

## TECHNICAL SPECIFICATION

Sr. No.	Description	Unit	DATA
<b>1</b>	<b>Capacity</b>		
1.1	Working	L	10L TO 50L
<b>2</b>	<b>Hazards Classification</b>		
		-	Non Flame Proof
<b>3</b>	<b>Vessel Type</b>		
3.1	Shell		Cylindrical, Top end with flange
3.2	Top	-	Flat, Flanged
3.3	Bottom	-	Dish, Welded
3.4	Supports		Legs
3.5	Mounting	-	Skid
<b>4</b>	<b>Jacket</b>		
4.1	Shell		Plain
4.1	Bottom		No Jacket
<b>5</b>	<b>Material of Construction</b>		
5.1	Product contact parts	-	SS 316
5.2	Product non contact parts	-	SS 304
5.3	Gaskets & Sealing		Silicone
5.4	Stool assembly		SS 304
5.5	Bearing housing		SS 304
5.6	Motor guard		SS 304
5.7	Insulation & Insulation Cover		Suitably insulated for hot & cold application with SS 304 welded insulation cover.
<b>6</b>	<b>Surface Finish</b>		
6.1	Internal	-	Mirror Ra < 0.5 Micron
6.2	External		Matt or Mirror finish Ra < 0.8 Micron
<b>11</b>	<b>Maximum air flow rate</b>	vvm	2
<b>12</b>	<b>Air Inlet</b>		
	0.2 μ absolute rated PTFE sterile air filter for Top Air and Sparger		
<b>13</b>	<b>Air Exhaust System</b>		
	Exhaust line of shall be equipped with suitably sized air condensor and 0.2 μ absolute rated PTFE filter.		
<b>14</b>	<b>Design Conditions</b>		
14.1	Design Code		ASME SEC. VIII DIV. 1 / BPE 2002
14.2	Design Pressure		
14.2.1	Shell	Barg	Full Vacuum to 3
14.2.2	Jacket	Barg	Full Vacuum to 4
14.3	Design Temperature		
14.3.1	Shell	°C	150
14.3.2	Jacket	°C	150
<b>15</b>	<b>Nozzles</b>		
15.1	<b>Top</b>		
15.1.1	MH / HH with sight glass	mm	50 ∅
15.1.2	Air Exhaust	mm	19 ∅
15.1.3	Light Glass	mm	50 ∅
15.1.4	Pressure Gauge	mm	38 ∅

15.1.5	Safety valve	mm	25 Ø
15.1.6	Foam level sensor	mm	38 Ø
15.1.7	Inoculum inlet	mm	12 Ø
15.2	<b>Shell</b>		
15.2.1	Alkali inlet	mm	12 Ø (Top part of fermenter shell)
15.2.2	Antifoam inlet	mm	12 Ø (Top part of fermenter shell)
15.2.3	Nutrient Inlet	mm	12 Ø (Top part of fermenter shell)
15.2.4	Spare	mm	12 Ø (Top part of fermenter shell)
15.2.5	Air sparger	mm	12 Ø
15.2.6	Surface air line	mm	12 Ø (Top part of fermenter shell)
15.2.7	Temperature sensor Port	-	25 Ø, Ingold
15.2.8	pH sensor Port	-	25 Ø, Ingold
15.2.9	DO sensor Port	-	25 Ø, Ingold
15.2.10	View glass	-	
1.2.11	Sampling arrangement - 3 valve assembly (Steam sterilizable)	mm	12 Ø
15.2.12	Jacket Inlet	mm	DN 15
15.2.13	Jacket outlet	mm	DN 15
15.3	<b>Bottom</b>		
15.3.1	Flush bottom valve (Steam Sterilizable)	mm	19 Ø

Sr. No.	Description	Unit	DATA
	<b>Process Control System</b>		
16	<b>Temperature &amp; Sterilization(121 Degree Auto Control)</b>		
	Temperature during fermentation shall be automatically controlled in PID mode		
17	<b>Air Flow</b>		
	Air flow during fermentation shall be controlled using Mass Flow Controller(Optional), Glass tube type Rotameter with needle valve & Solenoid Valve.		
18	<b>Pressure</b>		
	Positive pressure in the fermenter shall be controlled through PID Control valve provided in the exhaust line after exhaust air filter.		
19	<b>pH</b>		
	pH sensor and transmitter shall be provided for indicating and controlling the pH during fermentation. Alkali addition through peristaltic pump provided on the panel board.		
20	<b>DO</b>		
	DO sensor with amplifier to indicate dissolved oxygen level during fermentation. DO to be controlled by adjusting the air flow rate, stirrer speed and pure oxygen purging through sparger in Auto cascade Mode.		
21	<b>Foam Level</b>		
	Foam shall be controlled automatically. Antifoam solution addition through fixed speed peristaltic pump provided on the control panel.		
22	<b>Agitator Speed</b>		
	For variation of speed from 10 - 1500 RPM by variable frequency drive.		
23	<b>Local Panel</b>		
	A common local panel for shall be provided housing PLC, HMI, pH transmitter, DO amplifier, VFD etc. Material of construction of panel shall be SS 304.		
24	<b>Data Acquisition System 21 CFR ( Optional)</b>		
	Capturing on line data of all fermentation parameters like Temperature, pH, DO and agitator speed etc maintained during the fermentation cycle.		
25	<b>General Note :</b>		
	Complete system alongwith fermenter and accessories including process and utility piping shall be skid mounted with all process and utility piping. Skid frame shall be constructed with SS 304 square pipe of suitable size, ready for installation.		