

THE ICHHAMATI

CO-OPERATIVE MILK PRODUCERS' UNION LIMITED

[A Govt. of West Bengal Project]
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Regd. No. 3/IMU (N-24 Pgs.) of 1997

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Memo NO. IMUL/e TENDER /92/25-26 /

Date: 13.02.2026

Scope of Work	Supply Installation and Commissioning of (A) 1 no of NDDB Certified Bulk Milk Cooler each having capacity of 5000liters.(Schedule-I). (B) 1 no of NDDB Certified Bulk Milk Cooler each having capacity of 3000liters. (Schedule-II). (C) 1 no of NDDB Certified Bulk Milk Cooler each having capacity of 2000liters. / (Schedule-III)
Bid Inviting Authority	The Managing Director of The Ichhamati Cooperative Milk Producers' Union Limited
Technical Bid Documents to be furnished by bidder	<ol style="list-style-type: none">The Company must be OEM (Original Equipment Manufacturer) or OEM authorized supplier or Service provider of OEM. For authorized suppliers, valid authorization certificate must be submitted.ISO, BIS Certificate and Industrial safety certificate must be uploaded. The certificates should be valid on the last date of submission of bid and should remain valid during the tenure of the contract period if work is awarded.PAN CARD and GSTIN (GST Registration)Minimum Turnover of Rs 5 Crores in each Financial year 2022-2023, 2023-2024, 2024-25. Audited Balance Sheet of previous three consecutive financial years (2022-2023, 2023-2024, 2024-2025) must be provided. The statement of annual turnover from Chartered Accountant with sign, seal and registration number.Supply of minimum 25 no(s) of BMC in the last 3 years. Work Order and Completion Certificate in support of the same must be submitted/uploaded.COPY OF AFFIDAVIT as per ANNEXURE-I DULY SIGNED & SEALED AND NOTARIZED BY THE BIDDER.The Company which are blacklisted by any organization or by NDDB are not eligible to bid otherwise, bid will not be accepted and EMD may be forfeited. Even an order issued to such a bidder may get cancelled.The technical team of IMUL may inspect the required infrastructure available with the bidder before finalization of the tender.

(Schedule-I)

DETAILED TECHNICAL SPECIFICATIONS AND SCOPE OF SUPPLY **CAPACITY - 5000** **LITRE**

1. General Description

Design, supply, installation, testing and commissioning of Direct Expansion type bulk milk cooling systems including all accessories & items given in the detailed scope of supply, on turnkey basis.

2. Functional Requirement

These systems would be installed in village Dairy Co-operative Society (DCS) / village milk collection centre, which collects milk every day in the morning & evening from milk producers.

The milk collected shall be stored in the bulk milk cooler and cooled from ambient temperature to 4° centigrade.

The stored milk shall be dispatched to dairy plant through insulated road milk tanker once in a day.

3. Design Requirement

3.1 Capacity

The net capacity of the bulk milk cooler shall be as mentioned above and as per the requirement given in the enquiry/tender document.

However, the gross capacity in all the sizes shall be around 10% higher than the rated capacity to avoid accidental spillage of milk due to agitation or any other reason.

3.2 Applicable manufacturing/design code

3.2.1 Bulk Milk Cooler (BMC)

The BMC tank shall meet the requirements of ISO 5708 – 2 II (Latest version) for milk collection cycle of two times in a day with not more than 3.0 hours cooling time from 35 to 4°C for all milking and not more than 1.5 hours for second milking i.e. from 10 to 4°C.

For design of condensing unit for BMC ARI Standard 520-2004 (Air-Conditioning & Refrigeration Institute, Arlington, Virginia) for ambient temperature condition shall be applicable.

The tank shall be of an established & proven Direct Expansion type design, in regular production & use and not a prototype.

Note:

All milking means quantity of milk received in either morning shift or evening shift.

When a Tank for two milkings is either empty or contains 50% of its rated volume of milk at 4°C, and 50% of the rated volume of milk at 35°C is added in one batch, all of the milk shall be cooled to 4°C in not more than the specified cooling time.

When the second milking quantity of milk is added, the total quantity of milk shall be cooled to 4°C within the specified cooling time.

3.2.2 Refrigeration System

The refrigeration system shall be designed to meet performance ratings of positive displacement condensing units specified in ARI Standard 520-2004.

The refrigeration system shall also meet the requirements of milk collection system as per ISO 5708.

3.2.3 Accessories

Accessories like diesel generator set, electric & control cables, control panel, temperature sensor, electrical switchgears, refrigeration control valves & fittings etc. shall be of approved make as detailed in the specifications and shall meet the requirement of the latest relevant Indian Electricity Rules, ISO/BIS Standards.

4. Scope of the Bidder

4.1 Scope

The bidder's scope starts from SS 304 funnel with a SS mesh at inlet of the BMC tank for manual receiving of milk.

Alternatively, milk is received in milk can with SS 304 funnel with SS mesh and then manually poured into a balance tank (200 litres) and pumped to bulk milk cooler.

In some cases, the reception equipment will include a can tipping bar.

The balance tank of capacity 200 litres shall be made up of SS sheet conforming to AISI 304. From BMC, the milk shall be transferred to Road Milk Tanker (RMT) through food grade quality flexible hose of adequate length and milk transfer pump installed either on the RMT or through the pump supplied along with BMC.

Bidders should furnish separate prices for gravity fed system as well as for pumped system.

4.2 Supply

The bulk milk cooler shall be a complete unit with the refrigeration system, agitator(s), lockable inlet & outlet valve with strainer.

Also includes supply of AISI 304 balance tank with SS 304 filter for pumped system, SS piping & milk hose of food grade quality, unions and milk transfer pump of 5000 LPH, SS 304 pipes & fittings, erection materials, pipe supports, floor plates, hinged type pipe clamps.

The hose pipe shall be 10 metres long and end with SS liner and blank nut chained with the hose.

A wall mounted SS hook of adequate size for hanging the milk hose pipe roll shall also be provided.

The scope includes electrical & control panels and interconnecting cables.

Cable conduits shall also be supplied, earth pit pipes with removable cover & earthing as required by local electrical regulation.

The indicative distances between BMC outlet to milk pump inlet – 3 m, BMC to mains power point & DG set – 20 m may be considered for calculating cable, SS piping requirement, supports etc.

However, the exact distances shall be as per site conditions and complete piping & cabling necessary for installation shall be supplied.

4.3 Installation & Commissioning

The total job is on turnkey basis and includes supply, installation, testing, commissioning and training of the field personnel.

Minor civil works, providing & grouting supports are included in the scope.

Giving satisfactory training to the staff of the collection centre and trial runs for the complete unit.

Moreover, supplier has to demonstrate performance of the unit as per operating parameters to the Client / NDDDB.

5. Constructional Features

5.1 Bulk Milk Cooling Tank

5.1.1 Material of Construction

Tank inner, outer, bottom, top openable cover shall be fabricated from Stainless Steel AISI 304 material.

All components, as under, shall be made out of AISI 304 grade stainless steel:

Piping & fittings, Filter, Lockable cover, Agitator shaft & blade, adjustable Ball Feet with provision for 50 mm height adjustment, Dipstick, Outlet & Inlet Valves, Blank flanges etc.

The filter screen shall be fine wire mesh.

All the gaskets shall be of food grade nitrile or neoprene rubber material.

The AISI 304/316 evaporator shall be dimpled pressed plate jacket put as bottom plate of the inner tank.

The bottom evaporation surface in contact with milk as well as outer SS cladding is passivated by standard chemical treatment to impart corrosion resistance.

5.1.2 Shape & Orientation

The preferred shape of the tank shall be horizontal rectangular with an openable top cover.

The shape of the BMC tank shall conform to international sanitary design.

5.1.3 Milk Cooler Tank & Evaporator

The AISI 304 tank for the bulk milk cooler should be horizontal rectangular or horizontal semicircular bottom or vertical circular shape, which imparts smooth distribution of the fat in milk when agitator is set into operation.

The tank shall be so designed that all surfaces in contact with milk are readily accessible either in their position or after dismantling to permit thorough cleaning.

Inner Vessel:

All joints shall be TIG welded, any filler rod used being suitable for the parent metal.

All welds shall be ground smooth and free from crevices, porosity and brittleness.

All milk contact metallic surfaces of the inner vessel and its attachments should have finish not less than 150 grit finish.

Any permanent attachment to the inner vessel shall be welded with fillet radii not less than 6 mm.

All parts of the inner vessel shall drain directly to the outlet.

Internal corners formed round the bottom of the inner vessel and outlet well shall be of not less than 25 mm in radius.

Other internal corners shall be not less than 15 mm in radius.

The evaporator shall be laser welded dimpled jacketed.

In case of rectangular type bulk milk cooler, the evaporator is fixed as the bottom plate of the inner tank.

Whereas in semicircular bottom tank the jacket shall be at least up to 1/3 height of the tank.

In case of double compressor, total evaporator area shall be divided and separated into two sections.

Each section shall have separate suction & discharge connecting to each compressor.

The evaporator surface in contact with the milk should be passivated by standard treatment to impart corrosion resistance.

5.1.4 Tank Fittings & Accessories

The tank shall be provided with stainless steel inlet with special “no-foam” design, outlet 38/51 mm butterfly valve & blank union with locking arrangement, inspection window/manhole with locking arrangement, agitator and top cover with locking arrangement.

At the bottom of the outlet cup on the outer surface, a temperature sensor shall be permanently fixed.

It shall sense the temperature of the surface at the outlet and transmit the signal to the digital indicator.

The digital type temperature indicator shall be provided in the control panel with back up battery.

The tank shall be provided with SS calibrated dipstick to measure the volume of milk inside the tank. The dipstick shall be graduated from 10% or less to not less than 100% of the rated volume. Each division on dipstick shall represent a volume not greater than 0.5% of the rated volume. The calibration chart of dipstick having adequately bold letters shall be laminated/framed and shall be supplied with BMC.

The tank shall be equipped with agitator(s) capable of producing a uniform distribution of fat in the milk.

All SS fittings shall be of SMS standard.

The BMC shall be provided with 1 (one) AISI-304 filter with SS fine wire mesh suitable to filter extraneous matter such as dust particles, hay, flies, cow dung pieces/particles etc.

The filter shall be designed and installed in such a way that it can frequently and easily be cleaned.

Top cover lifting handle shall be an in-built feature of the unit.

The tank shall be provided with AISI 304 adjustable ball feet tamper proof type having provision of 50 mm height adjustment.

Provision of a bolt for earthing connection may be provided on one of the legs.

Number of ball feet shall be minimum 4 for small capacity tank and 6 for bigger tank.

5.1.5 Balance Tank, Capacity 200 Litres

The balance tank of 200 litre capacity shall be of sanitary design, fabricated from SS 304 sheet of 1.6 mm thick for shell & 2 mm bottom.

Outlet SS cup and sufficient slope shall be provided at bottom of tank for complete draining of milk.

The dimension of tank and fittings shall be suitable to meet milk collection operations at centre.

1 no. SS removable cover (1.0 mm thick) with handle shall be provided.

SS filter made from 1.6 mm SS plate with 2 mm dia holes (Removable type) to be provided for placement in the balance tank to remove coarse suspended impurities from milk.

Four number ball feet shall be provided for height adjustment of 50 mm. All fabricated parts shall be polished neat to 150 grit finish.

5.1.6 Stainless Steel Sanitary Milk Pump

5 KLPH, 10 MWC capacity milk pump shall be supplied for pumping milk from balance tank to BMC and BMC to road milk tanker.

Pump impeller & casing shall be made out of SS AISI 304/316 material.

All milk contact surfaces shall be finished to minimum 150 grits.

The pump should be of sanitary design.

Inlet & outlet of the pump shall have ends with SMS union.

The pump shall be provided with approved make motor having 'E'/'F' class insulation and IP 55 protection.

The flanged end motor shall have stainless steel shaft having hygienic mechanical sealing arrangement to prevent leakage from pump casing to rotor side of the motor.

Pump shall have SS shroud with air ventilation grill for circulating cooling air. The pump shall have SS adjustable ball feet.

5.1.7 Insulation

The insulation of the tank shall be done by injection, in situ, of high density (minimum 40 kg/m³, Chlorofluorocarbon free and environmental friendly) polyurethane foam without having any imperfection and hygroscopicity.

The efficiency of insulation should be such that at max 50°C ambient temperature the rate of rise of the mean temperature of the milk shall not exceed by 1°C in four hours, when the rated milk volume initially at about 4°C is allowed to stand undisturbed as per the requirement of ISO 5708 – 2 II when the refrigeration unit is not working.

5.1.8 Cleaning In Place (CIP)

For top openable configuration, facilities for manual cleaning shall be provided with suitable brush for BMC tank as well as brush for internal cleaning of SS pipes.

4 nos. of SS hooks shall be provided to keep these brushes, loose pipes etc.

5.1.9 Welding & Finishing

Inner, outer, intermediate dimpled jacket and nozzle connections shall be welded with TIG process only. The inner shell and all other product contact surface shall be polished up to minimum 150 grit finish. The outer surface to be polished with 150 grit dull finish or a circle finish.

5.2 Refrigeration System

The refrigeration system shall be designed to comply with ARI Standard 520-2004 and to meet the requirements of milk collection system of ISO 5708, Class 2 II.

The refrigeration system shall be of direct expansion type, with Freon-22 (R-22) or CFC free environmental friendly refrigerant to cool the raw milk from reception temperature to 4°C in the prescribed period mentioned.

The evaporator(s) of the refrigeration system shall form a part of the milk tank body as dimpled jacket in the bottom plate in case of rectangular open tank or at least up to 1/3rd height of the circular/semicircular tank.

It would be better if the system is compatible for the refrigerant R 407 C.

The refrigeration system shall be direct expansion type to perform cooling function in an ambient temperature of 46°C with air-cooled condenser.

5.2.1 Compressor

The refrigeration compressor shall be adequate enough to ensure that milk is cooled to 4°C in the prescribed time limit and suitable to operate at 0°C suction temperature and 60°C condensing temperature (air-cooled condenser) assuming 46°C ambient temperature.

The refrigeration compressor(s) shall be rotary/reciprocating, hermetically sealed type essentially suitable for refrigeration application in hot & humid Indian climatic conditions.

The motor of the compressor should have a thermistor temperature sensor embedded in windings for protection from excessive heating due to overloading or short-circuiting.

Similarly, a protection against off cycle migration of refrigerant to the compressor is necessary in the refrigeration unit, preferably a self-regulating PTC crank case heater.

The compressors selected should be energy efficient and consume least power to meet the cooling load requirements.

The bulk milk cooler up to capacity of 1000 L shall be provided with single compressor; however, for higher capacity units two compressors system shall be preferred.

In the offer bidder shall clearly mention whether the offered system shall work on single phase or three phase mains supply.

However, choice of single phase or three phase will rest on the sole discretion of the buyer.

Client shall approve Make(s) of the compressor.

Bidders can also offer Energy Efficient Hermetically Sealed Scroll Compressors as alternative to rotary/reciprocating compressors.

5.2.2 Condenser

The condenser shall be air cooled finned tube type having sufficient heat transfer area designed for extremely high ambient temperature given above.

The air circulation fan of condenser shall preferably be induced draft type sucking cold air over the compressors and throwing hot air out of the premises/place of installation.

The condensing temperature should not be less than 60°C considering operating ambient temperature of 46°C.

5.2.3 Receiver

For refrigeration circuit a suitable size liquid receiver mounted on the skid near compressor to assist system to store refrigerant during pump down cycle as well as in case of maintenance.

5.2.4 Thermostatic Expansion Valve

Suitable size and capacity Thermostatic Expansion Valve should be provided in the refrigeration circuit of the bulk milk cooler. The TX valve should be Maximum Operating Pressure type and of adequate capacity to feed optimum quantity of refrigerant to the milk cooling tank evaporator.

5.2.5 Refrigerant Pipe, Fittings & Controls

All pipes, valves, fittings & controls shall comply with the latest relevant BIS code applicable. Isolation valves at suction & discharge sides of the compressors is provided for compressor isolation during maintenance of the system.

A suction pressure regulating valve (KVL) shall be provided to restrict suction pressure within a reasonable limit for preventing tripping of compressor.

Copper/SS tubing shall be routed in such a way that if any leakage occurred during operation can easily be detected and the defective portion can be repaired/replaced without dismantling the whole system.

All the pipes shall be clamped properly with fixed support.

In case of double compressor system, pipe, fitting & control should be designed in such a way that both the compressors can run independently.

The tubing shall be insulated wherever necessary.

6. Electrical Control Panel

6.1 Control Panel

Four control panels shall be provided, one for the main power supply tapping, second for the refrigeration unit, the third for the milk tank and fourth for lighting, testing equipment and computers etc. Each panel shall be provided with suitable switchgear of required ratings for switching and protection as per the system requirement.

The incoming and outgoing power supply terminals shall be covered and secured with a lead seal to prevent tampering. The door of the panels should be provided with lockable handles.

For 15 KVA 3 Phase Automatic Stabiliser, following major components shall be provided:

1. The incoming grid power (Phase voltage 180 to 280 volts) shall be given through TPN MCB 40 A. Relay system to be provided to ensure that if incoming voltage is either less than 180 volts or more than 280 volts in any phase, stabiliser stops incoming power to stabiliser for its safety.
2. LED type Indicator lamps (R, Y, B) on the individual phases of supply.
3. A bypass switch 40 A for bypassing correcting transformer.
4. Correcting transformer, air cooled type, for each phase, with 6 steps each of 20 volts (phase 180-200-220-240-260-280 V) to be controlled through a relay system or servo controlled.
5. A Change-Over TPN switch 40 A between DG Set and corrected mains power supply.
6. A digital input and output (corrected) voltage/current/frequency indicator with selector switch for all three phases. The indicator shall be so provided as to be visible from a distance of at least 5 metre, and so located as to require no special effort to see the readings.
7. TPN MCB 40 A for correcting transformer ON/OFF.
8. TPN MCB 40 A for supplying power to Refrigeration Panel.
9. TPN MCB 32 A for supplying power to lighting DB.

10. TPN MCB 16 A for supplying power to starter of milk pump. Parallely 20 A metallic power plug socket to be provided.
11. If the corrected voltage at the output side goes beyond 180-280 volt range, a control relay/power contactor combination shall cut off output power supply with a loud alarm.
12. Suitable terminal blocks, heavy duty, 4 way for incoming mains (63 A) and 4 way (63 A) for DG Set incoming and terminal blocks (4 way 63 A for refrigeration, 4 way 32 A for lighting DB, 4 way 32 A for milk pump) heavy duty for outputs.
13. Housing enclosure of powder coated MS of appropriate size.
14. Double compression heavy duty Brass cable glands for two incoming armoured cables & PVC cable glands.

For 15 KVA Single Phase Automatic Stabiliser, Major components are to be worked out similar to 10 KVA single phase & 15 KVA three phase respectively for which details are given above.

6.1.2 Refrigeration Control Panel

The refrigeration unit shall be provided with a control panel made out of Stainless Steel suitable for wall mounting near the unit.

The panel shall be provided with motor starters, ON/OFF push buttons & necessary MCBs, control wiring, line voltage controller to guard the compressor against the supply voltage fluctuations. In case more than one compressor is provided in the refrigeration system, the control panel shall be provided with a sequence controller & timer to start one compressor at a time to avoid power supply surge.

The panel shall also have facility to operate refrigeration unit on auto/manual mode.

In the auto mode, as soon as the milk temperature reaches to pre-set value, the compressor should be switched off to avoid freezing of milk.

6.1.3 Milk Tank Control Panel

The milk tank shall be provided with a wall mounted control panel with timer to control the intermittent operation of the agitators & a digital temperature indicator to indicate the milk temperature to one decimal place with least count of 0.1°C on continuous basis.

It shall include suitable switchgears etc as required for switching & protection.

The agitator shall have interlocking arrangement with top cover opening limit switch.

The limit switch shall put off the agitator as soon as the top cover opens up.

Panel shall have provision for pre-setting temperature of BMC Tank (not below the milk temperature of 4 degree centigrade) for starting/stopping refrigeration compressors.

Suitable battery backup is to be provided so that temperature can be indicated when there is no electric supply.

6.1.4 Domestic Power Distribution Board

This distribution board would get single phase power from grid supply directly (it is assumed that when grid power is received in this DB, Main control panel gets power only from DG Set) as well as stabilised power from main control panel and feed power for lighting, electric geyser/solar water heating system, testing equipment/computers. The main components of this DB shall be as follow:

1. Wall mounted distribution board, MCB type
2. 32 DP Change over switch
3. 32 A DP MCB as incoming
4. 3 nos. 10 A MCB SP for lighting
5. 3 nos. 20 A MCB SP for geyser/Solar water heater, AMCU etc.

6.1.5 Cables & Electrical Switchgears

All electrical switchgears and controls required for the complete system shall be of suitable rating. All permanent wiring installed on the tank or associated units shall be carried out using PVC cable in heavy gauge, screwed galvanized steel conduit or plastic conduit, or in mineral-insulated coppersheathed cable.

Flexible electrical connections shall be made only to items normally movable in service.

Such flexibles shall be PVC insulated copper conductor cable not less than 24/0.20 mm in size (see IS 694 (Part 1-1964)) and earth continuity conductors of PVC insulated copper conductor shall be provided.

Cable between DG Set and main panel shall be either steel armored or un-armored in steel conduits.

For all electrical cables, suitable water tight cable glands and lugs should be used at ends. Specification for PVC insulated cables (for voltage up to 1100V): Part 1 with copper conductor (revised).

6.1.6 Earthing

The earthing should be carried out as per IS: 3043 - 1987 (reaffirmed 2001) - "Code of practice for earthing". Pipe type earthing can be used. The chassis, framework and the fixed parts of the metal casing of the tanks, DG Set body, refrigeration plant skid, and all panels shall be provided with two separate earthing terminals.

Neutral of DG Set shall be earthed by a separate independent earth pit.

Neutral of Grid supply shall also be earthed by a separate independent earth pit.

Suitable GI Strip (minimum 25x3 mm) to be used for connecting earth pit with nearest equipment earthing point.

From this point earthing to other points can be looped by suitable GI Strip or PVC insulated copper conductor cable of green colour (size minimum 1 x 4 Sq mm).

In view of above, total four earth pits to be provided for each installation.

The earthing terminals shall be readily accessible and so placed that the earth connections of the equipment are maintained when the cover or any other movable part of equipment is removed.

The earthing terminal shall be identified by means of the "□" marked in a legible and indelible manner on or adjacent to the terminals.

7. Diesel Generator Set (Air/Water Cooled) and Accessories

The DG set shall be either single or three phase as per the system requirement.

Proper justification with calculations should be provided for capacity of the diesel engine and alternator being considered for DG set.

The engine should be rated for continuous operation for:

The refrigeration system, milk tank agitator & milk-loading/unloading pump, hot water geyser (approx. 2 kW), AMCU, lightings, ceiling fan.

Rated maximum output of the DG set should be calculated considering the load mentioned, over and above 10% additional load shall be considered to handle any eventuality and with the ambient design dry bulb (DB) temperature (summer) $\leq 40^{\circ}\text{C}$, and winter 16°C .

Performance Requirement

The working KVA rating at site conditions after accounting for de-rating as per IS: 10001/10002 or equivalent shall be obtained at 0.8 power factor.

The Genset should have the engine, alternator, control panel and silencer as an integral part of the unit.

The major components of the DG set shall comprise:

7.1 Diesel Engine

The diesel engine should be suitable for Power Generation application type air/water cooled and capable of developing required BHP when running at 1500 rpm under NTP conditions and not agricultural engine.

The engine should be built to IS 10000/ISO 3046/BS 5514/649 and rated for continuous running of 24 hours with an overload capacity of 10% for a period not exceeding 1 hour in any 12 hours running. Diesel engine up to 20 kW should have valid BIS license and certificate clearly mentioning use for 'General purpose' application as per IS 10001 norms.

Engine ratings should be for operation at full load condition and should be suitable to take 100% block load.

The engine instrument panel shall be supplied with:

- Ignition key
- Starting push button
- Lubricating oil pressure gauge
- Temperature gauge for cooling water
- Temperature gauge for lubricating oil
- RPM meter (Analog type)
- Battery charging ammeter

7.1.1

The diesel engine should be four stroke, naturally aspirated/turbocharged, multi cylinders & complete with the following:

- a) Flywheel & flywheel housing
- b) Engine air/water cooling system with cooling fan & radiator CAC coolant with recovery bottle c) Air intake, fuel and lubricating oil filters
- d) Oil bath air cleaner
- e) Standard day fuel tank having capacity suitable for minimum 8 hours continuous operation. The tank shall be made with steel sheet of minimum thickness 18 gauge and complete with standard accessories such as drain pipe, fuel level indicator, valves, lockable cover, low-level contact & alarm. This tank to be inside the acoustic enclosure. f) Fuel pump with mechanical governor
- g) Coupling
- h) Exhaust silencer residential type
- i) Holding down bolts, MS combination base frame & AVM pads
- j) Self-starting arrangement with 12V suitable rated heavy-duty Lead Acid accumulator type battery with solid-state battery charging arrangement and cables k) Standard set of tools
- l) First fill of lubricating oil
- m) First fill of coolant
- n) Lubricating oil pressure & temperature gauge
- o) Control panel for engine with engine safety against over speed, high water & cylinder liner temperature, V-belt failure, low lubricating oil pressure, low water level in radiator, auxiliary failure, air cleaner choke indicator
- p) One brand new oil barrel of 200 litre capacity with manually driven gear/barrel pump for diesel transfer along with reinforced PVC hose for supply

7.2 Alternator

The engine should be closely/flexibly coupled to suitable self-excited, self-regulated (through an AVR) alternator developing required KVA at 0.8 power factor, 1/3 phase, 50 cycle/sec, 230/415 volts AC power supply under NTP conditions when running at 1500 RPM.

The alternator should be brushless type, screen protected and fitted with end shield and ball roller bearings.

The alternator shall have 'H' class of insulation.

It shall conform to IS 13364 (Part 1) 1992 up to 20 KVA or IS 13364 (Part II) 1992 above 20 KVA or IS 4722 of 1992.

7.3 Control Panel

The diesel generating set should be supplied with suitable floor/wall mounting type control panel duly pre-wired with the following instruments:

- One suitable scaled and rating kWh meter with accessories
- One ammeter with selector switch
- One voltmeter with selector switch • One no. frequency meter
- One no. hour meter (time totalizer)
- One set of epoxy resin casted CTs of suitable ratings
- One suitable capacity MCCB with overload and short circuit protection to disconnect power supply in case load of generating set increases beyond permitted limits. The rupturing capacity of the MCCB should not be less than 35 KA.
- One set of TPN bus bars insulated with heat shrinkable PVC sleeves (maximum permissible current density shall be 0.8 amps/mm²)
- One set of indicating lamps and control fuses

The control panel should conform to the Indian Electricity Rules.

7.4 Frame

The diesel engine and alternator should be mounted on specially designed combination base plate and MS structure of extremely rigid fabrication.

The base plate should be suitable for mounting the set on AVM pads over the foundation.

7.5 Acoustic Enclosure

DG set should carry a valid approval certificate issued as per CPCB norms complying with the provision of the Environment (Protection) Second Amendment Rules 2002, vide notification no G.S.R. 371 (E), dated 17th May 2002 & amended by GSR 448 (E) dt. 12/07/2004.

The Diesel Generator sets shall have a standard acoustic enclosure of 25 dB (A) insertion loss. The exhaust pipe with exhaust muffler with insertion loss of minimum 25 dB (A) is connected to the exhaust manifold preferably with flexible bellows.

7.5.1 General Requirement

The enclosure could be tailor made suitable for both indoor and outdoor installation as per the requirement and depending upon the capacity of D.G. Set.

The enclosure should be aesthetically designed to perform for optimum noise attenuation and in no way derate the performance of the DG set in extreme summer conditions.

Acoustic Enclosure should be environment friendly and protected against rodents etc. The enclosure should have:

- Adequate ventilation for genset cooling air requirement
- Absorbent/insulating material used is fire radiant
- Suitable thermal lagging to avoid localized heating of adjoining part of exhaust
- Appropriately located control panel
- Easy access side doors to service points on gensets
- Doors fitted with high quality gaskets to avoid leakage of sound
- Provision for engine air filters to suck the fresh inlet air for engine directly from atmosphere
- Sufficient space inside to fit different accessories like batteries etc & the maintenance can be done inside with easy movement of working person on DG set
- Enough space for control panel and fuel tank inside enclosure

For proper ventilation and to maintain the temperature inside the enclosure forced ventilated air circulation system using axial flow fan(s) to meet total engine requirements & air changes should be provided. (Air volume required for ventilation is to be based on combustion air, cooling air & alternator cooling air as per specifications given by engine and alternator manufacturer.) Temperature of enclosure should not exceed beyond 50°C of ambient temperature.

7.5.2 Constructional Features of Acoustic Enclosure

The enclosure shall be fabricated out of CRCA sheets of minimum 1.6 mm thickness and shall be reinforced adequately to ensure structural stability.

The enclosure shall be powder coated after seven tank pretreatment process.

The inside of the enclosure shall be lined with suitable fire retardant acoustic material to achieve the specified noise reduction level.

The enclosure shall be provided with suitable number of doors for access to engine, alternator and control panel for maintenance and servicing.

All doors shall be fitted with neoprene gaskets to prevent sound leakage.

The enclosure shall have provisions for lifting hooks/eye bolts for ease of handling and transportation.

The exhaust piping inside the enclosure shall be suitably insulated with glass wool and aluminum cladding to prevent excessive heating and ensure safety.

8. Water for Cleaning at Milk Collection Centre

Hot water facility shall be provided at milk collection centre for cleaning of BMC tank, milk cans and other equipment.

8.1 Solar Water Heating System (200 LPD)

The solar water heating system shall conform to IS 12933.

The collector shall have 4 mm thick toughened glass with minimum transmissivity of 82%.

The absorber plate shall be of copper with selective coating.

The storage tank shall be of SS 304 with minimum thickness of 1.2 mm.

The tank shall be insulated with minimum 40 mm thick PUF insulation.

The system shall be complete with electric back up heater of 2 kW capacity.

GI Class-B pipes shall be used for water connections.

Hot water pipe shall be insulated with minimum 50 mm thick rock wool insulation.

8.2 LPG Instant Gas Water Heater

As an alternative to solar water heater, LPG operated instant gas water heater of 6 or 10 LPM capacity may be provided.

The heater shall have automatic ignition, over temperature protection and oxygen depletion sensor.

8.3 Electric Water Heater

As another alternative, electric storage type water heater (minimum 50 litres capacity) may be provided along with 200 litres SS 304 hot water storage tank.

9. After Sales Service

The supplier shall have a service centre in the specified district or nearby district with adequate trained service personnel and infrastructure.

In case of breakdown, service engineer shall attend the site within 3 hours of receiving the complaint.

Regular preventive maintenance service visit shall be carried out once in every 8 weeks during warranty

period. The bidder shall also quote separately for comprehensive service contract for a period of 3 years after completion of warranty period.

10. Inspection

Inspection of BMC tank and refrigeration unit shall be carried out during fabrication stage and before dispatch. The bidder shall submit Quality Assurance Plan (QAP) and Quality Inspection Plan (QIP) for approval. Dye penetration test shall be conducted for welded joints.

Hydraulic test / Water tightness test shall be conducted before dispatch.

All necessary test certificates and inspection reports shall be furnished to the purchaser.

APPENDIX

LIST OF APPROVED MAKES OF BOUGHT OUT ITEMS

S.N.	ITEM DESCRIPTION	APPROVED MAKES
1.0	SS PUMPS	APV / ALFA LAVAL (LKM) / TETRA PACK / L&T / IDMC
2.0	SS VALVES & FITTINGS	IDMC / ALFA LAVAL (LKM)
3.0	REFRIGERATION CONTROLS	DANFOSS / ALCO / SANSEN / PARKER / AMERICAN SPECIALTIES
4.0	SS PIPES	BHANDARI FOILS / RATNAMANI / APEX TUBES

HEAVY METALS

S.N.	ITEM DESCRIPTION	APPROVED MAKES
5.0	SS PNEUMATIC VALVES	GEA / ALFA LAVAL (LKM) / KEYSTONE / IDMC
6.0	MOTORS	SIEMENS / ABB / KIRLOSKAR / BHARATH BIJLEE / SHARP / LUBI
7.0	CABLES - ARMOURED	FINOLEX / UNIVERSAL / CCI / NICCO / FORT GLOSTER / RR CABLE / HILIGHT / GREEN ELE / POLY CAB
8.0	Starters	L & T
9.0	Contactors	Telemachania / Siemens / L & T / Sprecher + Schuh
10.0	PUSH BUTTONS	L&T / SIEMENS / ABB / SCHNEIDER
11.0	Relays	SEGC / Siemens
12.0	INDICATING LAMPS	L&T / SIEMENS / SCHNEIDER / TECHNIC / VAISHANAV / PRECITECH
13.0	Current Transformers	Kappa
14.0	PRESSURE SWITCH	DANFOSS / ALCO / PARKER / HANSEN
15.0	DIGITAL INDICATOR	HONEYWELL / RAXIX / MASIBUS / PROTOCOL / VIBHUTI
16.0	D G SET	CUMMINS / KIRLOSKAR / MAHINDRA / EICHER / GREAVES / ASHOK LEYLAND
17.0	Alternator	Stamford / Leroy Somer
18.0	BATTERY FOR THE DG SET	EXIDE / STANDARD-FURUKUWA / PRESTOLITE / AMCO-YUASA / AMARON
19.0	STABILISER	SUVIK / MICROTECH / SEN & PANDIT / PACE / POWER ENGINEERS / ASABA / GURU NANAK
20.0	SOLAR HOT WATER SYSTEM	TATA BP SOLAR / JAIN IRRIGATION / RACOLD / SALORE / SUDARSHAN SAUR / STEEL HACKS / DGS&D - GOI APPROVED SUPPLIERS
21.0	Hot Water Electric Geyser	SPEARHOT / RACOLD / USHA / BATLIBOI / BAJAJ
22.0	HDPE TANK - HEAVY DUTY	SINTEX / KAVERI / HITANK

(Schedule-II)

DETAILED TECHNICAL SPECIFICATIONS AND SCOPE OF SUPPLY **CAPACITY - 3000 LITRE**

1. General Description

Design, supply, installation, testing and commissioning of Direct Expansion type bulk milk cooling systems including all accessories & items given in the detailed scope of supply, on turnkey basis.

2. Functional Requirement

These systems would be installed in village Dairy Co-operative Society (DCS) / village milk collection centre, which collects milk every day in the morning & evening from milk producers.

The milk collected shall be stored in the bulk milk cooler and cooled from ambient temperature to 4° centigrade.

The stored milk shall be dispatched to dairy plant through insulated road milk tanker once in a day.

3. Design Requirement

3.1 Capacity

The net capacity of the bulk milk cooler shall be as mentioned above and as per the requirement given in the enquiry/tender document.

However, the gross capacity in all the sizes shall be around 10% higher than the rated capacity to avoid accidental spillage of milk due to agitation or any other reason.

3.2 Applicable manufacturing/design code

3.2.1 Bulk Milk Cooler (BMC)

The BMC tank shall meet the requirements of ISO 5708 – 2 II (Latest version) for milk collection cycle of two times in a day with not more than 3.0 hours cooling time from 35 to 4°C for all milking and not more than 1.5 hours for second milking i.e. from 10 to 4°C.

For design of condensing unit for BMC ARI Standard 520-2004 (Air-Conditioning & Refrigeration Institute, Arlington, Virginia) for ambient temperature condition shall be applicable.

The tank shall be of an established & proven Direct Expansion type design, in regular production & use and not a prototype.

Note:

All milking means quantity of milk received in either morning shift or evening shift.

When a Tank for two milkings is either empty or contains 50% of its rated volume of milk at 4°C, and 50% of the rated volume of milk at 35°C is added in one batch, all of the milk shall be cooled to 4°C in not more than the specified cooling time.

When the second milking quantity of milk is added, the total quantity of milk shall be cooled to 4°C within the specified cooling time.

3.2.2 Refrigeration System

The refrigeration system shall be designed to meet performance ratings of positive displacement condensing units specified in ARI Standard 520-2004.

The refrigeration system shall also meet the requirements of milk collection system as per ISO 5708.

3.2.3 Accessories

Accessories like diesel generator set, electric & control cables, control panel, temperature sensor, electrical switchgears, refrigeration control valves & fittings etc. shall be of approved make as detailed in the specifications and shall meet the requirement of the latest relevant Indian Electricity Rules, ISO/BIS Standards.

4. Scope of the Bidder

4.1 Scope

The bidder's scope starts from SS 304 funnel with a SS mesh at inlet of the BMC tank for manual receiving of milk.

Alternatively, milk is received in milk can with SS 304 funnel with SS mesh and then manually poured into a balance tank (200 litres) and pumped to bulk milk cooler.

In some cases, the reception equipment will include a can tipping bar.

The balance tank of capacity 200 litres shall be made up of SS sheet conforming to AISI 304. From BMC, the milk shall be transferred to Road Milk Tanker (RMT) through food grade quality flexible hose of adequate length and milk transfer pump installed either on the RMT or through the pump supplied along with BMC.

Bidders should furnish separate prices for gravity fed system as well as for pumped system.

4.2 Supply

The bulk milk cooler shall be a complete unit with the refrigeration system, agitator(s), lockable inlet & outlet valve with strainer.

Also includes supply of AISI 304 balance tank with SS 304 filter for pumped system, SS piping & milk hose of food grade quality, unions and milk transfer pump of 5000 LPH, SS 304 pipes & fittings, erection materials, pipe supports, floor plates, hinged type pipe clamps.

The hose pipe shall be 10 metres long and end with SS liner and blank nut chained with the hose.

A wall mounted SS hook of adequate size for hanging the milk hose pipe roll shall also be provided.

The scope includes electrical & control panels and interconnecting cables.

Cable conduits shall also be supplied, earth pit pipes with removable cover & earthing as required by local electrical regulation.

The indicative distances between BMC outlet to milk pump inlet – 3 m, BMC to mains power point & DG set – 20 m may be considered for calculating cable, SS piping requirement, supports etc.

However, the exact distances shall be as per site conditions and complete piping & cabling necessary for installation shall be supplied.

4.3 Installation & Commissioning

The total job is on turnkey basis and includes supply, installation, testing, commissioning and training of the field personnel.

Minor civil works, providing & grouting supports are included in the scope.

Giving satisfactory training to the staff of the collection centre and trial runs for the complete unit.

Moreover, supplier has to demonstrate performance of the unit as per operating parameters to the Client / NDDDB.

5. Constructional Features

5.1 Bulk Milk Cooling Tank

5.1.1 Material of Construction

Tank inner, outer, bottom, top openable cover shall be fabricated from Stainless Steel AISI 304 material.

All components, as under, shall be made out of AISI 304 grade stainless steel:

Piping & fittings, Filter, Lockable cover, Agitator shaft & blade, adjustable Ball Feet with provision for 50 mm height adjustment, Dipstick, Outlet & Inlet Valves, Blank flanges etc.

The filter screen shall be fine wire mesh.

All the gaskets shall be of food grade nitrile or neoprene rubber material.

The AISI 304/316 evaporator shall be dimpled pressed plate jacket put as bottom plate of the inner tank.

The bottom evaporation surface in contact with milk as well as outer SS cladding is passivated by standard chemical treatment to impart corrosion resistance.

5.1.2 Shape & Orientation

The preferred shape of the tank shall be horizontal rectangular with an openable top cover.

The shape of the BMC tank shall conform to international sanitary design.

5.1.3 Milk Cooler Tank & Evaporator

The AISI 304 tank for the bulk milk cooler should be horizontal rectangular or horizontal semicircular bottom or vertical circular shape, which imparts smooth distribution of the fat in milk when agitator is set into operation.

The tank shall be so designed that all surfaces in contact with milk are readily accessible either in their position or after dismantling to permit thorough cleaning.

Inner Vessel:

All joints shall be TIG welded, any filler rod used being suitable for the parent metal.

All welds shall be ground smooth and free from crevices, porosity and brittleness.

All milk contact metallic surfaces of the inner vessel and its attachments should have finish not less than 150 grit finish.

Any permanent attachment to the inner vessel shall be welded with fillet radii not less than 6 mm.

All parts of the inner vessel shall drain directly to the outlet.

Internal corners formed round the bottom of the inner vessel and outlet well shall be of not less than 25 mm in radius.

Other internal corners shall be not less than 15 mm in radius.

The evaporator shall be laser welded dimpled jacketed.

In case of rectangular type bulk milk cooler, the evaporator is fixed as the bottom plate of the inner tank.

Whereas in semicircular bottom tank the jacket shall be at least up to 1/3 height of the tank.

In case of double compressor, total evaporator area shall be divided and separated into two sections.

Each section shall have separate suction & discharge connecting to each compressor.

The evaporator surface in contact with the milk should be passivated by standard treatment to impart corrosion resistance.

5.1.4 Tank Fittings & Accessories

The tank shall be provided with stainless steel inlet with special “no-foam” design, outlet 38/51 mm butterfly valve & blank union with locking arrangement, inspection window/manhole with locking arrangement, agitator and top cover with locking arrangement.

At the bottom of the outlet cup on the outer surface, a temperature sensor shall be permanently fixed.

It shall sense the temperature of the surface at the outlet and transmit the signal to the digital indicator.

The digital type temperature indicator shall be provided in the control panel with back up battery.

The tank shall be provided with SS calibrated dipstick to measure the volume of milk inside the tank.

The dipstick shall be graduated from 10% or less to not less than 100% of the rated volume.

Each division on dipstick shall represent a volume not greater than 0.5% of the rated volume.

The calibration chart of dipstick having adequately bold letters shall be laminated/framed and shall be supplied with BMC.

The tank shall be equipped with agitator(s) capable of producing a uniform distribution of fat in the milk.

All SS fittings shall be of SMS standard.

The BMC shall be provided with 1 (one) AISI-304 filter with SS fine wire mesh suitable to filter extraneous matter such as dust particles, hay, flies, cow dung pieces/particles etc.

The filter shall be designed and installed in such a way that it can frequently and easily be cleaned.

Top cover lifting handle shall be an in-built feature of the unit.

The tank shall be provided with AISI 304 adjustable ball feet tamper proof type having provision of 50 mm height adjustment.

Provision of a bolt for earthing connection may be provided on one of the legs.
Number of ball feet shall be minimum 4 for small capacity tank and 6 for bigger tank.

5.1.5 Balance Tank, Capacity 200 Litres

The balance tank of 200 litre capacity shall be of sanitary design, fabricated from SS 304 sheet of 1.6 mm thick for shell & 2 mm bottom.

Outlet SS cup and sufficient slope shall be provided at bottom of tank for complete draining of milk.

The dimension of tank and fittings shall be suitable to meet milk collection operations at centre.

1 no. SS removable cover (1.0 mm thick) with handle shall be provided.

SS filter made from 1.6 mm SS plate with 2 mm dia holes (Removable type) to be provided for placement in the balance tank to remove coarse suspended impurities from milk.

Four number ball feet shall be provided for height adjustment of 50 mm. All fabricated parts shall be polished neat to 150 grit finish.

5.1.6 Stainless Steel Sanitary Milk Pump

5 KLPH, 10 MWC capacity milk pump shall be supplied for pumping milk from balance tank to BMC and BMC to road milk tanker.

Pump impeller & casing shall be made out of SS AISI 304/316 material.

All milk contact surfaces shall be finished to minimum 150 grits.

The pump should be of sanitary design.

Inlet & outlet of the pump shall have ends with SMS union.

The pump shall be provided with approved make motor having 'E'/'F' class insulation and IP 55 protection.

The flanged end motor shall have stainless steel shaft having hygienic mechanical sealing arrangement to prevent leakage from pump casing to rotor side of the motor.

Pump shall have SS shroud with air ventilation grill for circulating cooling air. The pump shall have SS adjustable ball feet.

5.1.7 Insulation

The insulation of the tank shall be done by injection, in situ, of high density (minimum 40 kg/m³, Chlorofluorocarbon free and environmental friendly) polyurethane foam without having any imperfection and hygroscopicity.

The efficiency of insulation should be such that at max 50°C ambient temperature the rate of rise of the mean temperature of the milk shall not exceed by 1°C in four hours, when the rated milk volume initially at about 4°C is allowed to stand undisturbed as per the requirement of ISO 5708 – 2 II when the refrigeration unit is not working.

5.1.8 Cleaning In Place (CIP)

For top openable configuration, facilities for manual cleaning shall be provided with suitable brush for BMC tank as well as brush for internal cleaning of SS pipes.

4 nos. of SS hooks shall be provided to keep these brushes, loose pipes etc.

5.1.9 Welding & Finishing

Inner, outer, intermediate dimpled jacket and nozzle connections shall be welded with TIG process only. The inner shell and all other product contact surface shall be polished up to minimum 150 grit finish. The outer surface to be polished with 150 grit dull finish or a circle finish.

5.2 Refrigeration System

The refrigeration system shall be designed to comply with ARI Standard 520-2004 and to meet the requirements of milk collection system of ISO 5708, Class 2 II.

The refrigeration system shall be of direct expansion type, with Freon-22 (R-22) or CFC free environmental friendly refrigerant to cool the raw milk from reception temperature to 4°C in the prescribed period mentioned.

The evaporator(s) of the refrigeration system shall form a part of the milk tank body as dimpled jacket in the bottom plate in case of rectangular open tank or at least up to 1/3rd height of the circular/semicircular tank.

It would be better if the system is compatible for the refrigerant R 407 C.

The refrigeration system shall be direct expansion type to perform cooling function in an ambient temperature of 46°C with air-cooled condenser.

5.2.1 Compressor

The refrigeration compressor shall be adequate enough to ensure that milk is cooled to 4°C in the prescribed time limit and suitable to operate at 0°C suction temperature and 60°C condensing temperature (air-cooled condenser) assuming 46°C ambient temperature.

The refrigeration compressor(s) shall be rotary/reciprocating, hermetically sealed type essentially suitable for refrigeration application in hot & humid Indian climatic conditions.

The motor of the compressor should have a thermistor temperature sensor embedded in windings for protection from excessive heating due to overloading or short-circuiting.

Similarly, a protection against off cycle migration of refrigerant to the compressor is necessary in the refrigeration unit, preferably a self-regulating PTC crank case heater.

The compressors selected should be energy efficient and consume least power to meet the cooling load requirements.

The bulk milk cooler up to capacity of 1000 L shall be provided with single compressor; however, for higher capacity units two compressors system shall be preferred.

In the offer bidder shall clearly mention whether the offered system shall work on single phase or three phase mains supply.

However, choice of single phase or three phase will rest on the sole discretion of the buyer.

Client shall approve Make(s) of the compressor.

Bidders can also offer Energy Efficient Hermetically Sealed Scroll Compressors as alternative to rotary/reciprocating compressors.

5.2.2 Condenser

The condenser shall be air cooled finned tube type having sufficient heat transfer area designed for extremely high ambient temperature given above.

The air circulation fan of condenser shall preferably be induced draft type sucking cold air over the compressors and throwing hot air out of the premises/place of installation.

The condensing temperature should not be less than 60°C considering operating ambient temperature of 46°C.

5.2.3 Receiver

For refrigeration circuit a suitable size liquid receiver mounted on the skid near compressor to assist system to store refrigerant during pump down cycle as well as in case of maintenance.

5.2.4 Thermostatic Expansion Valve

Suitable size and capacity Thermostatic Expansion Valve should be provided in the refrigeration circuit of the bulk milk cooler. The TX valve should be Maximum Operating Pressure type and of adequate capacity to feed optimum quantity of refrigerant to the milk cooling tank evaporator.

5.2.5 Refrigerant Pipe, Fittings & Controls

All pipes, valves, fittings & controls shall comply with the latest relevant BIS code applicable. Isolation valves at suction & discharge sides of the compressors is provided for compressor isolation during maintenance of the system.

A suction pressure regulating valve (KVL) shall be provided to restrict suction pressure within a reasonable limit for preventing tripping of compressor.

Copper/SS tubing shall be routed in such a way that if any leakage occurred during operation can easily be detected and the defective portion can be repaired/replaced without dismantling the whole system.

All the pipes shall be clamped properly with fixed support.

In case of double compressor system, pipe, fitting & control should be designed in such a way that both the compressors can run independently.

The tubing shall be insulated wherever necessary.

6. Electrical Control Panel

6.1 Control Panel

Four control panels shall be provided, one for the main power supply tapping, second for the refrigeration unit, the third for the milk tank and fourth for lighting, testing equipment and computers etc. Each panel shall be provided with suitable switchgear of required ratings for switching and protection as per the system requirement.

The incoming and outgoing power supply terminals shall be covered and secured with a lead seal to prevent tampering. The door of the panels should be provided with lockable handles.

For 15 KVA 3 Phase Automatic Stabiliser, following major components shall be provided:

15. The incoming grid power (Phase voltage 180 to 280 volts) shall be given through TPN MCB 40 A. Relay system to be provided to ensure that if incoming voltage is either less than 180 volts or more than 280 volts in any phase, stabiliser stops incoming power to stabiliser for its safety.
16. LED type Indicator lamps (R, Y, B) on the individual phases of supply.
17. A bypass switch 40 A for bypassing correcting transformer.
18. Correcting transformer, air cooled type, for each phase, with 6 steps each of 20 volts (phase 180-200-220-240-260-280 V) to be controlled through a relay system or servo controlled.
19. A Change-Over TPN switch 40 A between DG Set and corrected mains power supply.
20. A digital input and output (corrected) voltage/current/frequency indicator with selector switch for all three phases. The indicator shall be so provided as to be visible from a distance of at least 5 metre, and so located as to require no special effort to see the readings.
21. TPN MCB 40 A for correcting transformer ON/OFF.
22. TPN MCB 40 A for supplying power to Refrigeration Panel.
23. TPN MCB 32 A for supplying power to lighting DB.
24. TPN MCB 16 A for supplying power to starter of milk pump. Parallely 20 A metallic power plug socket to be provided.
25. If the corrected voltage at the output side goes beyond 180-280 volt range, a control relay/power contactor combination shall cut off output power supply with a loud alarm.
26. Suitable terminal blocks, heavy duty,
4 way for incoming mains (63 A) and 4 way (63 A) for DG Set incoming and terminal blocks (4 way 63 A for refrigeration, 4 way 32 A for lighting DB, 4 way 32 A for milk pump) heavy duty for outputs.
27. Housing enclosure of powder coated MS of appropriate size.
28. Double compression heavy duty Brass cable glands for two incoming armoured cables & PVC cable glands.

For 15 KVA Single Phase Automatic Stabiliser, Major components are to be worked out similar to 10 KVA single phase & 15 KVA three phase respectively for which details are given above.

6.1.2 Refrigeration Control Panel

The refrigeration unit shall be provided with a control panel made out of Stainless Steel suitable for wall mounting near the unit.

The panel shall be provided with motor starters, ON/OFF push buttons & necessary MCBs, control wiring, line voltage controller to guard the compressor against the supply voltage fluctuations. In case more than one compressor is provided in the refrigeration system, the control panel shall be provided with a sequence controller & timer to start one compressor at a time to avoid power supply surge.

The panel shall also have facility to operate refrigeration unit on auto/manual mode.

In the auto mode, as soon as the milk temperature reaches to pre-set value, the compressor should be switched off to avoid freezing of milk.

6.1.3 Milk Tank Control Panel

The milk tank shall be provided with a wall mounted control panel with timer to control the intermittent operation of the agitators & a digital temperature indicator to indicate the milk temperature to one decimal place with least count of 0.1°C on continuous basis.

It shall include suitable switchgears etc as required for switching & protection.

The agitator shall have interlocking arrangement with top cover opening limit switch.

The limit switch shall put off the agitator as soon as the top cover opens up.

Panel shall have provision for pre-setting temperature of BMC Tank (not below the milk temperature of 4 degree centigrade) for starting/stopping refrigeration compressors.

Suitable battery backup is to be provided so that temperature can be indicated when there is no electric supply.

6.1.4 Domestic Power Distribution Board

This distribution board would get single phase power from grid supply directly (it is assumed that when grid power is received in this DB, Main control panel gets power only from DG Set) as well as stabilised power from main control panel and feed power for lighting, electric geyser/solar water heating system, testing equipment/computers. The main components of this DB shall be as follow:

6. Wall mounted distribution board, MCB type
 7. 32 DP Change over switch
 8. 32 A DP MCB as incoming
 9. 3 nos. 10 A MCB SP for lighting
 10. 3 nos. 20 A MCB SP for geyser/Solar water heater, AMCU etc.
-

6.1.5 Cables & Electrical Switchgears

All electrical switchgears and controls required for the complete system shall be of suitable rating. All permanent wiring installed on the tank or associated units shall be carried out using PVC cable in heavy gauge, screwed galvanized steel conduit or plastic conduit, or in mineral-insulated coppersheathed cable.

Flexible electrical connections shall be made only to items normally movable in service.

Such flexibles shall be PVC insulated copper conductor cable not less than 24/0.20 mm in size (see IS 694 (Part 1-1964)) and earth continuity conductors of PVC insulated copper conductor shall be provided.

Cable between DG Set and main panel shall be either steel armored or un-armored in steel conduits.

For all electrical cables, suitable water tight cable glands and lugs should be used at ends. Specification for PVC insulated cables (for voltage up to 1100V): Part 1 with copper conductor (revised).

6.1.6 Earthing

The earthing should be carried out as per IS: 3043 - 1987 (reaffirmed 2001) - "Code of practice for earthing". Pipe type earthing can be used. The chassis, framework and the fixed parts of the metal casing of the tanks, DG Set body, refrigeration plant skid, and all panels shall be provided with two separate earthing terminals.

Neutral of DG Set shall be earthed by a separate independent earth pit.

Neutral of Grid supply shall also be earthed by a separate independent earth pit.

Suitable GI Strip (minimum 25x3 mm) to be used for connecting earth pit with nearest equipment earthing point.

From this point earthing to other points can be looped by suitable GI Strip or PVC insulated copper conductor cable of green colour (size minimum 1 x 4 Sq mm).

In view of above, total four earth pits to be provided for each installation.

The earthing terminals shall be readily accessible and so placed that the earth connections of the equipment are maintained when the cover or any other movable part of equipment is removed.

The earthing terminal shall be identified by means of the "□" marked in a legible and indelible manner on or adjacent to the terminals.

7. Diesel Generator Set (Air/Water Cooled) and Accessories

The DG set shall be either single or three phase as per the system requirement.

Proper justification with calculations should be provided for capacity of the diesel engine and alternator being considered for DG set.

The engine should be rated for continuous operation for:

The refrigeration system, milk tank agitator & milk-loading/unloading pump, hot water geyser (approx. 2 kW), AMCU, lightings, ceiling fan.

Rated maximum output of the DG set should be calculated considering the load mentioned, over and above 10% additional load shall be considered to handle any eventuality and with the ambient design dry bulb (DB) temperature (summer) $\leq 40^{\circ}\text{C}$, and winter 16°C .

Performance Requirement

The working KVA rating at site conditions after accounting for de-rating as per IS: 10001/10002 or equivalent shall be obtained at 0.8 power factor.

The Genset should have the engine, alternator, control panel and silencer as an integral part of the unit.

The major components of the DG set shall comprise:

7.1 Diesel Engine

The diesel engine should be suitable for Power Generation application type air/water cooled and capable of developing required BHP when running at 1500 rpm under NTP conditions and not agricultural engine.

The engine should be built to IS 10000/ISO 3046/BS 5514/649 and rated for continuous running of 24 hours with an overload capacity of 10% for a period not exceeding 1 hour in any 12 hours running.

Diesel engine up to 20 kW should have valid BIS license and certificate clearly mentioning use for 'General purpose' application as per IS 10001 norms.

Engine ratings should be for operation at full load condition and should be suitable to take 100% block load.

The engine instrument panel shall be supplied with:

- Ignition key
- Starting push button
- Lubricating oil pressure gauge
- Temperature gauge for cooling water

- Temperature gauge for lubricating oil
- RPM meter (Analog type)
- Battery charging ammeter

7.1.1

The diesel engine should be four stroke, naturally aspirated/turbocharged, multi cylinders & complete with the following:

- Flywheel & flywheel housing
- Engine air/water cooling system with cooling fan & radiator CAC coolant with recovery bottle c) Air intake, fuel and lubricating oil filters
- Oil bath air cleaner
- Standard day fuel tank having capacity suitable for minimum 8 hours continuous operation. The tank shall be made with steel sheet of minimum thickness 18 gauge and complete with standard accessories such as drain pipe, fuel level indicator, valves, lockable cover, low-level contact & alarm. This tank to be inside the acoustic enclosure. f) Fuel pump with mechanical governor
- Coupling
- Exhaust silencer residential type
- Holding down bolts, MS combination base frame & AVM pads
- Self-starting arrangement with 12V suitable rated heavy-duty Lead Acid accumulator type battery with solid-state battery charging arrangement and cables k) Standard set of tools
- First fill of lubricating oil
- First fill of coolant
- Lubricating oil pressure & temperature gauge
- Control panel for engine with engine safety against over speed, high water & cylinder liner temperature, V-belt failure, low lubricating oil pressure, low water level in radiator, auxiliary failure, air cleaner choke indicator
- One brand new oil barrel of 200 litre capacity with manually driven gear/barrel pump for diesel transfer along with reinforced PVC hose for supply

7.2 Alternator

The engine should be closely/flexibly coupled to suitable self-excited, self-regulated (through an AVR) alternator developing required KVA at 0.8 power factor, 1/3 phase, 50 cycle/sec, 230/415 volts AC power supply under NTP conditions when running at 1500 RPM.

The alternator should be brushless type, screen protected and fitted with end shield and ball roller bearings.

The alternator shall have 'H' class of insulation.

It shall conform to IS 13364 (Part 1) 1992 up to 20 KVA or IS 13364 (Part II) 1992 above 20 KVA or IS 4722 of 1992.

7.3 Control Panel

The diesel generating set should be supplied with suitable floor/wall mounting type control panel duly pre-wired with the following instruments:

- One suitable scaled and rating kWh meter with accessories
- One ammeter with selector switch
- One voltmeter with selector switch • One no. frequency meter
- One no. hour meter (time totalizer)
- One set of epoxy resin casted CTs of suitable ratings
- One suitable capacity MCCB with overload and short circuit protection to disconnect power supply in case load of generating set increases beyond permitted limits. The rupturing capacity of the MCCB should not be less than 35 KA.

- One set of TPN bus bars insulated with heat shrinkable PVC sleeves (maximum permissible current density shall be 0.8 amps/mm²)
- One set of indicating lamps and control fuses

The control panel should conform to the Indian Electricity Rules.

7.4 Frame

The diesel engine and alternator should be mounted on specially designed combination base plate and MS structure of extremely rigid fabrication.

The base plate should be suitable for mounting the set on AVM pads over the foundation.

7.5 Acoustic Enclosure

DG set should carry a valid approval certificate issued as per CPCB norms complying with the provision of the Environment (Protection) Second Amendment Rules 2002, vide notification no G.S.R. 371 (E), dated 17th May 2002 & amended by GSR 448 (E) dt. 12/07/2004.

The Diesel Generator sets shall have a standard acoustic enclosure of 25 dB (A) insertion loss. The exhaust pipe with exhaust muffler with insertion loss of minimum 25 dB (A) is connected to the exhaust manifold preferably with flexible bellows.

7.5.1 General Requirement

The enclosure could be tailor made suitable for both indoor and outdoor installation as per the requirement and depending upon the capacity of D.G. Set.

The enclosure should be aesthetically designed to perform for optimum noise attenuation and in no way derate the performance of the DG set in extreme summer conditions.

Acoustic Enclosure should be environment friendly and protected against rodents etc. The enclosure should have:

- Adequate ventilation for genset cooling air requirement
 - Absorbent/insulating material used is fire radiant
 - Suitable thermal lagging to avoid localized heating of adjoining part of exhaust
 - Appropriately located control panel
 - Easy access side doors to service points on gensets
 - Doors fitted with high quality gaskets to avoid leakage of sound
 - Provision for engine air filters to suck the fresh inlet air for engine directly from atmosphere
 - Sufficient space inside to fit different accessories like batteries etc & the maintenance can be done inside with easy movement of working person on DG set
 - Enough space for control panel and fuel tank inside enclosure
-

For proper ventilation and to maintain the temperature inside the enclosure forced ventilated air circulation system using axial flow fan(s) to meet total engine requirements & air changes should be provided. (Air volume required for ventilation is to be based on combustion air, cooling air & alternator cooling air as per specifications given by engine and alternator manufacturer.) Temperature of enclosure should not exceed beyond 50°C of ambient temperature.

7.5.2 Constructional Features of Acoustic Enclosure

The enclosure shall be fabricated out of CRCA sheets of minimum 1.6 mm thickness and shall be reinforced adequately to ensure structural stability.

The enclosure shall be powder coated after seven tank pretreatment process.

The inside of the enclosure shall be lined with suitable fire retardant acoustic material to achieve the specified noise reduction level.

The enclosure shall be provided with suitable number of doors for access to engine, alternator and control panel for maintenance and servicing.

All doors shall be fitted with neoprene gaskets to prevent sound leakage.
The enclosure shall have provisions for lifting hooks/eye bolts for ease of handling and transportation.
The exhaust piping inside the enclosure shall be suitably insulated with glass wool and aluminum cladding to prevent excessive heating and ensure safety.

8. Water for Cleaning at Milk Collection Centre

Hot water facility shall be provided at milk collection centre for cleaning of BMC tank, milk cans and other equipment.

8.1 Solar Water Heating System (200 LPD)

The solar water heating system shall conform to IS 12933.
The collector shall have 4 mm thick toughened glass with minimum transmissivity of 82%.
The absorber plate shall be of copper with selective coating.
The storage tank shall be of SS 304 with minimum thickness of 1.2 mm.
The tank shall be insulated with minimum 40 mm thick PUF insulation.
The system shall be complete with electric back up heater of 2 kW capacity.
GI Class-B pipes shall be used for water connections.
Hot water pipe shall be insulated with minimum 50 mm thick rock wool insulation.

8.2 LPG Instant Gas Water Heater

As an alternative to solar water heater, LPG operated instant gas water heater of 6 or 10 LPM capacity may be provided.
The heater shall have automatic ignition, over temperature protection and oxygen depletion sensor.

8.3 Electric Water Heater

As another alternative, electric storage type water heater (minimum 50 litres capacity) may be provided along with 200 litres SS 304 hot water storage tank.

9. After Sales Service

The supplier shall have a service centre in the specified district or nearby district with adequate trained service personnel and infrastructure.
In case of breakdown, service engineer shall attend the site within 3 hours of receiving the complaint.
Regular preventive maintenance service visit shall be carried out once in every 8 weeks during warranty period. The bidder shall also quote separately for comprehensive service contract for a period of 3 years after completion of warranty period.

10. Inspection

Inspection of BMC tank and refrigeration unit shall be carried out during fabrication stage and before dispatch. The bidder shall submit Quality Assurance Plan (QAP) and Quality Inspection Plan (QIP) for approval. Dye penetration test shall be conducted for welded joints.
Hydraulic test / Water tightness test shall be conducted before dispatch.
All necessary test certificates and inspection reports shall be furnished to the purchaser.

APPENDIX

LIST OF APPROVED MAKES OF BOUGHT OUT ITEMS

S.N.	ITEM DESCRIPTION	APPROVED MAKES
1.0	SS PUMPS	APV / ALFA LAVAL (LKM) / TETRA PACK / L&T / IDMC

2.0	SS VALVES & FITTINGS	IDMC / ALFA LAVAL (LKM)
3.0	REFRIGERATION CONTROLS	DANFOSS / ALCO / SANSEN / PARKER / AMERICAN SPECIALTIES
4.0	SS PIPES	BHANDARI FOILS / RATNAMANI / APEX TUBES

HEAVY METALS

S.N.	ITEM DESCRIPTION	APPROVED MAKES
5.0	SS PNEUMATIC VALVES	GEA / ALFA LAVAL (LKM) / KEYSTONE / IDMC
6.0	MOTORS	SIEMENS / ABB / KIRLOSKAR / BHARATH BIJLEE / SHARP / LUBI
7.0	CABLES - ARMoured	FINOLEX / UNIVERSAL / CCI / NICCO / FORT GLOSTER / RR CABLE / HILIGHT / GREEN ELE / POLY CAB
8.0	Starters	L & T
9.0	Contactors	Telemachania / Siemens / L & T / Sprecher + Schuh
10.0	PUSH BUTTONS	L&T / SIEMENS / ABB / SCHNEIDER
11.0	Relays	SEGC / Siemens
12.0	INDICATING LAMPS	L&T / SIEMENS / SCHNEIDER / TECHNIC / VAISHANAV / PRECITECH
13.0	Current Transformers	Kappa
14.0	PRESSURE SWITCH	DANFOSS / ALCO / PARKER / HANSEN
15.0	DIGITAL INDICATOR	HONEYWELL / RAXIX / MASIBUS / PROTOCOL / VIBHUTI
16.0	D G SET	CUMMINS / KIRLOSKAR / MAHINDRA / EICHER / GREAVES / ASHOK LEYLAND
17.0	Alternator	Stamford / Leroy Somer
18.0	BATTERY FOR THE DG SET	EXIDE / STANDARD-FURUKUWA / PRESTOLITE / AMCO-YUASA / AMARON
19.0	STABILISER	SUVIK / MICROTECH / SEN & PANDIT / PACE / POWER ENGINEERS / ASABA / GURU NANAK
20.0	SOLAR HOT WATER SYSTEM	TATA BP SOLAR / JAIN IRRIGATION / RACOLD / SALORE / SUDARSHAN SAUR / STEEL HACKS / DGS&D - GOI APPROVED SUPPLIERS
21.0	Hot Water Electric Geyser	SPEARHOT / RACOLD / USHA / BATLIBOI / BAJAJ
22.0	HDPE TANK - HEAVY DUTY	SINTEX / KAVERI / HITANK

(Schedule -III)

DETAILED TECHNICAL SPECIFICATIONS AND SCOPE OF SUPPLY CAPACITY - 2000 LITRE

1. General Description

Design, supply, installation, testing and commissioning of Direct Expansion type bulk milk cooling systems including all accessories & items given in the detailed scope of supply, on turnkey basis.

2. Functional Requirement

These systems would be installed in village Dairy Co-operative Society (DCS) / village milk collection centre, which collects milk every day in the morning & evening from milk producers.

The milk collected shall be stored in the bulk milk cooler and cooled from ambient temperature to 4° centigrade. The stored milk shall be dispatched to dairy plant through insulated road milk tanker once in a day.

3. Design Requirement

3.1 Capacity

The net capacity of the bulk milk cooler shall be as mentioned above and as per the requirement given in the enquiry/tender document.

However, the gross capacity in all the sizes shall be around 10% higher than the rated capacity to avoid accidental spillage of milk due to agitation or any other reason.

3.2 Applicable manufacturing/design code

3.2.1 Bulk Milk Cooler (BMC)

The BMC tank shall meet the requirements of ISO 5708 – 2 II (Latest version) for milk collection cycle of two times in a day with not more than 3.0 hours cooling time from 35 to 4°C for all milking and not more than 1.5 hours for second milking i.e. from 10 to 4°C.

For design of condensing unit for BMC ARI Standard 520-2004 (Air-Conditioning & Refrigeration Institute, Arlington, Virginia) for ambient temperature condition shall be applicable.

The tank shall be of an established & proven Direct Expansion type design, in regular production & use and not a prototype.

Note:

All milking means quantity of milk received in either morning shift or evening shift.

When a Tank for two milkings is either empty or contains 50% of its rated volume of milk at 4°C, and 50% of the rated volume of milk at 35°C is added in one batch, all of the milk shall be cooled to 4°C in not more than the specified cooling time.

3.2.2 Refrigeration System

The refrigeration system shall be designed to meet performance ratings of positive displacement condensing units specified in ARI Standard 520-2004.

3.2.3 Accessories

Accessories like diesel generator set, electric & control cables, control panel, temperature sensor, electrical switchgears, refrigeration control valves & fittings etc. shall be of approved make as detailed in the specifications and shall meet the requirement of the latest relevant Indian electricity rules, ISO/BIS Standards.

4. Scope of the Bidder

4.1 Scope

The bidder's scope starts from SS 304 funnel with a SS mesh at inlet of the BMC tank for manual receiving of milk.

Alternatively, milk is received in milk can with SS 304 funnel with SS mesh and then manually poured in to a balance tank (200 litres) and pumped to bulk milk cooler.

In some cases, the reception equipment will include a can tipping bar.

The balance tank of capacity 200 litres shall be made up of SS sheet conforming to AISI 304.

From BMC, the milk shall be transferred to Road Milk Tanker (RMT) through food grade quality flexible hose of adequate length and milk transfer pump installed either on the RMT or through the pump supplied along with BMC. Bidders should furnish separate prices for gravity fed system as well as for pumped system.

4.2 Supply

The bulk milk cooler shall be a complete unit with the refrigeration system, agitator(s), lockable inlet & outlet valve with strainer.

Also includes supply of AISI 304 balance tank with SS 304 filter for pumped system, SS piping & milk hose of food grade quality, unions and milk transfer pump of 5000 LPH, SS 304 pipes & fittings, erection materials, pipe supports, floor plates, hinged type pipe clamps.

The hose pipe shall be 10 metres long and end with SS liner and blank nut chained with the hose.

A wall mounted SS hook of adequate size for hanging the milk hose pipe roll shall also be provided.

The scope includes electrical & control panels and interconnecting cables, cable conduits shall also be supplied, earth pit pipes with removable cover & earthing as required by local electrical regulation.

The indicative distances between BMC outlet to milk pump inlet – 3 m, BMC to Mains power point & DG set – 20 m may be considered for calculating cable, SS piping requirement, supports etc.

However, the exact distances shall be as per site conditions and complete piping & cabling necessary for installation shall be supplied.

4.3 Installation & Commissioning

The total job is on turnkey basis and includes supply, installation, testing, commissioning and training of the field personnel. Minor civil works, providing & grouting supports are included in the scope.

Giving satisfactory training to the staff of the collection centre and trial runs for the complete unit.

Moreover, supplier has to demonstrate performance of the unit as per operating parameters to the Client / NDDB.

5. Constructional Features

5.1 Bulk Milk Cooling Tank

5.1.1 Material of Construction

Tank inner, outer, bottom, top openable cover shall be fabricated from Stainless Steel AISI 304 material.

All components, as under, shall be made out of AISI 304 grade stainless steel.

Piping & fittings, Filter, Lockable cover, Agitator shaft & blade, adjustable Ball Feet with provision for 50 mm height adjustment, Dipstick, Outlet & Inlet Valves, Blank flanges etc.

The filter screen shall be fine wire mesh.

All the gaskets shall be of food grade nitrile or neoprene rubber material.

The AISI 304/316 evaporator shall be dimpled pressed plate jacket put as bottom plate of the inner tank.

The bottom evaporation surface in contact with milk as well as outer SS cladding is passivated by standard chemical treatment to impart corrosion resistance.

5.1.2 Shape & Orientation

The preferred shape of the tank shall be horizontal rectangular with an openable top cover. The shape of the BMC tank shall conform to international sanitary design.

5.1.3 Milk Cooler Tank & Evaporator

The AISI 304 tank for the bulk milk cooler should be horizontal rectangular or horizontal semicircular bottom or vertical circular shape, which imparts smooth distribution of the fat in milk when agitator is set in to operation.

The tank shall be so designed that all surfaces in contact with milk are readily accessible either in their position or after dismantling to permit thorough cleaning.

Inner Vessel

All joints shall be TIG welded, any filler rod used being suitable for the parent metal.

All welds shall be ground smooth and free from crevices, porosity and brittleness.

All milk contact metallic surfaces of the inner vessel and its attachments should have finish not less than 150 grit finish. Any permanent attachment to the inner vessel shall be welded with fillet radii not less than 6 mm.

All parts of the inner vessel shall drain directly to the outlet.

Internal corners formed round the bottom of the inner vessel and outlet well shall be of not less than 25 mm in radius. Other internal corners shall be not less than 15 mm in radius.

The evaporator shall be laser welded dimpled jacketed.

In case of rectangular type bulk milk cooler, the evaporator is fixed as the bottom plate of the inner tank.

Whereas in semicircular bottom tank the jacket shall be at least up to 1/3 height of the tank.

In case of double compressor, total evaporator area shall be divided and separated into two sections.

Each section shall have separate suction & discharge connecting to each compressor.

The evaporator surface in contact with the milk should be passivated by standard treatment to impart corrosion resistance.

5.1.4 Tank Fittings & Accessories

The tank shall be provided with stainless steel inlet with special “no-foam” design, outlet 38/51 mm butterfly valve & blank union with locking arrangement, inspection window/manhole with locking arrangement, agitator and top cover with locking arrangement.

At the bottom of the outlet cup on the outer surface, a temperature sensor shall be permanently fixed. It shall sense the temperature of the surface at the outlet and transmit the signal to the digital indicator.

The digital type temperature indicator shall be provided in the control panel with back up battery.

The tank shall be provided with SS calibrated dipstick to measure the volume of milk inside the tank. The dipstick shall be graduated from 10% or less to not less than 100% of the rated volume. Each division on dipstick shall represent a volume not greater than 0.5% of the rated volume.

The calibration chart of dipstick having adequately bold letters shall be laminated/framed and shall be supplied with BMC.

The tank shall be equipped with agitator(s) capable of producing a uniform distribution of fat in the milk.

All SS fittings shall be of SMS standard.

The BMC shall be provided with 1 (one) AISI-304 filter with SS fine wire mesh suitable to filter extraneous matter such as dust particles, hay, flies, cow dung pieces/particles etc.

The filter shall be designed and installed in such a way that it can frequently and easily be cleaned.

Top cover lifting handle shall be an in-built feature of the unit.

The tank shall be provided with AISI 304 adjustable ball feet tamper proof type having provision of 50 mm height adjustment.

Provision of a bolt for earthing connection may be provided on one of the legs.

Number of ball feet shall be minimum 4 for small capacity tank and 6 for bigger tank.

5.1.5 Balance Tank, Capacity 200 Litres

The balance tank of 200 litre capacity shall be of sanitary design, fabricated from SS 304 sheet of 1.6 mm thick for shell & 2 mm bottom.

Outlet SS cup and sufficient slope shall be provided at bottom of tank for complete draining of milk.

The dimension of tank and fittings shall be suitable to meet milk collection operations at centre.

1 no. SS removable cover (1.0 mm thick) with handle shall be provided.

SS filter made from 1.6 mm SS plate with 2 mm dia holes (Removable type) to be provided for placement in the balance tank to remove coarse suspended impurities from milk.

Four number Ball feet shall be provided for height adjustment of 50 mm. All fabricated parts shall be polished neat to 150 grit.

5.1.6 Stainless Steel Sanitary Milk Pump

5 KLPH, 10 MWC capacity milk pump shall be supplied for pumping milk from balance tank to BMC and BMC to road milk tanker.

Pump impeller & casing shall be made out of SS AISI 304/316 material.

All milk contact surfaces shall be finished to minimum 150 grits.

The pump should be of sanitary design.

Inlet & outlet of the pump shall have ends with SMS union.

The pump shall be provided with approved make motor having 'E'/'F' class insulation and IP 55 protection.

The flanged end motor shall have stainless steel shaft having hygienic mechanical sealing arrangement to prevent leakage from pump casing to rotor side of the motor.

Pump shall have SS shroud with air ventilation grill for circulating cooling air. The pump shall have SS adjustable ball feet.

5.1.7 Insulation

The insulation of the tank shall be done by injection, in situ, of high density (minimum 40 kg/m³, Chlorofluorocarbon free and environmental friendly) polyurethane foam without having any imperfection and hygroscopicity.

The efficiency of insulation should be such that at max 50°C ambient temperature the rate of rise of the mean temperature of the milk shall not exceed by 1°C in four hours, when the rated milk volume initially at about 4°C is allowed to stand undisturbed as per the requirement of ISO 5708 – 2 II when the refrigeration unit is not working.

5.1.8 Cleaning In Place (CIP)

For top openable configuration, facilities for manual cleaning shall be provided with suitable brush for BMC tank as well as brush for internal cleaning of SS pipes.

4 nos. of SS hooks shall be provided to keep these brushes, loose pipes etc.

5.1.9 Welding & Finishing

Inner, outer, intermediate dimpled jacket and nozzle connections shall be welded with TIG process only.

The inner shell and all other product contact surface shall be polished up to minimum 150 grit finish. The outer surface to be polished with 150 grit dull finish or a circle finish.

5.2 Refrigeration System

The refrigeration system shall be designed to comply with ARI Standard 520-2004 and to meet the requirements of milk collection system of ISO 5708, Class 2 II.

The refrigeration system shall be of direct expansion type, with Freon-22 (R-22) or CFC free environmental friendly refrigerant to cool the raw milk from reception temperature to 4°C in the prescribed period mentioned.

The evaporator(s) of the refrigeration system shall form a part of the milk tank body as dimpled jacket in the bottom plate in case of rectangular open tank or at least up to 1/3rd height of the circular/semicircular tank.

It would be better if the system is compatible for the refrigerant R 407 C.

The refrigeration system shall be direct expansion type to perform cooling function in an ambient temperature of 46°C with air-cooled condenser.

5.2.1 Compressor

The refrigeration compressor shall be adequate enough to ensure that milk is cooled to 4°C in the prescribed time limit and suitable to operate at 0°C suction temperature and 60°C condensing temperature (air-cooled condenser) assuming 46°C ambient temperature.

The refrigeration compressor(s) shall be rotary/reciprocating, hermetically sealed type essentially suitable for refrigeration application in hot & humid Indian climatic conditions.

The motor of the compressor should have a thermistor temperature sensor embedded in windings for protection from excessive heating due to overloading or short-circuiting.

Similarly, a protection against off cycle migration of refrigerant to the compressor is necessary in the refrigeration unit, preferably a self-regulating PTC crank case heater.

The compressors selected should be energy efficient and consume least power to meet the cooling load requirements. The bulk milk cooler up to capacity of 1000 L shall be provided with single compressor; however, for higher capacity units two compressors system shall be preferred.

In the offer bidder shall clearly mention whether the offered system shall work on single phase or three phase mains supply. However, choice of single phase or three phase will rest on the sole discretion of the buyer.

Client shall approve Make(s) of the compressor.

Bidders can also offer Energy Efficient Hermetically Sealed Scroll Compressors as alternative to rotary/reciprocating compressors.

5.2.2 Condenser

The condenser shall be air cooled finned tube type having sufficient heat transfer area designed for extremely high ambient temperature given above.

The air circulation fan of condenser shall preferably be induced draft type sucking cold air over the compressors and throwing hot air out of the premises/place of installation.

The condensing temperature should not be less than 60°C considering operating ambient temperature of 46°C.

5.2.3 Receiver

For refrigeration circuit a suitable size liquid receiver mounted on the skid near compressor to assist system to store refrigerant during pump down cycle as well as in case of maintenance.

5.2.4 Thermostatic Expansion Valve

Suitable size and capacity Thermostatic expansion valve should be provided in the refrigeration circuit of the bulk milk cooler.

The TX valve should be Maximum Operating Pressure type and of adequate capacity to feed optimum quantity of refrigerant to the milk cooling tank evaporator.

5.2.5 Refrigerant Pipe, Fittings & Controls

All pipes, valves, fittings & controls shall comply with the latest relevant BIS code applicable.

Isolation valves at suction & discharge sides of the compressors is provided for compressor isolation, during maintenance of the system.

A suction pressure regulating valve (KVL) shall be provided to restrict suction pressure within a reasonable limit for preventing tripping of compressor.

Copper/SS tubing shall be routed in such a way that if any leakage occurred during operation can easily be detected and the defective portion can be repaired/replaced without dismantling the whole system.

All the pipes shall be clamped properly with fixed support.

In case of double compressor system, pipe, fitting & control should be designed in such a way that both the compressors can run independently.

The tubing shall be insulated wherever necessary.

6. Electrical Control Panel

6.1 Control Panel

Four control panels shall be provided, one for the main power supply tapping, second for the refrigeration unit, the third for the milk tank and fourth for lighting, testing equipment and computers etc.

Each panel shall be provided with suitable switchgear of required ratings for switching and protection as per the system requirement.

The incoming and outgoing power supply terminals shall be covered and secured with a lead seal to prevent tampering. The door of the panels should be provided with lockable handles.

6.1.1 Main Control Panel with Automatic Voltage Stabiliser

This should be suitable to receive the incoming State Electricity Authority grid supply as well as supply from BMC's DG Set.

Grid supply to be stabilised for voltage fluctuation by an automatic type voltage stabiliser.

Output electric supply either stabilised grid supply or DG Set supply, to be selected through a change over switch. Provision to be made in this control panel to feed output supply to the refrigeration unit & BMC agitators through refrigeration control panel, to milk dispatch pump & to lighting Distribution board.

Grid supply shall be of three phase with provision in this panel to select only one healthy phase for giving output in case BMC is of single phase.

If BMC is of three phase, then this phase selector switch is not required.

DG set & stabiliser to be of single phase/three phase as per requirement specific to the project.

This panel to be of rating 10 KVA single phase for 1 KL, 15 KVA either single or three phase in case of 2 KL.

For 10 KVA Single Phase Automatic Stabiliser, following major components are required:

1. The incoming grid power (140 to 280 volts) shall be given through TPN MCB 63 A and phase selector switch of 63 A so that power can be drawn from the desired phase. Relay system to be provided to ensure that if incoming voltage is either less than 140 volts or more than 280 volts, stabiliser stops incoming power to stabiliser for its safety.
 2. LED type indicator lamps (R, Y, B) on the individual phases of supply.
 3. A bypass switch 63 A for bypassing correcting transformer.
 4. Correcting transformer, air cooled type, with 8 steps each of 20 volts (140-160-180-200-220-240-260-280 V) to be operated through a relay system or servo controlled.
 5. A Change-Over DP switch 63 A between DG Set and corrected mains power supply.
 6. A digital input and output (corrected) voltage/current/frequency indicator with selector switch. The indicator shall be so provided as to be visible from a distance of at least 5 metre, and so located as to require no special effort to see the readings.
 7. DP MCB 63 A for correcting transformer ON/OFF.
 8. DP MCB 63 A for supplying power to Refrigeration Panel.
 9. DP MCB 32 A for supplying power to lighting DB.
 10. DP MCB 16 A for supplying power to starter of milk pump. Parallely 20 A metallic power plug socket to be provided.
 11. If the corrected voltage at the output side goes beyond 200-260 volt range, a power relay shall cut off output power supply with a loud alarm.
 12. Suitable terminal blocks, heavy duty, 4 way for incoming mains (63 A) and 3 way (63 A) for DG Set incoming and suitable terminal blocks, heavy duty for various outputs mentioned above.
 13. Housing enclosure of powder coated MS of appropriate size.
 14. Double compression heavy duty Brass cable glands for two incoming armoured cables & PVC cable glands for unarmoured flexible all output cables.
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For 15 KVA 3 Phase Automatic Stabiliser, following major components shall be provided:

1. The incoming grid power (Phase voltage 180 to 280 volts) shall be given through TPN MCB 40 A. Relay system to be provided to ensure that if incoming voltage is either less than 180 volts or more than 280 volts in any phase, stabiliser stops incoming power to stabiliser for its safety.
2. LED type indicator lamps (R, Y, B) on the individual phases of supply.
3. A bypass switch 40 A for bypassing correcting transformer.
4. Correcting transformer, air cooled type, for each phase, with 6 steps each of 20 volts (phase 180-200-220-240-260-280 V) to be controlled through a relay system or servo controlled.
5. A Change-Over TPN switch 40 A between DG Set and corrected mains power supply.
6. A digital input and output (corrected) voltage/current/frequency indicator with selector switch for all three phases. The indicator shall be so provided as to be visible from a distance of at least 5 metre, and so located as to require no special effort to see the readings.
7. TPN MCB 40 A for correcting transformer ON/OFF.
8. TPN MCB 40 A for supplying power to Refrigeration Panel.
9. TPN MCB 32 A for supplying power to lighting DB.
10. TPN MCB 16 A for supplying power to starter of milk pump. Parallely 20 A metallic power plug socket to be provided.
11. If the corrected voltage at the output side goes beyond 180-280 volt range, a control relay/power contactor combination shall cut off output power supply with a loud alarm.
12. Suitable terminal blocks, heavy duty,
4 way for incoming mains (63 A) and 4 way
(63 A) for DG Set incoming and terminal
blocks (4 way 63 A for refrigeration,
4 way 32 A for lighting DB,
4 way 32 A for milk pump) heavy duty for outputs.

13. Housing enclosure of powder coated MS of appropriate size.
14. Double compression heavy duty Brass cable glands for two incoming armoured cables & PVC cable glands.

For 15 KVA Single Phase Automatic Stabiliser:

Major components are to be worked out similar to 10 KVA single phase & 15 KVA three phase respectively for which details are given above.

6.1.2 Refrigeration Control Panel

The refrigeration unit shall be provided with a control panel made out of Stainless Steel suitable for wall mounting near the unit.

The panel shall be provided with motor starters, ON/OFF push buttons & necessary MCBs, control wiring, line voltage controller to guard the compressor against the supply voltage fluctuations.

In case more than one compressor is provided in the refrigeration system, the control panel shall be provided with a sequence controller & timer to start one compressor at a time to avoid power supply surge. The panel shall also have facility to operate refrigeration unit on auto/manual mode.

In the auto mode, as soon as the milk temperature reaches to pre-set value, the compressor should be switched off to avoid freezing of milk.

6.1.3 Milk Tank Control Panel

The milk tank shall be provided with a wall mounted control panel with timer to control the intermittent operation of the agitators & a digital temperature indicator to indicate the milk temperature to one decimal place with least count of 0.1°C on continuous basis.

It shall include suitable switchgears etc as required for switching & protection.

The agitator shall have interlocking arrangement with top cover opening limit switch.

The limit switch shall put off the agitator as soon as the top cover opens up.

Panel shall have provision for pre setting temperature of BMC Tank (not below the milk temperature of 4 degree centigrade) for starting/stopping refrigeration compressors.

Suitable battery back up is to be provided so that temperature can be indicated when there is no electric supply.

6.1.4 Domestic Power Distribution Board

This distribution board would get single phase power from grid supply directly (it is assumed that when grid power is received in this DB, Main control panel gets power only from DG Set) as well as stabilised power from main control panel and feed power for lighting, electric geyser/solar water heating system, testing equipment/computers etc. The main components of this DB shall be as follow:

1. Wall mounted distribution board, MCB type
 2. 32 DP Change over switch
 3. 32 A DP MCB as incoming
 4. 3 nos. 10 A MCB SP for lighting
 5. 3 nos. 20 A MCB SP for geyser/Solar water heater, AMCU etc.
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6.1.5 Cables & Electrical Switchgears

All electrical switchgears and controls required for the complete system shall be of suitable rating.

All permanent wiring installed on the tank or associated units shall be carried out using PVC cable in heavy gauge, screwed galvanized steel conduit or plastic conduit, or in mineral-insulated copper-sheathed cable.

Flexible electrical connections shall be made only to items normally movable in service.

Such flexibles shall be PVC insulated copper conductor cable not less than 24/0.20 mm in size (see IS 694 (Part 1-1964)) and earth continuity conductors of PVC insulated copper conductor shall be provided.

Cable between DG Set and main panel shall be either steel armoured or un-armoured in steel conduits.

For all electrical cables, suitable water tight cable glands and lugs should be used at ends.

Specification for PVC insulated cables (for voltage up to 1100V): Part 1 with copper conductor (revised).

6.1.6 Earthing

The earthing should be carried as per IS: 3043 - 1987 (reaffirmed 2001) – “Code of practice for earthing”.

Pipe type earthing can be used.

The chassis, framework and the fixed parts of the metal casing of the tanks, DG Set body, refrigeration plant skid, and all panels shall be provided with two separate earthing terminals.

Neutral of DG Set shall be earthed by a separate independent earth pit.

Neutral of Grid supply shall also be earthed by a separate independent earth pit.
Suitable GI Strip (minimum 25 x 3 mm) to be used for connecting earth pit with nearest equipment earthing point.
From this point earthing to other points can be looped by suitable GI Strip or PVC insulated copper conductor cable of green colour (size minimum 1 x 4 Sq mm).
In view of above, total four earth pits to be provided for each installation.
The earthing terminals shall be readily accessible and so placed that the earth connections of the equipment are maintained when the cover or any other movable part of equipment is removed.
The earthing terminal shall be identified by means of the “□” marked in a legible and indelible manner on or adjacent to the terminals.

7. Diesel Generator Set (Air/Water Cooled) and Accessories

The DG set shall be either single or three phase as per the system requirement.
Proper justification with calculations should be provided for capacity of the diesel engine and alternator being considered for DG set.
The engine should be rated for continuous operation for:
The refrigeration system, milk tank agitator & milk-loading/unloading pump, hot water geyser (approx. 2 kW), AMCU, lightings, ceiling fan.
Rated maximum output of the DG set should be calculated considering the load mentioned, over and above 10% additional load shall be considered to handle any eventuality and with the ambient design dry bulb (DB) temperature (summer) 40°C, and winter 16°C.

Performance Requirement

The working KVA rating at site conditions after accounting for de-rating as per IS: 10001/10002 or equivalent shall be obtained at 0.8 power factor.
The Genset should have the engine, alternator, control panel and silencer as an integral part of the unit. The major components of the DG set shall comprise:

7.1 Diesel Engine

The diesel engine should be suitable for Power Generation application type air/water cooled and capable of developing required BHP when running at 1500 rpm under NTP conditions and not agricultural engine.
The engine should be built to IS 10000/ISO 3046/BS 5514/649 and rated for continuous running of 24 hours with an overload capacity of 10% for a period not exceeding 1 hour in any 12 hours running.
Diesel engine up to 20 kW should have valid BIS license and certificate clearly mentioning use for ‘General purpose’ application as per IS 10001 norms.
Engine ratings should be for operation at full load condition and should be suitable to take 100% block load.

The engine instrument panel shall be supplied with:

- Ignition key
 - Starting push button
 - Lubricating oil pressure gauge
 - Temperature gauge for cooling water
 - Temperature gauge for lubricating oil
 - RPM meter (Analog type)
 - Battery charging ammeter
-

7.1.1

The diesel engine should be four stroke, naturally aspirated/turbocharged, multi cylinders & complete with the following: a) Flywheel & flywheel housing
b) Engine air/water cooling system with cooling fan & radiator CAC coolant with recovery bottle c) Air intake, fuel and lubricating oil filters
d) Oil bath air cleaner
e) Standard day fuel tank having capacity suitable for minimum 8 hours continuous operation.
The tank shall be made with steel sheet of minimum thickness 18 gauge and complete with standard accessories such as drain pipe, fuel level indicator, valves, lockable cover, low-level contact & alarm.
This tank to be inside the acoustic enclosure. f)
Fuel pump with mechanical governor
g) Coupling
h) Exhaust silencer residential type
i) Holding down bolts, MS combination base frame & AVM pads

- j) Self-starting arrangement with 12V suitable rated heavy-duty Lead Acid accumulator type battery with solid-state battery charging arrangement and cables
- k) Standard set of tools
- l) First fill of lubricating oil
- m) First fill of coolant
- n) Lubricating oil pressure & temperature gauge
- o) Control panel for engine with engine safety against over speed, high water & cylinder liner temperature, V-belt failure, low lubricating oil pressure, low water level in radiator, auxiliary failure, air cleaner choke indicator
- p) One brand new oil barrel of 200 litre capacity with manually driven gear/barrel pump for diesel transfer along with reinforced PVC hose for supply

7.2 Alternator

The engine should be closely/flexibly coupled to suitable self-excited, self-regulated (through an AVR) alternator developing required KVA at 0.8 power factor, 1/3 phase, 50 cycle/sec, 230/415 volts AC power supply under NTP conditions when running at 1500 RPM.

The alternator should be brushless type, screen protected and fitted with end shield and ball roller bearings.

The alternator shall have 'H' class of insulation.

It shall conform to IS 13364 (Part 1) 1992 up to 20 KVA or IS 13364 (Part II) 1992 above 20 KVA or IS 4722 of 1992.

7.3 Control Panel

The diesel generating set should be supplied with suitable floor/wall mounting type control panel duly pre-wired with the following instruments:

- One suitable scaled and rating kWh meter with accessories
- One ammeter with selector switch
- One voltmeter with selector switch
- One no. frequency meter
- One no. hour meter (time totalizer)
- One set of epoxy resin casted CTs of suitable ratings
- One suitable capacity MCCB with overload and short circuit protection to disconnect power supply in case load of generating set increases beyond permitted limits.

The rupturing capacity of the MCCB should not be less than 35 KA.

- One set of TPN bus bars insulated with heat shrinkable PVC sleeves (maximum permissible current density shall be 0.8 amps/mm²)
- One set of indicating lamps and control fuses

The control panel should conform to the Indian Electricity Rules.

7.4 Frame

The diesel engine and alternator should be mounted on specially designed combination base plate and MS structure of extremely rigid fabrication.

The base plate should be suitable for mounting the set on AVM pads over the foundation.

7.5 Acoustic Enclosure

DG set should carry a valid approval certificate issued as per CPCB norms complying with the provision of the Environment (Protection) Second Amendment Rules 2002, vide notification no G.S.R. 371 (E), dated 17th May 2002 & amended by GSR 448 (E) dt. 12/07/2004.

The Diesel Generator sets shall have a standard acoustic enclosure of 25 dB (A) insertion loss.

The exhaust pipe with exhaust muffler with insertion loss of minimum 25 dB (A) is connected to the exhaust manifold preferably with flexible bellows.

7.5.1 General Requirement

The enclosure could be tailor made suitable for both indoor and outdoor installation as per the requirement and depending upon the capacity of D.G. Set.

The enclosure should be aesthetically designed to perform for optimum noise attenuation and in no way derate the performance of the DG set in extreme summer conditions.

Acoustic Enclosure should be environment friendly and protected against rodents etc. The enclosure should have:

- Adequate ventilation for genset cooling air requirement
- Absorbent/insulating material used is fire radiant
- Suitable thermal lagging to avoid localized heating of adjoining part of exhaust
- Appropriately located control panel
- Easy access side doors to service points on gensets

- Doors fitted with high quality gaskets to avoid leakage of sound
- Provision for engine air filters to suck the fresh inlet air for engine directly from atmosphere
- Sufficient space inside to fit different accessories like batteries etc & the maintenance can be done inside with easy movement of working person on DG set
- Enough space for control panel and fuel tank inside enclosure

7.5.2 Constructional Features of Acoustic Enclosure

The enclosure shall be fabricated out of CRCA sheets of minimum 1.6 mm thickness and shall be reinforced adequately to ensure structural stability.

The enclosure shall be powder coated after seven tank pretreatment process.

The inside of the enclosure shall be lined with suitable fire retardant acoustic material to achieve the specified noise reduction level.

The enclosure shall be provided with suitable number of doors for access to engine, alternator and control panel for maintenance and servicing.

All doors shall be fitted with neoprene gaskets to prevent sound leakage.

The enclosure shall have provisions for lifting hooks/eye bolts for ease of handling and transportation.

The exhaust piping inside the enclosure shall be suitably insulated with glass wool and aluminum cladding to prevent excessive heating and ensure safety.

APPENDIX LIST OF APPROVED MAKES OF BOUGHT OUT ITEMS

S.N.	ITEM DESCRIPTION	APPROVED MAKES
1.0	SS PUMPS	APV / ALFA LAVAL (LKM) / TETRA PACK / L&T / IDMC
2.0	SS VALVES & FITTINGS	IDMC / ALFA LAVAL (LKM)
3.0	REFRIGERATION CONTROLS	DANFOSS / ALCO / SANSEN / PARKER / AMERICAN SPECIALITIES
4.0	SS PIPES	BHANDARI FOILS / RATNAMANI / APEX TUBES

HEAVY METALS LIST OF APPROVED MAKES OF BOUGHT OUT ITEMS (Contd.)

S.N.	ITEM DESCRIPTION	APPROVED MAKES
5.0	SS PNEUMATIC VALVES	GEA / ALFA LAVAL (LKM) / KEYSTONE / IDMC
6.0	MOTORS	SIEMENS / ABB / KIRLOSKAR / BHARATH BIJLEE / SHARP / LUBI
7.0	CABLES – ARMoured	FINOLEX / UNIVERSAL / CCI / NICCO / FORT GLOSTER / RR CABLE / HI-LIGHT / GREEN ELE / POLY CAB
8.0	Starters	L & T
9.0	Contactors	Telemecanique / Siemens / L & T / Sprecher + Schuh
10.0	PUSH BUTTONS	L & T / SIEMENS / ABB / SCHNEIDER
11.0	Relays	SEGC / Siemens
12.0	INDICATING LAMPS	L & T / SIEMENS / SCHNEIDER / TECHNIC / VAISHANAV / PRECITECH
13.0	Current Transformers	Kappa
14.0	PRESSURE SWITCH	DANFOSS / ALCO / PARKER / HANSEN
15.0	DIGITAL INDICATOR	HONEYWELL / RAXIX / MASIBUS / PROTOCOL / VIBHUTI
16.0	D G SET	CUMMINS / KIRLOSKAR / MAHINDRA / EICHER / GREAVES / ASHOK LEYLAND
17.0	Alternator	Stamford / Leroy Somer
18.0	BATTERY FOR THE DG SET	EXIDE / STANDARD-FURUKOWA / PRESTOLITE / AMCO-YUASA / AMARON
19.0	STABILISER	SUVIK / MICROTECH / SEN & PANDIT / PACE / POWER ENGINEERS / ASABA / GURU NANAK
20.0	SOLAR HOT WATER SYSTEM	TATA BP SOLAR / JAIN IRRIGATION / RACOLD / SALORE / SUDARSHAN SAUR / STEEL HACKS / DGS&D – GOI APPROVED SUPPLIERS

21.0	Hot Water Electric Geyser	SPEARHOT / RACOLD / USHA / BATLIBOI / BAJAJ
22.0	HDPE TANK – HEAVY DUTY	SINTEX / KAVERI / HITANK

GENERAL TERMS & CONDITIONS

1. The documents submitted by the bidders should be properly indexed & digitally signed.
2. The bidding system is on internet platform. The site can be accessed through www.ncdfimarket.com maintained by National Cooperative Dairy Federation of India Ltd (NCDFI), which will be the venue for online bid submission.
3. All the registered members of the NCDFI eMarket, on deposit of EMD, are eligible to participate in the bidding.
4. During the scrutiny, if it comes to the notice to the tender inviting authority that the credential(s) and/or any other paper(s) has/have been of any bidder found incorrect/ manufactured/ fabricated, that bidder will not be allowed to participate in the tender process and that application will be rejected outright. The Ichhamati Cooperative Milk Producers' Union Ltd. Reserves the right to cancel the N.I.T. at any time without showing any reason and no claim in this respect will be entertained.
5. During evaluation the Committee may summon any bidder and seek clarification/information regarding bids within the stipulated time frame. In case the bidders fail to clarify any query during the stipulated time frame the bid shall be liable for rejection.
6. The Milk Union may reject any bid from any party with unsatisfactory performance with the Milk Union or any other Milk Union in the past.
7. Inspection of materials may be undertaken at the supplier's premises whenever necessary by the Tendering Authority/ any officer authorized by the undersigned.
8. For 'prompt after sale service' of the installed unit as and when required within warranty period free of cost. The service must be attended within 24 hours from the receipt of the information.
9. Bidders are required to go through the Tender Documents understand the requirement the location of the installation and commissioning and then quote their rate. Rate once quoted by the bidder shall be deemed to be quoted by the bidder after understanding the requirements of the Milk Union. Rates once quoted are final and no alteration in rate shall be allowed. All the pages of this NIT must be duly signed, sealed and uploaded by the bidder as a token of acceptance of the Terms and Conditions of the NIT.
10. **Price:** Price charged by the supplier for goods delivered under the contract shall not vary from the prices quoted by the supplier in its bid. Price consists of the cost of the equipment along with installation and commissioning of the unit along with trial run and satisfactory operational training of the entire unit with 3 years of comprehensive warranty along with all taxes and levies.
11. **Bid Validity:** The rate once quoted in this tender shall remain valid for a period of 365 days from the date of Financial Bid Evaluation. Bidders are therefore required to assess their rates before quoting them.
12. **Warranty:** All the spares and components of the BMC Set must be warranted by the supplier for a period of 3 years from the date of successful installation and commissioning. If any component is found to be non-functional due to any manufacturing defect or as a result of poor workmanship the component must be immediately replaced by the supplier within 24 hours free of cost and the replaced spare should have the warranty period of 3 years.

Warranty Extension: The warranty of equipment would be extended if equipment remains down during the warranty period, for more than period mentioned below: - ♦ If any major equipment has been down for more than 10 days in a year, warranty would be extended by one Month,

✦ If any major equipment has been down for more than 30 days due to malfunctioning of the any part supplied by supplier or want of spares/ consumable, warranty would be extended by 1 Year.

13. **Payment:** Payment shall be released in 3 phases in NEFT/RTGS to the Bank Account of the supplier after submission of 3 copies of invoice along with documents mentioned in Documentation clause which are as follows:
- a. **First Phase:** 70% payment shall be released within 1 month of successful delivery of the entire Unit in good condition certified by the Concerned Official and approved by the Competent Authority. EMD shall also be released after receipt of intimation in writing from the supplier.
(In case there is a delay in receipt of Govt. fund the timeline of supply shall be rescheduled and communicated to the supplier to avoid any confusion)
 - b. **Second Phase:** 20% payment shall be released after successful installation and commissioning of the entire Unit certified by the Concerned Official and approved by the Competent Authority.
 - c. **Third Phase:** 10% payment shall be released after 3 months of submission of equivalent amount of bank guarantee valid for a period of 3 years. This shall serve as Performance Guarantee. In case the party fails to provide maintenance and support as per the requirement of the Milk Union or is found to act in a way which jeopardizes the operations of the Milk Union, the Performance Bank Guarantee shall be forfeited after giving a Notice to the supplier in writing and the supplier shall be debarred from participating into any tender in future.
14. **EMD & Security Deposit:** EMD shall not carry interest. EMD of unsuccessful bidders shall be refunded within 2 working days after finalization of Award of Contract. EMD of the successful bidder shall be converted into Security Deposit and shall be released along with the first phase of payment.
Earnest Money Deposit (EMD):
A) All the bidders have to deposit **EMD Rs 83,000** in their NCDFI's escrow account for participation in the eAuction/bidding
(B) EMD by the bidder shall carry no interest.
(C) For successful bidder(s), the EMD shall be returned after deduction of the applicable TC on successful completion of the contract, whereas the EMD of the unsuccessful bidders will be released after completion of the eAuction. In case the bidder fails to deliver the goods within the stipulated period, the EMD of the bidder will be forfeited
15. **Insurance:** - The supplier shall make arrangements for insuring the goods against loss or damage incidental to manufacture or acquisition, transportation, storage and delivery. If the equipment's is not commissioned and handed over to The Ichhamati Co-Operative Milk Producers Union Ltd. within specified period, the insurance will have to be extended by the supplier at their cost till the successful installation, testing, commissioning and handing over of the goods to The Ichhamati Co-operative Milk Producers' Union Ltd.
12. **Penal Measure:** Time being the essence of the contract, failure to supply the materials within due time or delay in installation and commissioning of the materials shall invite penalty.
- I. **Liquidated damages of 0.5%** per week subject to a maximum of 10% of the total cost of materials shall be charged if goods are not delivered installed or commissioned in time and the amount will be deducted from the Security Deposit and bills submitted by the supplier.
 - II. For violation of any terms and conditions of the contract the Ichhamatii Milk Union reserves the right to cancel the contract without assigning any reason thereof. On

termination of Contract the Security Deposit will be forfeited and the resultant loss shall be recovered from the company. The subsequent company will be blacklisted for 3 years.

13. **Loading and Unloading** of goods is the responsibility of the purchaser. Supplier are required to notify the Milk Union prior to dispatch of goods.
14. **Site Preparation:** Preparation of site for installation and commissioning the Unit shall be arranged by the Milk Union.
15. **Documentation:** Complete documentation like principal warranty papers, operation manuals, document of technical specifications and guarantee cards have to be furnished by the supplier. Failure to submit any of the above documents in hard copies at the time of supply of the materials shall lead to non-acceptance of the material.
16. **Delivery, Installation and Commissioning:** The materials must be delivered installed and commissioned in the vicinity of the Village Level Cooperatives of North 24 Parganas district in West Bengal as mentioned in Installation Section of Technical Specification. The installation and commissioning of the unit must be completed within **20 days** from the acceptance of the Purchase Order. It is critically important to coordinate with the Milk Union before dispatch of materials.
17. **Inspection:** BMC unit after delivery are subject to inspection at dairy plants before acceptance. If rejected due to any defect, deficiency transit damage or wrong supply, the report of our inspector in this respect shall be final and no correspondence on the subject would be entertained. The rejected goods should be removed from our premises by the **Supplier within 15 days after receipt of our inspection report.**
18. **Standards:** The Goods supplied under this Agreement shall conform to the standards mentioned in the Technical Specifications and when no applicable standard is mentioned, to the authoritative standards appropriate to the Goods' to the latest Indian Standards.
19. **Registration of Goods:** If required under the Applicable Law, Goods supplied under the Agreement shall be registered for use in India.
20. **Patent Rights:** The Supplier shall indemnify the Purchaser against all third party claims of infringement of patent, trademark, or industrial design rights arising from use of the Goods or any part thereof.
21. **Packing:** The Supplier shall provide such packing of the Goods as is required to prevent their damage or deterioration during transit to their final destination, as indicated in the Purchase Order.
22. **Termination for Default** the Purchaser, without prejudice to any other remedy for breach of the Agreement, by written notice of default sent to the Supplier, may terminate this Agreement in whole or in part:
 - a) If the Supplier fails to deliver any or all of the Goods within the period(s) specified in the Purchase Order, or within any extension thereof granted by the Purchaser; or
 - b) If the Goods do not meet the Technical Specifications or registration requirement (if any) stated in the Agreement; or
 - c) If the Supplier, in the judgment of the Purchaser has engaged in fraud and corruption, in competing for or in executing the Agreement; or
 - d) If the Supplier fails to perform any other obligation(s) under the Agreement.

23. **Termination for Insolvency:** The Purchaser may at any time terminate the Agreement by giving written notice to the Supplier if the Supplier becomes bankrupt or otherwise insolvent.
24. **Termination for Convenience:** The Purchase, by written notice sent to the Supplier, may terminate the Agreement or the Purchase Order, in whole or in part, at any time for its convenience. The notice of termination shall specify that termination is for the Purchaser's convenience, the extent to which performance of the Supplier under the Agreement or Purchase Order is terminated, and the date upon which such termination becomes effective. The Goods that are already supplied before the Supplier's receipt of notice of termination shall be accepted by the Purchaser at the terms and prices described in the Agreement and the Purchaser order.
25. **Dispute Resolution:** Any dispute arising out of the Agreement, which cannot be amicably settled between the parties, shall be referred to adjudication/arbitration in accordance with the Arbitration and Conciliation Act of 1996 of India. The venue of adjudication/arbitration shall be Kolkata. The language of arbitration shall be English.
26. **Applicable Law:** The Agreement shall be interpreted in accordance with the laws of Union of India.
27. **Force Majeure:** If, at any time during the subsistence of this contract, the performance in whole or in part by either party of any obligation under this contract is prevented or delayed by reasons of any war or hostility, act of public enemy, civil commotion, sabotage, fire, floods, explosion, epidemics, quarantine restriction, strikers lockout or act of God (hereinafter referred to as events) neither party shall have any claim for damages against other in respect of such non-performance or delay in performance.
28. The undersigned reserves the right to accept or reject any tenders and to cancel the entire tender process at any point of time without assigning any reason thereof.
29. **Transaction Charges (TC):** NCDFI will levy TC from the successful bidder @0.4% + GST. Unsuccessful bidders need not pay any charges.
30. **TDS:** NCDFI will deduct TDS u/s 194 (O) from the seller's EMD on projected trade value at the time of issuance of the Bid Evaluation Result as statutory compliance

Sd/-
Managing Director
The Ichhamati Cooperative Milk Producers' Union Limited

Annexure – I

AFFIDAVIT (To be furnished in a Twenty Rupees NonJudicial Stamp Paper duly certified by Notary Public)

1. I/We the undersigned solemnly declare that all the statements made in the documents, records etc., attached with this application are true and correct to the best of my/our knowledge.
2. I/We the undersigned do hereby certify that neither my/our firm/company has been blacklisted by any Milk Union, Milk Federation or NDDB in the past.
3. I/We the undersigned do hereby certify that we have understood the terms and conditions and shall unconditionally comply to the terms and conditions of the Tender/Reverse Tender document.
4. I/We the undersigned authorize (s) and request any bank / person / firm / corporation / Government Departments to furnish pertinent information deemed necessary and requested by The Ichhamati Cooperative Milk Producers' Union Ltd. to verify the statement made by me/us or to assess my/our competence and general reputation.
5. I/We the undersigned understand(s) that further qualifying information / clarifications on the statement made by me / us may be requested by The Ichhamati Cooperative Milk Producers' Union Ltd and agree(s) to furnish such information/clarification within seven days from the date of receipt of such request from The Ichhamati Cooperative Milk Producers' Union Ltd.
6. I/We agreed to execute a formal Agreement embodying the terms & conditions of the Tender. **Dated**
Signature of Applicant with Seal:
To be signed by the officer authorized by the Firm/Company to sign on behalf, the
Firm/Company with company's seal)
Note: In case of sole proprietary concern, affidavit should be signed only by the sole proprietor.

(Title of the Officer)

(Title of the firm/Company)

(Date)

The above named deponent has understood the contents well and solemnly and sincerely declared and affirmed by the deponent in my presence at.....and signed before me on this day of (Seal).

(Signature of the Notary Public)