

always aware of your air

Solutions for Air and Gas Monitoring



MAS-100[®] Microbial Air Samplers

The Leading Solutions for Air and Gas Monitoring



Viable air monitoring plays an important part in pharmaceutical companies' contamination control strategy for the areas in which they manufacture. According to GMP guidances also compressed gases must be monitored for microbial contamination.

The various MAS-100® microbial air and compressed gas samplers are designed to perfectly fit the requirements of different controlled environments, for example classical cleanrooms (grade A/B/C/D), isolators and RABS for pharmaceutical manufacturing as well as food, beverage and cosmetics manufacturing lines.

For such tasks, the MAS-100® microbial air samplers offer significant advantages:

- · Highest precision
- Easy to use and clean
- · Completely validated and documented
- · Worldwide distribution and service

How the MAS-100® samplers work

All MAS-100® microbial air monitoring samplers are sieve impaction systems based on Anderson impaction, a proven principle accepted worldwide. Air is aspirated through a perforated lid by a radial fan, controlled by a flow sensor, that accurately regulates air flow in real time at the specified flow rate. The air is impacted onto the surface of growth medium in a 90 mm Petri dish, or with optional adaptors in a 55 mm contact plate or Growth Direct™ EM cassette. MAS-100® microbial air samplers comply with the guidelines as specified in ISO 14698 and EN 17141.

Accuracy runs in the family

The MAS-100® Microbial Air Monitoring Systems are the most accurate available for collecting air samples. Most utilize a state-of the-art mass flow sensor to continuously ensure a constant air flow rate at a standardized 100 liters per minute (only the MAS-100 VF® and MAS-100 Eco® samplers use electronic flow control for a uniform flow rate). Mass flow sensors allow the MAS-100® samplers to automatically adjust for differences in the fill volume of Petri dishes, changes in air density and differences between individual perforated lids. The instruments are delivered with a calibration certificate from an ISO 17025 accredited laboratory.

The perfect plates for active air sampling

Our ICR settle plates are produced under aseptic conditions, gamma-irradiated and triple-bagged, making them optimal for passive air sampling in isolators and cleanrooms. In addition to this, they are also suitable for active air monitoring with $MAS-100^{\circ}$ microbial air samplers. The ICR_{plus} plates, ideal for cultivation of anaerobic and microaerophilic organisms, additionally come with a locking mechanism to ensure the lid sits tight during transportation.



MAS-100 NT® Air Sampler

Order number 1091910001

The Industry Standard for GMP Compliant Performance

The MAS-100 NT® and MAS-100 NT Ex® portable microbial air samplers are the industry standard for use in critical environments. These compact, yet sophisticated instruments are the preferred choice for the highest demands in microbial air monitoring, providing utmost accuracy and excellent, proven collection efficiency. Their low particle generation complies with the requirements of ISO 14644 for use within ISO 5 controlled environments.

- Third-party validation acc. ISO 14698 (complies with EN 17141) confirms a d50 value of <1 µm and an excellent biological efficiency
- Built-in air flow compensation guarantees precise, standardized and reproducible flow rates
- Suitable for ISO 5/GMP Grade A cleanrooms with minimized turbulence of unidirectional air flow
- Compatible with 90 mm Petri dishes, 55 mm contact plates or Growth Direct™ cassettes
- Automated calibration with MAS-100 Regulus® digital anemometer
- Suitable for disinfection with many industry-standard disinfectants and vaporized hydrogen peroxide
- Interfaces to several EM software systems for digital and 21 CFR Part 11 compliant user management





The MAS-100 NT Ex® sampler(order number 1091940001) shares all functions of the MAS-100 NT® system but is specially designed for use in explosion hazard areas. It has received ATEX conformity certification and can be used in zone 2 and gas groups 11A, 11B and 11C in temperature classes T1 to T4.

The MAS-100 NT® system is available also with a HEPA exhaust filter (order number 1172740001) or can be upgraded with a filter mounting kit to reduce any risk of cross-contamination when moving from low to high grade cleanroom areas. Its filtration efficiency of more than 99.95% has even been proved in long-term simulations, running for a whole year, by particle measurements at the air exhaust of the instrument under worst-case conditions.

Technical Specifications

Parameter	MAS-100 NT® sampler MAS-100 NT Ex® sampler			
Size: Body / Perforated lid	270 x Ø 109 x 170 mm (w. handle & lid) / Ø 109 x 32 mm			
Weight: Body / Perforated lid	2.4 kg with perforated lid / 0.19 kg			
Material: Body / Perforated lid	Anodized aluminum / anodized alum	inum		
Flow rate	100 standard liters per minute (SLPN	100 standard liters per minute (SLPM) ±2.5%		
Flow regulation	Mass flow sensor	Mass flow sensor		
Default perforated lid	300 holes with Ø 0.6 mm (D50 value of 1.1 μ m; impaction speed 19.7 m/s @100 SLPM)			
Sample volumes	10 to 2000 liters (pre-set: 50, 100, 250, 500 & 1000 L)			
Sample modes	Standard single sample, sequential sampling: 2 to 50 fractions, start delay configurable from 1 to 120 min			
Batteries	Rechargeable 6 cell Li-Ion (7.4 V; 6.9 Ah)	Rechargeable 2 cell Li-Ion (7.4 V; 2.5 Ah)		
Battery capacity	Approx. 5.5 h (for 33.000 L)	approx. 2 h (for 12.000 L)		
Operating conditions	5 °C to 40 °C non-condensing relative humidity up to 2000 m above sea level			
ATEX Certification	N/A	€ II eG Ex ec IIC T4 Gc		
Tripod mounting	1/4" and a 3/8" tripod screw (optional quick-change adapter)			

Safe Lid for MAS-100 NT® air samplers

Always at your disposal

Safe Lid for MAS-100 NT® is a ready-to-use, disposable alternative to the autoclavable standard perforated lid:

- Time savings: no daily autoclaving
- Safety: sterile and double-packed
- Performance: reproducible results
- Data integrity: GS1 barcode enables tracking for digital data analysis.

for digital data analysis

Order here: SigmaAldrich.com/safe-lid



MAS-100 VF® Air Sampler

Order number 1171030001

Top Collection Efficiency in a Compact Design

The MAS-100 VF® active air sampler is especially designed for controlled environments. It is a particularly light-weight and compact model amongst the portable and battery-operated MAS-100® microbial air samplers. Its simple user menu is easily accessed and operated by a single touch slide control. The instrument has the same flow rate, d50 value and impaction speed as the MAS-100 NT® sampler.

- \bullet Third-party validation acc. ISO 14698 (complies with EN 17141) confirms a d50 value of <1 μm and an excellent biological efficiency
- Suitable for ISO 5/GMP Grade A cleanrooms with minimized turbulence of unidirectional air flow
- Compatible with 90 mm Petri dishes, 55 mm contact plates or Growth Direct™ cassettes
- Integrated, pre-installed software can be operated on a standard web browser surface
- Automated calibration with MAS-100 Regulus® digital anemometer (calibration certificate stored within the instrument)



Parameter	MAS-100 VF® sampler
Size: Body / Perforated lid	179 x Ø 109 x 148 mm (w. handle) / Ø 109 x 32 mm
Weight: Body / Perforated lid	1.9 kg incl. perforated lid / 0.19 kg
Material: Body / Perforated lid	Anodized aluminum / anodized aluminum
Flow rate	100 liters per minute (LPM) ±4%
Flow regulation	Electronically
Default perforated lid	300 holes with Ø 0.6 mm (D50 value of 1.1 $\mu m;$ impaction speed 19.7 m/s @100 LPM)
Sample volumes	10 to 2000 liters (pre-set: 50, 100, 250, 500 & 1000 L)
Sample modes	Standard single sample, start delay configurable from 1 to 120 min
Batteries	Rechargeable 6-cell Li-Ion battery (7.4 V/6.9 Ah)
Battery capacity	Approx. 5 h (for 30.000 L)
Operating conditions	5 °C to 40 °C non-condensing up to 2000 m above sea level
Tripod mounting	1/4" and a 3/8" tripod screw (optional quick-change adapter)



MAS-100 Eco® Air Sampler

Order number 1092270001

The Economic Choice

The portable MAS-100 Eco® sampler is the basic version of the MAS-100® range. It is used for microbiological air monitoring in the hygienic production of food and cosmetics, as well as in the maintenance of ventilation and air-conditioning systems (HVAC). The MAS-100 Eco® sampler is the lightest of the models and particularly easy to handle.

As an open system the MAS-100 Eco® sampler works with a broad variety of agar media in 90 mm Petri dishes and other plate formats.

- Easy cleaning with industry standard disinfectants
- Compatible with different nutrient plates, e.g., ready-to-use 90 mm standard plates, and (with optional adapters) 55 mm contact or Growth Direct™ plates
- · Active volume flow control
- Calibration with MAS-100 Regulus® digital anemometer
- Easy exchange of rechargeable batteries





Parameter	MAS-100 Eco® sampler
Size: Body / Perforated lid	Ø 109 x 110 mm (w. handle) / Ø 109 x 32 mm
Weight: Body / Perforated lid	1.4 kg incl. perforated lid / 0.19 kg
Material: Body / Perforated lid	Anodized aluminum / anodized aluminum
Flow rate	100 liters per minute (LPM) ±4%
Flow regulation	Electronically
Default perforated lid	400 holes with Ø 0.7 mm (D50 value of 1.6 μ m; impaction speed 11 m/s @100 LPM)
Sample volumes	1 to 1000 liters (pre-set: 10, 20, 100, 250 and 500 L)
Sample modes	Standard single sample, start delay configurable from 1 to 60 min
Batteries	2 x rechargeable NiMH cells (1.2 V/4.5 Ah)
Battery capacity	Approx. 3 h (= 18.000 L)
Operating conditions	5 °C to 40 °C non-condensing up to 2000 m above sea level
Tripod mounting	Optional

MAS-100 Atmos® Gas Sampler

Order number 1173280001

Sample Gases for Microbial Contamination

The new MAS-100 Atmos® microbial compressed gas sampler is a high-precision, portable and battery-powered device to monitor pressurized gases such as air, nitrogen, carbon dioxide and argon. The instrument is easy to use and can be operated in a pressure range of 1.2 to 7 bar abs (17.4 to 101.5 psi abs). At flow rate of 100 liters per minute the MAS-100 Atmos® gas sampler has the identical impaction speed and efficiency as the MAS-100 NT® sampler. The microorganisms are impacted under pressure to avoid any damage by dynamic decompression.

- Automated flow rate regulation & decompression
- Fully validated accuracy of sampled gas amounts over complete
- pressure range for each selectable gas type
- Optional exhaust tubing to avoid intoxication of environment
- Impaction under pressure for minimal risk of false negatives
- Freely configurable out-of-the-box use (21 CFR Part 11 non-compliant)
- Selectable 21 CFR part 11 compliant user management incl. individual login & tamper-proof audit trail
- Unique result barcode for easy implementation in EM software systems





Parameter	MAS-100 Atmos® sampler
Size: Body / Perforated lid	180 x 210 x 500 mm (with handle) / Ø 109 x 90 mm
Weight: Body / Perforated lid	7.3 kg / 0.75 kg
Material: Body / Perforated lid	Injection-molded high-performance polystyrene / anodized aluminum
Gas types (selectable, validated for correct sample volumes)	Compressed air, nitrogen (N2), carbon dioxide (CO2), argon (Ar)
Pressure range	1.2 to 7 bar abs (17.4 to 101.5 psi abs)
Default perforated lid	300 holes with Ø 0.6 mm (100 LPM: D50 1.1 μ m; impaction speed 19.7 m/s or 50 LPM: D50 1.6 μ m; impaction speed 9.8 m/s)
Sample volumes	50 to 3000 normal liters (NL)
Batteries	Li-Ion battery (7.2 V; 9.6 Ah, 72 Wh)
Battery capacity	2 h to 5 h (depending on gas type & pressure range); default battery indicator: 30 x 1000 liters at 2 bar abs for compressed air - increased number of samples at increasing pressure and lower volumes
Operating conditions	5 °C to 45 °C non-condensing up to 3000 m above sea level



MAS-100 Iso MH[®] & MAS-100 Iso NT[®] Air Samplers

Remote Sampling for Isolators and RABS

The MAS-100 Iso MH® air sampler is used to monitor microbiological contamination of the air in isolators or RABS remotely. Per control unit it allows the installation of up to four sampling heads for standard 90-100 mm Petri dishes at critical control points. All electronic and moving parts are kept outside the critical zone.

All instruments are delivered with standard interfaces (USB, RS232, and digital I/O). Models with additional interfaces such as Ethernet, Profibus or Profinet are available optionally for connectivity with computer and/or programmable logic controllers used in isolators.

- Double valve system to prevent back-flow and cross-contamination
- Active VHP decontamination of air duct
- Up to 10 m distance between sample location and control unit in isolators (50 m without using VHP decontamination)
- \bullet Third-party validation acc. ISO 14698 (complies with EN 17141) confirms a d50 value of <1 μ m and an excellent biological efficiency
- Built-in air flow compensation for precise, reproducible flow rate of 100 SLPM
- Various stainless steel sampling head configurations for 90 mm plates or other plate formats (e.g. Growth Direct™ plates)
- Multiple options for combining filters (in-line/exhaust)
- Automated calibration with MAS-100 Regulus® digital anemometer





Parameter	MAS-100 Iso MH/NT® sampler
Size: Body (MH / NT)	160 x 423 x 380 mm / 160 x 283 x 230 mm
Weight: Body (MH / NT)	9.1 to 16.6 kg (depending on configuration) / 7.3 kg
Material: Body (MH / NT)	Powder coated / Walls from anodized aluminum and body from stainless steel
Size: Sampling Head	Ø 109 x 900 mm (Connector Tri-Clamp, Ø 50.5 mm)
Weight: Sampling Head	1.5 kg
Material: Sampling head	Stainless Steel EN 1.4435 (X2CrNiMo18-14-3), acc. BN2 (electro polished pharmaceutical quality)
Flow rates	100 SLPM ±2.5%
Flow regulation	Mass flow sensor
Default perforated lid	300 holes with Ø 0.6 mm (@100 SLPM: D50 1.1 $\mu m;$ impaction speed 19.7 m/s)
Sample volumes	1 to 2000 liters (pre-set: 50, 100, 250, 500 & 1000 L)
Sample modes	Standard single sample, sequential sampling: 2 to 50 fractions, start delay configurable from 1 to 120 min; in addition, the MAS-100 MH $^{\odot}$ sampler offers consecutive sampling mode (CNS)
Power supply	110-240 V AC, 0.7-1.5 A / 47-63 Hz
Power input of instrument	24 V DC ±5%, max. limits: 2.7 A and 65 W
Operating conditions	5 °C to 40 °C (non-condensing relative humidity); up to 2000 m above sea level

Ordering information

Portable MAS-100[®] microbial air samplers

Product	Description	Ord. No.
MAS-100 NT® air sampler	Standard microbial air sampler	1.09191.0001
MAS-100 NT® air sampler w. Filter	MAS-100 NT® air sampler (built-in H13 exhaust filter)	1.17274.0001
MAS-100 NT Ex® air sampler	For explosion hazard areas	1.09194.0001
*MAS-100 NT Ex® air sampler w. Filter	For explosion hazard areas (built-in H13 exhaust filter)	1.17275.0001
MAS-100 VF® air sampler	Microbial air sampler	1.171030001
MAS-100 Eco® air sampler	Microbial air sampler	1.09227.0001

^{*}MTO products are not in stock – please mind lead times

Accessories for portable air samplers

Product	Description	Ord. No.	NT	VF	ECO
Perforated lid	300 holes x 0.6 mm, aluminum	1.09195.0001	✓	✓	-
Perforated lid	400 holes x 0.7 mm, aluminum	1.09088.0001	(✔)	(✔)	√
Dust cover	Aluminum cover protects sieve from dirt	1.09084.0001	✓	✓	√
Perforated lid contact plates	300 holes \times 0.6 mm, aluminum, for use with 55 mm ICR/ICRplus contact plates	1.19149.0001	√	√	-
Perforated lid for contact plates	400 holes \times 0.7 mm, aluminum, for use with 55 mm contact plates (non-lockable only)	1.09213.0001	(✔)	(✔)	√
Contact plate adapter	For centering and fixing 55 mm contact plates (not required for VF)	1.09214.0001	✓	-	√
*RapidMicroBio perforated lid	300 holes x 0.6 mm, aluminum, for GD cassettes	1.17315.0001	√	√	-
*RapidMicroBio perforated lid w. clamps	300 holes x 0.6 mm, aluminum with clamps for first installation to center GD cassettes	1.17316.0001	√	-	-
*Perforated lid	300 holes x 0.6 mm, aluminum, edge protected	1.19363.0001	√	√	-
Tripod	For sampling in heights (88 - 250 cm)	1.09326.0001	√	√	√
Quick Change Tripod Adapter	For quick adaption of MAS-100 $^{\circ}$ air sampler to tripod without screwing	1.09223.0001	✓	√	-
Tripod adapter	for MAS-100 Eco® air sampler	1.09127.0001	-	-	√
Tube adapter	For sampling hardly to access sampling locations, can be used with tubing $% \left\{ \left(1\right\} \right\} =\left\{ \left(1\right\} \right\} =\left\{ \left(1\right) \right\} =\left\{ \left(1\right$	1.09224.0001	✓	√	√
Mounting kit for filter	For upgrading MAS-100 NT*/Ex* air samplers with HEPA exhaust filter	1.17276.0001	√	-	-
HEPA H13 replacement filter	Ø 74 mm; Filter efficiency H13	1.17278.0001	✓	-	-
*Shoulder bag	For MAS-100 Eco® air sampler	1.091260001	_	-	√
Battery charger with DC plug	For all MAS-100 NT® air samplers with serial numbers $\geq\!110500$ incl. US/JP, EU, UK and AU power plugs	1.19133.0001	✓	-	-
Battery charger with Lemo plug	For all MAS-100 NT Ex® as well as MAS-100 NT® air samplers with serial numbers <110499 incl. US/JP, EU, UK and AU power plugs	1.09200.0001	√	-	-
Battery charger	For MAS-100 VF $^{\! \otimes}$ air sampler incl. US/JP, EU, UK and AU power plugs	1.17104.0001	-	√	-
Battery Charger	For MAS-100 Eco $^\circ$ air sampler incl. US/JP, EU, UK and AU power plugs	1.17269.0001	-	-	√

^{*}MTO products are not in stock – please mind lead times

Microbial compressed gas sampler and accessories

Product	Description	Ord. No.
MAS-100 Atmos® gas sampler	Standard microbial compressed gas sampler	1.17328.0001
Sampling head Atmos® gas sampler	with perforated lid 300 x 0.6 mm, provides D50 of 1.1 μm at 100 liters/min	1.17357.0001
Sampling head Atmos® gas sampler	with perforated lid 300 x 0.47 mm, provides D50 of 1.1 μ m at 50 liters/min	1.17363.0001
Pressure tube Atmos gas sampler 2 m with TC Connector	PTFE Tube with $3/8^{\prime\prime}$ female connector to gas supply with connector to instrument	1.17354.0001
Gas exhaust tube Atmos® gas sampler 5 m with TC Connector	PVC tube Ø 50 mm, stainless steel connector and tri-clamp	1.17349.0001
Adapter gas exhaust tube for MAS-100 Atmos® gas sampler	Stainless steel adapter for self-assembly of gas exhaust tubing (tubing excluded)	1.17348.0001
Hardware key set (5x) for MAS-100 Atmos® gas sampler	Re-writable for individual user login	1.17333.0001
Wheeled transport case for MAS-100 Atmos $^{\scriptsize{\circledcirc}}$ gas sampler	For safe transportation	1.17334.0001
Dust cover for MAS-100 Atmos® gas sampler	Polypropylene, white, autoclavable	1.17340.0001
Plate holder for MAS-100 Atmos® gas sampler stainless steel	Autoclavable	1.17335.0001
Filter cover for MAS-100 Atmos® gas sampler with 3 screws	Aluminum, autoclavable	1.17336.0001
HEPA H13 replacement filter	Ø 74 mm; Filter efficiency H13	1.17278.0001
MAS-100 Atmos® Battery Charger	For MAS-100 Atmos® including country specific power plugs	1.17329.0001

Control units for MAS-100® Iso MH® air samplers

Description Control Unit	Standard Interface USB	Standard Interface USB + Ethernet	Standard Interface USB + Profibus	Standard Interface USB + Profinet
MAS-100 Iso NT® air sampler	1.09168.0001	1.09174.0001	1.09173.0001	*1.17291.0001
MAS-100 Iso MH® air sampler - One head	*1.17174.0001	*1.17178.0001	*1.17177.0001	*1.17292.0001
MAS-100 Iso MH® air sampler - Two heads	*1.17118.0001	*1.17145.0001	*1.17144.0001	*1.17309.0001
MAS-100 Iso MH® air sampler - Three heads	*1.17146.0001	*1.17148.0001	*1.17147.0001	*1.17310.0001
MAS-100 Iso MH® air sampler - Four heads	*1.17149.0001	*1.17157.0001	*1.17155.0001	*1.17312.0001

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Accessories for MAS-100 Iso NT® & MAS-100 Iso MH® air samplers

Product	Description	Ord. No.	MAS-100 Iso MH®	MAS100 Iso NT®
Perforated lid	300 holes w. Ø 0.6 mm, edge-protected, stainless steel (default version)	1.09189.0001	✓	√
Perforated lid	400 holes w. Ø 0.7 mm, edge-protected, stainless steel	1.09222.0001	✓	√
Standard base for sampling head	Stainless steel with Allen key, tri-clamp, and silicone gasket	1.09328.0001	✓	√
Silicone gasket (5x)	Sealing between standard base and tubing	1.17084.0001	✓	√
Easy clean base for sampling head	Stainless steel with tri-clamp and silicone screen gasket	1.17091.0001	✓	√
Silicone screen gasket (5x)	Sealing between easy clean base models and tubing	1.17099.0001	✓	✓
*RapidMicroBio easy clean base	Stainless steel, for GD cassettes	1.17319.0001	✓	✓
*RapidMicroBio perforated lid	300 holes x 0.6 mm, stainless steel for GD cassettes	1.17314.0001	✓	√
Dust cover	Stainless steel cover protects sieve from dirt	1.09644.0001	✓	√
Tri-clamp (3x)	To facilitate mounting of sampling heads	1.09440.0001	✓	√
Elbow joint	Stainless steel with 2 tri-clamps and silicone gaskets	1.17083.0001	✓	√
Remote cable MAS-100 Iso NT® air sampler	Can be used for remote start & stop of sampling and can display the instrument status via LED	1.17181.0001	√	√
Pressure test kit	For testing tightness of installation	1.17085.0001	✓	✓
*MAS-100 Iso NT® air sampler IP54 Kit	Protection against solid objects that are bigger than 1 mm and water splashing from any direction	1.17159.0001	-	√
Power supply	For MAS-100 Iso $\ensuremath{NT}^{\tiny{\circledcirc}}$ air sampler with power cord and regional plug adapters	1.17182.0001	-	✓
Power supply	For MAS-100 Iso MH® air sampler with power cord and regional plug adapters	1.09784.0001	✓	-
*Profinet module	Converts Profibus to Profinet interface	1.17290.0001	✓	✓
Opticap® XL Aervent® (3 pieces)	Hydrophobic 0.2 μm, length 4"	KTGRA04TT3	✓	√
Opticap® XL5 Aervent® KTGR	Hydrophobic 0.2 μm, length 5''	KTGRA05TT1	✓	√
Opticap® XL10 Aervent® KTGR	Hydrophobic 0.2 μm, length 10"	KTGRA10TT1	✓	√

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