

STELLAR[®] Laboratory Freeze Dryer with NitroLy[™] Refrigeration



Zero Global Warming Potential Freeze-Dryer



The **STELLAR NitroLy** Freeze Dryer uses liquid nitrogen (LN₂) for cooling, a method that meets the Zero Global Warming Potential (GWP) criteria. LN₂ has minimal to zero GWP values and does not deplete the ozone layer, positioning it as eco-friendly substitutes for synthetic refrigerants.

LN₂ (liquid nitrogen) ensures the highest performance and reliability available. The STELLAR NitroLy system is designed to minimize moving parts, dramatically improving system reliability and reducing maintenance and repair costs. In addition, the NitroLy provides more robust system performance, enabling protocol transfer without modification.

Millrock equipment continues to be the standard by which other freeze dryer companies aspire. Decades of intelligent engineering have created the most robust and sophisticated freeze dryers on the market today. Paired with our world class customer and applications support teams, we are the "rock" of the lyophilization industry.

SYSTEM PERFORMANCE

- 5 Shelf pull down from +20 to -40°C in less than 30 minutes
- Vacuum pull down to 100 mT in less than 20 minutes
- Vacuum leak rate less than 30 mT per hour
- Vacuum level 10 mT in clean dry system

Advantages of LN₂ Cooling

- Zero GWP cooling system
- Non-flammable gas
- No proprietary technology
- Known and trusted method of cooling
- Quiet operation
- High system reliability
- Reduced maintenance expenses
- Easy to implement without changing existing protocols
- No additional room air conditioning or water cooling needed
- Similar cost of operation compared to mechanical refrigeration

STELLAR NitroLy Features



SYSTEM COOLING

- Liquid Nitrogen (LN₂)
- Zero GWP



SHELF SYSTEM

- Up to 6.25 sq ft of shelf area
- 10" x 18" shelf size
- Bulk or pneumatic stoppering option
Option: Increased stoppering pressure for 2ml vials
- 316L stainless Steel on all wetted parts



CONDENSER

- Internal condenser with baffle
- Exposed coil condensing surface to eliminate vapor bypass
- Hot gas defrost



VACUUM

- Pirani vacuum sensor with optional Capacitance Manometer
- Solenoid control with optional proportional control
- Gas backfill
- Corrosion resistant vacuum pump



FITTINGS

- Sanitary and KF fittings on all chamber access ports



CONTROL SYSTEM: Opti-Dry Gen²[®]

- PC/PLC with ethernet and remote connectivity
- Cycle Assist Protocol Generator
- Manual and automatic operating modes
- Automatic system and leak rate testing
- Predictive maintenance
- User definable batch reporting – date, operator, recipe, data, graphic, and alarms graphic and numeric data collection

See page 2 for options.

STELLAR® NitroLyo™ Freeze Dryer

SPECIFICATIONS

STELLAR NITROLYO SPECIFICATIONS	
SHELF AREA	3.75 to 6.25 sq ft (0.348 to 0.581 sqM)
SHELF ASSEMBLY	Bulk or Pneumatic Stoppering
SHELF TEMPERATURE RANGE	-70°C to +65°C -60°C to +65°C
SHELF HEAT TRANSFER	Hollow Fluid Filled
SHELF SIZE/FINISH	10" x 18", 316 L SS, 20 Ra or better (254mm x 457mm)
CONDENSER TEMPERATURE	-100°C
CONDENSER CAPACITY	12L
CONDENSER RATE	12L in 24 hours
CONDENSER STYLE	Internal Exposed Coil w/ Baffle
PRODUCT SENSORS	4 Type T Thermocouples
VACUUM PUMP	Corrosion Resistant
VACUUM CONTROL	Pirani w/ Solenoid & Needle Valve Option: Capacitance manometer with proportional control
GAS BACKFILL	Included
CONTROL SYSTEM	Opti-Dry® Gen2: PC/PLC Control
TRAYS	One per Shelf Included
CABINET	35" w x 42" d x 64" h
ELECTRICAL	230V, 50/60Hz, 1ph, 20A 220V, 50Hz, 1ph, 20A
LN ₂ SOURCE	25 LPH, 20 PSI

* Vacuum specifications are based on a Leybold D8b vacuum pump or similar.
Please note that units operated at 50Hz have heat removal de-rated by 17%.

AVAILABLE OPTIONS

MECHANICAL

- Clean room configuration
- Hydraulic Stoppering (2ml vials)
- Water Cooled Condenser
- Shelf latching kit to change shelf inter-distance
- Isolator interface for connection to an isolator
- Stainless steel door when using solvents
- LN₂ trap to protect your vacuum pump from solvents
- **H₂O₂ integration** for sterilization
- 12 or 24 Port Manifold

INSTRUMENTATION AND CONTROLS

- Up to 16 thermocouples
- Resistivity probe
- 21 CFR Part 11 capable software

VACUUM

- Capacitance manometer to control the same as production systems
- Proportional vacuum control (+/-2mT control)
- Dry vacuum pump for use when processing solvents

SERVICES

- Startup and training
- Software Validation
- Electro-Mechanical Validation documentation
- IQOQ, FAT and SAT documentation and execution

VIAL CAPACITY

VIAL (ml)	DIA (mm)	HGT (mm)	NUMBER OF SHELVES				
			1	2	3	4	5
2	16	41	480	960	1440	1920	2400
5	22	48	241	482	723	964	1205
10	24	58	199	398	597	796	-
20	29	71	136	272	408	544	-
50	43	81	55	110	165	-	-

SHELF CONFIGURATION

SHELVES	SPACING (in/MM)	AREA (sq ft/sq M)
3	4.5/114	3.75/0.348
4	3.25/82	5.0/0.464
5	2.5/63	6.25/0.581

BULK FILL (LITERS)

DEPTH (mm)	NUMBER OF TRAYS				
	1	2	3	4	5
10mm	1.0	2.3	3.5	4.6	5.8
15mm	1.7	3.5	5.2	6.9	8.7
20mm	2.3	4.7	7.0	9.2	11.6

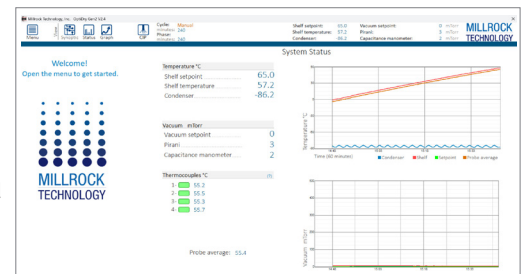


OPTI-DRY GEN2: PC/PLC CONTROL

Our new Opti-Dry Gen2 software provides sophisticated and intelligent tools to easily develop and execute both simple and advanced freeze-drying cycles. Millrock Reporter is included with every system, providing full batch reporting, including recipe, graphs, data, and alarms in a single report. Predictive maintenance with advanced system monitoring delivers cost-savings and enables maximum uptime by tracking and monitoring the condition and performance of equipment during normal operation. This same control system is used on industrial freeze dryers, allowing scaling to production. All systems are remotely accessible, with customer approval, for troubleshooting process issues.

Popular Features:

- Simple and easy to use for both the novice and experienced operator
- Better graphics and more meaningful data
- Ability to perform basic and intelligent protocols, standard features
 - Pre-freeze loading step
 - End of primary drying determination— requires a capacitance manometer
- **Cycle assist** automatically generates a protocol based on your product critical temperature
- **Full batch reporting**—reports include recipe, run data, run graphs, alarms in a PDF format
- **Predictive maintenance**—Component life tracking
- **System self-testing** with reporting
- Internet ready for remote support from the factory



Maximum Ice Condensing Rate (24hrs) is based on freeze drying water as aggressively as possible. The actual ability to condense ice at a specific rate over time is application dependent. Specifications subject to change without notification. All specifications based on 20C ambient and 60 Hz Trademarks registered to Millrock Technology, Inc. ST61016

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