

MAGNUM® XL Pilot Freeze Dryer

MILLROCK
TECHNOLOGY

We make freeze drying easy.

The **MAGNUM XL** offers up to 30 sq ft (2.787 sq M) of lyophilization shelf area with a condensing rate of 20 liters in 24 hours and a capacity of 30 liters. Millrock provides the most advanced PC/PLC controls with an intuitive user interface, as a standard feature, simplifying equipment operation and reporting.

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.

The MAGNUM is designed to eliminate the nuisance issues often experienced with our competitor's freeze dryers and provide the highest reliability components to ensure that your product is processed properly each and every run. Using more robust refrigeration components, such as scroll compressors, ensures the highest performance and reliability available.

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.

SYSTEM PERFORMANCE

- 15 Shelf pull down from +20 to -40C 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 (-85C)

Magnum XL Features



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



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



REFRIGERATION

- Oversized and highly reliable scroll compressors
- CFC-free non-proprietary refrigerants



VACUUM

- Pirani vacuum sensor with solenoid control
- Gas backfill
- Corrosion resistant vacuum pump
- Option: Capacitance manometer with proportional control



FITTINGS

- Sanitary and KF fittings on all chamber access ports

See page 2 for options.

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SPECIFICATIONS

MAGNUM XL STANDARD SPECIFICATIONS

SHELF AREA	20 to 30 sq ft (1.858 to 2.787 sqM)
SHELF ASSEMBLY	Bulk or Hydraulic Stoppering
SHELF TEMPERATURE RANGE	-70C to +65C
SHELF HEAT TRANSFER	Hollow Fluid Filled
SHELF SIZE/FINISH	12" x 24", 316L SS, 20Ra or better (305mm x 610mm)
CONDENSER TEMPERATURE	-85C
CONDENSER CAPACITY	30L
CONDENSER RATE	20L in 24 hours
CONDENSER STYLE	Exposed Coil, 6" Vapor Port
DEFROST	Hot Gas
COMPRESSORS (SCROLL)	3.5 HP 1st stage 2HP 2nd stage
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/60Hz, 1ph, 50A 220V/50Hz, 1ph, 50A 380V/50Hz, 3ph, 40A

* 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%.

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

BULK FILL (LITERS)

DEPTH (mm)	NUMBER OF TRAYS					
	10	11	12	13	14	15
10mm	18.8	20.4	22.3	24.1	26	27.8
15mm	27.8	-	-	-	-	-

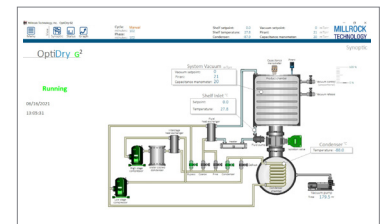


OPTI-DRY GEN2: PC/PLC CONTROL

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



AVAILABLE OPTIONS

MECHANICAL

- Clean room configuration
- Water Cooled Condenser
- Butterfly isolation valve on condenser
- 8" Vapor Port
- 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

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

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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Millrock Technology, Inc. • 39 Kieffer Lane, Kingston, NY 12401 • 845-339-5700 • sales@millrocktech.com • millrocktech.com