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THIRUVANANTHAPURAM REGIONAL CO-OPERATIVE MILKPRODUCERS' UNION LTD.

KSHEERA BHAVAN, PATTOM, THIRUVANANTHAPURAM -695 004

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No. 1264

Expression of Interest

The Managing Director, Thiruvananthapuram Regional Co-operative Milk Producers Union Ltd (TRCMPU Ltd) invites Expression of Interest from reputed Manufacturers / Authorized dealers/Fabricators for supply erection and commissioning of 3 Ton Briquette fired Boiler at Pathanamthitta Dairy. Please refer to the website of TRCMPU www.milmatrcmpu.com for further details.

1	Tender Notice No. & Date	689/TRU/PC/2023 Dated 10.06.2023
2	Item of Work	Suply, Erection and Commissioning of Briquete fired boiler at Pathanamthitta Dairy
3	Specification	Attached
4	Estimated Amount	To be provided by supplier
5	Date and Time of Publication of expression of Interest	26-07-2023, 4 PM
6	Date of Submission of EOI	09-08-2023,11 AM
7	Date and time of opening	09-08-2023, 11.30 AM
8	Pre-bid Meeting Date & Place	03-08-2023, 10 AM
9	Place of Opening	TRCMPU Ltd., Ksheera Bhavan, Pattom
		Thiruvananthapuram-695004.

The detailed address of the manufacturer along with place of manufacturing location, facilities available etc. shall be indicated. The details of the previous orders executed, orders now in hand etc. shall be specified. The tentative price of the equipment shall be indicated in the EOI in Indian rupee with taxes.

Submission of EOI does not mean as a bid submission and so no claim or preference shall be entertained in the event of placement of order after inviting bids at a later stage.

The EOI Document is also available on the TRCMPU website www.milmatrcmpu.com The bidder must place their sign and official seal on each page of the EOI document as a sign of acceptance of the matter.

You may submit your responses in sealed envelopes in prescribed format to the undersigned latest by 09.08.2023, 11:00 AM.

Managing Director

TRCMPU, Ksheera Bhavan

Pattom, Thiruvananthapuram 695004

Queries if any may be referred in writing to the Managing Director, TRCMPU, at the above mentioned address or E-mail: trcmpuproj@gmail.com , mdtrcmpu@gmail.com

MANAGING DIRECTOR

TRCMPU

SUPPLIER

(To be filled by supplier)
Annexure 2

Registered name and address of supplier	
GST NO	
Make/Model of equipment	
Estimated Price of Equipment (in INR)	
Details of Previous similar installations (certificates and performance reports to be attached)	

TECHNICAL SPECIFICATIONS

3Ton/ Hour STEAM BOILER & ACCESSORIES

1.0 SCOPE OF SUPPLY

The scope of supply shall include, but not limited to design, fabrication, supply of 3.0 TPH wood/briquette fired boiler complete with 3 pass wet back packaged type consisting of horizontal fire tube, integrated furnace with necessary opening for valves & fittings, manholes & head holes, reversing chamber, smoke chamber with furnace etc , Air pre heater and all mounted on a skid with Powder coated sheet metal panels to cover insulation.

The technical requirements given here under are only indicative and not descriptive and the Supplier shall ensure that the boiler and accessories supplied are complete in all respects for the smooth operation of the plant and should be suitable for the rated output.

2.0 TECHNICAL REQUIREMENTS

- 2.1 The boiler and accessories supplied shall be of standard design incorporating all the latest developments that has taken place in the field. Brief descriptions of the technical specifications are given in Annexure No. 1.
- 2.2 Any further accessories other than those specified but are required for the operation of the system shall be included in the offer to achieve the specified quality and quantity of steam.
- 2.3 The boiler and accessories supplied shall be fitted with the following items and shall ensure that they are in ready-to-use condition with no extra items/accessories to be fitted by the Purchaser.
 - a. Instrumentation and controls including water level controller, valves etc.
 - b. Safety guards and accessories required for safe operations.
 - c. Induced/forced air fans as required.
 - d. Feed water pumps
- 2.4 The boiler and accessories supplied shall be fabricated out of first quality steel sections and sheets as approved by IBR standards and shall be sturdy in nature with proper finish.
- 2.5 The impeller/shaft of rotating parts shall be statically as well as dynamically balanced.
- 2.6 Ladder shall be provided to the top of boiler to have access for the operation of steam stop valve, etc.
- 2.7 Adequate clearance shall be provided between the floor level and boiler bottom for the operation of drain valve required accessories.

STEAM BOILER

Capacity (F&A 100 Deg C)	: 3.0 TPH
Quantity	: 1 Nos
Steam pressure	: 10.5 kg/cm ²
Type of Boiler	: Smoke Tube (3 Pass Wet Back preferred)
Fuel	: Biomass Briquette/Fire wood:
Thermal Efficiency, NCV of fuel oil	: Minimum 84% on NCV
Minimum Sinking time (Minimum Time for which Boiler can provide steam at full load when power shut down)	: 7 min

- Pressure parts consisting of Shell and smoke tube assembly with necessary opening for valves & fittings, man holes & hand holes, etc. as per IBR requirements, smoke chamber with hinged door.

- Boiler construction shall be in accordance with the latest revision of Indian Boilers Regulation 1950, Act 1923 applicable.
 - Boiler design shall be compact and packaged design. The boiler should be of genuine three pass flue path. Flue gases should pass through the furnace (first pass) whereas second and third passes should be formed by nests of smoke tubes. At the end of the furnace the flue gas reverses into second pass tubes.
 - Ash door shall be at front side and ensured that air intake is minimum during firing. Ash settling chamber inside the furnace with access door
 - The fire tubes in the tubes nest should be plain without any restriction inside. These tubes should be easily accessible both from inside as well as outside for inspection and maintenance. These tubes are to be tightly expanded in the tube plate and strength welded.
 - Set of Cast iron Stationary Grates with grate bar supports to ensure higher residence time and complete combustion.
 - Combustion chamber with minimum refractory to increase heat transfer efficiency.
 - The boiler should have a minimum water volume of three times of maximum continuous rating of boiler
 - Thermal efficiency of the boiler shall be demonstrated as per BS-845 part 1 indirect method
 - Pressure Part supporting structure with base frame
 - Insulation to Boiler Shell, Riser and down comers, smoke chamber, etc.
 - Aluminum sheets of not less than 24swg thickness to cover insulation
 - All working parts of the boiler should be accessible for ease of inspection and Maintenance. On the shell, one elliptical man door and on tube plate one mud hole must be provided. Access to the combustion chamber should be through hinged refractory lined access door whereas tube nest should be exposed through hinge mounted front door.
- 3.2. One Air pre Heater as Heat Recovery Unit. One Module consisting of
- Structure for HRU and base frame
 - One Primary air Fan with electric motor and frame
- 3.3 Feed water system: Centrifugal SS Feed water pumps (1 working + 1 stand by)- 2 Nos. electrically driven vertical centrifugal multistage pumps mounted separately with motor capable of using feed water at a temperature of 120 Deg C with all SS internals interconnected pipework between pumps and feed check valves. The feed water pumps will be mounted on a separate skid connected to a base frame itself.
- Feed piping with valves and fittings suitable for APH option
- 3.4 One Multi clone dust collector with RAV as Pollution Control Equipment
- 3.5 One Induced Draught Fan with electric Motor and base frame
- 3.6 One Set of Doors for fuel charging, access and ash removal
- 3.7 Piping work consisting of One set of IBR piping between feed water pumps to boiler
- 3.8 Mountings and fittings consisting of
- Three Stop valves on feed water pump discharge line
 - Three Non return valves on feed water pump discharge line
 - One Main Steam stop valve
 - One Air vent valve
 - Two Single port spring loaded safety valves
 - One Main Shell blow down valve
 - Two Set of gauge glass with protector glass assembly
 - Two Set of Isolating stop valves for level controller
 - One Water level controller drain

- One Isolating valve for steam pressure gauge
- One Isolating valve for Inspector pressure gauge
- One Isolating valve for pressure gauge on feed water line
- Blow down valve for Membrane Panel

3.9 Instruments, Controls and Safeties consisting of

- Steam pressure indicator (gauge) for measuring steam pressure
- Pressure gauge for measuring water pressure in feed water piping
- Steam pressure switch for auto - cut off of Fuel feeding system & Fans
- Magnetic type water level controller with three magnetic switches
- Temperature indicator cum controller for high flue gas temperature interlock
- Vortex type steam flow meter for Steam flow measurement to be provided.
- Steam temperature & Stack temperature transmitters to be provided along with the boiler so as to incorporate the signals of same in the control panel.
- Boiler should be provided with an Automatic Blow down control system which will be TDS based system. Same should have TDS based sensor which will decide the frequency of blow down & in turn reduce the blow down loss.

3.10 Electrical System consisting of

- Power cum Control Panel MS powder coated, free standing, dust proof pre-wired) with main isolating switch, necessary contactors, relay timers, fuses etc. The panel shall conform to the Kerala State Electrical Inspectorate Standards.

3.11 Air Ducting Consisting of

- Air damper at Primary Fan Inlet
- Connecting Air duct between Primary Fan and Boiler
- Connecting Air duct between Primary Fan
- Canvass duct at Primary Fan outlet
- Intermediate air duct for APH option
- EPDM duct for APH intermediate duct

3.12 Flue gas ducting consisting of

- Flue gas damper at ID Fan inlet
- Metallic expansion bellow at inlet and outlet of ID fan

4 Mounting & Fittings

a.	Main steam stop valve	1 No. Piston Type
b.	Safety valve	2 Nos. (with each capable of 50% venting capacity)
c.	Feed check valve	2 Nos.
d.	Auxiliary valve	1 No. Piston Type
e.	Blow down valve with Automatic Blow down Control System	1 No.
f.	Isolating valve for water level controllers	2 Nos. Piston Type
g.	Isolating valve for pressure switches and pressure gauge	2 Nos. Piston Type
h.	Drain valve for water level controller	2 Nos. Piston Type
I.	Sight glass assembly	1 set

5 Instrumentation

a.	Water level controllers	1 Nos.	for low water level alarm
b.	Over-ride controller	1 No.	for lockout under extra low water level alarm
c.	Steam pressure gauge with cock	1 No.	For display of boiler steam pressure

d.	Water level gauge assembly	2 Nos.	For display of water level in the boiler
e.	Switch gears, relays, connectors	1 Set	For individual controls of equipment through control panel
f.	Audio / visual alarm	1 Set	In case of unsafe operation for lockout under extreme conditions

6 Controls and safeties:

a	High steam pressure switch	1 No.	To trip combustion fan
b	Level Controller	2 Nos.	To regulate feed water pump operation and trip blower in case of very low level with audio visual alarm.

7 Safety interlocks to be provided in the Boiler:

Unsafe condition	Instruments	Action
a) Extra low water level in the boiler	Drum Level control	Alarm & blower shut down
(b) Low water level	Drum level control	Control valve open
(c) High water level	Drum level control	Control valve close
(c) Steam pressure high	Pressure switch	Alarm & boiler trip
(d) Steam pressure high	Safety valve	Lift
(e) Stack temp. high	Temp switch	Alarm & boiler trip

- 8 Automatic Combustion manager: Boiler should be provided with the Auto Combustion Manager to continuously give alerts to the operator on operating change required so as to ensure better operating practices followed in boiler house. The mechanism will be consisting of -
- a. PLC based Boiler control panel
 - b. 12 inch HMI display on the PLC based Boiler control panel
 - c. Signals from the instruments provided on boiler such as TDS based ABCO system, Temperature transmitters, limit switch for door, furnace pressure transmitter.

- 9 The Automatic Combustion manager should minimum have controls on following:-

- Door opening /closing
- Draft control
- Feed rate
- Tube cleaning
- Sensor health & cleaning
- Safety related feedback
- Wet/dry fuel firing

10 Fuel

The output and other performance parameters of the boiler specified shall hold good as per the following specification of fuel charged to the boiler.

Ultimate Analysis (% weight basis)			
	Coal (Indian)	Wood	Biomass Briquettes
Carbon	44.6	36.71	41
Hydrogen	3.24	3.42	3.57
Nitrogen	1.01	0.56	0.415
Sulphur	0.55	0.1	0.13
Moisture	9.7	25	16.36
Ash	36.39	4.32	7
Oxygen	4.51	29.89	31.53
Net Calorific Value (NCV) kcal/kg	4300	2950	3356
Gross Calorific Value (GCV) kcal/kg	4500	3275	3635

11 Efficiency:

The boiler shall be designed and constructed to generate steam at efficiency of 84% on Net calorific value basis and with air pre heater. Efficiency shall be demonstrated as per standard BS 845 Part 1 indirect method considering standard operating condition & ambient temperature at 350C.

Other designed considerations:

Ambient temperature: 15 - 450C

Altitude : 600 m above mean sea level

12 Spares: Essential spares should be supplied with the equipment

13 Power Supply

Power supply - 415 V +/- 6 %, 50 Hz +/- 3 %, 3 phase, 4 wire

Control supply - 240 V +/- 6 %, 50 Hz +/- 3 %, Single phase

All motors shall be High energy efficient IE-3 (premium efficiency)

14 LIST OF APPROVED MAKES

Make of items	1st preference	
MS SHEET	SAIL	TISCO /VSP/JINDAL
Structural	SAIL	TISCO/VSP/JINDAL
GI 'B' class Pipe	TATA	
GM Valve/NRV	LEADER	
MS 'C' class Pipe	TATA	
MS 'C' class Pipe	TATA	

15 Makes

1.	Feed Water Pump	Grundfoss, Eq
2.	Motors	Crompton, Siemens, ABB - IE3
3.	Main steam stop valve & Mobrey Isolation valve	Forbes Marshall, BDK, Uniklinger, Eq
4.	Steam & Water Valves	Forbes Marshall, Uniklinger, BDK

5.	Non Return valve	Forbes Marshall ,Eq
6.	Safety valve	Forbes Marshall ,Eq
7.	Blow down valve	Levcon
8.	Level indicator	Teleflo / Tectrol
9.	Level controller	Malhotra
10.	Pressure switches	Danfoss, Indfoss,Eq
11.	Pressure gauges	Forbes Marshall, Eq
12.	Steam flow meter	Forbes Marshall, Eq
13.	Automatic Blowdown Control System	Forbes Marshall, Eq
14.	Electrical Switch Gears	Siemens
15.	Cables	Polycab
16.	MCB	Siemens
17.	Level / Pr. Transmitters	ABB, Eq
18.	Variable Frequency Drive	ABB

Note:

1. The makes of bought out items, which are not specified above but are required for the job, are to be got approved from MRCMPU prior to the supply.
2. The makes indicated are for implications against this order only and should not have any reference or prejudice to other MRCMPU enquiries/order.

16 BATTERY LIMITS

The battery limits of steam, blow down, fuel, refuse, air and flue gas, water and electricals and any exclusions shall be specified by the bidder as an annexure to the bid.

Electrical - All electrical power, control wirings and cable tray to various equipment shall be under the scope of supplier. Our scope is limited, up to providing main electrical connection upto control panel.

Civil works: All civil works will be done by MRCMPU

- 17 **Technical catalog:** Technical Manual of the equipment, comprising of installation, maintenance, spare parts catalogue, wiring diagrams should be supplied.

18 TECHNICAL DATA TO BE PROVIDED IN THE BID

15.01. The bidder should prepare and submit along with bid the detailed general assembly drawing showing overall dimensions of the unit.

15.02. **Spares:** The bidder should name the standard spares and quote for the spares for two years' normal operation

15.03. All the bidders should quote for the items as per the details and specifications given in Annexure 1.

15.04. The supplier should furnish the following details of the boiler in the format given below along with their bid:

(To be filled by supplier)

Annexure 1

TECHNICAL DATASHEET FOR 3000 KG/HR IBR BOILER		
Sr. No.	Description	
A	Technical Data	
1	Duty	
2	Capacity	
3	Type	
4	Fuel Considered	
5	Steam Pressure at generation	
6	Safety Valve set pressure	
7	Steam Quality	
8	Model	
9	Water Quality	
10	Briquette Consumption	
11	Flue gas outlet temperature/Size	
12	Heat Input Kcal/Hr	
13	Heat Output Kcal/Hr	
14	Max Outlet Temp At the Output	
15	Max Operating Temp (Steam)	
16	Steam Operating Temp	
17	Empty Wt Of the boiler (Kg)	
18	Filled Wt Of the boiler (Kg)	
19	Hydraulic Test Pressure	
B		
1	Boiler Package	
2	Max. Continuous rating	
2.1	At 100°C	
2.2	At 30°C	
3	Max. Pressure Rating (kg/cm ² g)	
4	Briquette	
5	G.C.V of Briquette	
6	N.C.V of fuel	
7	Heat transfer area	
7.1	Boiler	
8	Consumption at MCR	
8.1	Power in kW	
8.2	Briquette in Kg/Hr	
14	Boiler Efficiency	
14.1	a) Based on G.C.V	
14.2	b) Based on N.C.V	
15	Water Holding capacity upto normal working, m ³	

16	Steam Space m3	
18	Material of Construction	
18.1	Shell	
18.2	Furnace	
18.3	Tubes	
18.4	Pressure Piping	
19	Shell (Thickness)	
20	Tube (Thickness)	
21	Furnace (Thickness)	
C	Control Panel	
1	Make	
2	Type	
3	PLC Make	
4	Display type	
5	Display Size	
D	Thickness of insulation	
1	Front Wall	
2	Rear Wall	
3	Side wall	
E	Fan	
1	Make and Model No.	
2	Capacity m ³ /hr	
3	Excess Capacity m ³ /hr	
4	Static Pressure	
5	Speed rpm	
6	Power KW	
7	Motor make	
F	Feed Water Pump	
1	Make	
2	Model No.	
3	Capacity m ³ /hr	
4	Total head MLC	
5	Speed rpm	
6	Motor rating KW	
7	Type of coupling	
8	Absorbed Power kW	
9	NPSH required, design capacity, etc.	
G	Flue Gas	
1	SPM Levels (mg/Nm ³)	
2	A.3 Outlet Temperature (°C)	
3	Boiler	
4	Heat Recovery Unit	
H	Flue Gas Duct Size	

1	From Boiler Outlet to first junction(mm x mm)	
2	From First junction to chimney(mm x mm)	
3	Press drop in flue duct (mm WC)	
4	Flue gas flow m ³ /hr (per boiler)	
1	Automatic Blow down control system	
1	Type	
2	Manual bypass(provided)	
J	Steam Flow meter	
1	Type	Vortex
2	Size	
K	Pressure Transmitters	
1	Furnace	
L	Temperature Transmitters	
1	Stack	
2	Steam	
M	Chimney	
1	Diameter (mm)	
2	Height (mm)	
N	Make of Accessories	
1	Safety Valve	
2	Blow-down valve	
3	Main steam valve	
4	I.B.R. approved valves & flanges	
5	Feed Check valve	
6	Water level controller	
10	Level Indicator	
12	Insulation	
14	IBR pipes	
15	Motors	
16	Strainer	
17	Steam Trap	
18	Solenoid Valve	
19	Pressure Reducing Station	
20	Modulating pressure switch	
21	Temp. indicating Gauge	
22	Positioning relay	
23	Pressure Gauges	
24	Pressure Switches	
25	RTD's	
26	Temperature Controller	
27	PLC	
28	Contactors, Relay, Starters	
29	Control Fuses	

30	Power Cable	
31	Control cables	
32	Control valves	
33	Electro pneumatic positioners	
34	Temperature Transmitter	
35	Pressure Transmitter	
36	Steam flow meter	
37	On-Off Valves	
O	VOLTAGE AND POWER CONSUMPTION	
1	Power	
2	Control	
3	Control panel load	
6	Feed Water Pump	
7	Fan	
P	Utilities consumption	
1	Power Connected load	
2	Overall dimensions of the Unit (mm)	
O	Safety feedbacks mechanism for follong indications	
1	Door Position	
2	ID fan damper position	
3	Tube cleaning requirement	
4	Amount of feeding	
5	Bed adjustment requirement	
6	Condensate quantity change	
7	Steam Pressure Low/high	
8	Steam Pressure Low -	
9	Steam demand fluctuations	
10	Back firing	
11	Blow down cycle	