AVIVA Equipments Pvt. Ltd.

"Technical Specification of ISO certified Bulk Milk Chilling Units of *2000LTR* Capacity"

Submitted by

Aviva Equipments Pvt. Ltd., Ahmedabad, Gujarat.

INDEX

ANNEXURE – I
TECHNICAL SPECIFICATIONS

DETAILED TECHNICAL SPECIFICATIONS AND SCOPE OF SUPPLY

This chapter deals with the detailed specifications of items proposed in the scope of supply.

FUNCTIONAL REQUIREMENTS

The Bulk cooling units shall be used to cool raw milk at the village level co-operative milk societies from the ambient temperature to 4 degree centigrade in conformity to specified ISO 5708 2A II standard.

The cooling tank shall be used for immediately cooling the milk after milking so as to conserve the quality of milk and check the growth of microorganisms. It is intended for daily collection of milk. It is a hygienic container built to sanitary standards, which

besides cooling also serves as buffer storage prior to transfer of milk for onwards transportation for further processing.

Two milking system has been configured such that volume of each milking is as under:

i) Milking in the morning (up to 10 AM) - 50 %
ii) Milking in the evening - 50 %

The agitator provided in the cooling tank works intermittently and at a very gentle speed to avoid damage to the fat globules of milk. The agitator works only at temperatures below 20-25 ^{o} C so as to conserve butter fat structure.

TECHNICAL DATA

The bulk cooling tanks are built to ISO 5708 standard with categorization under Type 2AII.

The technical data for the complete module are given in enclosed Datasheet (ANNEXURE – II).

A) BULK MILK COOLER AT DCS- CAPACITY 500L TO 10000LBULK MILK STORAGE TANK AND REFRIGERATION CONTROL PANEL

1.0 Bulk Milk Cooler with Cover and Standard Accessories

1.1 Horizontal rectangular tank of capacity 300L 500L, 1000L & 2000L shall be supplied. (OPEN TYPE)

Tank inner, outer, bottom dimpled jacket and top open able cover shall be fabricated from Stainless Steel AISI 304 material and welded with TIG process. The inner shell and all other product contact surface shall be polished up to minimum 150 grits. The outer and inner surface shall be polished with circle finish.

The tank shall be complete with following:

- Top un-insulated cover with locking arrangement, inspection window, provision for agitator mounting and specially configured milk inlet. The top cover shall be hinged with a rugged arrangement comprising oil filled cylinders and mechanical springs to facilitate complete opening of tank cover for inspection and tank cleaning. A proper lifting handle in SS 304 construction is provided.

- Milk inlet complete with specially designed funnel terminating in no foam inlet arrangement with SS fine wire mesh.

- Outlets complete with specially designed lockable butter fly valve size 51mm and terminating in proper end connection with blank union.

- The insulation of the tank shall be done by injection, in situ, of high-density (minimum 40 kg/m3, CFC free and environmental friendly) polyurethane foam without having any imperfection and hygroscopicity. The efficiency of insulation is confirmed as per the requirement of ISO 5708 2A II (latest version) when the refrigeration unit is not working.

Ball feet specially made to prevent tempering, which could result in erratic measurement. Agitator in SS 304 construction complete with direct mount specially designed motor. The agitator is designed for producing uniform distribution of fat in milk.

1.2 Bulk Milk Storage Tank

Horizontal Closed Cylindrical tank of capacity 3000L, 5000L & 10000L shall be supplied.

Tank inner, outer, bottom dimpled jacket shall be fabricated from Stainless Steel AISI 304 material and welded with TIG process. The inner shell and all other product contact surface shall be polished up to minimum 150 grit finish.

The tank shall be complete with following:

- Top manhole cover with locking arrangement for inspection in SS 304 construction is provided.

- Milk inlet complete with specially designed no foam inlet arrangement for easy cleaning.
- Outlet complete with specially designed lockable butter fly valve size 51mm and terminating in proper end connection & blank union.
- The insulation of the tank shall be done by injection, in situ, of high-density (minimum 40 kg/m3, CFC free and environmental friendly) polyurethane foam without having any imperfection and hygroscopicity. The efficiency of insulation is confirmed as per the requirement of ISO 5708 2A II (latest version) when the refrigeration unit is not working.
- Ball feet specially made to prevent tempering, which could result in erratic measurement.
- Agitator in SS 304 construction complete with direct mount specially designed motor. The agitator is designed for producing uniform distribution of fat in milk.

2.0 Refrigeration Unit

The refrigeration system is designed for operation on R404A for Reciprocating/scroll compressors. The condensing units shall meet the latest safety standards.

The refrigeration system is designed with Single condensing unit for cap: 500L & 1000L & twin condensing units for Cap: 2000L, 3000L, 5000L & 10000L. The total evaporator circuit is divided in two segments and each segment is connected to an independent condensing unit in case of twin condensing unit. The condensing units shall operate on single phase for BMC Cap: 0.5KL, 1KL & 2KL and three-phase electric supply for capacity 3KL, 5KL & 10KL and each condensing unit shall comprise of the following:

2.1 Compressor - Hermetically sealed reciprocating/Scroll compressor complete with drive motor. The motor is fully enclosed suitable for specified electrical supply. It is confirmed that the hermetic is provided with thermister temperature sensor for protection against excess heating due to over loading and short-circuiting.

We shall also give optional to supply Scroll Condensing unit for the better efficiency and lower power consumption.

2.2 Condenser – Air-cooled, screen protected compact condenser unit comprising of finned condenser coils in several rows. Condenser fans of reputed make are fitted for the duty. The air circulation fans shall be induced draft type that will ensure blowing the air from inside to outside thereby making the system suitable for dusty and dry areas.

2.3 Receiver - A suitable size liquid receiver is included in the circuit of each condensing unit that would hold the refrigerant during maintenance and otherwise during the pump down cycle at the end of operation.

2.4 Thermostatic Expansion Valve – A thermostatic expansion valve shall be maximum operating pressure (MOP) type to ensure optimum quantity of refrigerant to the evaporator. It shall be ECTL make with suitably sized orifice if ECTL condensing units are considered and Danfoss Make if Danfoss condensing units are considered.

2.5 Evaporator – The evaporator shall be dimpled pressed plate jacket put at the bottom plate of the inner tank. The total evaporator area is divided and separated in to two sections and each section shall be operated by one condensing unit. All connecting pipes terminating outside the tank are of stainless steel construction. Our evaporator plate is laser welded for all capacity bulk milk cooling tank.

2.6 Refrigerant Pipes & Fittings and Controls – Compressors are provided with isolation valves to ease the maintenance. Copper/SS tubing for refrigerant shall be properly laid to facilitate attending the leakage if occurred during operation without dismantling the total system. All pipes are properly clamped on fixed support and sponge insulated for protection.

3.0 ELECTRICAL CONTROL PANEL

1) Refrigeration and Milk Tank control panel are included in the scope.

Refrigeration control panel and milk tank control panels and the main control panel shall be conforming to following specifications:

3.1 Refrigeration Control Panel:

One number control panel in dust and vermin proof design in stainless steel enclosure suitable for mounting on the wall is included. The panel is pre wired to terminal connections and shall comprise of the following:

- In coming MCB to receive power from main control panel (In stabilizer)
- Line voltage controller to guard the compressor against voltage supply fluctuation

Sequential controller with timer delay arrangement to avoid surge on power supply

- Selector switch for auto/manual mode of operation
- One number Switchgear i.e. contactors and overload relay for the motor of compressor, condenser and agitator.

3.2 Milk Tank Control Panel

This panel shall be mounted on the bulk milk storage tank together with refrigeration control panel. It is a pre manufactured control panel in SS 304 construction in dust and vermin proof design comprising the following:

- Digital Temperature Indicator and display range (0 to 100 Deg. C)
- Selector facility for selecting operation of agitator and compressors on auto or manual arrangement.

3.3 Cables & Electrical Switch Gears

The electrical switchgears as required are included in the control panels mentioned above. All power and control cabling between Main Control Panel, Refrigeration Panel and milk panel shall be flexible un-armoured, wherever laid through conduits. The conduits shall be heavy duty PVC type.

3.4 Tool Box and Operation Manual

A GI Sheet toolbox containing one set of all necessary tools required for regular maintenance of the unit shall be supplied along with the BMC.

Two set of operation & maintenance manual in Hindi and English containing complete details of starting, putting off, critical checks and day-to-day maintenance of the complete system shall be supplied. The manual shall also have the required electrical circuit diagrams.

Power Connection Require.

7.0 K.W / 9 H.P

ANNEXURE – II
TECHNICAL DATASHEET FOR BMC

Sr. No.	Description	2000L (Single/Three Phase) Open/Close Type
A.	MILK TANK	
1	Capacity - Rated /Gross	2000/2200+ Ltrs
2	Make and model	AVIVA-2 KL
3	Material used for construction (SS304/316)	SS 304
4	Shape	Horizontal/Rectangular/Cylindrical
	Orientation	Open Type/Close Type
5	Overall dimensions (without CDU) (LXWXH)	2400mm X 1460mm X 865mm (Open) 2000mm X 1500mm X 2050mm (Close)
6	Weight (with CDU)	560 Kg
7	No. and RPM of agitators	1 Nos. /30RPM
8	CIP facility	By brush - Manually
9	Thickness of Inner shell	2.0mm
10	Thickness of outer shell	1.5mm

AVIVA Equipments Pvt. Ltd.

11	Insulation:				
	Type		In-situ injected PUF		
	Thickness		50 mm		
	Density		40Kg/m3		
	Efficiency		As per standard		
12	Facility to measure milk volume		SS Dip stick with calibrated chart/Load Cell		
B	Refrigeration unit (Danfoss)*				
1	Make of compressor		Emerson/ Danfoss		
	Type of compressor		**Hermetically Sealed Scroll**		
	Model of compressor	**Danfoss**	**Emerson**		
		MT36	**CR 36**	**Reciprocating**	
		MLZ21	**ZB21**	**Scroll**	
	Size of compressor		2.5 TR X 2		
2	Make of condenser		Emerson/Shree/VINAYAK		
	Type of condenser		Air Cooled		
3	No. of compressor		Two		
4	Cooling capacity of compressor at 0 deg evaporating and 50deg condensing temp.(Kcal/Hr)		5588 X 2		
5	Number of fans		2		
6	Receiver size & capacity		3 Kg X 2		
7	Thermostatic Exp. Valve		Danfoss/Emerson, MOP/Renutrol		
8	Overall Dimension of cond. unit (LXWXH)		930mm X790mm X 680mm		
9	Type of refrigerant		R22	R404 & R22	
			CR36/MT36	MLZ21/ZB21	
C	DESIGN PARAMETERS				
1	Ambient temp. considered for design		45 deg. C		
2	Maximum cooling time for				
	All Milking		3.0 hrs		
	Second Milking		1.5 hrs		
3	Temperature range considered for				
	All Milking		35 to 4 Deg. C		
	Second Milking		10 to 4 Deg. C		

4	Safe Operating Temp	50deg.C
E	ELECTRICALS	
1	Connected load	
	Compressors (EMERSON-Scroll)	7.0 KW / 9 H.P
	Condenser fans	180W X 2
	Agitator(s)	70W / 90W
	Milk Pump	1000W
F	SERVO VOLTAGE STABILIZER	
	Capacity : 15 kva 3– phase • Input : Range : As Per Customer Requirement • Output: 400v Ac +/- 1% • With Change-Over Switch • With Bypass Switch • With Mcbs For Mains Isolator, Bulk cooler, Dairy Lighting & Milk Pump • With Kwh Meter, Battery Charger & Hour Meter For D.G. • With Digital 3– Phase Voltmeter, Current Meter, Frequency Meter. • With Auto- Manual System • With Under Voltage And Over Voltage Cutoff • With Efficiency Of 98% • Correction Speed Of Better 40 V Per Sec • M.S. Box With Pipe Structure Duly Powder Coated	

ANNEXURE – III

BATTERY LIMITS AND EXCLUSIONS BATTERY LIMITS

RAW MILK - At maximum temperature of 35°C shall be made available at the Balance tank by Society.

ELECTRICAL POWER – Three Phase Stabilized electrical powers including earthing shall be made available at the incoming feeder of Main Control Panel.

CHILLED MILK – 'Aviva' shall the chilled milk at the outlet of bulk milk cooler at 4 deg. C temperatures. Client/Union will connect the milk pump and hose pipe available on the Road Milk Tanker to the outlet of bulk cooling tank and unload milk.

CIP – Client/Union shall provide CIP solution at the CIP Solution at the balance tank in case of Close Type BMC.

EXCLUSIONS:-

- All types of civil works including grouting of skid and level floor with drains, grouting of supports, etc. The site preparation is excluded from our scope.
- Milk Unloading hose and the Road Milk Tanker pump with its electrical connection cable and starter is excluded. 'Aviva' would provide a socket at a convenient point to enable connecting the power supply for the tanker unloading pump.
- Main Control Panel with Servo Voltage stabilizer and Dg set are not included in scope of supply.
- Only first charge of refrigerant R - 22 and oil for cooling tank is included in our scope. Any additional charge of oil and refrigerant if subsequently required shall be provided by Client.
- The HT & LT power cables are excluded from the scope of supply.
- All types of consumables process water, electrical power; raw milk, etc. shall be arranged by client.
- Approval of local statutory authorities including NOC from GEB. 'Aviva' shall provide all necessary documentation as may be required.
- Any other item not specified in our offer.

WARRANTY

Subject to the terms of payment being punctually complied with And the equipment being operated properly, our machines carry a one year warranty, starting from the date of billing, against any manufacturing defect. Under the terms of our warranty, we are committed to repair or at our discretion, replace any defective component found within the said period. However, the defective parts must be sent to us by suitable means, at your expense, before seeking a replacement:

This warranty:

i) Does not extend to consequential damages or losses.
ii) Is null and void of any modifications are carried out without seeking our approval in writing.
iii) Does not cover electronic and electrical parts of the machine.
iv) Does not cover parts subject to normal wear and tear such as, coil of solenoid valves, bearings, heaters, indicating lamps etc.
v) Does not cover deterioration / failure of equipment due to adverse atmospheric conditions prevailing at site, improper usage and incorrect/

AVIVA Equipments Pvt. Ltd.

inadequate operating voltage. Suggested spares can be purchased for stocking at the time of delivery at additional cost.

vi) After successful installation if any refrigerant gas top up or charging of gas required it will be client scope or extra cost.

vii) Site visit will be chargeable within warranty period.

Yours truly,

For, Aviva Equipments Pvt. Ltd,

Bharat Shah
Managing Director