

# LyoConstellation™ S100

## Production Lyophilizer



### Key Features

- Powerful, configurable, aseptic production freeze dryer with optional SP Hull Row-by-Row (RxR-36) loading system
- Range of telemetry options to fit Line of Sight™ approach enabling easy transfer of cycles
- Optional LyoFlux\* 200 TDLAS instrument to measure vapor mass flow, and infer critical process data
- Optional ControlLyo® Nucleation Technology for improved product homogeneity and process efficiency
- Optional Tempris\* for wireless temperature sensing

### Specifications

Lowest Shelf Temperature	-55 °C
Shelf Temperature Control Range	-50 °C to +50 °C
Shelf Temperature Control Accuracy At Shelf Inlet Manifold	-40 °C to +40 °C: ± 0.5 °C Outside this range: ± 1.0 °C
Shelf Pull-Down From 20 °C To -40 °C	≤ 60 minutes
Shelf Temperature Uniformity <sup>1</sup>	± 1.0 °C
Lowest Condenser Temperature	-65 °C
Condenser Capacity	150 L
Condenser Pull-Down From 20 °C To -45 °C	≤ 60 minutes
Condenser Deposition Rate	150 L / 24 hour
Compressor Horsepower	22.4 kW (30 hp)
Vacuum Rate Of Rise <sup>2</sup>	≤ 30 mTorr/hour
Volume-Based Leak Rate <sup>2</sup>	≤ 15 mTorr-L/sec (0.02 mbar-L/sec)
Lowest System Vacuum <sup>2</sup>	≤ 20 mTorr

**Note\*:** Performance specifications are based on SP test data from clean, dry and empty (CDE) units operating at an ambient room temperature of approximately 20 °C. SP recommends an optimum operating range of 15-25 °C (59-77 °F) with an RH of ≤ 80 % at sea level.

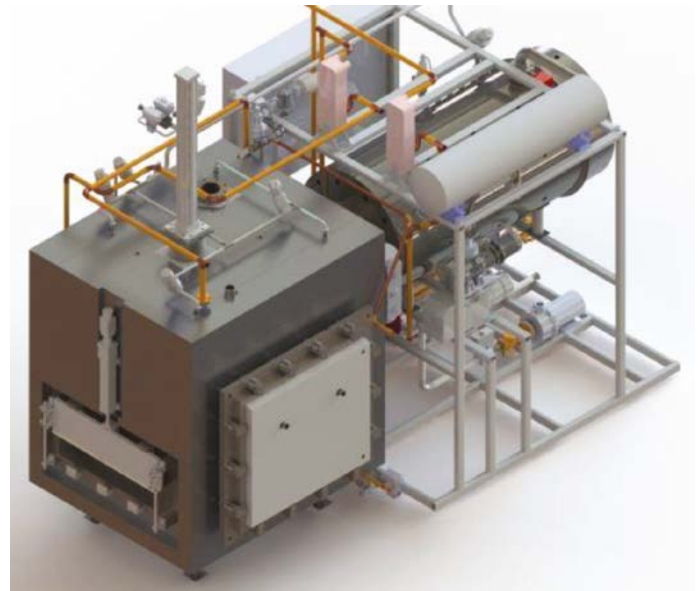
### Electrical Requirements

Voltage	208 VAC	400 VAC	480 VAC
Hertz	60 Hz	50 Hz	60 Hz
Phase	3 Φ (4 wire)	3 Φ (5 wire)	3 Φ (4 wire)
Breaker Amperage	275 A	150 A	125 A

### ControlLyo® Requirements (Optional)

Volume To Vent Percentage Ratio (Vv/V <sub>R</sub> )	< 6.5 %
--	---------

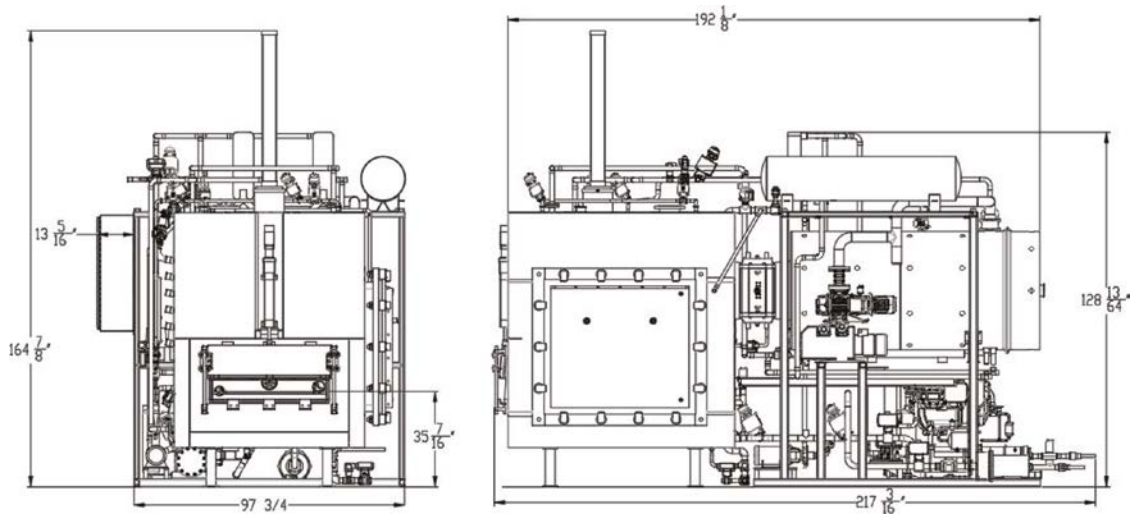
**Note:** Vent Volume (Vv) is the product chamber volume multiplied by 10. The volume of a standard SP Hull LyoConstellation S100 chamber is 4.99 m<sup>3</sup> (176.5 ft<sup>3</sup>). V<sub>R</sub> is the volume of the room in which the lyophilizer is located.



SP Hull LyoConstellation S100

### Utility Requirements

Compressed Air	5.52–6.89 barg (80–100 psig)
Cooling Water <sup>3</sup>	189.3 Lpm @ 26.6 °C (50 gpm max @ 80 °F)
Chamber Cooling Water	94.6–378.5 Lpm (25–100 gpm)
Inert Gas For Backfilling	9.3 Lpm @ 0.344–2.06 barg (0.33 scfm @ 5–30 psig)
Inert Gas For VLC / Vacuum Release	368 Lpm @ 0.344–2.06 barg (13 scfm @ 5–30 psig)
Inert Gas Consumption (Full Vacuum Release)	5,235 L @ 1 ATM
Inert Gas For ControlLyo®	2.41–2.75 barg (35–40 psig)
Steam For Sterilization In Place (SIP)	226 kg/hour (500 lbs/hour) @ 1.38–1.72 barg (20–25 psig)
Clean In Place (CIP) Water/Media	189 Lpm (50 gpm) @ 2.75 barg (40 psig)
Heat Output (Machine Room), Peak	0.846 kW/hour (2,890 BTU)



### Dimensional Data

Width	2.82 m (111.1 in)
Length	5.51 m (217.2 in)
Height	3.25 m (128.2 in)
Height, Inc. Stoppering Ram	4.19 m (164.9 in)
Maximum Weight	10,228 kg (22,550 lb)

**Note:** LyoFlux\* 200 TDLAS installation increases overall length by 915 mm (36 in). SP recommends a 915 mm (36 in) clearance around all sides of the unit for serviceability.

### Materials of Construction

Product Chamber	AISI 316L stainless steel
Shelf	AISI 316L stainless steel
Condenser Chamber	AISI 316L stainless steel
Isolation Valve Disc	AISI 316L stainless steel

### Surface Finish

Product Chamber Interior	0.635 micrometers (Ra 25 micro-inches)
Shelves	0.635 micrometers (Ra 25 micro-inches)
Condenser Chamber Interior	0.813 micrometers (Ra 32 micro-inches)

### Additional Information

Stoppering	Top-down hydraulic 15 psig (1.03 barg)
Condenser Defrost Type	Hot water / steam (optional)
Noise Level <sup>4</sup>	≤ 85 dB
Vapor Port Inner Diameter	508 mm (20 in)
Loading / Unloading Door To Clean Room	Automatic / Autolocking
Chamber Inspection Door To Machine Room	Manual locking
Locking For Condenser Door	Manual locking
CE Compliant	

### Shelf Configuration

Number of Shelves	Shelf Area	Shelf Clearance
10 Shelves (9 Usable, 1 Radiant)	10.03 m <sup>2</sup> (108 ft <sup>2</sup> )	121 mm (4.75 in)
Usable Shelf Dimensions (W × L)	914.4 mm × 1219.2 mm (36 in × 48 in)	—
Shelf Loading Height	900 mm (35 1/16 in)	—

### Refrigeration Information

F Gas	R507b
Charge (Kg)	Approximately 65 lbs
GWP	3,985
Total CO <sub>2</sub> e	90.61

### Options/Other Considerations

Rotary Hull Isolation Valve
ControlLy <sup>o</sup> ® Nucleation Technology
N+1 Redundancy
LyoFlux <sup>®</sup> 200 TDLAS Mass Flow Sensor
Independent CIP Skid
Tempris <sup>®</sup> Wireless Temperature Sensors
Virtual Servers & Thin Clients

<sup>1</sup> Shelf temperature deviations shall not exceed the specification relative to the mean of the highest and lowest temperature readings

<sup>2</sup> Vacuum specifications are based on SP test data from similar units equipped with a two-stage rotary vane vacuum pump. Units equipped with other vacuum pumps may yield different results (e.g; a dry pump shall yield a Lowest System Vacuum of ≤ 50 mTorr)

<sup>3</sup> Cooling water temperatures should not exceed 26.6 °C. (80 °F) supply, 32.2 °C (90 °F) return

<sup>4</sup> Noise from the equipment under normal operating conditions shall not exceed 85 dB when measured at any point 36 in (91.5 cm) away from the equipment. Lyophilizers equipped with ControlLy<sup>o</sup>® shall exceed the specified noise level rating for approximately 3 to 5 seconds during depressurization and SP recommends the use of both hearing and eye protection during the ControlLy<sup>o</sup>® process