

GreatFlo Proficient

— Fermenter/Bioreactor —

Reliable Performance within reach.



GREATFLO PROFICIENT

Fermenter / Bioreactor - Salient Features

5 L Working Volume | 7 L Total Volume | In-Situ Sterilizable SS Vessel

A compact, stainless-steel in-situ sterilizable fermenter/bioreactor configuration combining robust vessel construction, controlled agitation, process sensing, gas management and PLC-HMI based operation.

CORE PROCESS PLATFORM

5 L Working Volume 7 L total vessel volume with a stated minimum working volume of 2 L.	SS 316L Process Vessel SS 316L body with flat SS 316L top plate; jacket provided in SS 304.
In-Situ Sterilization Automatic sterilization through the steam jacket, with operation up to 125°C.	ASME-Based Vessel Design Vessel design specified as per ASME Section VIII Division I.
Sterile Process Capability Supports sterile addition, sterile sampling/inoculation and multiple independent process circuits.	Process Visibility Longitudinal sight-glass assembly with 10 mm toughened glass.

AGITATION & MIXING

Top-Drive Agitation Mechanically coupled top drive with bearing assembly and single mechanical seal.	Wide Speed Range Variable servo drive control from 50 to 1500 rpm with real-time HMI display.
400 W Servo Motor Top-mounted servo motor rated at 400 W.	Rushton Turbine System Three 6-blade Rushton impellers for process mixing.
Four Baffles Four baffles are specified in the vessel.	Electro-Polished Product Contact Parts Impellers and baffles specified in SS 316L, electro-polished to Ra 0.4 µm.

INSTRUMENTATION & PROCESS CONTROL

PLC + Touchscreen HMI PLC-based controller with 7-inch colour touchscreen HMI.	SCADA Compatibility Controller is specified as compatible with future SCADA upgrade.
Temperature Measurement PT100 RTD temperature sensor provided.	pH Measurement & Control Hamilton gel-filled pH probe with control range of pH 2-12. With Integrated micro transmitter and Bluetooth connectivity.
Optical DO Measurement Hamilton optical DO probe with range of 0-100% saturation. With Integrated micro transmitter and Bluetooth connectivity.	Automatic Antifoam Control Capacitance-principle SS foam probe with automatic defoaming-agent addition.
Peristaltic Addition Three fixed-speed peristaltic pumps for acid, alkali and inoculum, plus one fixed-speed defoaming pump.	Process Timer Temperature-control timer specified up to 99 minutes.

AERATION & GAS MANAGEMENT

Dual Rotameters Two rotameters for Air and O ₂ ; aeration stated up to 1 VVM / 10 LPM.	Electronic MFC One electronic Mass Flow Controller is included.
4-Port Gas Valve Assembly Four-port solenoid valve assembly provided for gas-flow management.	Ring Sparger Air inlet uses a ring sparger with by-pass arrangement and upper side entry.
Sterile Gas Filtration Two 2.5-inch, 0.2 µm PTFE Sartorius absolute filters with SS housing.	Exhaust Management Air outlet is provided with an exhaust condenser.

PROCESS PORTS & HANDLING

Dedicated Sensor Ports Separate ports for temperature, pH, DO and antifoam sensing.	Addition Ports Three hypodermic-needle-type ports for acid, alkali and inoculum addition.
Sampling & Harvest 25 mm flush-bottom sampling valve and flush-bottom harvest valve with 25 mm TC end.	Pressure Monitoring Top-plate pressure gauge specified from -1 to 3 bar.
Light Port Dedicated light port on the top plate.	Ease of Use & Maintenance Functional specification explicitly emphasizes ease of operation and maintenance.

UTILITIES & SUPPORT EQUIPMENT

Main Electrical Supply Main power supply specified as 415 VAC, 50 Hz.	Water Requirement Potable water requirement stated above 0.5 bar at 15-20°C.
Instrument Air Dry, oil-free, filtered instrument air required at 7 bar.	Air Compressor 1 HP compressor with regulator, 50 L tank, 67.86 LPM output and 8.5 bar working pressure.
Chilled Water Circulator CRC 110 circulator with 10 L SS 304 tank and in-built centrifugal pump.	Temperature-Control Utility Chilled-water circulator range specified from ambient to +4°C with $\pm 1^\circ\text{C}$ accuracy.

SALIENT CONFIGURATION AT A GLANCE

Working Volume	5 L	Total Volume	7 L
Agitation	50-1500 rpm	Motor	400 W Servo
Controller	PLC + 7-inch HMI	Sterilization	Automatic / Steam Jacket
pH	Hamilton, pH 2-12	DO	Hamilton Optical, 0-100%
Gas Control	2 Rotameters + 1 MFC	Sparger	Ring Sparger
Vessel Material	SS 316L	Max. Temperature	125°C

VFL SCIENCES PRIVATE LIMITED

3rd Floor, Kanagamani Complex, Plot No 6, 200 feet Road, Ponnammanmedu, Chennai 600110
Tel: +91 6385866828 | Email: info@vflsciences.com | Website: www.vflsciences.com
CIN: U28299TN2023PTC163152



TECHNICAL SPECIFICATION DOCUMENT

GreatFlo Proficient Fermenter/Bioreactor 5 Liter Working Volume In-Situ Sterilizable SS Vessel

SECTION I. GENERAL OVERVIEW

1. Fermenter Vessel

Parameter	Specification
Design	As per ASME Sec VIII Div. I
Working Capacity	5 L
Total Volume	7 L
D/H Ratio	1:2.5
Head Plate	SS 316L Flat Top
Head Plate Thickness	18 mm
Flange Thickness	14 mm
Body	SS 316L
Body Thickness	4 mm
Jacketed	Yes (SS 304)
Jacket Thickness	4 mm
Jacket Insulated	Non-Insulated

2. Agitation

Parameter	Specification
Location	Top
Type	Mechanically coupled to the shaft
Seal	Single Mechanical Seal
Installed Power	400 Watts
Rotating Speed	50-1500 rpm
Six-Bladed Rushton Turbine	3 Nos.

3. PORTS

Port	Specification
Pressure Gauge	1 No. (-1 to 3 bar) (Top Plate)
Light Port	1 No. (Top Plate)
Air Outlet with Exhaust Condenser	1 No. (Top Plate)
Sampling Port	1 No. - 25 mm (Flush Bottom Sampling Valve)
Acid, Alkali & Inoculum Ports	3 Nos. (Hypodermic Needle Type)
Air Inlet	Ring Sparger with By-Pass Arrangement (Upper Side Entry)
Temperature Sensor Port	1 No. (Shell)
pH Probe Port	1 No. (Shell)
DO Probe Port	1 No. (Shell)
Antifoam Probe	1 No. (Top Plate)
Harvest Port	Flush Bottom Valve with 25 mm TC End

4. INSTRUMENTATION AND SENSORS

Parameter	Specification
Temperature Sensor PT100 RTD	Yes (1 No.)
pH Probe	Yes (1 No.)
DO Probe	Yes (1 No.)
Antifoam Probe	Yes (1 No.)
Rotameter	Yes (2 Nos. - Air & O2)
Electronic Mass Flow Controller (MFC)	1 No.
4-Port Solenoid Valve Assembly	For Gas Flow Management

SECTION II. FUNCTIONAL SPECIFICATIONS

- Designed for ease of use and maintenance in all applications.
- Designed for sterile processes with multiple independent circuits.
- Temperature Control: Steam through jacket using automatic valves with integrated electrically heated steam generator.
- Sterile Addition: pH correction, antifoam, nutrients, etc.
- Aeration: Surface and sparger aeration.
- Sterile Sampling/Inoculation: Supported.
- Vessel Material: SS316L for long life and high quality.

SECTION III. MECHANICAL SPECIFICATIONS

Fermenter

Parameter	Specification
Fermenter Mounted On	Powder-coated Mild Steel Skid/Table
Vessel Shape	Flat Top and Dished Bottom
Working Volume	5 L
Total Volume	7 L
Minimum Working Volume	2 L
Maximum Operating Temperature	125°C
Jacket Connections	Inlet/Outlet
Sight Glass Assembly	Longitudinal with 10 mm Toughened Glass
Top Plate	SS316L with Milled Screws and Washers

Agitation System

Parameter	Specification
Motor Position	Top Plate with Bearing Assembly
Motor Type	Servo Motor
Motor Power	400 Watts
Maximum Speed	1500 rpm
Minimum Speed	50 rpm
Power Supply	230 V, 50 Hz
Drive Mechanism	Mechanical Coupling with Single Mechanical Seal
Impellers	Three 6-Blade Rushton Impellers
Baffles	4 Nos. (1/10 ID from Bottom to Working Volume)
Impeller & Baffle Material	SS316L, Electro-Polished (Ra 0.4 µm)

SECTION IV. INSTRUMENTATION AND CONTROL SYSTEM

Controller

Parameter	Specification
Controller	PLC with 7-inch Color Touch Screen HMI
Future Upgrade	SCADA Compatible

AGITATOR SPEED CONTROL

Parameter	Specification
Speed Control	Variable Servo Drive Control
Display	Real-Time Speed Display on HMI

TEMPERATURE CONTROL

Parameter	Specification
Sterilization	Automatic Sterilization via Steam Jacket
Cooling	Water Circulation in Jacket
Control Range	Up to 125°C
Accuracy	±1°C
Timer	Up to 99 Minutes

pH AND DO CONTROL

Parameter	Specification
pH Probe	Hamilton (Gel Filled, Switzerland)
DO Probe	Hamilton Optical Type (Switzerland)
pH Range	2-12
DO Range	0-100% Saturation
Peristaltic Pumps	3 Fixed-Speed Pumps for Acid, Alkali & Inoculum

ANTIFOAM CONTROL

Parameter	Specification
Foam Detection	SS Probe (Capacitance Principle)
Defoaming	Automatic Defoaming Agent Addition
Defoaming Pump	1 Fixed-Speed Peristaltic Pump

UTILITY MODULE

Parameter	Specification
Aeration	2 Rotameters (Maximum 1 VVM / 10 LPM)
Electronic Mass Flow Controller (MFC)	1 No.
Gas Flow Management	4-Port Solenoid Valve Assembly
Absolute Filters	Two 2.5-inch, 0.2 µm PTFE Sartorius Filters with SS Housing

SECTION V. POWER / UTILITY SUPPLY REQUIRED

Main Power / Utilities

Parameter	Specification
Main Power Supply	415 VAC, 50 Hz
Potable Water	>0.5 bar, 15-20°C
Air Supply	Dry, Oil-Free, Filtered Instrument Air at 7 Bar

Air Compressor

Parameter	Specification
Motor	1 HP
Regulator	Included
Output Capacity	67.86 LPM
Tank Capacity	50 L
Voltage	440 V, 50 Hz
Working Pressure	8.5 Bar

Chilled Water Circulator - Model CRC 110

Parameter	Specification
Tank Capacity	10 L
Tank Material	SS304
Temperature Range	Ambient to +4°C
Accuracy	±1°C
Controller	Microprocessor-Based Digital PID
Pump	In-built Centrifugal Pump for External Circulation
Voltage	230 V, 50 Hz

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