

# SP Scientific LyoConstellation S20

## Pilot Lyophilizer



### Key Features

- Unmatched process accuracy and reliability.
- Deliver "line of sight" approach in cycle development & scale up using same technologies from R&D to production.
- Designed to conform to good instrumentation practices.
- Optional TDLAS instrument with integrated communication with LyoS™.
- Optional ControlLyo® Technology for improved product homogeneity and process efficiency.

### Electrical Requirements (Lyophilizer)

Voltage	208 VAC	400 VAC	480 VAC
Hertz	60 Hz	50 Hz	60 Hz
Phase	3 $\Phi$ (4 wire)	3 $\Phi$ (5 wire)	3 $\Phi$ (4 wire)
Breaker Amperage	70 A	TBD	TBD

### Performance Specifications

Lowest Shelf Temperature (50 Hz / 60 Hz)	-60 °C
Shelf Temperature Control Range	-55 to 65 °C
Shelf Temperature Control Accuracy	$\pm$ 0.5 °C
Shelf Pull-Down from 20 °C to -40 °C	$\leq$ 25 minutes
Shelf Temperature Uniformity*	$\pm$ 1.0 °C
Lowest Condenser Temperature	-65 °C
Condenser Surface Area	19.4 ft <sup>2</sup> (1.8 m <sup>2</sup> )
Condenser Pull-Down from 20 °C to -45 °C	$\leq$ 20 minutes
Maximum Sublimation Rate <sup>†</sup>	2,050 g/hour
Number of Compressors	1
Compressor Horsepower	10 hp (7.45 kW)
System Refrigerant	R410A (CFC free)
Vacuum Time to 100 mTorr <sup>§</sup>	$\leq$ 20 minutes
Vacuum Rate of Rise <sup>§</sup>	$\leq$ 30 mTorr/hour
Volume-Based Leak Rate <sup>§</sup>	$\leq$ 0.010 mbar·L/sec (7.5 mTorr·L/sec)
Lowest System Vacuum <sup>§</sup>	$\leq$ 15 mTorr

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

### Utility Requirements

Compressed Air	80 psig (5.52 bar)
Cooling Water <sup>¶</sup>	3-5 gpm (11-19 Lpm)
Inert Gas for Backfilling	3-5 psig (0.21-0.34 bar)
Inert Gas for VLC / Vacuum Release	3-5 psig (0.21-0.34 bar)
Inert Gas Consumption (full vacuum release)	860 L @ 1 ATM
Inert Gas for ControlLyo®	50-60 psig (3.45-4.14 bar)
Steam for Sterilization In Place (SIP)	90 lbs/hr (40.82 kg/h) @ 20-25 psig (1.38-1.72 bar)
Clean In Place (CIP) Water / Media	40 gpm (150 Lpm) @ 60 psig (4.14 bar)

### Utility Requirements

Cooling Water Heat Removal	140,000 BTU/h (41.03 kW)
Heat Output (Room), Peak	10,000 BTU/h (2.93 kW)

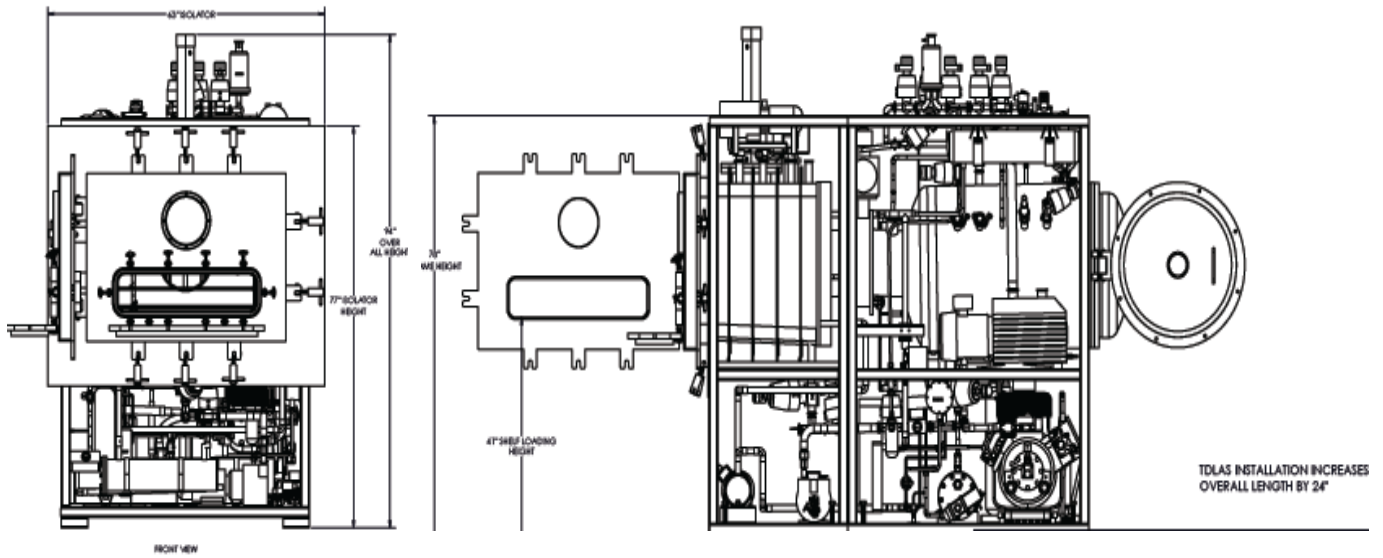
### ControlLyo® Requirements (Optional)

Volume to Vent percentage ratio ( $V_v/V_R$ ) <sup>††</sup>	< 6.5%
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**Note:** Vent Volume ( $V_v$ ) is the product chamber volume multiplied by 10. The volume of a standard LyoConstellation S20 chamber is 18 ft<sup>3</sup> (0.51 m<sup>3</sup>).  $V_R$  is the volume of the room in which the lyophilizer is located.

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### Dimensional Data

Width	63 in (160.0 cm)
Length (Doors Closed)	118 in (299.7 cm)
Height	94 in (238.8 cm)
Max. Weight	7,000 lb (3175.1 kg)
Min. Clearance on All Sides	24 in (60 cm)

**Note(s):** TDLAS installation increases overall length by 24 in (61.0 cm). SP Scientific recommends a 24-inch (60.7 cm) clearance around all sides of the unit for serviceability.

### Shelf Configuration

Number of Shelves	Shelf Area	Shelf Clearance
5 Shelves	20.8 ft <sup>2</sup> (19,323.8 cm <sup>2</sup> )	3 in (76.2 mm)

**Shelf Dimensions (W x L):** 20 in x 30 in (508 mm x 762 mm)

### Materials of Construction

Product Chamber	AISI 316L Stainless Steel
Shelf	AISI 316L Stainless Steel
Condenser Chamber	AISI 316L Stainless Steel
Isolation Valve Disc	AISI Type 316L SS

### Additional Information

Stoppering	Top-Down Hydraulic
Defrost Type	Hot water/ Steam (optional)
Noise Level <sup>†</sup>	≤ 85 dBA
Vapor Port Inner Diameter	12 inches (30.5 cm)

### Surface Finish

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

### Other Considerations

Protection Rating: IP20  
CE Compliant

\* Shelf temperature deviations shall not exceed the specification relative to the mean of the highest and lowest temperature readings.

<sup>†</sup> The specified Maximum Sublimation Rate at 40 °C, 100 mTorr using a 0.001" thickness plastic lined trays

<sup>§</sup> Vacuum specifications are based on SP Scientific 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>¶</sup> Cooling water temperatures should not exceed 24 °C.

<sup>‡</sup> Noise from the equipment under normal operating conditions shall not exceed 85 dBA when measured at any point 3 feet (91 cm) away from the equipment. Lyophilizers equipped with ControLyo® shall exceed the specified noise level rating for approximately 3 to 5 seconds during depressurization. SP Scientific recommends the use of both hearing and eye protection during the ControLyo® process.