

**THE MAGNUM** offers up to 20 sq ft of shelf area with a **condensing rate of 30 liters**. Not only does the price/performance beat anything in its class, but Millrock also provides the most advanced controls/user interface, as a standard feature. The standard **controls are PC/PLC based**, offering data collection and self-testing features.

Our **easy-to-use software** provides automatic freeze-drying, defrost, system and leak rate testing. Data can be printed either numerically or graphically. This same control system is used on industrial dryers, allowing scaling to production. An interactive maintenance screen simplifies component servicing. All systems are **remotely accessible**, with customer approval, for troubleshooting process issues.

**Advanced system options** include **FreezeBooster® Controlled Nucleation, Auto-Dry™ Protocol Optimization, AccuFlux™, and LyoPAT™ In-Process, Process Analytical Technology**. The combination provides the ideal platform for simplified and optimized protocol development.

**THE MAGNUM** has been developed from over 50 years of experience in the freeze drying world. The standard system design provides a highly reliable platform for your freeze drying needs. Using more robust refrigeration components ensures the **highest performance and reliability available**. In addition, the system is designed to be **more tolerant of fluctuations in room temperature and supply voltage**, which are common issues with lower end systems.

Unique design features include: more accurate vacuum sensors; no rubber hoses; no vapor flow choke points; superior shelf temperature uniformity; reduced shelf temperature transition times; increased stoppering pressure; and more, to ensure that the equipment is not a limit to your freeze drying needs.

### SYSTEM PERFORMANCE

- 10 Shelf pull down from +20 to -40C in less than 40 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 (-85)

### MAGNUM HIGHLIGHTS

#### CONTROL SYSTEM

- PC/PLC with ethernet and remote internet connectivity
- Manual and automatic operating modes
- Graphic and numeric data collection
- Automatic system and leak rate testing
- Options for Protocol Optimization and Controlled Nucleation

#### SHELF SYSTEM

- Up to 20 sq. ft. of shelf area
- Large shelves for more product capacity – 12" x 24"
- Increased stoppering pressure – for 2ml vials
- 316L on all wetted parts

#### CONDENSER

- 6" vapor port standard
- Exposed coil condenser for maximum efficiency
- Hot gas defrost

#### REFRIGERATION

- High reliability scroll compressors
- Oversized refrigeration components for high reliability
- CFC-free, non-proprietary refrigerants

#### VACUUM

- Pirani vacuum sensor standard
- Vacuum control standard
- Gas backfill standard
- 375LPM corrosion resistant vacuum pump

#### PORTS

- Sanitary style fittings on all sensor and vacuum ports
- Built-in validation port – sanitary fitting

#### APPLICATIONS

- Tissue Bank
- Small Scale Production
- Diagnostics
- Well Plates
- Vials
- Bulk Applications / Trays



## FEATURES & SPECIFICATIONS

### MAGNUM® STANDARD FEATURES

SHELF AREA	10 sq ft to 20 sq ft
SHELF ASSEMBLY	Bulk or Hydraulic Stoppering
SHELF TEMPERATURE RANGE	-45°C or -70° to + 65°C
SHELF HEAT TRANSFER	Hollow Fluid Filled
SHELF SIZE/FINISH	12"x 24", 316L, 20 Ra or better
VAPOR PORT	6" Standard, 8" Option
CONDENSER TEMP	-53°C or -85°C
CONDENSER CAPACITY	30L
CONDENSING RATE	20L in 24 hours
CONDENSER STYLE	Exposed Coil
DEFROST	Hot Gas
COMPRESSORS (SCROLL)	5hp (-53°C), 3.5hp & 2hp (-85°C)
PRODUCT SENSORS	4, Type T
VACUUM PUMP	375 LPM, Corrosion Resistant
VACUUM CONTROL	Pirani w/ Solenoid & Needle Valve
GAS BACKFILL	included
CONTROL SYSTEM	PC/PLC with Opti-Dry Software
TRAYS	One per shelf included
CABINET	46" w x 37"d x 80"h
ELECTRICAL	230V/3ph/60Hz/30A (-53°C) 230V/1ph/60Hz/40A (-85°C)

### BULK FILL (LITERS)

DEPTH	5	6	7	8	9	10
10mm	9.3	11.1	13	14.8	16.7	18.8
15mm	13.9	16.7	19.5	22.3	25	27.8
20mm	18.5	22.3	26	29.7	33.4	37.1

\* Patented and Patent Pending technology.

Note: Specifications subject to change without notice. All specifications based on 20C ambient on 60Hz.

## SHELF CONFIGURATION

SHELVES	SPACING (in/mm)	AREA (sq ft/sq M)
5	5.5/139	10/0.93
6	4.5/114	12/1.1
7	3.75/95	14/1.3
8	3.25/82	16/1.48
9	2.8/71	18/1.67
10	2.5/63	20/1.86

## AVAILABLE OPTIONS

- **FreezeBooster®** Controlled Nucleation\*
- **LyoPAT®** Determines vial heat transfer coefficient(Kv), defines process design space in a single run & develops transferrable protocols\*
- **Auto-Dry™** Protocol Development Software\*
- Water Defrost
- Up to 18 Product Probes
- Capacitance Manometer
- Proportional Vacuum Control
- Dry Vacuum Pump
- Isolation Valve
- Stainless Steel Doors
- Shelf Latching Kit
- LN2 Trap
- Water Cooled Condenser
- 8" Vapor Port
- Resistivity Probe
- CIP
- 50L Condenser (Magnum XL)
- Clean Room Configuration
- Isolator Interface
- H2O2 Integration Kit
- 21 CFR Part 11 Software
- Validation Documentation
- IQ/OQ Workbook
- FAT/SAT

## VIAL CAPACITY

VIAL ml	DIA (mm)	HT (mm)	5	6	7	8	9	10
2	16	41	3870	4644	5418	6192	6966	7740
5	22	48	2015	2418	2821	3224	3627	
10	24	58	1610	1932	2254	2576	2898	
20	29	71	1090	1308	1526	1744		
50	43	81	480	576	672	768		
100	52	92	325	390	455			

## OPTI-DRY® PC/PLC CONTROL

**THE MAGNUM** Series comes complete with PLC controls and a PC for programming and data collection. Our easy-to-use software provides automatic freeze-drying, defrost, and system test. Data can be printed either numerically or graphically. This same control system can be used on industrial dryers, allowing scaling to production. An interactive maintenance screen simplifies component servicing.

**Opti-Dry** uses an ethernet platform for hardware connectivity making data transmission extremely fast. It also provides web connectivity for those who want remote access to their systems.

For R&D, Protocol Development, Small Scale Production, Cycle Automation and Optimization, Opti-Dry offers all the tools you need.

### BUILT-IN CONTROL FEATURES

- Product temperature feedback optimizes the recipe, both freezing and primary drying, based on the product temperature average.
- Multiple methods for Primary Drying Endpoint Determination (requires capacitance manometer)
- Pressure Rise Testing (requires isolation valve).

