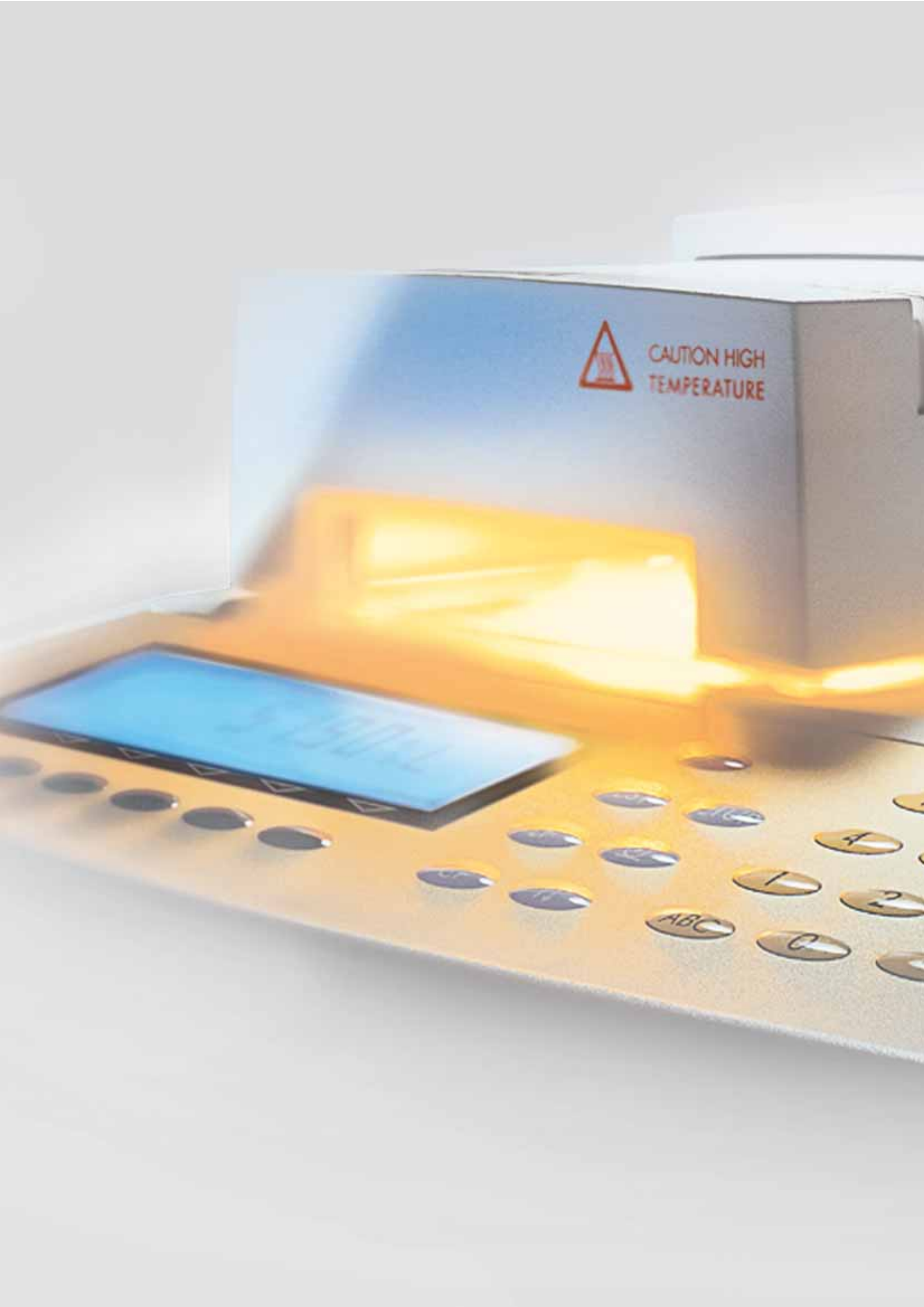

CAUTION HIGH
TEMPERATURE

Moisture and Water Analysis

The Right Analyzer for Any Application

Foods, chemical | pharmaceutical products, building materials or animal feed – you name it, the moisture or water content has a decisive impact on price, processability and quality, ranging from raw materials to final products. Determining this moisture content is one of the most common analyses in product development and in the manufacturing process. Here, the most diverse requirements on speed, resolution of the values measured or on the operating design of the moisture analyzers must also be considered in all cases. As a leading provider of moisture analysis equipment, Sartorius is thoroughly familiar with the needs of its customers and thus offers a wide range of equipment that is continuously being enhanced.

Infrared drying – fast and precise
Infrared dryers from the Sartorius **Moisture Analyzer** Series are increasingly used as a fast alternative to the classic oven drying method. These compact analyzers are designed for routine applications in production and incoming inspection. With the resolution of an analytical balance, they are also ideal for research and development. Whether you need an analyzer with an EC type-approval certificate or one tested for applications in legal metrology, Sartorius offers a customized solution for nearly every requirement. With their wide selection of infrared heat sources, including halogen lamp, CQR (coiled quartz radiator) or ceramic heating element, these moisture analyzers can be optimally adapted to the intended application.

Microwave drying
If the sample contains a large amount of water, microwave drying is the fastest and most effective drying method. It takes just 40–120 seconds to vaporize the water out of the sample. Under normal pressure conditions, the temperature of the escaping water vapor measures slightly over 100°C during the heating process, comparable to the 105°C setting in a classic oven dryer.

Differential weighing
If the oven drying method is absolutely essential, the differential weighing program of the **LA Reference** series of balances efficiently manages large volumes of data and automatically calculates the differences between the tare weight, initial sample weight and backweights.

Coulometry: selective detection of water
If you need to determine not only the moisture, but also the water content of a sample, the coulometric Karl Fisher (KF) titration method is the most commonly used technique. A further advancement in KF titration is the combination method incorporated in the WDS 400 **Water Detection System**. The WDS 400 allows accurate measurements to be performed down to a detection limit of 1µg of water. At the same time, it enables quantitative differentiation among surface water, capillary water, and water of crystallization. In addition, the WDS 400 completely eliminates the need for the test reagents required in KF titration.

Microwave resonance technology
The microwave resonance method offers the advantage of particularly fast measurement, well below one second. At the same time, it is non-destructive, which means that this versatile method can be used in the laboratory and for online and offline applications. The basis of this new Sartorius product line is the LMA300P, a modular system that consists of a control and evaluation unit and a resonator module in which the moisture of a sample is measured. Applications for the system cover measurement of the moisture in pourable, granulated and viscous products with a moisture content between 0.1% and 60%. The new PMD300 series can analyze moisture levels online, meaning that the analysis is performed and the results passed to the processing unit continuously. Highly sensitive sensors integrated in the production line constantly analyze moisture content and send the information to the processing unit, which is directly connected to the controller, ensuring that the entire process is constantly controlled and documented – and 100% automatic.

NIR technology
Optical or spectroscopic methods exploit the interaction between light and the sample. If light is directed on a sample, a part of that light is reflected, changing it characteristically. The resulting change in the light is then used to calculate the moisture content. NIR spectroscopy is a non-destructive technology, meaning that the samples can be used for further analyses. In addition, NIR spectroscopy is fast, reliable and precise. The LMA500 NIR calibrator is the first in our new NIR spectroscopy series. It not only analyzes moisture content, it can also do on-site calibration, allowing adaptation of methods to the materials being tested at a given time. The NIR calibrator is designed for pourable and granulated substances with a moisture content between 0.1% and 50%, depending on the sample.

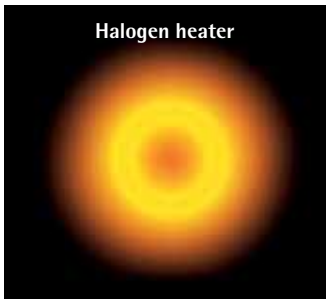
Sartorius MA35
Easy... very easy!

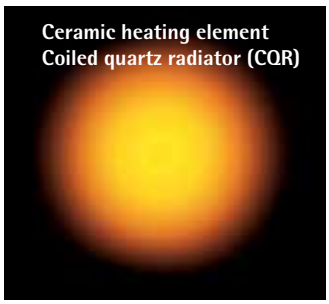
The MA35 is the new basic model in the **Moisture Analyzer** Series from Sartorius. Its performance functions and operating design are geared toward daily routine processes, such as repetitive QC monitoring of samples as performed during in-process control and incoming goods inspection. To make the MA35 even more user-friendly, we have done away with the least-used programming options, without compromising flexibility or measurement accuracy.

No need for programming
Because end-point determination is fully automatic, it is no longer necessary to program a shutoff parameter. The MA35 continuously monitors the drying process and stops the measurement as soon as the sample has reached a constant weight – i.e., when no more weight loss can be detected despite heating. A built-in weighing system provides the measurement accuracy required for this with 1-mg resolution that is optimized for use in high temperature ranges. For sample heating, the MA35 is equipped with two powerful metal tubular-shaped heating elements, providing 360 watts of power. These heating elements, also called dark radiators, are both rugged and durable. Compared to heating lamps made from glass, such as infrared lamps and halogen heaters, these are especially resistant to dirt and vibration. In addition, the MA35's metal heating elements can be used in accordance with the strict guidelines of the FDA and HACCP in cases where glass is prohibited in certain production processes.

Easy-to-understand and error-free moisture analysis
The operating design focuses on accuracy and ease of use. The concise display shows the user all important information at a single glance. Easy-to-understand icons guide you in three steps from taring the sample pan to starting the measurement. The MA35 has done away with the regular Program Selection menu, opting instead for a limited number of drying routines that can be saved in the non-volatile memory. All important operating parameters can be accessed and changed in seconds, giving you more flexibility. The optional printer, YDP03-0CE, enables you to print analysis results on a short report to save on paper usage. If you need comprehensive documentation, you can also print out the sample analysis results as well as the weighing system and temperature calibration as a detailed GLP report.

Sartorius MA150: The Compact Class Featuring Maximum Performance with Minimum Space Requirements





For routine operation
A rugged design with low space requirements and easy operation are the major features of this analyzer. Fully automatic drying of a sample until a constant weight is reached eliminates the need for programming an endpoint shutoff parameter. A total of 20 drying routines can be saved to give you the flexibility you need when measuring the moisture content of additional, out-of-the-ordinary samples.

Customizable and fast
Now you can choose between two different infrared analyzers that cover a diverse range of moisture measurement requirements. Whichever heat source you opt for, both analyzers deliver results within minutes. For temperature-sensitive samples, a ceramic heating element ensures especially gentle heating over the entire surface. The other choice, a CQR quartz glass heater, optimizes the analysis time even further, which is already ultra-fast for the analyzer featuring the ceramic heater.

Application-specific solutions
Practical accessories round off the entire lineup of Sartorius moisture analyzers, including an in-use dust cover, supplied as standard equipment. Also available is a special moisture analyzer version without openly accessible glass components, making you compliant with the stringent FDA and HACCP requirements that ban the use of glass in production.

Sartorius MA100: Analytical Precision Combined With Flexibility and Dynamics

As accurate as an analytical balance
The **MA100** was the first infrared dryer in the world to feature a built-in weighing system with 0.1-mg resolution and an EC type-approval certificate. A motorized heating unit moves over the sample to open or close the sample chamber. This reduces interfering effects when a sample is placed on the pan or a measurement is started. The pacesetting design enables the MA100 to achieve a measuring accuracy well beyond that provided by conventional infrared dryers.

Automatic adaptation to reference values
The MA100 features "Swift Parameter Adjustment to a given Reference Method," or SPRM. This function enables the operating parameters of **MA100** to be adapted to the results of an available reference method and saved as a drying routine. Optimization of operating parameters doesn't get any faster than this.

Flexible and modular
The MA100 analyzers give you a choice of three different infrared heat sources: a halogen lamp for standard applications, a ceramic heating element for gentle heating of temperature-sensitive samples and a CQR quartz glass heater. The CQR combines the fast drying capability of a halogen lamp with the gentle heating capability of a ceramic heater for drying samples evenly over their entire surface. A printer that can be optionally integrated into the housing eliminates the familiar cable spaghetti of an external printer, while helping keep your work area tidy.

A clean solution
Did you accidentally spill a sample? Are there spatters of grease inside the sample chamber? No problem with the MA100! The Plug & Dry® feature lets you slide out the heater cover easily for thorough cleaning and without letting any dirt get inside the housing.

Sartorius LMA100P:
Workhorse for Monitoring Production and Incoming Goods

A rugged environment and a tremendous influx of samples characterize the incoming goods and production departments.

Unique and modular
The **LMA100P**, a modular moisture analysis tool, is designed for production inspection with heavy sample traffic. Several samples can be analyzed simultaneously since up to four heating modules can be operated in parallel on one control unit. And different measurement parameters can be set for every module. A table saved in the setup menu controls which user can access which module. This guarantees the traceability of your measurements by preventing confusion with measurements from someone else's module.

Practical ideas for every day use
Entering moisture content tolerances allows the user to identify, after measurement, whether the test results lie within the accepted range or it is necessary to take regulatory action. The device features a large backlit display for easy reading, even under poor lighting conditions. The keyboard and handles are specially designed for operation in the production line and warehouse and can be operated easily while wearing work gloves. The hinged cover has a wide opening angle, allowing the user to insert and remove the sample easily.

Communicative
With RS-232, USB and Ethernet ports, the LMA100P supports every common interface available and can be integrated into your current communications infrastructure. Additionally, the LMA100P features an integrated thermal printer to enable on-site printing of data records. And when the device completes a measurement, it lets the user know by emitting an audible signal and activating a blinking red and green LED at the appropriate heating module.

Specifications
MA35 | MA100 | MA150 | LMA100P

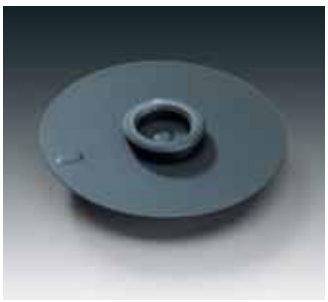
	MA35	MA100	MA150	LMA100P
Max. weighing capacity (g)	35	100	150	100
Accuracy of the weighing system (mg)	1	0.1	1	0.1
Weighing system with EC type-approval certificate		•		
Repeatability, average (%)				
– for initial sample weight approx. > 1 g	± 0.2	± 0.1	± 0.2	± 0.1
– with initial sample weight of approx. 5 g	± 0.05	± 0.02	± 0.05	± 0.02
Readability (%)	0.01	0.001	0.01	0.001
Display mode for results				
– % moisture	•	•	•	•
– volatile matter				•
– % dry weight	•	•	•	•
– % RATIO	•	•	•	•
– g residue	•	•	•	•
– g/kg residue		•	•	
– g/l residue			•	
– mg/l residue				•
– mg weight loss		•	•	
– Calculated value (measured value × factor)		•		
– ppm moisture				•
– ppm dry weight				•
Temperature range and settings				
– 40 to 160 °C, adjustable in 1-degree increments	•			
– 30 to 230 °C, adjustable in 1-degree increments		•		
– 40 to 220 °C, adjustable in 1-degree increments			•	
– 30 to 210 °C, adjustable in 1-degree increments				•
Heating modes				
– Standard drying	•	•	•	•
– Quick drying		•		
– Gentle drying		•	•	
– Phase drying		3×0.1–999 min.	1×0.1–999 min.	2×0.0–99.9 min.
Analysis modes				
– Fully automatic	•	•	•	
– Semi-automatic		1–50 mg/5–300 sec. 0.1–5.0%/5–300 sec.	1–50 mg/5–300 sec. 0.1–5.0%/5–300 sec.	0.010–9.990%/ 0.1–99.9 min.
– Timer settings	1×0.1–99 min.	3×0.1–999 min.	1×0.1–99 min.	2×0.0–99.9 min.
– Timer mode +fully/semi-automatic		2×0.1–999 min. + Automatic		
SPRM mode for parameter recognition		•		
Heating units				
– Ceramic IR heating element (infrared)		•	•	
– Halogen lamp (infrared)		•		
– CQR heater (coiled quartz radiator)		•	•	
– Metal tubular heating element (infrared dark radiator)	•			
– Quartz tube radiator (4 tubes				•
Upgrade of heating unit to Plug & Dry®*		•		
Access to sample chamber				
– hinged, flip-up cover	•		•	•
– motorized cover		•		

* Does not apply to the CQR quartz heating element

	MA35	MA100	MA150	LMA100P
Optional version compliant with FDA|HACCP regulations**	•		•	
DLG Signam approved			•	
Built-in calibration weight		•		•
Operator guidance features – Context-sensitive menu with alphanumeric interactive prompts and symbols – Text input for sample identification using soft-keys – Numeric keypad for sample identification and parameter input – Parameter input using soft-keys	•	•	•	•
		•		•
		•		
		•		•
reproTEST for determining the repeatability of the weighing system		•		
Number of program memory modules	1	30	20	300
Memory for data storage – Statistics on the last 9999 measurements – End point up to the next moisture analysis run	•	•	•	999
Password protection to prevent unauthorized changes in parameters		•	•	
Manual input of tare weights		•		
Data printer – Built-in (optional retrofit) – External (optional)	•	•	•	
Thermal printer built in				•
Printout – GLP-compliant, configurable – GLP-compliant, not configurable – Short report	•	•	•	•
	•			
Data interface port – RS-232C unidirectional – RS-232C bidirectional – Ethernet – USB	•	•	•	•
				•
				•
Bar code scanner connectivity		•		
Dust cover for the keypad		•	•	
Power consumption (VA)	max. 400	max. 700	max. 700	max. 700***
Dimensions (mm) W × D × H	224×366×191	350×453×156	213×320×180.5	495×413×235***
Weight, approx. (kg)	5.8	8.0	5.5	10***

* Does not apply to the CQR quartz heating element
** Not available with halogen or CQR quartz heating element
*** Applies to the combination of one operating and one heating module

Accessories
MA35 | MA100 | MA150 | LMA100P



Accessories	Order No.			
	MA35	**MA100**	**MA150**	**LMA100P**
Disposal sample pans, 80 pcs, aluminum; round, 90 mm ∅	6965542	6965542	6965542	6965542
Reusable sample pans, 10 pcs, stainless steel, round, 100 mm ∅				0-2014
Glass fiber filters, 80 pcs, 90 mm ∅ for analysis of liquid, pasty and fatty samples	6906940	6906940	6906940	6906940
Panel replacement set (conversion kit) Aluminum panels for replacing glass panels to meet FDA|HACCP regulations	YDS05MA	YDS03MA	YDS04MA	
Windows® 2000|NT|XP-compatible software for data collection and for programming drying programs; 9|25-pin interface cable included		YMW02MA	YMW02MA	
SartoCollect, software for communication between moisture analyzer and PC; 25-pin/9-pin cable included (2 m)	•	•	•	
Carrying case		YDB03MA	YDB05MA	
Data printer				
– Built-in		YDP03-0CE		
– External	YDP01MA	YDP03-0CE	YDP03-0CE	
Color ink ribbon for data printer	6906918	6906918	6906918	
Paper rolls for data printer				
– 5 pcs, 50 m each	690693	690693	690693	
– 5 pcs, 20 m each (thermo paper)				69M30100
External calibration weight				
– 100 g (E2)			YSS43-00	
– 100 g (E2) DKD certificate			YSS43-02	
– 30 g ± 0.3 mg	YCW452-00			
– 30 g ± 0.3 mg DKD certificate	YCW452-02			
– 50 g (E2)		YCW512-00		YCW512-00
– 50 g (E2) DKD certificate		YCW512-02		YCW512-02
Temperature adjustment set	YTM01MA	YTM03MA	YTM03MA	YTM06MA
Additional heating module with integrated weighing system				LMA100PQ-000U

Interested in receiving more information about our moisture analyzers?
Visit www.sartorius.com/moisture. Our applications database contains a wealth of details about which analyzer is suitable for which application and which operating parameters Sartorius recommends for use. Moreover, numerous scientific publications are available for download as PDF files.

Sartorius LMA200PM:
Speed Meets Analytical Precision

If the sample contains a large amount of water, microwave drying in accordance with the thermogravimetric (loss-on-drying) technique is the fastest and most effective drying method. Developed for measuring moisture content ranging from approximately 8% to 100%, the LMA200PM performs moisture analysis in a fraction of the time it takes for other thermogravimetric methods. It delivers results in just 40 to 120 seconds on average. The cylindrical design of the sample chamber and the dual apertures at the bottom of the chamber permit focused emission of microwave energy. This prevents hot and cold spots from occurring, a familiar problem with conventional microwave analyzers.

Built-in analytical balance
The moist and dry weight of the sample required for calculating the loss of moisture is measured by a built-in analytical weighing system featuring 0.1 mg resolution. Thanks to its monolithic design (the cell is robotically etched from a single block), this system is particularly suitable for use in a moisture analyzer, because it considerably reduces zero point drift during heat exposure when compared with conventional weighing systems.

Intelligent endpoint determination
A moisture sensor integrated in the exhaust system of the sample chamber monitors the progress of drying. When the measurement begins, the moisture of the air inside the sample chamber continuously increases as water evaporates from the sample. Once the sample has dried and no longer releases water, the air moisture content drops back to its original level – a clear indication of the end point. At the same time, the built-in weighing system monitors the weight progression and confirms when the sample reaches a constant weight. This dual monitoring system ensures optimal moisture analysis results.

High speed
Two factors play a major role for ultra-fast measurements. First, the sample must absorb microwave energy within the shortest time possible and transform it into heat energy. For this purpose, the LMA200PM has a cylindrical sample chamber that focuses the microwave radiation on the sample. Microwave radiation enters the sample chamber through two openings at the bottom; coupled with the rotation of the sample, this ensures ideal absorption of the microwave energy. Second, the resulting water vapor must be transported away from the sample as fast as possible to obtain rapid analysis results. To accomplish this, a sample is applied to a glass fiber pad that allows water vapor to evaporate not only upward from the sample, but also downward through the pad. An exhaust system draws water vapor out of the sample chamber, thus preventing the effects of condensation.

Specifications | Accessories
LMA200PM

Model	LMA200PM
Weighing capacity (g)	70
Accuracy of the weighing system (g)	0.0001
Repeatability, average with initial sample weight of approx. 1 g (%)	± 0.05
Sample carrier	∅ 90 mm glass fiber pad
Display modes	% moisture, ppm moisture, % volatile components, % dry weight (solids), ppm dry weight, g dry weight, mg loss on drying, % RATIO
Measuring range	Approx. 8 to 100% moisture
Sample heating	Microwave generator with 1000 W input power
Power control for heating	2 to 100%, adjustable in 1%-increments
Endpoint determination	– Fully automatic, by means of weight and moisture sensors – User-defined as loss of weight/time: 1 to 50 mg/1 to 99 sec. 0.1 to 9.9%/1 to 99 sec. – Timer-mode: 0.1 to 99.9 min.
Response time (s)	Approx. 40 –120 (depends on sample and moisture content)
Programs	320, saved in non-volatile memory
Data printer	Thermal printer, built in
Moisture analysis report	– Configurable GLP-compliant printout – The report can be printed on non-fading paper by the built-in thermal printer.
Operator guidance	– Menu-driven, alphanumeric dialog texts (English, French, German, Italian and Spanish available) – 5 pre-programmed function keys
Data interfaces	– 1 RS-232 for PC – 1 Ethernet
Housing dimensions W×D×H (mm) | (inches)	510 × 535 × 304 | 20" × 21" × 12"
Weight, approx. (kg) | lbs	22 | 48.5
Power consumption (VA)	max. 1200

Accessories	Order No.
80 glass fiber pads	6906940
500 disposable pipettes	YAT01MA
5 rolls of printer paper, 20 m each	69M30100