

# MAGNUM<sup>®</sup> XL Pilot Freeze Dryer

## with NitroLyo<sup>™</sup> Refrigeration

MILLROCK  
TECHNOLOGY



### Zero Global Warming Potential Freeze-Dryer

The **MAGNUM XL NitroLyo** Freeze Dryer uses liquid nitrogen (LN<sub>2</sub>) for cooling, a method that meets the Zero Global Warming Potential (GWP) criteria. LN<sub>2</sub> has minimal to zero GWP values and does not deplete the ozone layer, positioning it as eco-friendly substitutes for synthetic refrigerants.

LN<sub>2</sub> (liquid nitrogen) ensures the highest performance and reliability available. The MAGNUM XL NitroLyo system is designed to minimize moving parts, dramatically improving system reliability and reducing maintenance and repair costs. In addition, the NitroLyo 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

- 15 Shelf pull down from +20 to -40°C in less than 60 minutes
- Vacuum pull down to 100 mT in less than 30 minutes
- Vacuum leak rate less than 30 mT per hour
- Vacuum level 10 mT in clean dry system

### Advantages of LN<sub>2</sub> 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

## MAGNUM XL NitroLyo Features



#### SYSTEM COOLING

- Liquid Nitrogen (LN<sub>2</sub>)
- Zero GWP



#### SHELF SYSTEM

- Up to 30 sq ft of shelf area
- 12" x 24" shelf size
- Bulk or hydraulic stoppering option
- 12 PSI stoppering pressure for 2ml vials
- 316L stainless Steel on all wetted parts



#### CONDENSER

- External condenser with 6" vapor port
- 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<sup>®</sup>

- 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.*

# MAGNUM® XL NitroLyo™ Freeze Dryer

## SPECIFICATIONS

### MAGNUM XL NITROLYO SPECIFICATIONS

SHELF AREA	20 to 30 sq ft (1.858 to 2.787 sqM)
SHELF ASSEMBLY	Bulk or Hydraulic Stoppering
SHELF TEMPERATURE RANGE	-70°C to +65°C -60°C to +65°C
SHELF HEAT TRANSFER	Hollow Fluid Filled
SHELF SIZE/FINISH	12" x 24", 316L SS, 20Ra or better (305mm x 610mm)
CONDENSER TEMPERATURE	-100°C
CONDENSER CAPACITY	30L
CONDENSER RATE	20L in 24 hours
CONDENSER STYLE	Exposed Coil, 6" Vapor Port
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	46" w x 37" d x 88.5" h
ELECTRICAL	230V, 50/60Hz, 1ph, 30A
LN2 SOURCE	25 LPH, 20 PSI

\* Vacuum specifications are based on a Leybold D16b vacuum pump or similar.  
Please note that units operated at 50Hz have heat removal de-rated by 17%.



## AVAILABLE OPTIONS

### MECHANICAL

- Clean room configuration
- Butterfly isolation valve on 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
- **Clean in Place** to wash between different products
- **H2O2 integration** for sterilization

### INSTRUMENTATION AND CONTROLS

- Auto-Dry Protocol Development
- 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					
			10	11	12	13	14	15
2	16	41	7740	8514	9288	10062	10863	11610
5	22	48	4030	4433	4836	5239	-	-
10	24	58	3220	3542	-	-	-	-
20	29	71	2180	-	-	-	-	-
50	43	81	-	-	-	-	-	-
100	52	92	-	-	-	-	-	-

## SHELF CONFIGURATION

SHELVES	SPACING (in/MM)	AREA (sq ft/sq M)
10	3.25/82	20/1.85
11	2.9/73	22/2.04
12	2.6/66	24/2.23
13	2.3/58	26/2.41
14	2.1/53	28/2.60
15	2.0/51	30/2.79

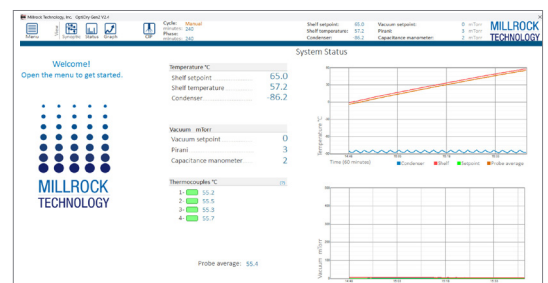


## OPTI-DRY GEN2: PC/PLC CONTROL

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. MA61016

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