13.5 %
Fiber % Cane	:	13.5-14 %
Imbibition	:	250-300 % on Fiber
Cane	:	Manually harvested green cane
Extraneous Material	:	1.5 % Maximum
Transportation	:	By Road through Trucks

Voltage Levels

Generation Voltage	:	11 kV \pm 10%
Frequency	:	50 Hz
Distribution Voltage	:	415 \pm 10 V AC
AC Control Voltage	:	230 V AC
DC Control Voltage	:	110 V AC
Electric Motors	:	IEC / EN 60034

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1.3 DESIGN BASIS

Reference : Capacity Optimization at 3240 TCD With Efficiency Improvements at Existing Sugar Plant Dt. 02.03.2023 & Amendment Dt. 04.03.2023

Capacity : 135 TCH, 3240 TCD

Cane Handling & Preparation. Milling

Cane & Rake elevator drive : New AC VFD drive
 Fibrizor : Swing Hammer Heavy Duty
 Milling (Existing) : 4 Nos. 30" x 60" Three Roller Mill with TRFR (Toothed Roller Pressure Feeder)
 VFD for TRPF drive : 75 HP- 4 Nos.
 Target : Preparation Index – 85
Process House
 Juice Heater : New 250 m² – 2 Nos. for Sulphited juice Heating
 : DCH for clear juice heating
 Evaporator : 2200 m SK and 2500 m² Robert as 1st and 2nd body
 Pan station : Supply Tank for Syrup & AH molasses
 Molasses conditioners for AH & BH Molasses
 Massecuite discharge valves for Pans
 B/C Melter
 Centrifugal station : 1250 Kg/h – 3 Nos. batch CF machines
 Sugar handling : Sugar elevator, Sugar Grader, Sugar Bins, Sugar weighing machines, Sugar stitching machines, stitching slat conveyors
 Target : Steam % Cane ≤ 45 % on Cane
 Deviation from RFQ : Sulphited Juice heating in three stages

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2 SCOPE OF SUPPLY & SERVICES

2.1 SCOPE OF SUPPLY

The Scope of Supply for **Capacity Optimization at 3240 TCD with efficiency improvements in Mill & Boiling House** at existing sugar plant:

- Part I : Equipment for Cane Handling, preparation and Milling
- Part II : Equipment for Process House
- Part III : Limited Process monitoring & automation for 5Nos. Batch Pans

2.2 SCOPE OF SERVICES

The Scope of Services for Capacity Optimization at 3240 TCD with efficiency improvements at existing sugar plant includes:

- Design and Engineering
- Manufacturing and Procurement
- Dismantling of equipment related to scope of supply
- Quality/ Project Management
- Transportation (FOR –Uttarakhand, Site (Incoterms 2020)
- Supervision, Erection & Commissioning

Note-But excludes any modification, repair or replacement of part of existing equipment, machinery and piping other than offered.

2.2.1 OTHER SCOPE

- *Supply and replacement of damaged platforms and removal of all wooden platforms to be replaced with MS chequered plates.
- All dismantled equipment and material to be shifted to the assigned location in the factory premises.

**Note- Total tonnage for staging and structure, stair cases, Railings, Platform, chequered plate, gratings etc., standard and fabricated piping, standard and fabricated bends, reducers, tees, flanges, gaskets, hardware etc. for new, modified and existing structure and piping considered as 325 Tons. If Tonnage exceeds than specified, the same shall be paid extra on per kg basis and similarly if it is less than specified, the same shall be deducted on per kg basis.*

Supplies and Services are rendered in conformity with proven engineering principles, practices taking into account the current state of art technology.

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3 PART-1: CANE HANDLING, CANE PREPERATION & MILLING

TECHNICAL SPECIFICATIONS

3.1 HYDRAULIC GRAB FOR CANE UNLOADER

1 No. Mechanical Grab to be replaced with Hydraulic type grab of 5 Tones SWL capacity.

No. of Grab	:	1 No.
Capacity of Grab	:	5T SWL
Lifting capacity of Grab	:	3 Ton
Type of Grab	:	Hydraulic

3.2 SWING HAMMER FIBRIZER MAIN CANE CARRIER

Existing fixed type fibrizor rotor assembly to be replaced with Swing type hammers following specifications:-

Quantity	:	1 No.
Type	:	Swing Hammer
Width	:	1525 mm
Swing diameter	:	1830 mm
Hammer Quantity	:	72 -84
Weight of each hammer	:	20 Kgs with detachable do-mite tips made of special shock resistance alloy steel and secured through 50mm dia. SS Pins, the Hammer shank and fiberizor disc should have GM bushes to suit SS pins.
Hubs	:	About 50mm hubs shall be Carbon Steel shrunk fitted on rotor shaft.
Shaft Diameter	:	330 mm dia. at center, 240 mm at Journal
Shaft MOC	:	40C8 as per IS:1570
Bearing	:	Double row spherical 23252 CCK W33
Plummer Block	:	Cast steel with water cooling Arrangement
Lubrication	:	Oil Mist
Hood	:	Completely covered by reinforced MS

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		fabricated hood made out of 12 mm thick plate attached to main carrier frame,
	:	with deflector plate,
Deflector plate	:	20 mm thickness with 2.5mm SS lining
Rear chute	:	12 mm thick with 2.5 mm SS lining & bolted doors on the top of hood.
Anvil Plate	:	MS, Pocketed, Adjustable type
		Wrap angle 140-160 deg., hard faced to 500-BHN
		Shall have provisions for adjustment of Clearance.
<i>Drive</i>	:	Existing
Type of drive	:	Steam Turbine
Power	:	1000 HP with both overload valve Closed at par
Speed	:	750 rpm

3.3 AUTO CANE FEEDING SYSTEM

Quantity	:	1 No.
		Modification of existing system

Existing Auto cane feed control to be modified:-

The system shall ensure the uniform feed rate to the 1st mill with provision to change the feed rate any time having a variation not more than $\pm 5\%$ set rate. Primary cane carrier shall follow speed of secondary cane carrier in a fixed ratio. Load of all cane preparation devices shall override the speed signal of each cane carrier. When load of any cane preparation device exceeds 80% of rated load, the speed of that cane carrier shall be proportionately reduced. If load exceeds 100% of rated load, that cane carrier will stop. It will restart automatically when overload condition on that cane preparation device becomes normal. These overload settings shall be adjustable from the control panel.

The system shall have the following provisions.

Sensors:

For load sensing of cane preparatory devices such as chopper, leveller, fibrizer and 1st mill, suitable current transformers / two wire electronic analogue pressure transmitters with capacitance sensing technology with 4-20 mADC output and configurable for calibration to the required pressure ranges within the designed pressure span of the transmitter. In addition to this level sensing of prepared cane at Donnelley chute also be considered.

Control Action :

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The system should be provided with two control actions i.e. proportional and ON-OFF control actions

Proportional control as per the 1st mill load (TRPF motor and Steam Turbine). ON-OFF control as per the high load settings of the cane preparatory devices and first mill.

Set Points :

Following settings are to be provided,

For loads of various cane preparatory devices and 1st mill turbine, precision load setters of 1 K 10 Turns helipots with dial knobs.

For average height and feed rate precision 10 K 10 Turns helipots with dial knobs.

Visual Indication:

Coloured lamp indicators for the high set load values.

Carrier Speed Adjustments:

The speed of the cane carriers can be adjusted from zero to the rated RPM with the settings provided on the control panel at operator's console. Facility for manual operation shall also be available in case of emergency.

Indicators : Analogue load indicators (i.e. current or pressure indicators) and speed indicators.

Power Supply : 230 V AC, 50 Hz

3.4 DRIVES FOR MAIN CANE CARRIER AND ELEVATING RAKE TYPE CARRIER

Existing Dyno drives to be replaced with AC VFD Drive. It shall be coupled to existing gearing system. The manual operation shall also be available at head shaft of both units.

For Main Cane Carrier

Quantity	:	1 No.
Application	:	Cane Conveyor
Mounting	:	Horizontal foot mounting
Drive	:	50 KW / 1440 RPM ACVFD drive

For Rake Elevator

Quantity	:	1 No.
Application	:	Cane Conveyor
Mounting	:	Horizontal foot mounting
Drive	:	30 KW / 1440 RPM ACVFD drive

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3.5 VFD FOR TRPF DRIVES

Quantity	:	4 Nos.
All Motors (Existing)	:	75 HP Slip Ring for 1 st Mill TRPF
	:	75 HP TEFC for 2 nd to 4 th Mill TRPF
		(For Existing Motors)
Present reduction	:	fixed speed motors with belt drives to reduction gears
		Closed reduction gears ratio – 1:63.8
		Followed by set of open spur gears on 30:110 teeth
Operating speed range	:	60 to 110%
Phase	:	Three phase
Frequency	:	50 Hz
Combined Variation	:	± 5%

To operate these motor on VFD. Necessary VFD panels to be provided for these motors.

Type of Duty	:	Continuous equivalent of AC Drive
Variable Speed Range	:	30-110% of base speed
Constant Torque Operation	:	30-100% of base speed
Maximum Speed	:	110 % of base speed

3.6 PERFORMANCE PARAMETERS

Input Parameters

Fiber % Cane	:	13 - 14%
Pol % Cane	:	13-14%
MJ Purity	:	81-82

Milling Plant

Crush Rate	:	135 TCH
PI	:	± 85

**Special Note: USIPL's performance liability remains to the performance of supplied equipment.*

3.7 BATTERY LIMIT

Cane	:	Below hydraulic grab
Semi Prepared cane of about 65 PI	:	Inlet of Fibrizor
Prepared Cane	:	At Discharge of Fibrizor
Electrical	:	Power at incomer of VFD

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4 PART-2: PROCESS (FROM JUICE MEASUREMENT TO SUGAR BAGGING)

TECHNICAL SPECIFICATIONS

4.1 SCREENED JUICE PUMPS (Existing to be used)

Existing screened juice tank in mill house shall be retained. Existing screened juice pumps to be dismantled and replaced with existing 2 Nos weighed juice pumps for pumping juice direct to VLJH through mass flow meter, Condensate heater and correction juice heater.

Quantity	:	2 Nos.
Type	:	Centrifugal
Capacity	:	180 m ³ /h
Juice Head	:	60-70 m (To be confirmed by Buyer)

Existing screened / raw juice line shall be modified for installation of flow meter and removal of existing weighing scale and intermediate pumping. If required, impeller to be changed after season, which shall be in Buyer scope.

4.2 JUICE FLOW MEASURING SYSTEM

Juice flow measuring system shall have computerized, Instantaneous and integrated system, to be installed in screened juice pumps delivery line with Jumbo display facilities.

Quantity	:	1 No.
Type	:	Mass Flow meter
Capacity	:	200 t/h
Material	:	Juice

Indication Facilities:-

- Flow rate in TPH.
- Current hour flow rate in tones.
- Last hour flow in tones.
- Existing weighed juice receiving tank and weighing scales to be dismantled.

4.3 JUICE HEATING

Raw Juice Heating

- Shifting 1 No. VLJH of 120 m² heating surface to be shifted to operate in parallel as **condensate heater** along with existing 1 No. raw juice heater of 120m² HSA.

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Double beat valves : CI body SS internal and neoprene Rubber
200 NB

Temperature Gauge : for Inlet and outlet juice temp. indication

Cover opening : common mechanism

Condensate : To receiver with equalizing connection and
flow to common condensate tank.

- Arrangement for air release and draining to be provided in each compartment with leak proof handle cocks
- A tray at bottom to drain juice and divert to raw juice /mud tank
- Platform at bottom around covers for opening & fitting
- Tubular heaters shall be complete with staging, juice inlet/outlet pipes & double beat valves of required sizes and vapor inlet connection & valve of required size as above. Vacuum equalizing connection to be provided from respective last bodies of evaporator's where ever required. Condensate extraction arrangement with receivers and pumps, with one pump as standby shall be provided.

4.4 CLEAR JUICE HEATER

Inlet Temperature : 95-96 deg. C

Outlet temperature : 108-110 deg. C

1 No. DCH to be installed to operate as **Clear juice heater** with vapours 1st connection.

Quantity : 1 No.

Flow rate : 200 m3/h

Type : DCH

Purpose : First Heating of Clear Juice

MOC of DCH : SS304

Heating media : 1st Vapor

Vapour Pipe size : 250 mm, MS

Juice Inlet Pipe Size : 250 mm

Juice Inlet Pipe Size : 200 mm

- DCH shall be complete with staging, juice inlet/outlet pipes & valves for juice of required sizes and vapor inlet connection with valve of required size as above.
- Clear juice line to be modified to connect to DCH and discharge pipe to be taken to New 2200 m2 SK and existing 800m2 SK.
- Vapour Connection for 1st Vapour header to be connected to New DCH.

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4.5 JUICE PUMPS

Quantity	: 2 Nos. (1 No each for Sulphited & Clear Juice)
Type	: Centrifugal Pump
Capacity	: 200 m ³ /h
Head	: 65 m
MOC	: All SS
Juice Temperature	: 100 deg. C
Brix	: 15

- Existing Sulphited juice receiving tank and clear juice receivers shall be used.
- Existing juice pumps shall be retained as stand by.
- Existing motors, piping and valves shall be used.
- Necessary pipe connections to be done as required and required for rearranged juice heaters.

4.6 EVAPORATION SECTION

First Effect

Type	: Semi-Kestner
Heating Surface	: 2200 m ²
Material	: Carbon Steel IS 2062 Gr A/B
Tube Material	: SS 304 - 1.6 mm Thk.

Second Effect

Type	: Robert
Heating Surface	: 2500 m ²
Material	: Carbon Steel IS 2062 Gr A/B
Tube Material	: ERW Tubes Grade SS 304

The specifications of new evaporator vessels shall be as under:-

Particulars	<u>1st Effect (SK-1)</u>	<u>2nd Effect (Robert)</u>
Heating Surface	2200 m ²	2500 m ²
Type	SK	Robert
Body shell and Calandria	MS –16mm	MS –20 mm
Bottom Saucer & top cones	MS –20mm	MS –22 mm
Save all in-built Poly baffle type	SS 304 1.2mm	-
Save all Centrifugal	--	SS409 5mm thick
Tube Plate thickness	MS – 32 mm	MS – 32 mm
Tubes Ligament	12 mm minimum	12 mm minimum
SS Tubes	Annealed SS ERW as per ASTM A249	Annealed SS ERW as per ASTM A249
Size of tubes	45 OD X1.6 mm Thk. L-5000 mm long	45 OD X1.6 mm Thk. L-3000mm long

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Instrumentation	Inlet juice flow meter ----- Mercury filled 150mm Mercury filled 150mm Dial thermometer in dial thermometer in Vapor space & for Vapour space & for Calandria Calandria
Cylindrical Height of bodies above tube plate	7000 mm min 6000 mm min
Inlet vapor / exhaust pipe size with valves	As per design As per design
Size & thickness of vapor outlet Pipes	As per design As per design
Condensate Extraction & flash Recovery	Condensate receiver with flash Vapour to next vessel Condensate receiver with flash Vapour to next vessel
Juice Inlet	From delivery of CJ from SK / Existing VC pump. Through Pump to be provided by Purchaser
Juice Out let	To 2 nd body 2500m2 /To existing SK of 800 M2 with suitable inter valve. To common Header & transfer to 2 parallel Body

- Butter fly Vapour valves of require size shall be provided between 2nd and 3rd vessel, between 3and 4th vessel and between 4th and 5th vessel to regular the flow of vapors. **The control system to be provided by the purchaser, but the butterfly valves for automatic control to be provided by the Vendor.**
- All mountings and facilities for soda/chemical boiling, relief valve in Calandria, facility for open soda boiling, working plat form, sight/light glasses shall be provided as prescribed in standard specifications.
- Staging for new evaporator vessels as detailed above to be designed, supplied and installed to facilitate installation of new vessels. Necessary approach, working platform also to be arranged.
- Exhaust line to be extended to New 2200m2 SK.

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- Existing 800m² SK and 950m² VC outlet shall be connected to 1st Vapour header as well as 2nd Vapour header so that these bodies can operate as stand by for 1st as well as 2nd body.
- Connection shall be provided from 1st Vapour header to new 2500 m² Robert body and also to existing 800m² SK and 950m² VC.
- Juice line shall be modified accordingly.
- Condensate from 2nd body shall be taken to Condensate receiver with equalizing connection and condensate shall flow to common Vapour condensate tank.

4.7 JUICE TRANSFER PUMP

Quantity	: 1No. (1W)
Type	: Centrifugal Pump
Capacity	: 150 m ³ /h
Head	: 12 m
Juice Brix	: About 25
Juice Temperature	: 110 deg. C
MOC	: All SS

**Note:-For standby existing pump to be used.*

4.8 EXHAUST CONDENSATE PUMP

Quantity	: 1No. (1W)
Type	: Centrifugal Pump With mechanical Seal
Capacity	: 75 m ³ /h
Head	: 30 m
MOC	: Body CI and SS Internals

**Note:-For standby existing pump to be used.*

4.9 VAPOUR CONDENSATE TANK

Quantity	: 1 No.
Type	: Cylindrical
MOC	: MS

4.10 VAPOUR CONDENSATE TRANSFER PUMP

Quantity	: 2 Nos. (1W + 1SB)
Type	: Centrifugal
Capacity	: 145 m ³ /h
Head	: 40 m
MOC	: Body CI and SS Internals

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4.11 PAN STORAGE SUPPLY TANK

Existing set of open rectangular syrup storage tanks and AH molasses tanks to be replaced with vertical cylindrical / syrup molasses tanks 1 each of following capacities.

Type	: Vertical cylindrical
Syrup storage Tank – capacity	: 60 M3 - 1 No.
AH molasses Tank capacity	: 40 M3 – 1 No.
Material	: MS
Thickness Bottom and Cylindrical	: 8 mm
Thickness top cover	: 8 mm

4.12 PAN DISCHARGE VALVES

To replace existing manually operated discharge valves in all 7 Nos pans with new discharge valves of following sizes:-

- For 60 T pan - 3 Nos - 600 mm size each
- For 40 T pan - 4 Nos - 500 mm size each
- Each valve to be of heat resistant, rubber seated, pneumatically operated.
- The discharge of A, B & C pans to have independent headers with valves to discharge each massecuite separately in the respective crystallizer.
- The existing open massecuite gutters below the vacuum pans to be discarded.

4.13 MOLASSES CONDITIONERS

Qty.	: 2 Nos. (1 No. each)
Heating Media	: 2nd Body Vapor
Type	: Direct Contact Heater
AH Molasses	: 20 m3/h
BH Molasses	: 10 m3/h
MOC	: SS 409

Auto temp. Control system and Brix indication.

Temperature of conditioned Molasses is 70°C (approx.)

Conditioned molasses shall contain no fine grains

4.14 VACUUM CRYSTALLIZER

Capacity	: 1 No.
Type	: Horizontal Cylindrical with stirrer, center hollow shaft, supporting arms and stirrer ribbon
Application	: For A Massecuite
Capacity	: 45 T

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Material : Carbon Steel IS 2062 Gr A/B

4.15 INJECTION PUMPS

The following pumps need to be replaced:-

- Water Injection pump –
Capacity 2600 m³ /hr. – Head 20 meters. (End suction) – 1 no
- Existing motors shall be used
- Existing piping, valves and fittings shall be used.
- 2 Nos existing pumps of 900 m³/hr. capacity to operate along with new/replaced 2600 m³/hr. capacity pumps in each case. (1 no exclusively for evaporator condenser)

Details

Quantity : 1 No.
Type : Centrifugal Pump
Capacity : 2600 m³/h,
Head : 20 m Head

4.16 SPRAY POND

Spray pond nozzles to rearranged in such a way that 350 Nozzles can be used independently and balance through separate header to increase efficiency of spray system

4.17 SPRAY PUMPS

The following pumps need to be replaced:-

- Spray water pump - capacity 2600 m³ /hr. – Head 12 meters.
(End Suction) – 1 No
- Existing motors shall be used after the confirmation from the supplier. If not found suitable then the same have to be arranged new by the Buyer.
- Existing piping, valves and fittings shall be used.
- All worn out pipes/headers from spray pumps delivery line to be replaced on per kg basis.
- 2 Nos existing pumps of 900 m³/hr. capacity to operate along with new/replaced 2600 m³/hr. capacity pumps in each case. (1 no exclusively for evaporator condenser)

Quantity : 1 No.
Type : Centrifugal Pump
Capacity : 2600 m³/h,

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Head : 12 m Head

4.18 MULTI-JET CONDENSERS WITH AUTOMATION : Existing (Client Scope)

4.19 B/C SUGAR MELTER

Quantity : 1 No.
Type : Cylindrical (Horizontal/Vertical)
Capacity : 10 t/h
Brix : 65
Material : Carbon Steel IS 2062 Gr A/B

- The melter shall be complete with drive, steam, hot water connection.
- The new melter shall be installed at suitable place in centrifugal house. The existing melter shall be shifted suitably for Rori (sugar lumps) and dust melting. Existing B/C melt pumps shall be used to pump RORI/DUST melt to main B/C sugar melter.
- Brix & Temperature control

4.20 B/C MELT PUMPS

Quantity : 2 Nos
Type : Centrifugal
Capacity : 20 m³/h
Head : 30 m

4.21 PROCESS FLOW METERS

The following magnetic process water flow meters (7 Nos.) shall be supplied and installed for pans and centrifugal house:-

- Common hot water flow meter for pans and centrifugal machines main line.
- Flow meter for A Centrifugal machines
- Flow meter for B & C cont. machines and to magma mixers
- Flow meter for B/C sugar melter.
- Flow meter for A Pans & Dry seed.
- Flow meter for B & C pans.
- Flow meter for Rori & dust melter

4.22 COOLING COILS FOR C TWIN VERTICAL CRYSTALLIZER

All cooling and reheating elements in both sections of Twin vertical C-Masseccuite crystallizer of 150 Tones capacity each are to be replaced with C class MS pies using existing valves.

4.23 PUG MILL FOR A- BATCH CENTRIFUGAL MACHINES

Quantity : 1 No.
Type : Horizontal 'U' type

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Capacity : suitable for 2 Batch Centrifugal Machines
Material : Carbon Steel IS 2062 Gr A/B

4.24 A BATCH TYPE CENTRIFUGAL MACHINES

Quantity : 3 Nos.
Application : For A Massecuite curing Type
: Fully automatic flat bottom, plough
Discharge, with air cleaning arrangement.

Capacity : 1250 kg/charge
Number of cycles /hr. : 20
Motor : Suitable for ACVFD
Power : 200 kW
Mounting : Flange Mounting
Electric Supply Voltage : 415+/- 10%
Frequency : 50 +/- 5 % c/s
Power factor : 0.85.
Insulation : Class ' F '
Protection : IP-55, Duty S-1,
Mounting : IMVI Construction, Shaft extension – Y 55
Shaft Extension : Undrilled
Start : VFD start, VPI, Insulated bearing at NDE, TB
on RHS viewed from DE
Motor Make : Siemens /ABB /as per OEM

Drive
Motor Panel AC : VFD multi drive panel
Make : ABB/ Rhythm Automation / Form a plastic
Drive Type : ACS 880-14-600-3 or equivalent
PLC : Siemens/Mitsubishi/ABB
Protection : IP – 23
Mains : MCCB -630 Amp. With semiconductor fuse
Panel : Built in 2 mm & 3 mm sheet (as per IES
Standards) Painted Anti-corrosion with powder
coating
Bus Bar : Aluminum bus 99 % (as per design capacity
Hindalco make or equivalent)
Special Features : HMI, Multifunction meter with import,
Export measurement & control transformer.

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The machine shall be of SS 304 basket and MS high quality casing complete with staging, frame pug mill, double massecuite pneumatic operated gate' valves.

All operations of the automatic recycling type machines including charging and discharging, changing the speed, application of superheated wash water, molasses separation, operation, bottom valve closing etc. shall be automatic. Manually operated brakes shall also be provided with process logical control program shall be provided such that the plough should not be operated at higher basket speed than ploughing speed of 60 RPM. Each machine shall have individual switch fuse isolator of suitable rating, an ammeter, and thyristorised / air break-contactor for operating the machine in manual and fully automatic recycling with a separate selector switch. All operations such as charging, bringing the machine at different speeds, retardation, water wash, pug mill gate opening and closing, syrup separation, cycle over etc. shall be given on control box and indicated by different lamps. All these applications shall also be possible to be applied by push button/rotary switch in manual or automatic position of the selector switch from the control box except bringing the machines at different speeds, retardation and cycle over.

Necessary arrangement in the panel shall be provided for tripping of the machine in case of high temperature and beyond acceptable vibration level on sensing through ETDs of the motors. A discharge chute to be provided for discharging in hopper below machine. Machines shall be equipped with HMI system.

The machines shall be complete with A frame. Existing structure with suitable strengthening shall be used. Double Massecuite feeding pneumatic operated valves shall be supplied along with machines.

4.25 SUPER-HEATED WASH WATER PHE FOR A BATCH CENTRIFUGAL

Quantity : 1 No.
Type : PHE
Capacity : 10 m³/h,
Outlet temperature : 90 deg. C
Outlet temperature : 112 deg. C

4.26 SHWW PUMPS SUITABLE FOR A BATCH CENTRIFUGAL

Quantity : 2 Nos.
Type : Centrifugal

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Capacity : 10 m³/h,
Head : 50 m

4.27 AIR COMPRESSORS

Quantity : 1No.
Type : Screw Type
Capacity : 250 CFM
Pressure : 7 kgf /cm²

4.28 SUGAR ELEVATOR

Quantity : 1 No.
Capacity : 25 t/h
Application : Transfer Sugar from existing hopper to Grader
Duty : Continuous
Type : Belt with SS Bucket
Drive : TEFC Flame proof motor with Helical Gear
Height : To suite building height of 16 m
Speed : 30-50 m /min
Casing : MS

4.29 SUGAR GRADER

Quantity : 1 No.
Capacity : 25 t/h
No. of Decks : 6 Nos.
Feed material : Dry Sugar
Type : Mechanically vibrated totally enclosed design
Chutes : 200 NB SS 409 pipe
Discharge : Sugar Bin
Drive : Flame proof
Separation required : Lumps above top screen & dust below bottom screen
Mesh size to be provided by Buyer.

4.30 SUGAR BINS

Sugar from grader is transferred by gravity in sugar Bins.
Quantity : 4 Nos.
1 or 2 Nos for M
1 No. each for S & L
Capacity : 20 T 4 Nos. or

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20T – 2 Nos. & 40 T 1 No with two outlets
Type : Cylindrical conical bottom
MOC : SS 409

4.31 AUTOMATIC SUGAR WEIGHING & BAG FILLING MACHINES

Quantity : 4 Nos.
Material to be weighed : Sugar
Type : Gravity fed Electro- Pneumatic
net weighed fully automatic
: Weighs automatically the required
quantity of material in weigh pan and
discharges it into the packing bags.
: Pneumatically operated bag holder for
bags
Capacity : 400 bags/ hour of 50 kg each
Accuracy : ± 20 g
Temperature : 30°C to 40°C
Weighing : 50 kg
Air pressure : 4.5 kg/cm²

4.32 SUGAR BAG STITCHING MACHINE

Quantity : 4 Nos.

- Electrically operated Double row stitch bag stitching machines complete with Swing head mounted on tabular column.
- 1 No. Spare head for stitching machine shall be provided.

Capacity / machine : 400 bags/hour of 50 Kg bag

4.33 SUGAR BAG SLAT/ CONVEYORS

Quantity : 4 Nos.
Type : Slat
Slat conveyor size : 350 mm (W) x 270 mm (H) height with
adjustable bag support
Chain : Pin roller bush type
Chain pitch : 1.5" pitch
Foot switch : Double action type
Tubular column : Telescope type adjustment for various
sizes of bags

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4.34 SUGAR BAGS CONVEYOR CUM LOADER TO TROLLEY- (Client Scope)

4.35 DRY SEED ARRANGEMENT

Dry seed from last deck of new sugar grader shall be handled manually for feeding to Dry seed elevator as at being fed at present.

4.36 RORI DUST SUGAR MELTER AND MELT PUMP

- Existing B/C melter presently installed at cont. machines platform to be shifted suitably in dryer house melting Rori & dust sugar.
- A suitable sugar elevator to be installed to drop Rori and dust sugar to melter with a centrifugal pump of 10 m³ /hr capacity to deliver melt to main sugar B/C melter.

4.37 PERFORMANCE PARAMETERS

Input Parameters

Fiber % Cane	:	13 - 14%
Pol % Cane	:	13-14%
MJ Purity	:	81-82
Exhaust Steam Pressure	:	1 Kg/cm ² g
Exhaust steam Temperature	:	125 deg. C

Output Parameters

Crush Rate	:	135 TCH
Mixed Juice % cane	:	110%
Syrup Brix	:	60-65
Spray Pond	:	To handle complete inflow with 350 nozzles with a spray water temperature at 5°±1° higher than wet bulb temperature or temperature drop of inlet tail pipe hot water and spray water shall be 10-12°.
Steam % Cane	:	45% on cane
Grain Size	:	0.6 – 0.8 mm
Steam % Cane	:	≤ 45 % on Cane (including of juice heaters evaporators, vacuum pans, soda boiling, radiation losses, Sulphur furnaces, molasses conditioner, pan washing, cutover lines, pan water boiling etc.)

**Special Note: USIPL's performance liability remains to the performance of supplied equipment.*

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4.38 BATTERY LIMITS

Screened / Raw juice:	Modification of existing juice line to Vapour line juice heaters, condensate heater and correction Raw juice heater
Sulphited juice :	Modification of existing juice line to juice heaters
Clear juice :	Modification of existing juice line to DCH and New SK and existing SK
Evaporator juice :	Connecting new 2 nd body juice line through transfer pump to existing 560m2 and 440 m2 as 3 rd body
Exhaust :	Extension of existing line to 200 m SK
1st Vapour Header :	Connecting 800 m2 SK & 950 m2 VC outlet Vapour Connecting to Pan & Juice heater header & Melter, Pan wash
2nd Vapour Header :	Connecting 800 m2 SK & 950 m2 VC outlet Vapour Connecting to Pan & Juice heater header & Molasses Conditioner and also to two new 250 m2 juice heaters
3rd Vapour Header :	To two new 250 m2 juice heaters
Condensate :	New Exhaust Condensate to be connected to existing Exhaust condensate header Existing condensate to be taken to Vapour condensate tank and then through condensate heaters to existing condensate pipe line to overhead tank
Syrup, AH :	Modification of existing lines at pan floor to new Syrup and AH tanks
AH / BH Molasses :	Line at Pan Station to be modified to Molasses conditioners and to supply tanks
Massequite :	Pipe line from Pan Discharge valves to respective

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Crystallizers

Modification of A massecuite line form A Crystallizer to new pug mill

B/C Melt : Connecting Melt from new B/C Melt pump to existing B/C melt line

Rori / dust melt : To New B/C melter

Sugar : Batch CF machine discharge to existing hopper
: Discharge last multi tray hopper to sugar bag filling Machines
: Sugar bags – At discharge of stitching conveyor

Electricals : New MCC for new equipment and cables to Respective drives

Instrumentation air : From Compressor to new massecuite discharge Valves, Clear juice DCH control valves, Melter control Valves, Molasses conditioner control valves

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4.39 APPENDIX I: USIPL Suggestion only for Boiling House (*Optional*)

➤ **To meet the desired Steam economy**

1. SJ shall be in three stages instead of two stages for better steam economy using existing juice heaters and two nos. new juice heaters as per RFQ.
2. CJ - PHE instead of DCH to avoid dilution.
The above will reduce evaporation of last two 440 m² existing bodies, which is higher.

➤ **To reduce the Project Cost**

1. Instead of lifting roof for two new evaporator bodies, these can be installed outside and will be provided with Aluminium cladding.

➤ **To reduce final Molasses Purity to 30±1**

1. B/CA and A1 or C1 existing continuous CF machine may be bottleneck and may need one no. additional continuous centrifugal machine at 135 TCH.
2. To control final molasses purity, we may have to for C1 or A1 Massequite, we may need additional Pan and Crystallizer as Pan & Crystallizer Capacity may be bottleneck.

➤ **To have more Sugar Storage**

1. Roof for Sugar Elevator can be lifted still higher than 16 m to have higher bin capacity.

Note: These suggestions are optional and are not a part of scope of supply.

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5 PART-3: LIMITED PROCESS MONITORING & AUTOMATION

TECHNICAL SPECIFICATIONS

5.1 BATCH PAN AUTOMATION

Limited process monitoring and automation as per the following scope

- Complete Pan Automation for 3 Nos A pans of 2 Nos- 60 T and 1 no – 40 Tones strike capacity & 2 Nos C pans of 60 T and 40 T strike capacity respectively from start to start. (The control of main vapor valve is excluded presently for cost considerations).
- Water flow control to vacuum pan condensers to maintain targeted vacuum with minimum water consumption.
- Control of flow of vapor from 2nd, 3rd and 4th vessel of evaporator

Scope

Supply and installation/commissioning and Performance

Pans Automation:-

Out of existing 7 nos. vacuum pans 5 nos. pans (3 Nos A pans and 2 Nos C pans) to be automated from start to start except operation of Steam/vapor valve, pan discharge valve with future provisions for including the balance 2 Nos pans and future refinery pans into the existing system.

Advantages

- Higher Rendement.
- Improved sugar quality
- Continuous feeding of syrup/ molasses into the pan, while maintaining the massecuite brix at desired value at each level will ensure consistency of massecuite to eliminate formation of false grain. This will result in better exhaustion of molasses.
- The vapor withdrawal by the pans will be steady & not cause undue stress on evaporator and/or steam generation system
- Continuous feeding will ensure boiling time reduced leading to better capacity utilization.
- Undue water usage in the pan will be practically eliminated resulting in at least 1 to 2% saving in steam consumption.
- Will eliminate the need for operator skills & interferences.

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5.2 CONTROL PHILOSOPHY:

- The batch pan to be configured with Rockwell Automation's or equivalent latest DCS Process Controller type Compact Logix, comprising of processor and I/O Modules, installed in a Panel and PC based Operator Stations. The Operator Stations to enable pan operator to view the process parameters and make set point changes as desired. The PC based Operator Stations to communicate with DCS controller over Ethernet/IP network.
- The batch pan operation to be a combination of continuous regulating control for pan vacuum & massecuite brix as well as a sequence, of boiling the pan from start to finish, The DCS controller will use a combination of Functional Block Diagram (FBD) programming for continuous control loops and Ladder Logic for sequence of operation, to give the most efficient control of the total batch pan boiling cycle.
- The DCS control system to be totally modular and expandable easily. Initially, the Control System will to I/O's suitable for automation of 8 Nos. batch pans.
- Rockwell Automation's or equivalent universal Flex type I/O modules to be used to receive process and position signals from the batch pan to regulate Open/Close commands to control valves. The I/O modules to be compact and designed for mounting in control panels to sit directly on terminal bases. The flex I/O modules to be "Hot Swappable" with RIUP feature (Removal & Insertion Under Power) such that the whole system need not to be shutdown to replace a faulty module.
- All DCS controller & I/O modules to be installed in a free standing Control Panel, completely wired internally to marshalling terminals. The panel to be complete with 24v DC power supply unit for powering field sensors and auxiliary relays for operation of Open/Close control valves.

5.3 TYPICAL SYSTEM CONFIGURATION

- All data in the DCS processor to be sent to 1 No. PC based Operator Station over Ethernet/IP network. The Operator Station to have a 24" LED LCD display display the pan process parameters, status of valves and stage of the pan boiling cycle. Operators to enter desired brix values for different stages of the pan boiling cycle, depending on purity of syrup, at the beginning of the first cycle. These brix values to be stored in the memory of the control system for further pan boiling cycles. In event of change in the purity of the syrup, the operators to be required to change these parameters for further pan boiling cycles.
- Operator station MMI Visualization software type Factory Talk View are latest with inbuilt features with 25 display pages , unlimited Tags and with unlimited viewpoint providing remote monitoring facility subject to Net connectivity

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available at Operator station (PC) (Net connectivity shall be in purchaser(Sitarjanj Sugar) scope if they want to view their operation remotely .

- Based on the purities of syrup & different molasses, the operator to decide on the feed intake into each pan, at each level of massecuite during boiling cycle, to ensure desired final massecuite purity of each cycle.

This information will be stored in the DCS and the desired syrup or molasses to be automatically fed to the pan as level in the pan rises.

5.4 CONTROL SEQUENCING:

- The Control Philosophy for the batch pan operation to start with operator entering the brix values at each of the 6 levels of the pan, initially for first one or two cycles. Once these are established the pan to operate automatically in a sequential manner from cycle to cycle without any interference by the operators.

The operator to then give a “START” command from the monitor screen. The Vacuum build up to be automatic.

- Pan & Crystallizer Cutover valves to operate automatically to take seed into the pan. Operator to then open the vapor valve and pan boiling to then proceed automatically till the end of the pan boiling cycle. The DCS system to maintain different brix of massecuite at different levels automatically, based on the values entered by operator at start of the cycle.
- At the end of pan boiling cycle, operator to close vapor valve and discharge the pan. Pan steaming (washing) will be done automatically and pan to be ready for next boiling cycle. Operator will to again give “START” command from monitor screen to start the next cycle.

5.5 SCOPE OF SUPPLY OF HARDWARE:

- Sensors for massecuite level, brix, vacuum, & temperature to be installed on the pans along with regulating control valves for feed & vacuum control and OPEN/CLOSE type pneumatic valves for cutover & steaming lines.
- A DCS control system with PC based Operator Station to be installed to operate/control all the control valves during the pan boiling cycle.

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- Following operations to be made fully automatic & sequential on real time basis:
 - a) Control of Injection Water flow to condenser
 - b) Operation of Pan Cutover Valves
 - c) Automatic control of feed intake to pan during complete boiling cycle of pan.
 - d) Operation of Vapor Steaming (washing) valve
- Following operations to be done manually as at present:
 - a) Operation of Exhaust & Vapor inlet Valve at start & end of boiling cycle
 - b) Operation of Pan Discharge Valve after Pan is ready for Discharge will be done pneumatically in an inching mode.

5.6 SUPPLY OF PANS FIELD INSTRUMENTS:

- Vacuum Transmitter : 5 Nos.
- Brix sensor with Transmitter : 3 Nos.
Microwave type for A massecuite Pans
- Conductivity based Brix sensor & Transmitter : 2 Nos.
C Massecuite Pans
- Level sensor : 5 Nos.
- Conductivity sensors with Transmitter : 30 Nos.
- Ultrasonic type Level sensors : 5 Nos.
for Syrup, Melt, AL, BH & CL tanks
- Temperature sensor with Tx : 10 Nos.
For Body & Calanderia (2 Nos for each Pan)
- Injection water control valve : Nil
Condenser vendor scope
- Feed Control valves : 5 Nos.
6" (One no. for each pan)
- Feed Control valve for Header : 20 Nos.
4" (four no. for each pan)
- Vapour steaming Control valve : 5 Nos.
5"/6" (One no. for each pan)
- Hot water Control valve : 5 Nos.
3" (One no. for each pan)
- Non-Condensable ON-OFF Control Valve : 5 Nos.
2" (One no. for each pan)
- Cutover Valve ONOFF Cutover Valve : 5 Nos.
8" (One no. for each pan)
- Discharge Valve ON-OFF Butterfly Type : 5 Nos
20"(One no. for each pan – Manual operation)

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- Vacuum Break Valve : 5 Nos
4" (One no. for each pan)

Auto/Man facility for Pan Operations

Quantity : 3 Nos.

1 no. Panel-Enclosure common for 2 pans Comprising of HMI 6" for Display Parameters, Auto/manual Station for Control Valve-4 nos. For regulating valves, Selectors switches- .Push Buttons to operate Pans by Operator in Manual Mode

Air Compressor

Quantity : 1 No.

Type : Oil & Moisture free

Capacity : 200 cfm

Pressure : 7 kg/cm²

AC Control Room for Pans

Quantity : 1 No.

Size : 5 mtrs x 5 mtrs

Proposed Location : In front of Pan No. 1,2 & 3

UPS

Quantity : 1 No.

Type : Online Redundant

Capacity : 6KVA
with 30 Minutes Battery Backup

Cable & Cable Trays and Erection Hardware

Signal & Control Cables Shielded Armored : 1 Lot Standard

Cable Trays 300mm,150 & 50 mm Size : 1 Lot

Erection Hardware like Pipes, Fittings, : 1 Lot

Nipples, Tee, Elbow, Union,

Instruments Fittings, Valves Flanges etc. : 1 Lot

5.7 DCS CONTROL SYSTEM

5.7.1 DCS CONTROLLER:

Comprising of Redundant processors,
Power supply units &

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1 Set Communication modules and Input /Output Modules for I/Os suitable for automation of 11 nos. Batch Pans, housed in a floor mounted control panel, completely wired internally with 24v DC power supply unit.

Size: 2000 (H) x 800 (W) x 600 (D)

5.7.2 OPERATOR STATIONS:

PC based Operator Station, comprising of:

- PC with latest specifications, 2 GB RAM, 500 GB HDD,
- 2 nos.21" Monitor, with Windows 7 operating system
- Operator Interface SCADA software, runtime version 2 nos.

5.7.3 NETWORKS:

Necessary Ethernet network, comprising of:

- 5 port Ethernet Switch 2 nos.
- Ethernet Cable type CAT6 20 mtrs.
- Network Connectors, etc. Lot

5.7.4 FIELD INSTRUMENTS:

- Supply of Field Instruments & Valves as mentioned above Lot
- Interconnecting signal cables, cable trays, etc. Lot

5.7.5 INSTALLATION:

- Laying of cable trays and cables from field instruments to Pan Control Panel.
- Installation of Control Panel, etc.
- DCS hardware should withstand ambient temperatures up to 55°C, 95% RH and Voltage variations from 85v to 265v AC.
- DCS controllers, along with their power supply units, communication cards and mounting chassis will be redundant.
- The PA x DCS system should be totally modular in design and should be easily expanded at a later date without becoming obsolete and eliminates the need to frequently replace the existing system with a new one.
- Supply and installation of control system with field instruments, interconnecting cables, hardware and supervision of commissioning for 5 nos. pans feed control system.

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BUYER	M/s JGN Sugar & Biofuels Pvt. Ltd, Sitarganj	DOC. NO.	USI.CO/PR4/JGN/2022-23/128
PROJECT	Technical Offer for Capacity Optimization at 3240 TCD with Efficiency Improvements in Mill & Boiling House at Existing Sugar Plant	REV. NO:	1.0
		DATE:	1 st April, 2023

5.7.6 SERVICES:

- Design / engineering, development of application LS software for DCS controller & Supervision of commissioning above.
- Provide UPS for 230v AC Power Supply DCS panel, PC, etc.
- Provide Instruments Air line upto each control valve.
- Provide Control Room with A/c, furniture, etc.
- Installation of control valves in pipelines and sensors in the pan.

5.7.7 ESSENTIAL SPARES:

- I/O modules each type : 05 Nos.
- Microwave Brix sensor : 01 Nos.
- Conductivity Brix sensor : 01 Nos.
- Level sensor with transmitter : (01 Nos.) 02 Nos.
- Temperature sensor : 03 Nos.

5.7.8 SCHEDULE OF IMPLEMENTATION:

Complete procurement, delivery, erection, commissioning and testing 20 Weeks max.

5.7.9 THE EXISTING EQUIPMENT TO BE USED:-

Injection Water Control Valve : 5 Nos.
With new condenser (other part scope)

Note:

- Electrical Power Supply 230VAC 50HZ shall be provided by factory
- This does not include the auto control of Steam/Vapour inlet and pan discharge valve but includes the auto control for cut over valve, pan condensers and complete sequential control for the pan automation from start to start.

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6 EXCLUSIONS

- All Civil Work including Factory Building incl. sheeting, sheds (covered/semi covered for fuels, machinery, tools etc.) pump houses, stores, offices, warehouses/go-downs, MCC all Foundations including Machinery Foundations, Grouting including Structure / Machinery Grouting, Red Bricks, Sand, Cement for Boiler, Construction of any internal roads, storm water drains, main drains, fencing and civil work of any nature.
- Any modification, repair or replacement of part of existing equipment, machinery and piping other than offered.
- Main Cane Carrier Gear Box, Gearing etc.
- Main Cane Carrier Cable up to incoming Terminal of VFD panel.
- Rake Elevator Gear Box, Gearing etc.
- Rake Elevator Cable up to incoming Terminal of VFD panel
- TRPF Cable up to incoming Terminal of VFD panel
- Any Item for existing Pumps, motors, Gearboxes and Valves.
- Screen Juice Tank
- Weighed juice receiving tank and weighing scales.
- Weighed Juice Pump -180m³/h 60 m head to work as screened juice pumps.
- Sulphited Juice Tank, Clear Juice Tank, Existing Sulphited Juice Pump, Existing Clear Juice Pump, Suction piping & Valves, Delivery piping & valves, existing piping.
- Control system for Butter fly Vapour valves to regulate Vapour flow.
- Tube Cleaning Chemical.
- Piping, valves & fitting for Pan Supply tanks.
- Motor including Suction/ Delivery piping, Control valves & fitting for new Injection Pump.
- Motor including Suction/ Delivery piping, Control valves & fitting for new Spray Pump.
- Any Valves for Vertical Crystallizers.
- Condensers with Automation for Pan & Evaporator.
- Structure, Molasses Tanks, Pumps, Piping & Fitting etc. for Batch Centrifugal machine.
- Input Power to VFD panel & Motor drive.
- Electrical panels and cabling from panel to drives for new equipment.
- Sugar Bag Belt Conveyors for loading into Trolley.
- Insulation and Cladding of the supply equipment and for existing Equipments.
- Fire-fighting system.
- A/C & Ventilation system.
- All Laboratory equipment & Lab Chemicals.
- Workshop & Work shop machinery.
- Storage and security of the machinery and equipment at plant site.

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- Diesel Generator.
- Power & control cables from motor terminal to MCC.
- Interconnecting cables between MCC & DCS.
- Control Cable between VFD's to DCS
- Optimizing the capacity and efficiency of existing 3 Nos. boilers.
- Necessary statutory / any other clearance, right of way, land clearance, land acquisition, statutory approval for all Electricals including related civil works.
- Security system.
- Boarding & lodging, local conveyance Medical Facilities for all supervisory and commissioning staff and engineers of bought out suppliers/vendors.
- Taxes & duties, Government clearance, work permit and any tax applicable etc.
- Registration charges, local statutory inspection charge (Necessary document will be provided by Supplier) for obtaining statutory approval.
- Third party Inspection.
- Plant operation and maintenance.
- Lab test if any required for testing / checking of material / changes of materials other than above considerations (Like pressure parts & non pressure parts)
- During Erection required water service, chemicals, cleaning
- Pipe, tube dia. & its thickness are required for fixing the flow nozzle and instrumentation items
- Any other item / services, which are not specifically mentioned in our scope of supply and proposal.

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7 MAKES

7.1 MECHANICAL

S. NO.	EQUIPMENT	MAKE
1.	Cane Unloader	Uttam
2.	Fibrizor	Uttam
3.	Evaporator	Uttam
4.	Crystallizer	Uttam
5.	Centrifugal Machines	Uttam / Thyssen Krupp / WIL
6.	Air Compressor	Ingersol Rand / Kirloskar / Atlas Copco / Comtech / Elgi / Chicago Pneumatic
7.	Sugar Grader	IC / Bevcon /RB Technocrat
8.	Centrifugal Pumps	Sintech /PSP / Kirloskar / Gita
9.	Screw Pumps	Roto / Risansi / Equivalent
10.	Magma Pumps	PSP/ Risansi / Gita
11.	Butterfly Valves	Crane / Thorat / Delval / KSB / Ketz
12.	CI Valves	Calsens / Zoloto / Kalpna / Thorat
13.	Planetary Gear Boxes	Premium / Elecon / Magtorq / Bonfiglioli
14.	Helical / Worm Gear Boxes	Premium /Elecon / Santhi Gearbox/
15.	Cut Over & Discharge Valve	Puri/ Thorat/ Marsh/ Equivalent
16.	Motors	Siemens/ ABB/ CGL/ BBL
17.	VFD	Siemens/ ABB/ CGL

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7.2 INSTRUMENTATION

S. No.	NAME OF INSTRUMENTS	MAKES
1.	PLC/DCS	ABB/Rockwell/Siemens/Honeywell
2.	Pressure/Temperature Gauges	Tempson /Thermal/ Wika/GIC/Baumer
3.	Transmitters	ABB/Yokogawa/Emerson/Honeywell/E&H
4.	Conductivity Sensor with Transmitter	ABB/ Alfa/ Forbe Marshall/INS/SIDPL
5.	Brix Sensor with Transmitter	Berthold Hairer / Kassan / IPRO India
6.	Level Sensor with Transmitter	I&S / Siemens/ Omega/E&H/P&F
7.	Mag-Flow/Mass-Flow	ABB/Yokogawa/Emerson/E & H
8.	Temperature Sensor with Tx.	PEPL/ Yokogawa/ABB/ Rosemount/ Wika
9.	Control Valves	Dembla/ I&S/ Pnucon/ R.K. Controls/ Bray
10.	Vacuum Break valve	Dembla/ I&S/ Pnucon
11.	pH Sensor with Transmitter	ABB/ Khrono Marshall/ Yokogawa/ Emerson
12.	Donnelly chute Level Transmitter	Energy Venture/ Max India
13.	Instrument Cable	Cords/Thermo pad/Race/Polycab

ADDITIONAL ITEMS LIST - SITARGANJ			17.05.2023
S. No.	Description	Qty (Nos.)	
I	Additional Scope		Remarks
1	DCH- 200 m3/hr. for SJ with instrumentation	1	
2.1	New motor of 75 kW, 1440 RPM for 1st Mill TRPF	1	
2.2	Additional price of VFD for 75 kW for 1st Mill TRPF instead of 55 kw	1	
2.3	Cable- 40 mtr.	1	
2.4	Coupling for new motor	1	
3	Additional supply of Couplings for TRPF Motors for 2nd , 3rd & 4th Mills	3	
4	Additional requirement of Imbibition water magnetic flow meter, Transmitter and Bypass control valve.	1	
5	Additional requirement of New Screen juice tank - 30 m3	1	
6	Addl. Requirement of Pug mill and Magma mixer with Planetary drive (Existing Pump with motor shall be used)	1 each	
7	Continuous Centrifugal machine- 1500 mm	1	
8	IRIS valve & cable, Transient Heater for Cont. Centrifugal machine	1	
9	Single Entry Condensor Automation- 250 mm Butterfly valve with Positioners and accessories required.	7	
10	Additional requiremnt of Belt required for Sugar Conveying and Trolley Loading	4	
11	Air Ejector- 300 mm with Inlet butterfly valve without control valve	1	
12	MS Rectangular Tank 15 m3 x 2 with partition plates	1	
II	Transportation (For- Project Site basis)		
III	Erection & Commissioning		
1	Erection & Commissioning for Additional Scope	1 lot	

M/S JGN SUGAR & BIOFUELS PVT LTD,
SITARGANJ, UTTARAKHAND

UTTAM
INDIA

Technical offer of Juice Sulphitor 200HLCapacity

REFERENCE: USI.CO/PR4/JGN/2023-2024/20

DATE: 02nd June, 2023

UTTAM SUCROTECH INTERNATIONAL PVT. LTD.			
CLIENT	M/s JGN Sugar & Biofuels Pvt. Ltd, Sitarganj	DOC. NO.	USI.CO/PR4/JGN/2023-2024/20
DOCUMENT	Technical offer of Juice Sulphitor 200HL Capacity	REV. NO:	0.0
		DATE:	02 nd June, 2023

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DOCUMENT	Technical offer of Juice Sulphitor 200HL Capacity	REV. NO:	0.0
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CONTACT DETAILS

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1. SCOPE OF SUPPLY

1.1. SCOPE OF SUPPLY & SERVICES

The Scope of Supply & Services for “**Bare One No Juice Sulphitor 200HL with drive**” shall includes:

- Design and Engineering
- Manufacturing and Procurement
- Quality/ Project Management
- Supply Ex-Works Ghaziabad, Uttar Pradesh, India basis.

Note-But excludes any modification, repair or replacement of part of existing equipment, machinery and piping other than offered.

The list of **Optional items or service** (On client requirement):

- Transportation (FOR –Uttarakhand, Site (Incoterms 2020) (Optional)
- Dismantling, Supervision, Erection & Commissioning (Optional)
- Steel Structural with Railing and Platform (Optional) on per kg basis (FOR –Uttarakhand, Site (Incoterms 2020) (Optional)
- Piping and Fittings (Optional) on per kg basis (FOR –Uttarakhand, Site (Incoterms 2020) (Optional)

Supplies and Services are rendered in conformity with proven engineering principles, practices taking into account the current state of art technology.

UTTAM SUCROTECH INTERNATIONAL PVT. LTD.			
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2. TECHNICAL SPECIFICATION- JUICE SULPHITOR

2.1. JUICE SULPHITOR

Quantity	:	1 No.
Capacity	:	200 HL
Plant Capacity	:	135 TCH
Sulphited Juice % on Cane	:	125 %
Retention Time	:	About 7 minutes
Shell diameter	:	3500 mm
Overflow height	:	2250 mm
Vertical shell height	:	4250 mm
Material of Construction	:	Carbon Steel – IS 2062 Gr A/BR
Body Shell	:	10 mm
Shell Top Cover	:	10 mm
Shell Bottom Cone	:	12 mm
Perforated Plate	:	12 mm
So2 Tower Shell	:	10 mm
So2 Tower Top Cone	:	10 mm
So2 Tower Bottom Cone	:	10 mm
So2 Sparger	:	FRP
So2 Gas Inlet	:	SCH 10S - SS 316

Continuous Juice Sulphitation unit shall be designed:

- Stirrer shall be driven by Gearbox and speed shall be about 16 rpm.
- Fabricated in carbon steel construction
- **Provision for shock liming**

Drive

Motor	:	5.5 kW - TEFC Sq. cage
Speed	:	1440 RPM

Speed Reducer

Gear Box	:	Planetary Gear Box
Final Speed	:	16 RPM
Safety Factor	:	2

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Note: - Client to Ensure & Supply of-

- 1. Required quality, quantity & controlled dried So₂ Gas from burned Sulphur (80 - 100 kg/Hr.) / as per process requirement with Min 1.0 kg/cm² So₂ Gas pressure at the inlet of Juice Sulphitor.**
- 2. Required quality and quantity of milk of lime at the inlet of Lime proportionate Unit.**

2.2. OPTIONAL ITEM LIST

The below-mentioned optional items & services are not the part of the scope of supply, however, if client required, it can be supplied on chargeable basis as per the Price schedule of this offer.

2.2.1 Transportation (Optional)

- Transportation with Insurance of Juice Sulphitor from Ex- Works Ghaziabad (UP) to Project Site, Sitarganj at Uttarakhand basis (Incoterm 2020) shall be Optional.

2.2.2 Steel & Structure (Optional)

- Steel & structure with all railing, platform etc. for supplied equipment shall be optional on per kg basis.

2.2.3 Piping & Fittings (Optional)

- Piping & fittings for supplied equipment shall be optional on per kg basis.

2.2.4 Services – Dismantling, Supervision, Erection and Commissioning (Optional)

- Services of Dismantling, Supervision, Erection & Commissioning shall be optional.

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2.3. TERMINAL POINTS

- Juice Sulphitor inlet and outlet nozzle flange.
- Underside of saddle supports base plates
- Drive Stub Shaft.
- Power Supply at the Supplied motor terminal end.

2.4. EXCLUSIONS

- Any kind of Civil work
- DCS, Automation, Instruments, cable and Indicator for Juice Sulphitor
- Any kind of Electrical Panel, Switches, Starter, Cable & Cable tray etc. except motor for supplied Gearbox.
- Any Valves for the Juice Sulphitor
- Any Pump with motor for Juice Sulphitor
- Insulation, Lagging & Cladding for Juice Sulphitor
- Any type of SO₂ Gas Generation, Drying ,Cooling & Controlling System
- Any type of Modification in existing Sulphur burners, SO₂ piping system, valves etc.
- Any type of automation and control, monitoring for SO₂ Gas.
- Any type of Air Blowers for SO₂ Gas System.
- Any type of Mixed Juice flow stabilization system, juice flow monitoring system.
- Any type of Filtrate juice flow monitoring system.
- Any type of MOL preparation system, MOL monitoring and control system except specified, MOL pumps with VFD etc.
- Air Compressor with piping.

M/S JGN SUGAR & BIOFUELS PVT LTD,
SITARGANJ, UTTRAKHAND

UTTAM
INDIA

Technical offer of Reconditioning of 2 Nos. TRPF Rollers

REFERENCE: USI.CO/PR4/JGN/2023-2024/24

DATE: 07th June, 2023

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CONTACT DETAILS

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1. SCOPE OF SUPPLY

1.1. SCOPE OF SUPPLY & SERVICES

The Scope of Supply of “**Reconditioning of the 2 Nos. TRPF Rollers**” as per the enquiry, emailed on dated 30.05.2023 & reference drawing shall include:

- Dismantling of 2 Nos. old wear out, Top & Bottom TRPF Rollers at Ghaziabad works.
- Design and Engineering
- Old shaft machining at center
- Key way machining of shaft
- 2 Nos. full-length new keys.
- 5 Nos. total supports for Roller shell
 - a) 1st at center partition to be shrunk fitted & welded with shell
 - b) 2nd & 3rd partitions adjacent to center partition to be press fitted on shaft & welded with shell.
 - c) 2 Nos. at both ends will be shrunk fitted & welded with shell.
- Each Roller shell will be manufactured in 2 pieces joined at center.
- Roller shell to be machined with reference to Journals center.
- Top Roller having 14 Nos. tooth rows, Bottom roller having 15 Nos. tooth rows in longitudinal & 16 Nos. tooth per row circumferential for both rollers.
- Each TRPF Roller shell with teeth all over will be Hard faced.
- Painting
- Quality/ Project Management
- Supply Ex-Works Ghaziabad, Uttar Pradesh, India basis.

Important Note:

- 1) Any extra repair job work required / observed other than mentioned above shall be notified for prior approval and quotation.
- 2) To & fro Transportation from Site to Ghaziabad and vice versa of the Rollers shall be in client scope
- 3) 2 Nos. Existing TRPF Rollers with Shafts and Pressure Chute Top & Bottom plates shall be free issue material by client.
- 4) Generated scrap will not be returnable.

Supplies and Services are rendered in conformity with proven engineering principles, practices taking into account the current state of art technology.

UTTAM SUCROTECH INTERNATIONAL PVT. LTD.			
CLIENT	M/s JGN Sugar & Biofuels Pvt. Ltd, Sitarganj	DOC. NO.	USI.CO/PR4/JGN/2023-2024/24
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2. TECHNICAL SPECIFICATION- RECONDITIONING OF TOP & BOTTOM TRPF ROLLERS

2.1. TOOTHED ROLLER PRESSURE FEEDER TOP & BOTTOM ROLLERS

Client Reference Drawing:

TRPF Top Rollers : KSCM/S/7610
TRPF Bottom Rollers : KSCM/S/101006

The reconditioning of the top & bottom rollers:

Quantity : 2 Nos. (1 No Top Roller+1 No Bottom Roller)
Existing Rollers with Shaft : Client Scope (free issue material)
Existing Pressure chute
(Top & Bottom Plates) : Client Scope (free issue material)

The Client will deliver the free Issue material to the following address:-

Address: M/s Uttam Sucrotech International Pvt. Ltd.
C-41/42/43, Sector 21, Meerut Road Industrial Area,
Ghaziabad, Uttar Pradesh 201003, India

The Top & Bottom Rollers Shells are fabricated out with mild steel tested quality material as below detail:

Dimension:

Shell & Blind : 30mm Thick after machining
Shell dia. : 765mm after machining

MOC:

Shell & Blind : MS IS2062 GR 250 BR

The mild steel teeth will be welded with shell and all over will be hard faced.

The Bottom roller tooth will be on center of the roller & Top roller groove will be on center or vice versa.

Important Note:

- 1) Any extra repair job work required / observed other than mentioned above shall be notified for prior approval and quotation.
- 2) To & fro Transportation from Site to Ghaziabad and vice versa of the Rollers shall be in client scope
- 3) 2 Nos. Existing TRPF Rollers with Shafts and Pressure Chute Top & Bottom plates shall be free issue material by client.
- 4) Generated scrap will not be returnable.

2.2. EXCLUSIONS

- Site Dismantling & Erection & Commissioning
- Any type of Modification in existing system.
- Any other item and modification other than specified in this offer.