

**MP** Dry Cabinet

# Smart drying and storage solutions



elektronik



# Let's meet the future

MP elektronik is a manufacturer of complete solutions for drying processes for wide range of applications. Since 2012 we develop and manufacture dry cabinets and customized solutions for not only electronic industry that are trend setting.

MP elektronik is the only manufacturer worldwide, who builds fully customizable dry storage systems. You will profit from complete solutions that perfectly match your demands. Our systems convince with performance and efficiency. They are designed to increase profitability in your production.

MP Dry Cabinets are being constantly developed to meet all customer's requirements for storage of their PCBs and MSD components with an outstanding performance/cost ratio.

# Moisture Classification

Two standards help electronics manufacturers tackle the challenges of moisture sensitivity: IPC/JEDEC J-STD-020B and IPC/JEDEC J-STD-033C. The joint industry standards were developed by IPC (Bannockburn, IL) and JEDEC Solid State Technology Association (Arlington, VA). Both standards have recently been updated to support components that may need to be processed at higher temperatures, such as devices that use lead-free solder. The IPC/JEDEC J-STD-020B standard identifies the classification level of nonhermetic solid-state surface mount devices that are sensitive to moisture-induced stress. It is used to determine what classification level should be used for initial reliability qualification. Once identified, devices can be correctly packaged, stored and handled to avoid subsequent thermal and mechanical damage during reflow or repair.

The IPC/JEDEC J-STD-033C standard provides manufacturers with standardized methods for handling, packing,

shipping and using moisture-sensitive surface-mount devices. It defines methods and outlines procedures to use to avoid damage from moisture absorption and exposure to reflow temperatures that can result in yield and reliability degradation. The standard helps end users achieve safe and damage-free reflow with the dry packing process.

Both of the industry standards classify moisture sensitivity levels (MSL). Each level is expressed numerically, with the MSL number increasing with the vulnerability of the package to popcorn cracking. For instance, MSL 1 refers to electronic devices that are immune to popcorn cracking regardless of exposure to moisture.

On the other hand, MSL 6 devices are most prone to moisture-induced fracture and have an extremely short floor life. The floor life of a part is the amount of time that it can be exposed to the environment and still be considered safe to reflow.

BODY THICKNESS	LEVEL	DYRING AT 1% RH			DYRING AT 2% RH		DYRING AT 5% RH	
		25°C 1% RH	40 °C 1% RH	<b>60 °C 1% RH</b>	25°C 2% RH	40°C 2% RH	40°C 5% RH	90°C 5% RH
THICKNESS ≤ 1.4 mm	2a	5 days	2 days	<b>12 hours</b>	7 days	3 days	5 days	23 hours
	3	8 days	3 days	<b>18 hours</b>	12 days	5 days	8 days	33 hours
	4	9 days	4 days	<b>24 hours</b>	13 days	6 days	9 days	37 hours
	5	10 days	5 days	<b>30 hours</b>	14 days	7 days	10 days	41 hours
	5a	10 days	6 days	<b>36 hours</b>	15 days	9 days	10 days	54 hours
THICKNESS >1.4 mm ≤2.0 mm	2a	22 days	10 days	<b>2 days</b>	30 days	15 days	22 days	3 days
	3	23 days	11 days	<b>2 days</b>	35 days	16 days	23 days	4 days
	4	28 days	14 days	<b>3 days</b>	40 days	17 days	28 days	5 days
	5	35 days	16 days	<b>4 days</b>	50 days	24 days	35 days	6 days
	5a	56 days	18 days	<b>4 days</b>	67 days	27 days	56 days	8 days
THICKNESS >2.0 mm ≤4.5 mm	2a	67 days	20 days	<b>5 days</b>	80 days	30 days	67 days	10 days
	3	67 days	22 days	<b>5 days</b>	80 days	31 days	67 days	10 days
	4	67 days	22 days	<b>5 days</b>	80 days	31 days	67 days	10 days
	5a	67 days	22 days	<b>5 days</b>	80 days	31 days	67 days	10 days

## Moisture-sensitive devices (MSDs)

Moisture-sensitive devices (MSDs) are electronic components encapsulated with plastic compounds and other organic materials. Moisture from atmospheric humidity enters permeable packaging materials by diffusion and collects at the interfaces of dissimilar material.

During reflow soldering, the combination of rapid moisture expansion and material mismatch can result in package cracking or delamination of critical interfaces within the package. Unfortunately, these internal defects are nearly impossible to detect during the PCB assembly and test process. They lead to a number of failure modes that have a negative impact on manufacturing yield and cause early failure of electronic products, such as cameras, cell phones and computers.

## Dry cabinets

Dry cabinets are an alternative to moisture barrier bags that can greatly reduce the risk of operator handling errors. The metal cabinets feature tightly sealed doors and multiple shelves for storing trays and reels for extended periods of time. A good dry box maintains relative humidity at 2 percent or less for indefinite safe storage, as stated in the guidelines under the IPC/JEDEC J-STD-033C specification.

Humidity is removed from the cabinets by use of a powerful desiccant. Moisture absorbed by the desiccant is vaporized and released outside the dry box. Digital controls record the temperature and humidity over time. Nitrogen cabinets are a more expensive way to purge moisture. They use a constant positive pressure flow to void the cabinet of all oxygen, which forces out all moisture and contamination.

Dry cabinets have automated control systems that allow electronic manufacturers to manage and track their MSD devices. They use automatic data collection technology, such as bar coding and radio frequency identification. The automated systems eliminate the need for manual procedures, such as identifying MSDs, filling out log sheets and entering time calculations, which are time-consuming and open to human error.



# Advantages



## Low relative humidity

Very low relative humidity under 0.5%RH together with powerful heating, which enables drying temperature up to 60°C for ST series (40°C for LT series), are ideal for storing of your PCBs and all MSD level components without any need of repacking a MBB bag.

## Short drying time

The combination of a low relative humidity and high drying temperature means a significant reduction of the time required for effective drying of all stored components or PCBs. With MP DRY CABINET ST the drying time for MSD Level 3 components, with a body thickness of 1.4mm, is reduced down from 120 hours to 18 hours\* (at 1%RH and 60°C).

\*Compared to the competitions typical standard of only 2%RH and 40°C

## Manufactured according to IPC standards

MP Dry Cabinets are manufactured according to IPC/ JEDEC J-STD 033C and IPCS-1601 standards.

## Measuring of real relative humidity values

The sensor position in all our drying cabinets is in the highest possible point in the cabinet. Dry air is much heavier than moist air and therefore our sensor position guarantees the most realistic internal air humidity values.

## Low energy consumption

MP DRY CABINET ST series feature very effective 30mm insulation as a standard (45 mm/60 mm optional) and dithermal metalized glass (no risk of operator burns, even when the cabinet is set to maximum temperature) to ensure maximum energy saving and low running cost.

# MP DRY CABINET

TOUCH DISPLAY

USB PORT

ETHERNET



DOUBLE GLASS

ESD GROUNDING POINT

ROTRONIC SENSOR

RFID SYSTEM

## ESD safe

All our drying cabinets from MP DRY CABINET ST series are made of high quality stainless steel, LT series feature ESD safe powder coating (RAL7016), and therefore meet all ESD regulations. All our cabinets are equipped with an ESD grounding point ( $\varnothing$  10 mm).

## ROTRONIC sensor

Each drying cabinet is equipped very accurate sensor from swiss company ROTRONIC. Each sensor is factory calibrated and comes with a calibration protocol. Of course we offer a on-site calibration of the sensor. Or simply send us your sensor for calibration and we will provide you with another one for this period of time.

## Traceability

Each MP DRY CABINET is equipped with a datalogger with internal memory for storing of internal temperature and relative humidity values in real time. Simultaneously is every door opening and its duration monitored and stored. All these data are downloadable via Ethernet (option for LT series) or USB memory stick as a standard.

## RFID

Operator has to scan his RFID card to get access to the cabinet. The operator will have the possibility to open only the doors, which are assigned to his card, all other doors remain locked. The details about time, duration and operator's name are collected and can be shown.

## Models



### MP DRY CABINET I ST

External dimensions  
700 x 1070 x 690 mm

Internal dimensions  
640 x 800 x 520 mm

Volume  
260 l

### MP DRY CABINET II ST

External dimensions  
700 x 1920 x 690 mm

Internal dimensions  
640 x 1650 x 520 mm

Volume  
550 l

### MP DRY CABINET IV ST

External dimensions  
1410 x 1920 x 680 mm

Internal dimensions  
1280 x 1520 x 520 mm

Volume  
1010 l

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**3** stainless steel shelves, adjustable  
in steps of 20 mm

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**5** stainless steel shelves, adjustable  
in steps of 20 mm

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**10** stainless steel shelves, adjustable  
in steps of 20 mm





### MP DRY CABINET I LT

External dimensions  
700 x 960 x 680 mm

Internal dimensions  
695 x 760 x 600 mm

Volume  
315 l

### MP DRY CABINET II LT

External dimensions  
700 x 1920 x 690 mm

Internal dimensions  
695 x 1660 x 600 mm

Volume  
690 l

### MP DRY CABINET IV LT

External dimensions  
1393 x 1920 x 690 mm

Internal dimensions  
1390 x 1660 x 600 mm

Volume  
1385 l

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**3** ESD shelves, adjustable in steps  
of 20 mm

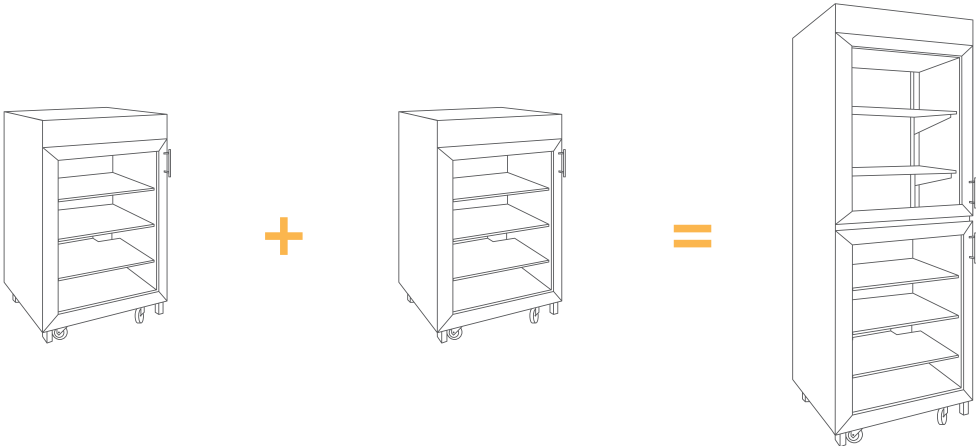
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**5** ESD shelves, adjustable in steps  
of 20 mm

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**10** ESD shelves, adjustable  
in steps of 20 mm

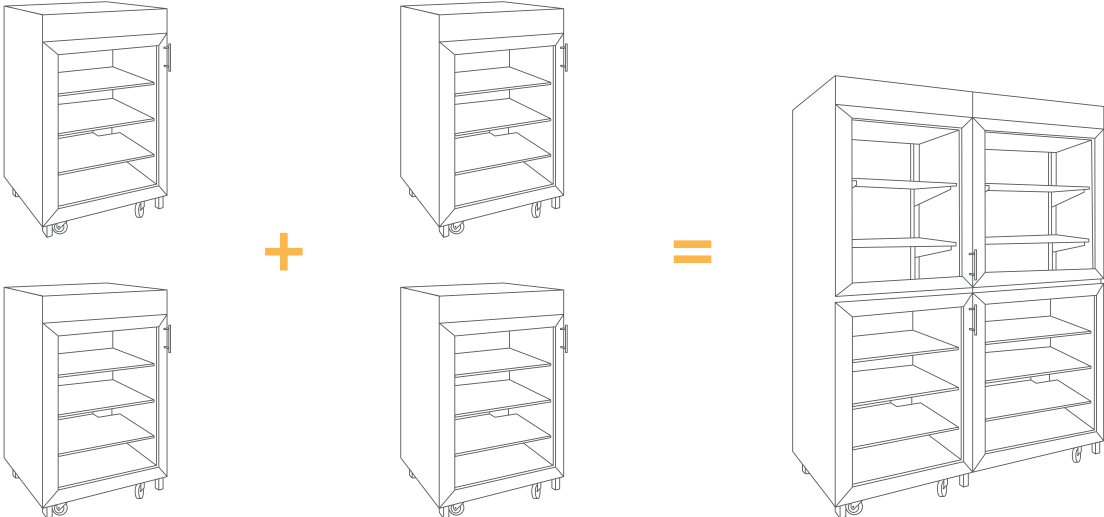
2 CHAMBERS HORIZONTALLY SEPARATED for MP Dry cabinet II ST/LT



2 CHAMBERS VERTICALLY SEPARATED for MP Dry cabinet IV ST/LT

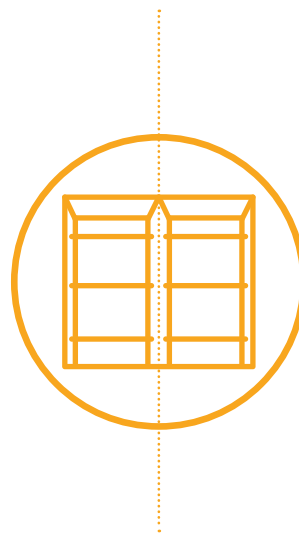


4 CHAMBERS SEPARATED for MP Dry cabinet IV ST/LT



## Independent chambers system

- each chamber is thermally and hermetically separated
- each chamber is equipped with its own drying unit, sensor and touch screen control panel
- different parameters can be set up in every chamber separately
- data from each chamber are tracked via LAN or USB separately
- electromagnetic lock for each chamber with its own time parameters possible

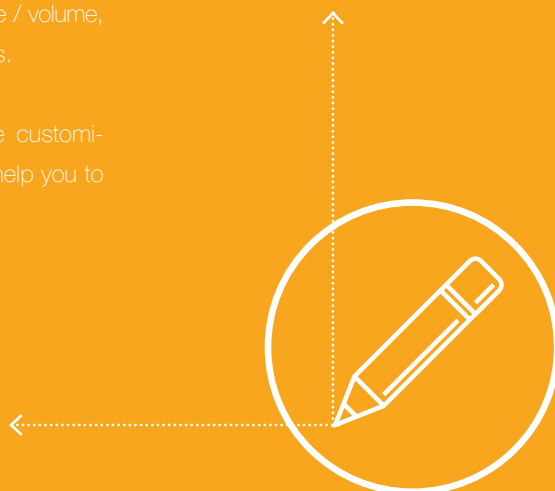


## Customization

**MP Dry Cabinets are being constantly developed to meet all customer's requirements.**

All our cabinets are produced directly at MP elektronik. Thanks to that we can build your cabinet in any size / volume, number of doors or drying / heating / cooling units.

For our cabinets we also develop and produce customized handling systems. Just ask us how can we help you to design and build your perfect cabinet.

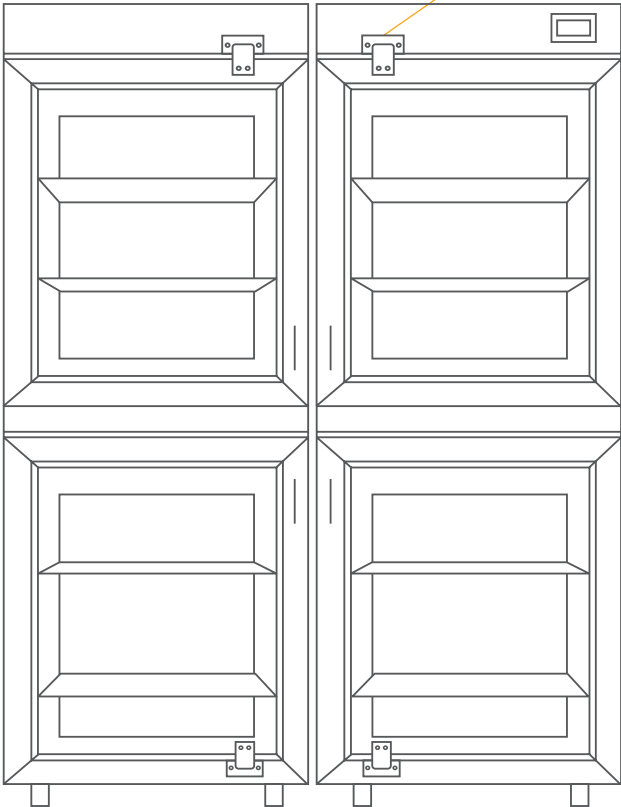
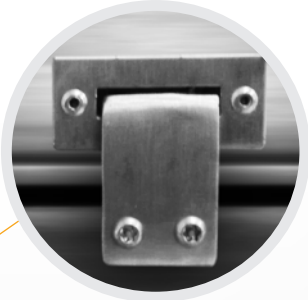


# RFID System

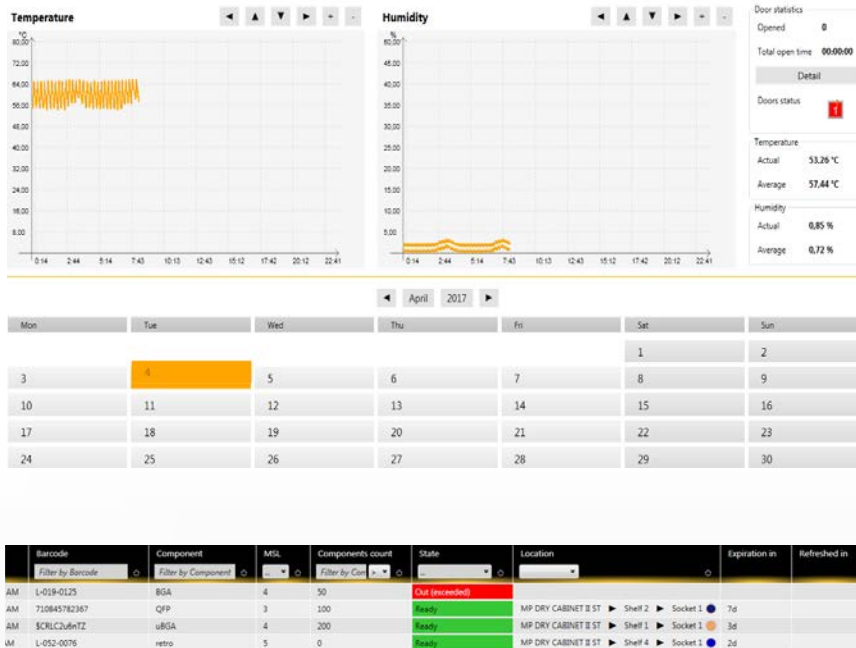
**The only real time Access Control System on the market.**

Operator has to scan his RFID card to get access to the cabinet. The operator will have the possibility to open only the doors, which are assigned to his card, all other doors remain locked. The details about time, duration and operator's name are collected and can be shown.

**RFID SW** software is a combination of our DRY CABINET SW (on-line graphical display of temperature and humidity inside of the cabinet + count of door openings) and a cabinet equipped with electromagnetic locks and a RFID reader.



# Software



## DryCabinet SW

shows the relative humidity and the temperature of a chosen cabinet in a time graph. Also shows the number of door openings for each day and average values for temperature and RH. Tool for statistic print out or export for chosen time period. Real-time connection of the cabinet via Ethernet or data transfer via USB.

- Data input via 1D / 2D scanner
- Material library for easy identification
- User defined MSL level and current dry cabinet settings (temperature + humidity)
- Alarm for expired components
- Quantity can be manually added
- Scanner for locations outside of the cabinet is also possible

## DryTrace SW

for storage management of carriers and PCBs inside the drying cabinet. The user is informed what is in which cabinet and where the materials are in a specific cabinet by using names and color codes for each shelf and shelving compartment. There is also the expiry time for each component being shown and how long it will take, under current conditions to dry out completely.

## DRYTrace Library Import SW

Simple utility to import customer's component library in .csv format into DryTrace SW library.

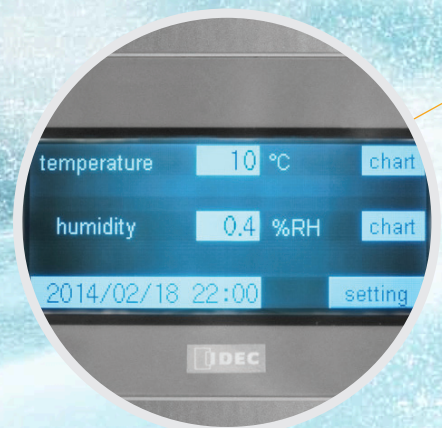
## Email client for DryTrace

With this option emails with prewarnings and warnings regarding expired materials will be sent out.

# Cooling System

All MP DRY Cabinet ST can be equipped with multiple cooling units of our own design. This powerful thermoelectric cooling system maintains stable low temperatures down to 10 °C in any cabinet size. Such low temperatures are suitable for long-term storage of electronic components, because they significantly reduce the intermetallic effect.

Our very unique combination of cooling, heating and drying unit in one MP DRY Cabinet offers the possibility of storing components at very low humidity (below 1% RH) and at a user-defined temperature in a range of 10 °C to 60 °C.







EK

DRY CABIN



# T140

An intelligent and safety solution for high temperature applications. Specifically designed for PCB conformal coating and potting applications the T140 offers an advanced curing solution. With heating up to 140°C and with programmable temperature profile (5 steps in standard) the T140 will ensure quick reliable results. In combination with MP Drying unit (option) is it most effective solution on the market. The operator safety is ensured by special fast cooling system with electric exhaust flap and electromagnetic locking system. With this system, you can make sure the cabinet stays locked until it is at a safe temperature to open.

## External dimensions

825 x 2050 x 690 mm  
(incl. 350 mm exhaust)

## Internal dimensions

630 x 780 x 440 mm

## Volume

260 l

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**3** stainless steel shelves, adjustable  
in steps of 20 mm







**MP** CABINET T140

Temp. (°C) 20.00  
Temp. (°F) 68.00  
Door 1 0000  
Door 2 0000  
Door 3 0000  
Door 4 0000

# Technical Parameters

	MP DRY CABINET ST	MP DRY CABINET LT	MP T140
ESD-SAFE DESIGN	✓	✓	✓
FULL STAINLESS STEEL BODY	✓	✗	✓
FULL ESD BODY - RAL 7016	✗	✓	✗
RFID ACCESS WITH ELECTROMAGNETIC DOOR LOCK	•	•	•
PASSWORD PROTECTED ELECTROMAGNETIC DOOR LOCK WITH TIMER	•	•	✓
MECHANICAL DOOR LOCK	•	•	✗
SLIDE-OUT SHELVES (MAX. 35 KG)	✓	✓	✗
SLIDE-OUT SHELVES (MAX. 100 KG)	•	•	•
STANDARD SHELVES (MAX 50 KG)	✓	✓	✓
ADJUSTABLE HEATING UP TO 140 °C	✗	✗	✓
ADJUSTABLE HEATING UP TO 70 °C	•	✗	✗
ADJUSTABLE HEATING UP TO 60 °C	✓	✗	✗
ADJUSTABLE HEATING UP TO 40 °C	✗	•	✗
DRYING UNIT MPDRY 5	✓	✓	•
ADDITIONAL DRY UNIT MPDRY 5 (FOR II + IV)	•	•	✗
ELECTRIC EXHAUST FLAP	•	•	✓
ADJUSTABLE COOLING UNIT (MIN. 10 °C)	•	✗	✗

• optional accessories

	MP DRY CABINET ST	MP DRY CABINET LT	MP T140
ROTRONIC SENSOR +/- 0,8 % RH, 0.1 K	✓	✓	✓
ROTRONIC SENSOR HPS +/- 0.5 % RH, 0.1K	•	•	•
INTERNAL NITROGEN ATMOSPHERE	•	•	•
FULLY GRAPHICAL TOUCH DISPLAY - IDEC	✓	✓	✓
INTEGRATED DATALOGGER (USER CONFIGURABLE)	✓	✓	✓
PROGRAMMABLE TEMPERATURE PROFILE	×	×	✓
LAN NETWORK CONNECTION	✓	✓	✓
USB CONNECTOR	✓	✓	✓
CONFIGURABLE ACOUSTIC ALARM (open door alarm, time defined by user, alarm for nonfunctional drying unit)	✓	✓	✓
DRY CABINET SOFTWARE	•	•	•
DRYTRACE SOFTWARE	•	•	•
HEIGHT-ADJUSTABLE LEGS	✓	✓	✓
ESD WHEELS	✓	✓	×
DITHERMAL METAL COATED GLASS	✓	×	✓
INTERIOR LED ILLUMINATION	•	•	×
STATUS LIGHT	•	•	•

## Contact

[www.dry-cabinet.com](http://www.dry-cabinet.com)  
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