SARTORIUS

Product Datasheet

Biostat STR® Generation 3 for Emerson's DeltaV™

Pre-Engineered for True Native Integration and Ultimate Upstream Performance

Product Information

Biostat STR® Generation 3 for Emerson's DeltaV™ hardware, software toolkit, and consumables comprise a state-of-the-art, single-use biomanufacturing platform developed for easy, fast, and seamless native integration into plant DCS. The system is specifically designed with DeltaV™ components and other preferred features with native EtherNet/IP™ communications at the device level while fully leveraging the proven bioreactor | bag design and technology of the Biostat STR® family for commercial manufacturing.

Biostat STR® bioreactors and Flexsafe STR® bags encompass a size range of 50 L to 2,000 L, prioritizing quality, precision, and seamless scalability.

These advanced solutions enable accelerated success through the establishment of stable processes, ensuring the safe and reliable production of biologic medicines for patients globally.

Features and Benefits

- Stay flexible and optimize space
- Improve productivity and ease of use
- Seamless true native integration into plant DeltaV™ DCS
- Increase speed to market
- Optimize capital costs
- Reduce maintenance costs
- Achieve superior process control

Technical Specifications

Table 1: *Bag Holder With TCU*

	Biostat STR® 50	Biostat STR® 200	Biostat STR® 500	Biostat STR® 1000	Biostat STR® 2000
Material			AISI 304 L stainless steel		
Dimensions (W × D × H) [mm | in]	815 × 1,061 × 1,951 | 32 × 47.8 × 77	815 × 1,291 × 1,977 | 32 × 50.8 × 78	1,058 × 1,614 × 2,308 | 41.7 × 63.5 × 91	1,250 × 1,664 × 2,689 | 49.2 × 65.5 × 106	3,460 × 2,676 × 3,762 | 136.2 × 105.4 × 148.1 (incl. platform)
Footprint [m² | ft²]	0.86 | 9.26	1.05 | 11.3	1.71 | 18.41	2.08 | 22.4	9.3 | 100.1 (incl. platform)
Weight [kg | lb]	325 | 716.5	445 | 981.1	700 | 1,543	875 | 1,929	2,300 | 5,070.6 (incl. platform)
Packaging Dimensions [mm | in]	1,450 × 1,150 × 2,200 | 57.1 × 45.3 × 82.7	1,450 × 1,150 × 2,200 | 57.1 × 45.3 × 82.7	1,800 × 1,200 × 2,400 | 70.9 × 47.2 × 94.5	1,800 × 1,500 × 2,600 | 70.9 × 59 × 102.4	
Installed on skid	■	■	■	■	■
Double wall	■	■	■	■	■
Electro-polished	■	■	■	■	■
Single front door	■	■	■	■	■
Holder for gas filters	■	■	■	■	■
Viewing window	1	1	1	1	1
Lateral window for sensors and ports	2	2	2	2	2
Top drive motor	■	■	■	■	■

■ Available - Not available □ Optional, needs to be ordered separately

Figure 1: *Biostat STR® Generation 3 for Emerson's DeltaV™ 50 | 200 | 500 | 1000 | 2000*

Table 2: *Main Control Cabinet*

Specifications for All Biostat STR® Models and Sizes	
Material	AISI 304 stainless steel
Dimensions without carriage (W × D × H), [mm | in]	1,000 × 1,050 × 1,765 | 39.4 × 41.3 × 69.5
Footprint with carriage [m^2 | ft^2]	1.05 | 11.03
Weight [kg | lb]	305 | 673
Single version	■
Installed on skid	■
HMI	(usually part of plant DCS)
Transmitter with local displays	■
Safety measurement and shut-off	■
Designed for GMP commercial manufacturing	■

■ Available - Not available □ Optional, needs to be ordered separately

Table 3: *Facility and Utility Requirements*

	Biostat STR® 50	**Biostat STR® 200**	**Biostat STR® 500**	**Biostat STR® 1000**	**Biostat STR® 2000**
Power Supply Power | Frequency | Consumption					
208 VAC | 60 Hz | 23 A	■	■	■	■	■
Gas Supply	Gas specification according to ISO 8573-1: dry, free of oil and dust				
Compressed air [bar]	2	2	2	4	4
Gas pressure O_2, N_2, CO_2 [bar]	2	2	2	4	4
Water Supply					
Cooling water – supply pressure [bar]	1.5	1.5	1.5	1.5	2
Drain for water [lpm]	25	25	25	25	40
Temperature (min.) [°C | °F]	8 | 46	8 | 46	8 | 46	8 | 46	8 | 46
Degree of hardness (max.), [dH]	12	12	12	12	12
Environmental Requirements					
Ambient temperature [°C | °F]	5 – 25 | 41 – 77	5 – 25 | 41 – 77	5 – 25 | 41 – 77	5 – 25 | 41 – 77	5 – 25 | 41 – 77
Relative humidity range [%]	40 – 80	40 – 80	40 – 80	40 – 80	40 – 80

■ Available - Not available □ Optional, needs to be ordered separately

Table 4: *Process Control*

	Biostat STR® 50	Biostat STR® 200	Biostat STR® 500	Biostat STR® 1000	Biostat STR® 2000
Agitation Module					
Max. stirrer speed[1] [rpm]	240	150	110	90[2]	70
Temperature Control Unit					
Type	Heating | cooling	Heating | cooling	Heating | cooling	Heating | cooling	Heating | cooling
Heating kW | Cooling HP					
Temperature control, double wall	8 °C (46 °F) above cooling water up to 40 °C (104 °F)	8 °C (46 °F) above cooling water up to 40 °C (104 °F)	8 °C (46 °F) above cooling water up to 40 °C (104 °F)	8 °C (46 °F) above cooling water up to 40 °C (104 °F)	8 °C (46 °F) above cooling water up to 40 °C (104 °F)
Over-temperature protection	■	■	■	■	■
Connection to pressure-rated	■	■	■	■	■
Cooling Water [bar]	up to 6	up to 6	up to 6	up to 6	up to 6
Agitation Module	Four-gas mix (O_2, N_2, CO_2, air) with three outlets				
Mass Flow Controllers (MFC)					
Number of MFCs	8	8	8	8	8
Accuracy of MFC	±1% full-scale	±1% full-scale	±1% full-scale	±1% full-scale	±1% full-scale
For sparger line	Ring sparger, micro- or combi-sparger (O_2, N_2, CO_2, air)				
Flow Rates [lpm][3]	(0.02 – 5)	(0.08 – 20)	(0.2 – 50)	(0.4 – 100)	(1.4 – 200)
For overlay line	(CO_2, air)				
Flow rates [lpm][3]	(0.02 – 5)	(0.08 – 20)	(0.2 – 50)	(0.4 – 100)	(1.4 – 200)
Advanced DO Controller	■	■	■	■	■
Max. gassing rate [vvm]	0.1 for micro sparger				
Max. total gassing rate [vvm]	0.2 for all STR sizes				
External Pumps					
At media control hub	6 (up to 8)	6 (up to 8)	6 (up to 8)	6 (up to 8)	6 (up to 8)

Table 4: *Process Control (Continued)*

	Biostat STR® 50	Biostat STR® 200	Biostat STR® 500	Biostat STR® 1000	Biostat STR® 2000
Sensors and Measurement					
Temperature Probe Pt100	■	■	■	■	■
Measurement range [°C | °F]	0 – 150 | 32 – 302	0 – 150 | 32 – 302	0 – 150 | 32 – 302	0 – 150 | 32 – 302	0 – 150 | 32 – 302
pH, Single-Use, Optical	■	■	■	■	■
Measurement range	6.0 – 8.0	6.0 – 8.0	6.0 – 8.0	6.0 – 8.0	6.0 – 8.0
Recalibration function	■	■	■	■	■
pH, Electro-Chemical, Multiuse and Single-Use	■	■	■	■	■
Measurement range	3 – 10 / 0 – 12	3 – 10 / 0 – 12	3 – 10 / 0 – 12	3 – 10 / 0 – 12	3 – 10 / 0 – 12
DO, Single-Use Optical	■	■	■	■	■
Measurement range [%]	0 – 110	0 – 110	0 – 110	0 – 110	0 – 110
Recalibration function	■	■	■	■	■
DO Optical or Polarographic, Reusable	■	■	■	■	■
Measurement range [%]	0 – 110	0 – 110	0 – 110	0 – 110	0 – 110
Load cells	■	■	■	■	■
Balance substrate	(up to 6)	(up to 6)	(up to 6)	(up to 6)	(up to 6)
BioPAT® Viamass	□	□	□	□	□
BioPAT® Trace (Glucose | Lactate Sensor)	-	-	-	-	-

Table 4: *Process Control (Continued)*

	Biostat STR® 50	Biostat STR® 200	Biostat STR® 500	Biostat STR® 1000	Biostat STR® 2000
Accessories					
Media control hub	■	■	■	■	■
Ladder | platform	-	-	■	■	■
Bag lifting device[4]	-	□	□	□	■
Filter line IN	■	■	■	■	■
Filter line OUT	■	■	■	■	■
SU exhaust cooler	■	■	■	■	-
Holder for conventional probes	■	■	■	■	■

■ Available - Not available □ Optional, needs to be ordered separately

[1] Valid for 2 × 3-blade impellers. In case of 1 × 3-blade and 1 × 6-blade impellers, the maximum stirrer speed may be reduced depending on the filling level.
[2] At maximum filling level, the stirrer speed is limited to 70 rpm at 1,000 L scale.
[3] Alternative lower flow ranges are available upon request.
[4] Bag Lifting Device is required for the operation of 2,000 L Biostat STR® and is optional but strongly recommended for the operation of 500 and 1,000 L.

Table 5: *Communication | Control Tower Interface*

	Biostat STR® 50	Biostat STR® 200	Biostat STR® 500	Biostat STR® 1000	Biostat STR® 2000
DeltaV™ primary network	■	■	■	■	■
DeltaV™ secondary network	■	■	■	■	■
Industrial Ethernet (EtherNet/IP™)*	■	■	■	■	■
Native EtherNet/IP™ at device level (scales, pumps, sensors etc.)	■	■	■	■	■

■ Available - Not available □ Optional, needs to be ordered separately

Note. With a PK series controller onboard the skid, only two ethernet connections are required for the primary and secondary DeltaV™ network. However, if the PK controller is externally located or it is an S or M series controller, the third ethernet connection is required to integrate the EtherNet/IP™ devices. Native EtherNet/IP™ on most devices, where not available, brought into EtherNet/IP™ network via convertors.

*EtherNet/IP™ is a trademark of ODVA, Inc. For more information regarding ODVA, visit www.odva.org

Table 6: *Geometrical Data of Flexsafe STR® Bags*

Flexsafe STR®	50 L	200 L	500 L	1,000 L	2,000 L
Total volume [L]	68	280	700	1,300	2,800
Max. working volume [L]	50	200	500	1,000	2,000
Min. working volume [L]	12.5	50	125	250	500
Turndown ratio	1:4	1:4	1:4	1:4	1:4
Bag diameter, d1 [mm]	370	585	815	997	1,295
Bag height, h1 [mm]	666	1,055	1,467	1,800	2,330
Ratio, h1/d1	1.8	1.8	1.8	1.8	1.8
Liquid height, h2 [mm]	480	783	1,005	1,360	1,670
Ratio, h2/d1	1.3	1.34	1.23	1.36	1.29
Impeller diameter, d2 [mm]	143	225	310	379	492
Ratio, d2/d1	0.38	0.38	0.38	0.38	0.38
Distance between impellers [mm]	186	300	403	493	640
Volume bottom impeller, fully immersed V1 [L]	12.5	50	125	250	395
Volume top impeller does not touch surface V2 [L]	23	95	247	450	953
Volume top impeller, fully immersed V3 [L]*	31	125	327	597	1,266
Bag packaging dimensions W × D × H [mm | in]	395 × 395 × 1170 | 15.5 × 15.5 × 46	395 × 595 × 1440 | 15.5 × 23.4 × 56.7	764 × 1153 × 1320 | 30.1 × 45.4 × 52	764 × 1153 × 1440 | 30.1 × 45.4 × 56.7	995 × 1195 × 1715 | 39.2 × 47 × 67.5

* Volume varies depending on the bag configuration (e.g., impeller and sparger configuration).

Table 7: *Example of Flexsafe STR® 200 L Basic Configuration*

Position	Designation	Tubing Material	Tubing Termination	Remarks
A	Overlay aeration	Si(Pt)	Opta connector	Without spare port
B	Substrate line 1	Si - TPE	MPC quick coupling	
C	Substrate line 2	Si - TPE	MPC quick coupling	
D	Sparger aeration	Si(Pt)	Opta connector	Without spare port
E	Substrate 3 – 4	Si - TPE, C-Flex®*	MPC quick coupling	Two lines via Y, dip tube
F	Base addition	Si - TPE, C-Flex®*	Clave connector	
G	Antifoam addition	Si - TPE, C-Flex®*	Clave connector	
H	Gas out (exhaust)	ID, Si(Pt)	Opta connector	Two lines via Y
I	Temperature sensor	Si(Pt)	-	Reusable sensor (Pt100)
J	DO sensor	-	-	Optical single-use sensor
K	pH sensor	-	-	Electrochemical single-use sensor
L	Small-volume sampling	Si - TPE, Si(Pt)	Clave connector	
M	Bottom-drain harvest	Si - TPE, C-Flex®*	MPC quick coupling	

- Not available

*C-Flex® is a registered trademark of Saint-Gobain Performance Plastics Corporation.

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