

REVO®

R&D Freeze Dryers

APPLICATIONS

Cycle Development & Optimization
Well Plates & Alternative Delivery Devices
Product for Stability Studies
Formulation Development
Diagnostics
Bulk Tray



The REVO lyophilizer offers up to 10 sq ft (.929 sq M) of shelf area with a condensing capacity of 20 Liters in 24 hours. It has the largest shelves and best shelf-to-shelf spacing of any system in its class, resulting in more product throughput in the same floor space. Using the best components and design techniques combined with the most advanced PC/PLC control system, offering data collection and self-testing features. The REVO freeze dryer is the perfect solution for both your important research and protocol development.

Our easy-to-use MCS software provides automatic freeze-drying, defrost, and 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 with a familiar HMI. 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 CIP. The combination provides the ideal platform for simplified and optimized lyophilization protocol development.

Unique design with features include: more accurate vacuum sensors; no rubber hoses; 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

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

REVO Features

CONTROL SYSTEM

- MCS - 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 & Controlled Nucleation

SHELF SYSTEM

- Up to 10 sq ft (.989 sq M) of shelf area
- Larger shelves for more product capacity - 12" x 24" (304.8mm x 608mm)
- Increased stoppering pressure for hard to stopper systems
- 316L stainless steel on all wetted parts

CONDENSER

- 4" vapor port(6" optional)
- Exposed coil configuration for maximum efficiency

REFRIGERATION

- Highly reliable scroll compressors
- Oversized compressors for high performance
- CFC Free non-proprietary refrigerants

VACUUM

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

ADDITIONAL

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

REVO

R&D Freeze Dryers

MILLROCK
TECHNOLOGY

millrocktech.com

SPECIFICATIONS

REVO™ STANDARD SPECIFICATIONS

| | |
|-------------------------|--|
| SHELF AREA | 2 to 10 sq ft (0.186 to 0.929 sq M) |
| SHELF ASSEMBLY | Bulk or Hydraulic Stoppering |
| SHELF TEMPERATURE RANGE | -45C or -70C to +65C |
| SHELF HEAT TRANSFER | Hollow Fluid Filled |
| SHELF SIZE/FINISH | 12"x 24", 316LSS, 20 Ra or better (304 x 608mm) |
| CONDENSER TEMPERATURE | -53C or -85C |
| CONDENSER CAPACITY | 30L |
| CONDENSING RATE | 20 L in 24 hours |
| CONDENSER STYLE | Exposed Coil, 4" port |
| DEFROST | Hot Gas |
| COMPRESSORS (SCROLL) | 5 HP (-53C), 3.5 HP & 2 HP (-85C) |
| PRODUCT SENSORS | 4, Type T Thermocouples |
| VACUUM PUMP | 375 LPM corrosion resistant |
| VACUUM CONTROL | Pirani w/ Solenoid & Needle Valve |
| GAS BACKFILL | Included |
| CONTROL SYSTEM | PC/PLC with MCS Software |
| TRAYS | One per shelf included |
| CABINET | 35" w x 46"d x 75"h |
| ELECTRICAL | 230V/1ph/60Hz/30A (-53C) |

SHELF CONFIGURATION

| SHELVES | SPACING (in/mm) | AREA (sq ft/sq M) |
|---------|-----------------|-------------------|
| 1 | 14.5/368 | 2/0.186 |
| 2 | 7.0/177 | 4/0.373 |
| 3 | 4.5/114 | 6/0.559 |
| 4 | 3.25/82 | 8/0.746 |
| 5 | 2.5/63 | 10/0.929 |

BULK FILL (LITERS)

| #trays Depth | 1 | 2 | 3 | 4 | 5 |
|-----------------|-----|-----|------|------|------|
| 10mm | 1.8 | 3.6 | 5.4 | 7.2 | 9.0 |
| 15mm | 2.7 | 5.4 | 8.1 | 10.8 | 13.5 |
| 20mm | 3.6 | 7.2 | 10.8 | 14.4 | 18.0 |

VIAL CAPACITY

| VIAL ml | DIA (mm) | HEIGHT (mm) | NUMBER OF SHELVES | | | | |
|---------|----------|-------------|-------------------|------|------|------|------|
| | | | 1 | 2 | 3 | 4 | 5 |
| 2 | 16 | 41 | 774 | 1548 | 2322 | 3096 | 3870 |
| 5 | 22 | 48 | 403 | 806 | 1209 | 1612 | 2015 |
| 10 | 24 | 58 | 322 | 644 | 966 | 1288 | |
| 20 | 29 | 71 | 218 | 436 | 654 | | |
| 50 | 43 | 81 | 96 | 192 | | | |
| 100 | 52 | 92 | 65 | 130 | | | |

REVO® R&D Freeze Dryers

AVAILABLE OPTIONS

- FreezeBooster® Controlled Nucleation (Portable)*
- AccuFlux® Heat Flow Measurement and Control
- Auto-Dry Protocol development software
- Up to 16 Product Probes
- Capacitance Manometer
- Isolation Valve
- Proportional Vacuum Control
- Dry Vacuum Pump
- Stainless Steel Door
- 4" vapor port (6" optional)
- Shelf latching kit
- Water Cooled Condenser
- Hydraulic Stoppering
- Resistivity Probe
- Clean Room Configuration
- Isolator Interface
- 12 or 24 port Manifold
- H2O2 Integration Kit
- 21 CFR Part 11 Software
- Validation Documentation
- IQ/OQ Workbook
- FAT/SAT
- LN2 Trap
- Clean in Place

MCS - PC/PLC CONTROL

THE REVO research and development lyophilizer 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.



MCS 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.

AutoDry is proprietary software that utilizes product temperature feedback to freeze dry your product automatically with just a few simple operator inputs. Utilizing the melting temperature that you program into the system the freeze dryer will add as much heat as possible without exceeding the temperature safety margin. The end of primary drying is automatically detected by the system. Once primary drying is complete the system moves into secondary drying and remains there until the system is unloaded.

Millrock Technology, Inc

39 Kieffer Lane, Kingston, NY 12401 | 1.845.339.5700 | sales@millrocktech.com

Specifications subject to change without notification. All specifications based on 20C ambient and 60 Hz

Trademarks are registered to Millrock Technology, Inc

RE61016

