

Expertise

Date of Issue: 24.05.2011

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Applicant: MBV AG
Industriestrasse 9
CH-8712 Stäfa

Test object: MAS-100 NT Upgrade

Goal:

To adduce evidence that the MAS-100 NT Upgrade (New blower including drive board (Rev.1), new charging board (Rev. 10), new Firmware Version (V1.4) and new PC software V1.5) do not have a negative influence regarding bandwidth and deviations from the target air flow.

Approach:

Performing comparison measurements at three devices. Each of them is first configured with the dc motor and after that configured with the ec motor.

Summary

Evaluation Deviation from Target Air Flow:

There is no difference between the results coming from dc motor and ec motor measurements.

The difference “adjustment to average calibration“ is comparable.

The bandwidth of the measured deviations from the target air flow coming from the ec motor is even less and therefore the result is better.

Remark:

The better results coming from the ec motor measurements can be the result using the optimized firmware version 1.4.

Evidence:

Adduce evidence is therefore given that the MAS-100 NT Upgrade have comparable or better results regarding bandwidth and deviations from the target air flow.

Measuring results

DUT 103563

300 x 0.6 mm head	DC Motor	EC Motor
Set-Value (during adjustment)	3111 mV	3146 mV
Deviation from Target Air Flow:		
- Justage / Cal. 1	0.4 %	0.4 %
- Cal. 2	0.9 %	0.1 %
- Cal. 3	-0.2 %	0.0 %
- Cal. 4	0.6 %	-0.1 %
- Cal. 5	0.4 %	-0.1 %
Bandwith (Cal. 1 to Cal. 5)	1.1 %	0.5 %
Difference adjustment to average calibration	0.42 %	0.06 %

400 x 0.6 mm head	DC Motor	EC Motor
Set-Value (during adjustment)	3033 mV	3045 mV
Deviation from Target Air Flow:		
- Justage / Cal. 1	-0.5 %	0.5 %
- Cal. 2	-0.1 %	0.7 %
- Cal. 3	-0.3 %	0.5 %
- Cal. 4	0.0 %	0.6 %
- Cal. 5	-0.1 %	0.7 %
Bandwith (Cal. 1 to Cal. 5)	0.5 %	0.2 %
Difference adjustment to average calibration	-0.20 %	0.60 %

DUT 103552

300 x 0.6 mm head	DC Motor	EC Motor
Set-Value (during adjustment)	3193 mV	3221 mV
Deviation from Target Air Flow:		
- Justage / Cal. 1	0.6 %	0.2 %
- Cal. 2	0.8 %	0.2 %
- Cal. 3	0.6 %	0.4 %
- Cal. 4	0.7 %	0.3 %
- Cal. 5	0.5 %	0.5 %
Bandwith (Cal. 1 to Cal. 5)	0.3 %	0.3 %
Difference adjustment to average calibration	0.64 %	0.32 %

400 x 0.6 mm head	DC Motor	EC Motor
Set-Value (during adjustment)	3096	3132 mV
Deviation from Target Air Flow:		
- Justage / Cal. 1	-0.4 %	-0.1 %
- Cal. 2	-0.3 %	0.1 %
- Cal. 3	0.0 %	0.1 %
- Cal. 4	-0.3 %	-0.3 %
- Cal. 5	-0.1 %	-0.2 %
Bandwith (Cal. 1 to Cal. 5)	0.4 %	0.4 %
Difference adjustment to average calibration	-0.22 %	-0.08 %

DUT 103553

300 x 0.6 mm head	DC Motor	EC Motor
Set-Value (during adjustment)	3013 mV	3049 mV
Deviation from Target Air Flow:		
- Justage / Cal. 1	0.1 %	0.4 %
- Cal. 2	0.3 %	0.4 %
- Cal. 3	0.8 %	0.3 %
- Cal. 4	0.6 %	0.1 %
- Cal. 5	0.7 %	0.0 %
Bandwith (Cal. 1 to Cal. 5)	0.7 %	0.4 %
Difference adjustment to average calibration	0.5 %	0.24 %

400 x 0.6 mm head	DC Motor	EC Motor
Set-Value (during adjustment)	2947 mV	2957 mV
Deviation from Target Air Flow:		
- Justage / Cal. 1	-0.3 %	-0.5 %
- Cal. 2	-0.2 %	-0.8 %
- Cal. 3	0.2 %	-0.4 %
- Cal. 4	-0.1 %	-0.9 %
- Cal. 5	-0.3 %	-0.8 %
Bandwith (Cal. 1 to Cal. 5)	0.5 %	0.5 %
Difference adjustment to average calibration	-0.14 %	-0.68 %

Comments:

Test Procedure:

Automatical adjustment is followed by four calibrations according MBV Calibration Procedure (PC Software MBV SOP Version 1.5) using the Adjustment Equipment DA-100 NT (No. 15777) as reference.

Same procedure using

- the 300 x 0.6 mm head and the 400 x 0.7 mm head.
- the dc motor configuration and using the ec motor configuration

Basis:

Providing a defined air flow of 100 liter / min a control loop needs a specific set-value. This set-value depends from the air resistance of the system, significantly given through the use of the two different heads

Control loop

It is a question of designing the control loop, how stabil the system is (air flow) at the time of adjustment.

The calibration occurs in that phase, where the control loop is in the static control range.

Depending on the design of the control loop an overshoot or undershoot can occur or a control deviation can exist.

Setpoint setting "Set-Value":

The set-value for the 400 x 0.7 mm head is lower than for the 300 x 0.6 mm head, as expected.

Bandwith:

Due to the design of the control loop system there is a resulting air flow bandwith.

The Anemometer DA-100 NT and the flow sensor signal processing are mainly involved building up this bandwith.

Difference adjustment to average calibration:

The set-value, which is calculated during the adjustment and is given to the control unit as reference value, is essential for a possible resulting difference adjustment to average calibration.

The set-value calculation is based on the Anemometer DA-100 NT and the flow sensor signal processing.

Measurement accuracy:

Specifications:

- Anemometer DA-100 NT: + / - 1.0 % used as Adjustment Equipment / Calibration Equipment
- MAS-100 NT: + / - 2.5 %

Attachment:

Adjustment and Calibration Certificates

Gebenstorf, 24.05.2011



Erich Forster

Calibration Certificate Nr.103552

Test Object	Instrument:	MAS-100 NT Microbial Air Sampler
	Serialnumber:	00103552
	Firmware Version:	1.3
	Sampling Head:	300*0.6 mm
	Calibration Procedure	MBV SOP

Adjustment Equipment	Adjustment Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serialnumber:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min *	0.1
	Adjustment conditions:	Temp.: 25.5 [°C], Amb. Pressure: 960 [mbar]

Calibration Equipment	Calibration Equipment	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serialnumber:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min *	0.1
	Callibration conditions:	Temp.: 25.6 [°C], Amb. Pressure: 962 [mbar]

Calibration Results

Measurement No:		1	2	3	Result
Target Air Flow *	[l/min]	100.0	100.0	100.0	100.0
Flow of DA-100 NT *	[l/min]	100.5	100.4	100.9	100.6
Flow deviation of DA-100 NT *	[l/min]	0.1	0.1	0.1	0.1
Test Result (Corrected Flow of DA-100 NT) *	[l/min]	100.4	100.3	100.8	100.5
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	0.4	0.3	0.8	0.5
Test Result					accepted

(*) All flows corrected to 20°C and 1013 mbar atmospheric pressure; the formula to calculate volume into mass flow is in the DA-100 NT user manual

Calibration Note

Calibration Date:	14.04.2011	Adj. test object:	14.04.2011
Calibrated by:		Signature:	
Approved by:		Signature:	

Due Date: 13.04.2012

Calibration Certificate Nr.103552

Test Object	Instrument:	MAS-100 NT Microbial Air Sampler
	Serialnumber:	00103552
	Firmware Version:	1.3
	Sampling Head:	400*0.7 mm
	Calibration Procedure	MBV SOP

Adjustment Equipment	Adjustment Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serialnumber:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min *	0.1
	Adjustment conditions:	Temp.: 25.7 [°C], Amb. Pressure: 960 [mbar]

Calibration Equipment	Calibration Equipment	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serialnumber:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min *	0.1
	Callibration conditions:	Temp.: 25.8 [°C], Amb. Pressure: 963 [mbar]

Calibration Results

Measurement No:		1	2	3	Result
Target Air Flow *	[l/min]	100.0	100.0	100.0	100.0
Flow of DA-100 NT *	[l/min]	100.0	99.9	100.1	100.0
Flow deviation of DA-100 NT *	[l/min]	0.1	0.1	0.1	0.1
Test Result (Corrected Flow of DA-100 NT) *	[l/min]	99.9	99.8	100.0	99.9
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	-0.1	-0.2	0.0	-0.1
Test Result					accepted

(*) All flows corrected to 20°C and 1013 mbar atmospheric pressure; the formula to calculate volume into mass flow is in the DA-100 NT user manual

Calibration Note

Calibration Date: 14.04.2011 Adj. test object: 14.04.2011

Calibrated by: _____ Signature: _____

Approved by: _____ Signature: _____

Due Date: 13.04.2012

Adjustment and Calibration Certificate Nr.103552

Test Object	Instrument:	MAS-100 NT Microbial Air Sampler
	Serial Number:	103552
	Firmware Version:	1.4
	Sampling Head:	300*0.6 mm
	Calibration Procedure:	MBV SOP / Version 1.5

Adjustment Equipment	Adjustment Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Adjustment Conditions:	Temp.: 26.4 [°C], Amb. Pressure: 959 [mbar]

Calibration Equipment	Calibration Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Calibration conditions:	Temp.: 26.4 [°C], Amb. Pressure: 960 [mbar]

Calibration Check Results:

Measurement No:		1	2	3	Result
Target Air Flow	[SLPM]	100.0	100.0	100.0	100.0
Air Flow on DA-100 NT	[SLPM]	100.4	100.3	100.2	NA
Deviation of DA-100 NT *	[SLPM]	0.1	0.1	0.1	NA
Corrected Air Flow	[SLPM]	100.3	100.2	100.1	100.2
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	0.3	0.2	0.1	0.2
Calibration Check Status:					accepted

(*) For the DA-100 (NT) the deviation mentioned on the calibration certificate is not normalized to SLPM conditions (20°C; 1013 mbar) as it is not significant: The correction would be 0.034% per °C (1/293) and 0.09% (1/1013) per mbar difference to the SLPM standard conditions. E.g. a 0.2l/min deviation measured at 25°C and 940mbar leads to an error of 8.8% or 0.018l.

Adjustment Date: 14.04.2011

Adjusted by: _____ Signature: _____

This report has been produced by an electronic system and is valid with a single signature of the calibrator.

Due Date: 13.04.2012

Calibration Certificate Nr.103552

Test Object	Instrument:	MAS-100 NT Microbial Air Sampler
	Serial Number:	103552
	Firmware Version:	1.4
	Sampling Head:	300*0.6 mm
	Calibration Procedure:	MBV SOP / Version 1.5

Adjustment Equipment	Adjustment Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Adjustment Conditions:	Temp.: 26.4 [°C], Amb. Pressure: 959 [mbar]

Calibration Equipment	Calibration Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Calibration conditions:	Temp.: 26.2 [°C], Amb. Pressure: 958 [mbar]

Calibration Check Results:

Measurement No:		1	2	3	Result
Target Air Flow	[SLPM]	100.0	100.0	100.0	100.0
Air Flow on DA-100 NT	[SLPM]	100.1	99.9	100.8	NA
Deviation of DA-100 NT *	[SLPM]	0.1	0.1	0.1	NA
Corrected Air Flow	[SLPM]	100.0	99.8	100.7	100.2
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	0.0	-0.2	0.7	0.2
Calibration Check Status:					accepted

(*) For the DA-100 (NT) the deviation mentioned on the calibration certificate is not normalized to SLPM conditions (20°C; 1013 mbar) as it is not significant: The correction would be 0.034% per °C (1/293) and 0.09% (1/1013) per mbar difference to the SLPM standard conditions. E.g. a 0.2l/min deviation measured at 25°C and 940mbar leads to an error of 8.8% or 0.018l.

Calibration Date: 14.04.2011 Last Adjustment Date: 14.04.2011

Calibrated by: _____ Signature: _____

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Due Date: 13.04.2012

Calibration Certificate Nr.103552

Test Object	Instrument:	MAS-100 NT Microbial Air Sampler
	Serial Number:	103552
	Firmware Version:	1.4
	Sampling Head:	300*0.6 mm
	Calibration Procedure:	MBV SOP / Version 1.5

Adjustment Equipment	Adjustment Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Adjustment Conditions:	Temp.: 26.4 [°C], Amb. Pressure: 959 [mbar]

Calibration Equipment	Calibration Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Calibration conditions:	Temp.: 26.0 [°C], Amb. Pressure: 959 [mbar]

Calibration Check Results:

Measurement No:		1	2	3	Result
Target Air Flow	[SLPM]	100.0	100.0	100.0	100.0
Air Flow on DA-100 NT	[SLPM]	100.3	100.4	100.6	NA
Deviation of DA-100 NT *	[SLPM]	0.1	0.1	0.1	NA
Corrected Air Flow	[SLPM]	100.2	100.3	100.5	100.3
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	0.2	0.3	0.5	0.3
Calibration Check Status:					accepted

(*) For the DA-100 (NT) the deviation mentioned on the calibration certificate is not normalized to SLPM conditions (20°C; 1013 mbar) as it is not significant: The correction would be 0.034% per °C (1/293) and 0.09% (1/1013) per mbar difference to the SLPM standard conditions. E.g. a 0.2l/min deviation measured at 25°C and 940mbar leads to an error of 8.8% or 0.018l.

Calibration Date: 14.04.2011 Last Adjustment Date: 14.04.2011

Calibrated by: _____ Signature: _____

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Due Date: 13.04.2012

Calibration Certificate Nr.103552

Test Object	Instrument:	MAS-100 NT Microbial Air Sampler
	Serial Number:	103552
	Firmware Version:	1.4
	Sampling Head:	300*0.6 mm
	Calibration Procedure:	MBV SOP / Version 1.5

Adjustment Equipment	Adjustment Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Adjustment Conditions:	Temp.: 26.4 [°C], Amb. Pressure: 959 [mbar]

Calibration Equipment	Calibration Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Calibration conditions:	Temp.: 26.2 [°C], Amb. Pressure: 960 [mbar]

Calibration Check Results:

Measurement No:		1	2	3	Result
Target Air Flow	[SLPM]	100.0	100.0	100.0	100.0
Air Flow on DA-100 NT	[SLPM]	100.7	100.6	100.6	NA
Deviation of DA-100 NT *	[SLPM]	0.1	0.1	0.1	NA
Corrected Air Flow	[SLPM]	100.6	100.5	100.5	100.5
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	0.6	0.5	0.5	0.5
Calibration Check Status:					accepted

(*) For the DA-100 (NT) the deviation mentioned on the calibration certificate is not normalized to SLPM conditions (20°C; 1013 mbar) as it is not significant: The correction would be 0.034% per °C (1/293) and 0.09% (1/1013) per mbar difference to the SLPM standard conditions. E.g. a 0.2l/min deviation measured at 25°C and 940mbar leads to an error of 8.8% or 0.018l.

Calibration Date: 14.04.2011 Last Adjustment Date: 14.04.2011

Calibrated by: _____ Signature: _____

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Due Date: 13.04.2012

Adjustment and Calibration Certificate Nr.103552

Test Object	Instrument:	MAS-100 NT Microbial Air Sampler
	Serial Number:	103552
	Firmware Version:	1.4
	Sampling Head:	400*0.7 mm
	Calibration Procedure:	MBV SOP / Version 1.5

Adjustment Equipment	Adjustment Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Adjustment Conditions:	Temp.: 26.2 [°C], Amb. Pressure: 960 [mbar]

Calibration Equipment	Calibration Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Calibration conditions:	Temp.: 26.0 [°C], Amb. Pressure: 960 [mbar]

Calibration Check Results:

Measurement No:		1	2	3	Result
Target Air Flow	[SLPM]	100.0	100.0	100.0	100.0
Air Flow on DA-100 NT	[SLPM]	100.0	99.8	100.3	NA
Deviation of DA-100 NT *	[SLPM]	0.1	0.1	0.1	NA
Corrected Air Flow	[SLPM]	99.9	99.7	100.2	99.9
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	-0.1	-0.3	0.2	-0.1
Calibration Check Status:					accepted

(*) For the DA-100 (NT) the deviation mentioned on the calibration certificate is not normalized to SLPM conditions (20°C; 1013 mbar) as it is not significant: The correction would be 0.034% per °C (1/293) and 0.09% (1/1013) per mbar difference to the SLPM standard conditions. E.g. a 0.2l/min deviation measured at 25°C and 940mbar leads to an error of 8.8% or 0.018l.

Adjustment Date: 14.04.2011

Adjusted by: _____ Signature: _____

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Due Date: 13.04.2012

Calibration Certificate Nr.103552

Test Object	Instrument:	MAS-100 NT Microbial Air Sampler
	Serial Number:	103552
	Firmware Version:	1.4
	Sampling Head:	400*0.7 mm
	Calibration Procedure:	MBV SOP / Version 1.5

Adjustment Equipment	Adjustment Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Adjustment Conditions:	Temp.: 26.2 [°C], Amb. Pressure: 960 [mbar]

Calibration Equipment	Calibration Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Calibration conditions:	Temp.: 26.0 [°C], Amb. Pressure: 959 [mbar]

Calibration Check Results:

Measurement No:		1	2	3	Result
Target Air Flow	[SLPM]	100.0	100.0	100.0	100.0
Air Flow on DA-100 NT	[SLPM]	100.2	100.0	100.3	NA
Deviation of DA-100 NT *	[SLPM]	0.1	0.1	0.1	NA
Corrected Air Flow	[SLPM]	100.1	99.9	100.2	100.1
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	0.1	-0.1	0.2	0.1
Calibration Check Status:					accepted

(*) For the DA-100 (NT) the deviation mentioned on the calibration certificate is not normalized to SLPM conditions (20°C; 1013 mbar) as it is not significant: The correction would be 0.034% per °C (1/293) and 0.09% (1/1013) per mbar difference to the SLPM standard conditions. E.g. a 0.2l/min deviation measured at 25°C and 940mbar leads to an error of 8.8% or 0.018l.

Calibration Date: 14.04.2011 Last Adjustment Date: 14.04.2011

Calibrated by: _____ Signature: _____

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Due Date: 13.04.2012

Calibration Certificate Nr.103552

Test Object	Instrument: MAS-100 NT Microbial Air Sampler Serial Number: 103552 Firmware Version: 1.4 Sampling Head: 400*0.7 mm Calibration Procedure: MBV SOP / Version 1.5
Adjustment Equipment	Adjustment Equipment: DA-100 NT Digital Anemometer Accuracy: +/- 1% Serial Number: 15777 Adjustment Date: 22.03.2011 Due Date: 21.03.2013 Deviation in l/min: 0.1 Adjustment Conditions: Temp.: 26.2 [°C], Amb. Pressure: 960 [mbar]
Calibration Equipment	Calibration Equipment: DA-100 NT Digital Anemometer Accuracy: +/- 1% Serial Number: 15777 Adjustment Date: 22.03.2011 Due Date: 21.03.2013 Deviation in l/min: 0.1 Calibration conditions: Temp.: 26.2 [°C], Amb. Pressure: 961 [mbar]

Calibration Check Results:

Measurement No:		1	2	3	Result
Target Air Flow	[SLPM]	100.0	100.0	100.0	100.0
Air Flow on DA-100 NT	[SLPM]	100.2	99.9	100.6	NA
Deviation of DA-100 NT *	[SLPM]	0.1	0.1	0.1	NA
Corrected Air Flow	[SLPM]	100.1	99.8	100.5	100.1
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	0.1	-0.2	0.5	0.1
Calibration Check Status:					accepted

(*) For the DA-100 (NT) the deviation mentioned on the calibration certificate is not normalized to SLPM conditions (20°C; 1013 mbar) as it is not significant: The correction would be 0.034% per °C (1/293) and 0.09% (1/1013) per mbar difference to the SLPM standard conditions. E.g. a 0.2l/min deviation measured at 25°C and 940mbar leads to an error of 8.8% or 0.018l.

Calibration Date: 14.04.2011 Last Adjustment Date: 14.04.2011

Calibrated by: _____ Signature: _____

This report has been produced by an electronic system and is valid with a single signature of the calibrator.

Due Date: 13.04.2012

Calibration Certificate Nr.103552

Test Object	Instrument:	MAS-100 NT Microbial Air Sampler
	Serial Number:	103552
	Firmware Version:	1.4
	Sampling Head:	400*0.7 mm
	Calibration Procedure:	MBV SOP / Version 1.5

Adjustment Equipment	Adjustment Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Adjustment Conditions:	Temp.: 26.2 [°C], Amb. Pressure: 960 [mbar]

Calibration Equipment	Calibration Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Calibration conditions:	Temp.: 25.7 [°C], Amb. Pressure: 960 [mbar]

Calibration Check Results:

Measurement No:		1	2	3	Result
Target Air Flow	[SLPM]	100.0	100.0	100.0	100.0
Air Flow on DA-100 NT	[SLPM]	99.5	100.2	100.0	NA
Deviation of DA-100 NT *	[SLPM]	0.1	0.1	0.1	NA
Corrected Air Flow	[SLPM]	99.4	100.1	99.9	99.8
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	-0.6	0.1	-0.1	-0.2
Calibration Check Status:					accepted

(*) For the DA-100 (NT) the deviation mentioned on the calibration certificate is not normalized to SLPM conditions (20°C; 1013 mbar) as it is not significant: The correction would be 0.034% per °C (1/293) and 0.09% (1/1013) per mbar difference to the SLPM standard conditions. E.g. a 0.2l/min deviation measured at 25°C and 940mbar leads to an error of 8.8% or 0.018l.

Calibration Date: 14.04.2011 Last Adjustment Date: 14.04.2011

Calibrated by: _____ Signature: _____

This report has been produced by an electronic system and is valid with a single signature of the calibrator.

Due Date: 13.04.2012

Calibration Certificate Nr.103563

Test Object	Instrument:	MAS-100 NT Microbial Air Sampler
	Serialnumber:	00103563
	Firmware Version:	1.3
	Sampling Head:	300*0.6 mm
	Calibration Procedure	MBV SOP

Adjustment Equipment	Adjustment Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serialnumber:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min *	0.1
	Adjustment conditions:	Temp.: 24.8 [°C], Amb. Pressure: 962 [mbar]

Calibration Equipment	Calibration Equipment	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serialnumber:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min *	0.1
	Callibration conditions:	Temp.: 24.8 [°C], Amb. Pressure: 962 [mbar]

Calibration Results

Measurement No:		1	2	3	Result
Target Air Flow *	[l/min]	100.0	100.0	100.0	100.0
Flow of DA-100 NT *	[l/min]	101.1	100.9	100.9	100.9
Flow deviation of DA-100 NT *	[l/min]	0.1	0.1	0.1	0.1
Test Result (Corrected Flow of DA-100 NT) *	[l/min]	101.0	100.8	100.8	100.9
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	1.0	0.8	0.8	0.9
Test Result					accepted

(*) All flows corrected to 20°C and 1013 mbar atmospheric pressure; the formula to calculate volume into mass flow is in the DA-100 NT user manual

Calibration Note

Calibration Date: 14.04.2011 Adj. test object: 14.04.2011

Calibrated by: _____ Signature: _____

Approved by: _____ Signature: _____

Due Date: 13.04.2012

Calibration Certificate Nr.103563

Test Object	Instrument: MAS-100 NT Microbial Air Sampler Serialnumber: 00103563 Firmware Version: 1.3 Sampling Head: 300*0.6 mm Calibration Procedure: MBV SOP
Adjustment Equipment	Adjustment Equipment: DA-100 NT Digital Anemometer Accuracy: +/- 1% Serialnumber: 15777 Adjustment Date: 22.03.2011 Due Date: 21.03.2013 Deviation in l/min *: 0.1 Adjustment conditions: Temp.: 24.8 [°C], Amb. Pressure: 962 [mbar]
Calibration Equipment	Calibration Equipment: DA-100 NT Digital Anemometer Accuracy: +/- 1% Serialnumber: 15777 Adjustment Date: 22.03.2011 Due Date: 21.03.2013 Deviation in l/min *: 0.1 Callibration conditions: Temp.: 24.9 [°C], Amb. Pressure: 962 [mbar]

Calibration Results

Measurement No:		1	2	3	Result
Target Air Flow *	[l/min]	100.0	100.0	100.0	100.0
Flow of DA-100 NT *	[l/min]	100.0	100.0	99.6	99.8
Flow deviation of DA-100 NT *	[l/min]	0.1	0.1	0.1	0.1
Test Result (Corrected Flow of DA-100 NT) *	[l/min]	99.9	99.9	99.5	99.8
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	-0.1	-0.1	-0.5	-0.2
Test Result					accepted

(*) All flows corrected to 20°C and 1013 mbar atmospheric pressure; the formula to calculate volume into mass flow is in the DA-100 NT user manual

Calibration Note

Calibration Date: 14.04.2011 Adj. test object: 14.04.2011
Calibrated by: _____ Signature: _____
Approved by: _____ Signature: _____

Due Date: 13.04.2012

Calibration Certificate Nr.103563

Test Object

Instrument:	MAS-100 NT Microbial Air Sampler
Serialnumber:	00103563
Firmware Version:	1.3
Sampling Head:	300*0.6 mm
Calibration Procedure	MBV SOP

Adjustment Equipment

Adjustment Equipment:	DA-100 NT Digital Anemometer
Accuracy:	+/- 1%
Serialnumber:	15777
Adjustment Date:	22.03.2011
Due Date:	21.03.2013
Deviation in l/min *	0.1
Adjustment conditions:	Temp.: 24.8 [°C], Amb. Pressure: 962 [mbar]

Calibration Equipment

Calibration Equipment	DA-100 NT Digital Anemometer
Accuracy:	+/- 1%
Serialnumber:	15777
Adjustment Date:	22.03.2011
Due Date:	21.03.2013
Deviation in l/min *	0.1
Callibration conditions:	Temp.: 24.9 [°C], Amb. Pressure: 962 [mbar]

Calibration Results

Measurement No:		1	2	3	Result
Target Air Flow *	[l/min]	100.0	100.0	100.0	100.0
Flow of DA-100 NT *	[l/min]	101.0	100.5	100.5	100.6
Flow deviation of DA-100 NT *	[l/min]	0.1	0.1	0.1	0.1
Test Result (Corrected Flow of DA-100 NT) *	[l/min]	100.9	100.4	100.4	100.6
Deviation from Target Air Flow: Maximum Allowable Deviation: $\pm 2.5\%$	[%]	0.9	0.4	0.4	0.6
Test Result					accepted

(*) All flows corrected to 20°C and 1013 mbar atmospheric pressure; the formula to calculate volume into mass flow is in the DA-100 NT user manual

Calibration Note

Calibration Date: 14.04.2011 Adj. test object: 14.04.2011

Calibrated by: _____ Signature: _____

Approved by: _____ Signature: _____

Due Date: 13.04.2012

Calibration Certificate Nr.103563

Test Object	Instrument: MAS-100 NT Microbial Air Sampler	Serialnumber: 00103563
	Firmware Version: 1.3	Sampling Head: 300*0.6 mm
	Calibration Procedure MBV SOP	

Adjustment Equipment	Adjustment Equipment: DA-100 NT Digital Anemometer	Accuracy: +/- 1%
	Serialnumber: 15777	Adjustment Date: 22.03.2011
	Due Date: 21.03.2013	Deviation in l/min *: 0.1
	Adjustment conditions: Temp.: 24.8 [°C], Amb. Pressure: 962 [mbar]	

Calibration Equipment	Calibration Equipment DA-100 NT Digital Anemometer	Accuracy: +/- 1%
	Serialnumber: 15777	Adjustment Date: 22.03.2011
	Due Date: 21.03.2013	Deviation in l/min *: 0.1
	Callibration conditions: Temp.: 25.1 [°C], Amb. Pressure: 962 [mbar]	

Calibration Results

Measurement No:		1	2	3	Result
Target Air Flow *	[l/min]	100.0	100.0	100.0	100.0
Flow of DA-100 NT *	[l/min]	100.5	100.4	100.5	100.4
Flow deviation of DA-100 NT *	[l/min]	0.1	0.1	0.1	0.1
Test Result (Corrected Flow of DA-100 NT) *	[l/min]	100.4	100.3	100.4	100.4
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	0.4	0.3	0.4	0.4
Test Result					accepted

(*) All flows corrected to 20°C and 1013 mbar atmospheric pressure; the formula to calculate volume into mass flow is in the DA-100 NT user manual

Calibration Note

Calibration Date:	14.04.2011	Adj. test object:	14.04.2011
Calibrated by:		Signature:	
Approved by:		Signature:	

Due Date: 13.04.2012

Calibration Certificate Nr.103563

Test Object	Instrument: MAS-100 NT Microbial Air Sampler Serialnumber: 00103563 Firmware Version: 1.3 Sampling Head: 400*0.7 mm Calibration Procedure: MBV SOP
Adjustment Equipment	Adjustment Equipment: DA-100 NT Digital Anemometer Accuracy: +/- 1% Serialnumber: 15777 Adjustment Date: 22.03.2011 Due Date: 21.03.2013 Deviation in l/min *: 0.1 Adjustment conditions: Temp.: 25.1 [°C], Amb. Pressure: 962 [mbar]
Calibration Equipment	Calibration Equipment: DA-100 NT Digital Anemometer Accuracy: +/- 1% Serialnumber: 15777 Adjustment Date: 22.03.2011 Due Date: 21.03.2013 Deviation in l/min *: 0.1 Calibration conditions: Temp.: 25.2 [°C], Amb. Pressure: 961 [mbar]

Calibration Results

Measurement No:		1	2	3	Result
Target Air Flow *	[l/min]	100.0	100.0	100.0	100.0
Flow of DA-100 NT *	[l/min]	100.3	99.8	99.8	99.9
Flow deviation of DA-100 NT *	[l/min]	0.1	0.1	0.1	0.1
Test Result (Corrected Flow of DA-100 NT) *	[l/min]	100.2	99.7	99.7	99.9
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	0.2	-0.3	-0.3	-0.1
Test Result					accepted

(*) All flows corrected to 20°C and 1013 mbar atmospheric pressure; the formula to calculate volume into mass flow is in the DA-100 NT user manual

Calibration Note

Calibration Date: 14.04.2011 Adj. test object: 14.04.2011

Calibrated by: _____ Signature: _____

Approved by: _____ Signature: _____

Due Date: 13.04.2012

Calibration Certificate Nr.103563

Test Object	Instrument:	MAS-100 NT Microbial Air Sampler
	Serialnumber:	00103563
	Firmware Version:	1.3
	Sampling Head:	400*0.7 mm
	Calibration Procedure	MBV SOP

Adjustment Equipment	Adjustment Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serialnumber:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min *	0.1
	Adjustment conditions:	Temp.: 25.1 [°C], Amb. Pressure: 962 [mbar]

Calibration Equipment	Calibration Equipment	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serialnumber:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min *	0.1
	Callibration conditions:	Temp.: 25.3 [°C], Amb. Pressure: 963 [mbar]

Calibration Results

Measurement No:		1	2	3	Result
Target Air Flow *	[l/min]	100.0	100.0	100.0	100.0
Flow of DA-100 NT *	[l/min]	100.3	99.9	100.1	100.1
Flow deviation of DA-100 NT *	[l/min]	0.1	0.1	0.1	0.1
Test Result (Corrected Flow of DA-100 NT) *	[l/min]	100.2	99.8	100.0	100.0
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	0.2	-0.2	0.0	0.0
Test Result					accepted

(*) All flows corrected to 20°C and 1013 mbar atmospheric pressure; the formula to calculate volume into mass flow is in the DA-100 NT user manual

Calibration Note

Calibration Date: 14.04.2011 Adj. test object: 14.04.2011

Calibrated by: _____ Signature: _____

Approved by: _____ Signature: _____

Due Date: 13.04.2012

Calibration Certificate Nr.103563

Test Object	Instrument: MAS-100 NT Microbial Air Sampler Serialnumber: 00103563 Firmware Version: 1.3 Sampling Head: 400*0.7 mm Calibration Procedure: MBV SOP
Adjustment Equipment	Adjustment Equipment: DA-100 NT Digital Anemometer Accuracy: +/- 1% Serialnumber: 15777 Adjustment Date: 22.03.2011 Due Date: 21.03.2013 Deviation in l/min *: 0.1 Adjustment conditions: Temp.: 25.1 [°C], Amb. Pressure: 962 [mbar]
Calibration Equipment	Calibration Equipment: DA-100 NT Digital Anemometer Accuracy: +/- 1% Serialnumber: 15777 Adjustment Date: 22.03.2011 Due Date: 21.03.2013 Deviation in l/min *: 0.1 Calibration conditions: Temp.: 25.3 [°C], Amb. Pressure: 961 [mbar]

Calibration Results

Measurement No:		1	2	3	Result
Target Air Flow *	[l/min]	100.0	100.0	100.0	100.0
Flow of DA-100 NT *	[l/min]	99.7	99.7	100.5	99.9
Flow deviation of DA-100 NT *	[l/min]	0.1	0.1	0.1	0.1
Test Result (Corrected Flow of DA-100 NT) *	[l/min]	99.6	99.6	100.4	99.9
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	-0.4	-0.4	0.4	-0.1
Test Result					accepted

(*) All flows corrected to 20°C and 1013 mbar atmospheric pressure; the formula to calculate volume into mass flow is in the DA-100 NT user manual

Calibration Note

Calibration Date:	14.04.2011	Adj. test object:	14.04.2011
Calibrated by:	_____	Signature:	_____
Approved by:	_____	Signature:	_____

Due Date: 13.04.2012

Adjustment and Calibration Certificate Nr.103563

Test Object	Instrument:	MAS-100 NT Microbial Air Sampler
	Serial Number:	103563
	Firmware Version:	1.4
	Sampling Head:	300*0.6 mm
	Calibration Procedure:	MBV SOP / Version 1.5

Adjustment Equipment	Adjustment Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Adjustment Conditions:	Temp.: 24.9 [°C], Amb. Pressure: 962 [mbar]

Calibration Equipment	Calibration Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Calibration conditions:	Temp.: 24.9 [°C], Amb. Pressure: 962 [mbar]

Calibration Check Results:

Measurement No:		1	2	3	Result
Target Air Flow	[SLPM]	100.0	100.0	100.0	100.0
Air Flow on DA-100 NT	[SLPM]	100.5	100.3	100.6	NA
Deviation of DA-100 NT *	[SLPM]	0.1	0.1	0.1	NA
Corrected Air Flow	[SLPM]	100.4	100.2	100.5	100.4
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	0.4	0.2	0.5	0.4
Calibration Check Status:					accepted

(*) For the DA-100 (NT) the deviation mentioned on the calibration certificate is not normalized to SLPM conditions (20°C; 1013 mbar) as it is not significant: The correction would be 0.034% per °C (1/293) and 0.09% (1/1013) per mbar difference to the SLPM standard conditions. E.g. a 0.2l/min deviation measured at 25°C and 940mbar leads to an error of 8.8% or 0.018l.

Adjustment Date: 15.04.2011

Adjusted by: _____ Signature: _____

This report has been produced by an electronic system and is valid with a single signature of the calibrator.

Due Date: 14.04.2012

Calibration Certificate Nr.103563

Test Object	Instrument:	MAS-100 NT Microbial Air Sampler
	Serial Number:	103563
	Firmware Version:	1.4
	Sampling Head:	300*0.6 mm
	Calibration Procedure:	MBV SOP / Version 1.5

Adjustment Equipment	Adjustment Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Adjustment Conditions:	Temp.: 24.9 [°C], Amb. Pressure: 962 [mbar]

Calibration Equipment	Calibration Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Calibration conditions:	Temp.: 25.4 [°C], Amb. Pressure: 961 [mbar]

Calibration Check Results:

Measurement No:		1	2	3	Result
Target Air Flow	[SLPM]	100.0	100.0	100.0	100.0
Air Flow on DA-100 NT	[SLPM]	99.6	100.4	100.6	NA
Deviation of DA-100 NT *	[SLPM]	0.1	0.1	0.1	NA
Corrected Air Flow	[SLPM]	99.5	100.3	100.5	100.1
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	-0.5	0.3	0.5	0.1
Calibration Check Status:					accepted

(*) For the DA-100 (NT) the deviation mentioned on the calibration certificate is not normalized to SLPM conditions (20°C; 1013 mbar) as it is not significant: The correction would be 0.034% per °C (1/293) and 0.09% (1/1013) per mbar difference to the SLPM standard conditions. E.g. a 0.2l/min deviation measured at 25°C and 940mbar leads to an error of 8.8% or 0.018l.

Calibration Date: 15.04.2011 Last Adjustment Date: 15.04.2011

Calibrated by: _____ Signature: _____

This report has been produced by an electronic system and is valid with a single signature of the calibrator.

Due Date: 14.04.2012

Calibration Certificate Nr.103563

Test Object	Instrument:	MAS-100 NT Microbial Air Sampler
	Serial Number:	103563
	Firmware Version:	1.4
	Sampling Head:	300*0.6 mm
	Calibration Procedure:	MBV SOP / Version 1.5

Adjustment Equipment	Adjustment Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Adjustment Conditions:	Temp.: 24.9 [°C], Amb. Pressure: 962 [mbar]

Calibration Equipment	Calibration Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Calibration conditions:	Temp.: 25.4 [°C], Amb. Pressure: 961 [mbar]

Calibration Check Results:

Measurement No:		1	2	3	Result
Target Air Flow	[SLPM]	100.0	100.0	100.0	100.0
Air Flow on DA-100 NT	[SLPM]	100.0	100.1	100.2	NA
Deviation of DA-100 NT *	[SLPM]	0.1	0.1	0.1	NA
Corrected Air Flow	[SLPM]	99.9	100.0	100.1	100.0
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	-0.1	0.0	0.1	0.0
Calibration Check Status:					accepted

(*) For the DA-100 (NT) the deviation mentioned on the calibration certificate is not normalized to SLPM conditions (20°C; 1013 mbar) as it is not significant: The correction would be 0.034% per °C (1/293) and 0.09% (1/1013) per mbar difference to the SLPM standard conditions. E.g. a 0.2l/min deviation measured at 25°C and 940mbar leads to an error of 8.8% or 0.018l.

Calibration Date: 15.04.2011 Last Adjustment Date: 15.04.2011

Calibrated by: _____ Signature: _____

This report has been produced by an electronic system and is valid with a single signature of the calibrator.

Due Date: 14.04.2012

Calibration Certificate Nr.103563

Test Object	Instrument:	MAS-100 NT Microbial Air Sampler
	Serial Number:	103563
	Firmware Version:	1.4
	Sampling Head:	300*0.6 mm
	Calibration Procedure:	MBV SOP / Version 1.5

Adjustment Equipment	Adjustment Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Adjustment Conditions:	Temp.: 24.9 [°C], Amb. Pressure: 962 [mbar]

Calibration Equipment	Calibration Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Calibration conditions:	Temp.: 25.3 [°C], Amb. Pressure: 961 [mbar]

Calibration Check Results:

Measurement No:		1	2	3	Result
Target Air Flow	[SLPM]	100.0	100.0	100.0	100.0
Air Flow on DA-100 NT	[SLPM]	100.3	99.9	99.7	NA
Deviation of DA-100 NT *	[SLPM]	0.1	0.1	0.1	NA
Corrected Air Flow	[SLPM]	100.2	99.8	99.6	99.9
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	0.2	-0.2	-0.4	-0.1
Calibration Check Status:					accepted

(*) For the DA-100 (NT) the deviation mentioned on the calibration certificate is not normalized to SLPM conditions (20°C; 1013 mbar) as it is not significant: The correction would be 0.034% per °C (1/293) and 0.09% (1/1013) per mbar difference to the SLPM standard conditions. E.g. a 0.2l/min deviation measured at 25°C and 940mbar leads to an error of 8.8% or 0.018l.

Calibration Date: 15.04.2011 Last Adjustment Date: 15.04.2011

Calibrated by: _____ Signature: _____

This report has been produced by an electronic system and is valid with a single signature of the calibrator.

Due Date: 14.04.2012

Calibration Certificate Nr.103563

Test Object	Instrument:	MAS-100 NT Microbial Air Sampler
	Serial Number:	103563
	Firmware Version:	1.4
	Sampling Head:	300*0.6 mm
	Calibration Procedure:	MBV SOP / Version 1.5

Adjustment Equipment	Adjustment Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Adjustment Conditions:	Temp.: 24.9 [°C], Amb. Pressure: 962 [mbar]

Calibration Equipment	Calibration Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Calibration conditions:	Temp.: 25.4 [°C], Amb. Pressure: 961 [mbar]

Calibration Check Results:

Measurement No:		1	2	3	Result
Target Air Flow	[SLPM]	100.0	100.0	100.0	100.0
Air Flow on DA-100 NT	[SLPM]	100.0	100.0	100.0	NA
Deviation of DA-100 NT *	[SLPM]	0.1	0.1	0.1	NA
Corrected Air Flow	[SLPM]	99.9	99.9	99.9	99.9
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	-0.1	-0.1	-0.1	-0.1
Calibration Check Status:					accepted

(*) For the DA-100 (NT) the deviation mentioned on the calibration certificate is not normalized to SLPM conditions (20°C; 1013 mbar) as it is not significant: The correction would be 0.034% per °C (1/293) and 0.09% (1/1013) per mbar difference to the SLPM standard conditions. E.g. a 0.2l/min deviation measured at 25°C and 940mbar leads to an error of 8.8% or 0.018l.

Calibration Date: 15.04.2011 Last Adjustment Date: 15.04.2011

Calibrated by: _____ Signature: _____

This report has been produced by an electronic system and is valid with a single signature of the calibrator.

Due Date: 14.04.2012

Adjustment and Calibration Certificate Nr.103563

Test Object	Instrument:	MAS-100 NT Microbial Air Sampler
	Serial Number:	103563
	Firmware Version:	1.4
	Sampling Head:	400*0.7 mm
	Calibration Procedure:	MBV SOP / Version 1.5

Adjustment Equipment	Adjustment Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Adjustment Conditions:	Temp.: 25.5 [°C], Amb. Pressure: 961 [mbar]

Calibration Equipment	Calibration Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Calibration conditions:	Temp.: 25.6 [°C], Amb. Pressure: 961 [mbar]

Calibration Check Results:

Measurement No:		1	2	3	Result
Target Air Flow	[SLPM]	100.0	100.0	100.0	100.0
Air Flow on DA-100 NT	[SLPM]	100.8	100.6	100.5	NA
Deviation of DA-100 NT *	[SLPM]	0.1	0.1	0.1	NA
Corrected Air Flow	[SLPM]	100.7	100.5	100.4	100.5
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	0.7	0.5	0.4	0.5
Calibration Check Status:					accepted

(*) For the DA-100 (NT) the deviation mentioned on the calibration certificate is not normalized to SLPM conditions (20°C; 1013 mbar) as it is not significant: The correction would be 0.034% per °C (1/293) and 0.09% (1/1013) per mbar difference to the SLPM standard conditions. E.g. a 0.2l/min deviation measured at 25°C and 940mbar leads to an error of 8.8% or 0.018l.

Adjustment Date: 15.04.2011

Adjusted by: _____ Signature: _____

This report has been produced by an electronic system and is valid with a single signature of the calibrator.

Due Date: 14.04.2012

Calibration Certificate Nr.103563

Test Object	Instrument:	MAS-100 NT Microbial Air Sampler
	Serial Number:	103563
	Firmware Version:	1.4
	Sampling Head:	400*0.7 mm
	Calibration Procedure:	MBV SOP / Version 1.5

Adjustment Equipment	Adjustment Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Adjustment Conditions:	Temp.: 25.5 [°C], Amb. Pressure: 961 [mbar]

Calibration Equipment	Calibration Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Calibration conditions:	Temp.: 25.6 [°C], Amb. Pressure: 962 [mbar]

Calibration Check Results:

Measurement No:		1	2	3	Result
Target Air Flow	[SLPM]	100.0	100.0	100.0	100.0
Air Flow on DA-100 NT	[SLPM]	101.0	100.9	100.6	NA
Deviation of DA-100 NT *	[SLPM]	0.1	0.1	0.1	NA
Corrected Air Flow	[SLPM]	100.9	100.8	100.5	100.7
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	0.9	0.8	0.5	0.7
Calibration Check Status:					accepted

(*) For the DA-100 (NT) the deviation mentioned on the calibration certificate is not normalized to SLPM conditions (20°C; 1013 mbar) as it is not significant: The correction would be 0.034% per °C (1/293) and 0.09% (1/1013) per mbar difference to the SLPM standard conditions. E.g. a 0.2l/min deviation measured at 25°C and 940mbar leads to an error of 8.8% or 0.018l.

Calibration Date: 15.04.2011 Last Adjustment Date: 15.04.2011

Calibrated by: _____ Signature: _____

This report has been produced by an electronic system and is valid with a single signature of the calibrator.

Due Date: 14.04.2012

Calibration Certificate Nr.103563

Test Object	Instrument:	MAS-100 NT Microbial Air Sampler
	Serial Number:	103563
	Firmware Version:	1.4
	Sampling Head:	400*0.7 mm
	Calibration Procedure:	MBV SOP / Version 1.5

Adjustment Equipment	Adjustment Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Adjustment Conditions:	Temp.: 25.5 [°C], Amb. Pressure: 961 [mbar]

Calibration Equipment	Calibration Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Calibration conditions:	Temp.: 25.6 [°C], Amb. Pressure: 963 [mbar]

Calibration Check Results:

Measurement No:		1	2	3	Result
Target Air Flow	[SLPM]	100.0	100.0	100.0	100.0
Air Flow on DA-100 NT	[SLPM]	100.5	100.6	100.8	NA
Deviation of DA-100 NT *	[SLPM]	0.1	0.1	0.1	NA
Corrected Air Flow	[SLPM]	100.4	100.5	100.7	100.5
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	0.4	0.5	0.7	0.5
Calibration Check Status:					accepted

(*) For the DA-100 (NT) the deviation mentioned on the calibration certificate is not normalized to SLPM conditions (20°C; 1013 mbar) as it is not significant: The correction would be 0.034% per °C (1/293) and 0.09% (1/1013) per mbar difference to the SLPM standard conditions. E.g. a 0.2l/min deviation measured at 25°C and 940mbar leads to an error of 8.8% or 0.018l.

Calibration Date: 15.04.2011 Last Adjustment Date: 15.04.2011

Calibrated by: _____ Signature: _____

This report has been produced by an electronic system and is valid with a single signature of the calibrator.

Due Date: 14.04.2012

Calibration Certificate Nr.103563

Test Object	Instrument:	MAS-100 NT Microbial Air Sampler
	Serial Number:	103563
	Firmware Version:	1.4
	Sampling Head:	400*0.7 mm
	Calibration Procedure:	MBV SOP / Version 1.5

Adjustment Equipment	Adjustment Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Adjustment Conditions:	Temp.: 25.5 [°C], Amb. Pressure: 961 [mbar]

Calibration Equipment	Calibration Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Calibration conditions:	Temp.: 25.6 [°C], Amb. Pressure: 961 [mbar]

Calibration Check Results:

Measurement No:		1	2	3	Result
Target Air Flow	[SLPM]	100.0	100.0	100.0	100.0
Air Flow on DA-100 NT	[SLPM]	100.9	100.6	100.5	NA
Deviation of DA-100 NT *	[SLPM]	0.1	0.1	0.1	NA
Corrected Air Flow	[SLPM]	100.8	100.5	100.4	100.6
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	0.8	0.5	0.4	0.6
Calibration Check Status:					accepted

(*) For the DA-100 (NT) the deviation mentioned on the calibration certificate is not normalized to SLPM conditions (20°C; 1013 mbar) as it is not significant: The correction would be 0.034% per °C (1/293) and 0.09% (1/1013) per mbar difference to the SLPM standard conditions. E.g. a 0.2l/min deviation measured at 25°C and 940mbar leads to an error of 8.8% or 0.018l.

Calibration Date: 15.04.2011 Last Adjustment Date: 15.04.2011

Calibrated by: _____ Signature: _____

This report has been produced by an electronic system and is valid with a single signature of the calibrator.

Due Date: 14.04.2012

Calibration Certificate Nr.103563

Test Object	Instrument:	MAS-100 NT Microbial Air Sampler
	Serial Number:	103563
	Firmware Version:	1.4
	Sampling Head:	400*0.7 mm
	Calibration Procedure:	MBV SOP / Version 1.5

Adjustment Equipment	Adjustment Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Adjustment Conditions:	Temp.: 25.5 [°C], Amb. Pressure: 961 [mbar]

Calibration Equipment	Calibration Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Calibration conditions:	Temp.: 25.5 [°C], Amb. Pressure: 962 [mbar]

Calibration Check Results:

Measurement No:		1	2	3	Result
Target Air Flow	[SLPM]	100.0	100.0	100.0	100.0
Air Flow on DA-100 NT	[SLPM]	100.6	100.7	101.2	NA
Deviation of DA-100 NT *	[SLPM]	0.1	0.1	0.1	NA
Corrected Air Flow	[SLPM]	100.5	100.6	101.1	100.7
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	0.5	0.6	1.1	0.7
Calibration Check Status:					accepted

(*) For the DA-100 (NT) the deviation mentioned on the calibration certificate is not normalized to SLPM conditions (20°C; 1013 mbar) as it is not significant: The correction would be 0.034% per °C (1/293) and 0.09% (1/1013) per mbar difference to the SLPM standard conditions. E.g. a 0.2l/min deviation measured at 25°C and 940mbar leads to an error of 8.8% or 0.018l.

Calibration Date: 15.04.2011 Last Adjustment Date: 15.04.2011

Calibrated by: _____ Signature: _____

This report has been produced by an electronic system and is valid with a single signature of the calibrator.

Due Date: 14.04.2012

Calibration Certificate Nr.103553

Test Object	Instrument:	MAS-100 NT Microbial Air Sampler
	Serialnumber:	00103553
	Firmware Version:	1.3
	Sampling Head:	300*0.6 mm
	Calibration Procedure	MBV SOP

Adjustment Equipment	Adjustment Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serialnumber:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min *	0.1
	Adjustment conditions:	Temp.: 26.6 [°C], Amb. Pressure: 962 [mbar]

Calibration Equipment	Calibration Equipment	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serialnumber:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min *	0.1
	Callibration conditions:	Temp.: 26.6 [°C], Amb. Pressure: 960 [mbar]

Calibration Results

Measurement No:		1	2	3	Result
Target Air Flow *	[l/min]	100.0	100.0	100.0	100.0
Flow of DA-100 NT *	[l/min]	100.0	100.2	101.1	100.4
Flow deviation of DA-100 NT *	[l/min]	0.1	0.1	0.1	0.1
Test Result (Corrected Flow of DA-100 NT) *	[l/min]	99.9	100.1	101.0	100.3
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	-0.1	0.1	1.0	0.3
Test Result					accepted

(*) All flows corrected to 20°C and 1013 mbar atmospheric pressure; the formula to calculate volume into mass flow is in the DA-100 NT user manual

Calibration Note

Calibration Date: 14.04.2011 Adj. test object: 14.04.2011

Calibrated by: _____ Signature: _____

Approved by: _____ Signature: _____

Due Date: 13.04.2012

Calibration Certificate Nr.103553

Test Object	Instrument: MAS-100 NT Microbial Air Sampler Serialnumber: 00103553 Firmware Version: 1.3 Sampling Head: 300*0.6 mm Calibration Procedure: MBV SOP
Adjustment Equipment	Adjustment Equipment: DA-100 NT Digital Anemometer Accuracy: +/- 1% Serialnumber: 15777 Adjustment Date: 22.03.2011 Due Date: 21.03.2013 Deviation in l/min *: 0.1 Adjustment conditions: Temp.: 26.6 [°C], Amb. Pressure: 962 [mbar]
Calibration Equipment	Calibration Equipment: DA-100 NT Digital Anemometer Accuracy: +/- 1% Serialnumber: 15777 Adjustment Date: 22.03.2011 Due Date: 21.03.2013 Deviation in l/min *: 0.1 Calibration conditions: Temp.: 26.6 [°C], Amb. Pressure: 961 [mbar]

Calibration Results

Measurement No:		1	2	3	Result
Target Air Flow *	[l/min]	100.0	100.0	100.0	100.0
Flow of DA-100 NT *	[l/min]	101.5	100.4	100.9	100.9
Flow deviation of DA-100 NT *	[l/min]	0.1	0.1	0.1	0.1
Test Result (Corrected Flow of DA-100 NT) *	[l/min]	101.4	100.3	100.8	100.8
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	1.4	0.3	0.8	0.8
Test Result					accepted

(*) All flows corrected to 20°C and 1013 mbar atmospheric pressure; the formula to calculate volume into mass flow is in the DA-100 NT user manual

Calibration Note

Calibration Date: 14.04.2011 Adj. test object: 14.04.2011

Calibrated by: _____ Signature: _____

Approved by: _____ Signature: _____

Due Date: 13.04.2012

Calibration Certificate Nr.103553

Test Object	Instrument: MAS-100 NT Microbial Air Sampler Serialnumber: 00103553 Firmware Version: 1.3 Sampling Head: 300*0.6 mm Calibration Procedure: MBV SOP
Adjustment Equipment	Adjustment Equipment: DA-100 NT Digital Anemometer Accuracy: +/- 1% Serialnumber: 15777 Adjustment Date: 22.03.2011 Due Date: 21.03.2013 Deviation in l/min *: 0.1 Adjustment conditions: Temp.: 26.6 [°C], Amb. Pressure: 962 [mbar]
Calibration Equipment	Calibration Equipment: DA-100 NT Digital Anemometer Accuracy: +/- 1% Serialnumber: 15777 Adjustment Date: 22.03.2011 Due Date: 21.03.2013 Deviation in l/min *: 0.1 Callibration conditions: Temp.: 26.7 [°C], Amb. Pressure: 961 [mbar]

Calibration Results

Measurement No:		1	2	3	Result
Target Air Flow *	[l/min]	100.0	100.0	100.0	100.0
Flow of DA-100 NT *	[l/min]	100.7	100.6	100.7	100.6
Flow deviation of DA-100 NT *	[l/min]	0.1	0.1	0.1	0.1
Test Result (Corrected Flow of DA-100 NT) *	[l/min]	100.6	100.5	100.6	100.6
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	0.6	0.5	0.6	0.6
Test Result					accepted

(*) All flows corrected to 20°C and 1013 mbar atmospheric pressure; the formula to calculate volume into mass flow is in the DA-100 NT user manual

Calibration Note

Calibration Date: 14.04.2011 Adj. test object: 14.04.2011
Calibrated by: _____ Signature: _____
Approved by: _____ Signature: _____

Due Date: 13.04.2012

Adjustment and Calibration Certificate Nr.103553

Test Object	Instrument:	MAS-100 NT Microbial Air Sampler
	Serialnumber:	00103553
	Firmware Version:	1.3
	Sampling Head:	400*0.7 mm
	Calibration Procedure	MBV SOP

Adjustment Equipment	Adjustment Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serialnumber:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min *	0.1
	Adjustment conditions:	Temp.: 26.6 [°C], Amb. Pressure: 960 [mbar]

Calibration Equipment	Calibration Equipment	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serialnumber:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min *	0.1
	Callibration conditions:	Temp.: 26.6 [°C], Amb. Pressure: 962 [mbar]

Calibration Results

Measurement No:		1	2	3	Result
Target Air Flow *	[l/min]	100.0	100.0	100.0	100.0
Flow of DA-100 NT *	[l/min]	100.2	99.8	99.5	99.8
Flow deviation of DA-100 NT *	[l/min]	0.1	0.1	0.1	0.1
Test Result (Corrected Flow of DA-100 NT) *	[l/min]	100.1	99.7	99.4	99.7
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	0.1	-0.3	-0.6	-0.3
Test Result					accepted

(*) All flows corrected to 20°C and 1013 mbar atmospheric pressure; the formula to calculate volume into mass flow is in the DA-100 NT user manual

Calibration Note

Calibration Date:	14.04.2011	Adj. test object:	14.04.2011
Calibrated by:	_____	Signature:	_____
Approved by:	_____	Signature:	_____

Due Date: 13.04.2012

Calibration Certificate Nr.103553

Test Object	Instrument: MAS-100 NT Microbial Air Sampler Serialnumber: 00103553 Firmware Version: 1.3 Sampling Head: 400*0.7 mm Calibration Procedure: MBV SOP
Adjustment Equipment	Adjustment Equipment: DA-100 NT Digital Anemometer Accuracy: +/- 1% Serialnumber: 15777 Adjustment Date: 22.03.2011 Due Date: 21.03.2013 Deviation in l/min *: 0.1 Adjustment conditions: Temp.: 26.6 [°C], Amb. Pressure: 960 [mbar]
Calibration Equipment	Calibration Equipment: DA-100 NT Digital Anemometer Accuracy: +/- 1% Serialnumber: 15777 Adjustment Date: 22.03.2011 Due Date: 21.03.2013 Deviation in l/min *: 0.1 Callibration conditions: Temp.: 26.6 [°C], Amb. Pressure: 960 [mbar]

Calibration Results

Measurement No:		1	2	3	Result
Target Air Flow *	[l/min]	100.0	100.0	100.0	100.0
Flow of DA-100 NT *	[l/min]	100.0	99.8	100.0	99.9
Flow deviation of DA-100 NT *	[l/min]	0.1	0.1	0.1	0.1
Test Result (Corrected Flow of DA-100 NT) *	[l/min]	99.9	99.7	99.9	99.8
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	-0.1	-0.3	-0.1	-0.2
Test Result					accepted

(*) All flows corrected to 20°C and 1013 mbar atmospheric pressure; the formula to calculate volume into mass flow is in the DA-100 NT user manual

Calibration Note

Calibration Date: 14.04.2011 Adj. test object: 14.04.2011
 Calibrated by: _____ Signature: _____
 Approved by: _____ Signature: _____

Due Date: 13.04.2012

Calibration Certificate Nr.103553

Test Object	Instrument: MAS-100 NT Microbial Air Sampler Serialnumber: 00103553 Firmware Version: 1.3 Sampling Head: 400*0.7 mm Calibration Procedure: MBV SOP
Adjustment Equipment	Adjustment Equipment: DA-100 NT Digital Anemometer Accuracy: +/- 1% Serialnumber: 15777 Adjustment Date: 22.03.2011 Due Date: 21.03.2013 Deviation in l/min *: 0.1 Adjustment conditions: Temp.: 26.6 [°C], Amb. Pressure: 960 [mbar]
Calibration Equipment	Calibration Equipment: DA-100 NT Digital Anemometer Accuracy: +/- 1% Serialnumber: 15777 Adjustment Date: 22.03.2011 Due Date: 21.03.2013 Deviation in l/min *: 0.1 Calibration conditions: Temp.: 26.6 [°C], Amb. Pressure: 960 [mbar]

Calibration Results

Measurement No:		1	2	3	Result
Target Air Flow *	[l/min]	100.0	100.0	100.0	100.0
Flow of DA-100 NT *	[l/min]	100.0	100.5	100.4	100.3
Flow deviation of DA-100 NT *	[l/min]	0.1	0.1	0.1	0.1
Test Result (Corrected Flow of DA-100 NT) *	[l/min]	99.9	100.4	100.3	100.2
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	-0.1	0.4	0.3	0.2
Test Result					accepted

(*) All flows corrected to 20°C and 1013 mbar atmospheric pressure; the formula to calculate volume into mass flow is in the DA-100 NT user manual

Calibration Note

Calibration Date:	14.04.2011	Adj. test object:	14.04.2011
Calibrated by:	_____	Signature:	_____
Approved by:	_____	Signature:	_____

Due Date: 13.04.2012

Calibration Certificate Nr.103553

Test Object	Instrument: MAS-100 NT Microbial Air Sampler	Serialnumber: 00103553
	Firmware Version: 1.3	Sampling Head: 400*0.7 mm
	Calibration Procedure: MBV SOP	

Adjustment Equipment	Adjustment Equipment: DA-100 NT Digital Anemometer	Accuracy: +/- 1%
	Serialnumber: 15777	Adjustment Date: 22.03.2011
	Due Date: 21.03.2013	Deviation in l/min *: 0.1
	Adjustment conditions: Temp.: 26.6 [°C], Amb. Pressure: 960 [mbar]	

Calibration Equipment	Calibration Equipment: DA-100 NT Digital Anemometer	Accuracy: +/- 1%
	Serialnumber: 15777	Adjustment Date: 22.03.2011
	Due Date: 21.03.2013	Deviation in l/min *: 0.1
	Callibration conditions: Temp.: 26.6 [°C], Amb. Pressure: 958 [mbar]	

Calibration Results

Measurement No:	1	2	3		Result
Target Air Flow *	[l/min]	100.0	100.0	100.0	100.0
Flow of DA-100 NT *	[l/min]	100.2	99.9	99.9	100.0
Flow deviation of DA-100 NT *	[l/min]	0.1	0.1	0.1	0.1
Test Result (Corrected Flow of DA-100 NT) *	[l/min]	100.1	99.8	99.8	99.9
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	0.1	-0.2	-0.2	-0.1
Test Result					accepted

(*) All flows corrected to 20°C and 1013 mbar atmospheric pressure; the formula to calculate volume into mass flow is in the DA-100 NT user manual

Calibration Note

Calibration Date:	14.04.2011	Adj. test object:	14.04.2011
Calibrated by:		Signature:	
Approved by:		Signature:	

Due Date: 13.04.2012

Calibration Certificate Nr.103553

Test Object	Instrument: MAS-100 NT Microbial Air Sampler Serialnumber: 00103553 Firmware Version: 1.3 Sampling Head: 400*0.7 mm Calibration Procedure: MBV SOP
Adjustment Equipment	Adjustment Equipment: DA-100 NT Digital Anemometer Accuracy: +/- 1% Serialnumber: 15777 Adjustment Date: 22.03.2011 Due Date: 21.03.2013 Deviation in l/min *: 0.1 Adjustment conditions: Temp.: 26.6 [°C], Amb. Pressure: 960 [mbar]
Calibration Equipment	Calibration Equipment: DA-100 NT Digital Anemometer Accuracy: +/- 1% Serialnumber: 15777 Adjustment Date: 22.03.2011 Due Date: 21.03.2013 Deviation in l/min *: 0.1 Calibration conditions: Temp.: 26.7 [°C], Amb. Pressure: 960 [mbar]

Calibration Results

Measurement No:		1	2	3	Result
Target Air Flow *	[l/min]	100.0	100.0	100.0	100.0
Flow of DA-100 NT *	[l/min]	99.6	100.1	99.7	99.8
Flow deviation of DA-100 NT *	[l/min]	0.1	0.1	0.1	0.1
Test Result (Corrected Flow of DA-100 NT) *	[l/min]	99.5	100.0	99.6	99.7
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	-0.5	0.0	-0.4	-0.3
Test Result					accepted

(*) All flows corrected to 20°C and 1013 mbar atmospheric pressure; the formula to calculate volume into mass flow is in the DA-100 NT user manual

Calibration Note

Calibration Date: 14.04.2011 Adj. test object: 14.04.2011

Calibrated by: _____ Signature: _____

Approved by: _____ Signature: _____

Due Date: 13.04.2012

Adjustment and Calibration Certificate Nr.103553

Test Object	Instrument:	MAS-100 NT Microbial Air Sampler
	Serial Number:	103553
	Firmware Version:	1.4
	Sampling Head:	300*0.6 mm
	Calibration Procedure:	MBV SOP / Version 1.5

Adjustment Equipment	Adjustment Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Adjustment Conditions:	Temp.: 25.8 [°C], Amb. Pressure: 960 [mbar]

Calibration Equipment	Calibration Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Calibration conditions:	Temp.: 25.8 [°C], Amb. Pressure: 960 [mbar]

Calibration Check Results:

Measurement No:		1	2	3	Result
Target Air Flow	[SLPM]	100.0	100.0	100.0	100.0
Air Flow on DA-100 NT	[SLPM]	100.3	100.7	100.4	NA
Deviation of DA-100 NT *	[SLPM]	0.1	0.1	0.1	NA
Corrected Air Flow	[SLPM]	100.2	100.6	100.3	100.4
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	0.2	0.6	0.3	0.4
Calibration Check Status:					accepted

(*) For the DA-100 (NT) the deviation mentioned on the calibration certificate is not normalized to SLPM conditions (20°C; 1013 mbar) as it is not significant: The correction would be 0.034% per °C (1/293) and 0.09% (1/1013) per mbar difference to the SLPM standard conditions. E.g. a 0.2l/min deviation measured at 25°C and 940mbar leads to an error of 8.8% or 0.018l.

Adjustment Date: 15.04.2011

Adjusted by: _____ Signature: _____

This report has been produced by an electronic system and is valid with a single signature of the calibrator.

Due Date: 14.04.2012

Calibration Certificate Nr.103553

Test Object	Instrument:	MAS-100 NT Microbial Air Sampler
	Serial Number:	103553
	Firmware Version:	1.4
	Sampling Head:	300*0.6 mm
	Calibration Procedure:	MBV SOP / Version 1.5

Adjustment Equipment	Adjustment Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Adjustment Conditions:	Temp.: 25.8 [°C], Amb. Pressure: 960 [mbar]

Calibration Equipment	Calibration Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Calibration conditions:	Temp.: 25.8 [°C], Amb. Pressure: 961 [mbar]

Calibration Check Results:

Measurement No:		1	2	3	Result
Target Air Flow	[SLPM]	100.0	100.0	100.0	100.0
Air Flow on DA-100 NT	[SLPM]	100.7	100.4	100.3	NA
Deviation of DA-100 NT *	[SLPM]	0.1	0.1	0.1	NA
Corrected Air Flow	[SLPM]	100.6	100.3	100.2	100.4
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	0.6	0.3	0.2	0.4
Calibration Check Status:					accepted

(*) For the DA-100 (NT) the deviation mentioned on the calibration certificate is not normalized to SLPM conditions (20°C; 1013 mbar) as it is not significant: The correction would be 0.034% per °C (1/293) and 0.09% (1/1013) per mbar difference to the SLPM standard conditions. E.g. a 0.2l/min deviation measured at 25°C and 940mbar leads to an error of 8.8% or 0.018l.

Calibration Date: 15.04.2011 Last Adjustment Date: 15.04.2011

Calibrated by: _____ Signature: _____

This report has been produced by an electronic system and is valid with a single signature of the calibrator.

Due Date: 14.04.2012

Calibration Certificate Nr.103553

Test Object	Instrument:	MAS-100 NT Microbial Air Sampler
	Serial Number:	103553
	Firmware Version:	1.4
	Sampling Head:	300*0.6 mm
	Calibration Procedure:	MBV SOP / Version 1.5

Adjustment Equipment	Adjustment Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Adjustment Conditions:	Temp.: 25.8 [°C], Amb. Pressure: 960 [mbar]

Calibration Equipment	Calibration Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Calibration conditions:	Temp.: 25.9 [°C], Amb. Pressure: 962 [mbar]

Calibration Check Results:

Measurement No:		1	2	3	Result
Target Air Flow	[SLPM]	100.0	100.0	100.0	100.0
Air Flow on DA-100 NT	[SLPM]	100.5	100.3	100.3	NA
Deviation of DA-100 NT *	[SLPM]	0.1	0.1	0.1	NA
Corrected Air Flow	[SLPM]	100.4	100.2	100.2	100.3
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	0.4	0.2	0.2	0.3
Calibration Check Status:					accepted

(*) For the DA-100 (NT) the deviation mentioned on the calibration certificate is not normalized to SLPM conditions (20°C; 1013 mbar) as it is not significant: The correction would be 0.034% per °C (1/293) and 0.09% (1/1013) per mbar difference to the SLPM standard conditions. E.g. a 0.2l/min deviation measured at 25°C and 940mbar leads to an error of 8.8% or 0.018l.

Calibration Date: 15.04.2011 Last Adjustment Date: 15.04.2011

Calibrated by: _____ Signature: _____

This report has been produced by an electronic system and is valid with a single signature of the calibrator.

Due Date: 14.04.2012

Calibration Certificate Nr.103553

Test Object	Instrument: MAS-100 NT Microbial Air Sampler Serial Number: 103553 Firmware Version: 1.4 Sampling Head: 300*0.6 mm Calibration Procedure: MBV SOP / Version 1.5
Adjustment Equipment	Adjustment Equipment: DA-100 NT Digital Anemometer Accuracy: +/- 1% Serial Number: 15777 Adjustment Date: 22.03.2011 Due Date: 21.03.2013 Deviation in l/min: 0.1 Adjustment Conditions: Temp.: 25.8 [°C], Amb. Pressure: 960 [mbar]
Calibration Equipment	Calibration Equipment: DA-100 NT Digital Anemometer Accuracy: +/- 1% Serial Number: 15777 Adjustment Date: 22.03.2011 Due Date: 21.03.2013 Deviation in l/min: 0.1 Calibration conditions: Temp.: 26.0 [°C], Amb. Pressure: 960 [mbar]

Calibration Check Results:

Measurement No:		1	2	3	Result
Target Air Flow	[SLPM]	100.0	100.0	100.0	100.0
Air Flow on DA-100 NT	[SLPM]	100.1	100.2	100.2	NA
Deviation of DA-100 NT *	[SLPM]	0.1	0.1	0.1	NA
Corrected Air Flow	[SLPM]	100.0	100.1	100.1	100.1
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	0.0	0.1	0.1	0.1
Calibration Check Status:					accepted

(*) For the DA-100 (NT) the deviation mentioned on the calibration certificate is not normalized to SLPM conditions (20°C; 1013 mbar) as it is not significant: The correction would be 0.034% per °C (1/293) and 0.09% (1/1013) per mbar difference to the SLPM standard conditions. E.g. a 0.2l/min deviation measured at 25°C and 940mbar leads to an error of 8.8% or 0.018l.

Calibration Date: 15.04.2011 Last Adjustment Date: 15.04.2011

Calibrated by: _____ Signature: _____

This report has been produced by an electronic system and is valid with a single signature of the calibrator.

Due Date: 14.04.2012

Calibration Certificate Nr.103553

Test Object	Instrument:	MAS-100 NT Microbial Air Sampler
	Serial Number:	103553
	Firmware Version:	1.4
	Sampling Head:	300*0.6 mm
	Calibration Procedure:	MBV SOP / Version 1.5

Adjustment Equipment	Adjustment Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Adjustment Conditions:	Temp.: 25.8 [°C], Amb. Pressure: 960 [mbar]

Calibration Equipment	Calibration Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Calibration conditions:	Temp.: 25.9 [°C], Amb. Pressure: 962 [mbar]

Calibration Check Results:

Measurement No:		1	2	3	Result
Target Air Flow	[SLPM]	100.0	100.0	100.0	100.0
Air Flow on DA-100 NT	[SLPM]	100.2	100.1	100.1	NA
Deviation of DA-100 NT *	[SLPM]	0.1	0.1	0.1	NA
Corrected Air Flow	[SLPM]	100.1	100.0	100.0	100.0
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	0.1	0.0	0.0	0.0
Calibration Check Status:					accepted

(*) For the DA-100 (NT) the deviation mentioned on the calibration certificate is not normalized to SLPM conditions (20°C; 1013 mbar) as it is not significant: The correction would be 0.034% per °C (1/293) and 0.09% (1/1013) per mbar difference to the SLPM standard conditions. E.g. a 0.2l/min deviation measured at 25°C and 940mbar leads to an error of 8.8% or 0.018l.

Calibration Date: 15.04.2011 Last Adjustment Date: 15.04.2011

Calibrated by: _____ Signature: _____

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Due Date: 14.04.2012

Adjustment and Calibration Certificate Nr.103553

Test Object	Instrument: MAS-100 NT Microbial Air Sampler Serial Number: 103553 Firmware Version: 1.4 Sampling Head: 400*0.7 mm Calibration Procedure: MBV SOP / Version 1.5
Adjustment Equipment	Adjustment Equipment: DA-100 NT Digital Anemometer Accuracy: +/- 1% Serial Number: 15777 Adjustment Date: 22.03.2011 Due Date: 21.03.2013 Deviation in l/min: 0.1 Adjustment Conditions: Temp.: 26.2 [°C], Amb. Pressure: 962 [mbar]
Calibration Equipment	Calibration Equipment: DA-100 NT Digital Anemometer Accuracy: +/- 1% Serial Number: 15777 Adjustment Date: 22.03.2011 Due Date: 21.03.2013 Deviation in l/min: 0.1 Calibration conditions: Temp.: 26.2 [°C], Amb. Pressure: 961 [mbar]

Calibration Check Results:

Measurement No:		1	2	3	Result
Target Air Flow	[SLPM]	100.0	100.0	100.0	100.0
Air Flow on DA-100 NT	[SLPM]	99.3	99.7	99.7	NA
Deviation of DA-100 NT *	[SLPM]	0.1	0.1	0.1	NA
Corrected Air Flow	[SLPM]	99.2	99.6	99.6	99.5
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	-0.8	-0.4	-0.4	-0.5
Calibration Check Status:					accepted

(*) For the DA-100 (NT) the deviation mentioned on the calibration certificate is not normalized to SLPM conditions (20°C; 1013 mbar) as it is not significant: The correction would be 0.034% per °C (1/293) and 0.09% (1/1013) per mbar difference to the SLPM standard conditions. E.g. a 0.2l/min deviation measured at 25°C and 940mbar leads to an error of 8.8% or 0.018l.

Adjustment Date: 15.04.2011

Adjusted by: _____ Signature: _____

This report has been produced by an electronic system and is valid with a single signature of the calibrator.

Due Date: 14.04.2012

Calibration Certificate Nr.103553

Test Object	Instrument:	MAS-100 NT Microbial Air Sampler
	Serial Number:	103553
	Firmware Version:	1.4
	Sampling Head:	400*0.7 mm
	Calibration Procedure:	MBV SOP / Version 1.5

Adjustment Equipment	Adjustment Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Adjustment Conditions:	Temp.: 26.2 [°C], Amb. Pressure: 962 [mbar]

Calibration Equipment	Calibration Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Calibration conditions:	Temp.: 26.1 [°C], Amb. Pressure: 960 [mbar]

Calibration Check Results:

Measurement No:		1	2	3	Result
Target Air Flow	[SLPM]	100.0	100.0	100.0	100.0
Air Flow on DA-100 NT	[SLPM]	99.4	99.4	99.0	NA
Deviation of DA-100 NT *	[SLPM]	0.1	0.1	0.1	NA
Corrected Air Flow	[SLPM]	99.3	99.3	98.9	99.2
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	-0.7	-0.7	-1.1	-0.8
Calibration Check Status:					accepted

(*) For the DA-100 (NT) the deviation mentioned on the calibration certificate is not normalized to SLPM conditions (20°C; 1013 mbar) as it is not significant: The correction would be 0.034% per °C (1/293) and 0.09% (1/1013) per mbar difference to the SLPM standard conditions. E.g. a 0.2l/min deviation measured at 25°C and 940mbar leads to an error of 8.8% or 0.018l.

Calibration Date: 15.04.2011 Last Adjustment Date: 15.04.2011

Calibrated by: _____ Signature: _____

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Due Date: 14.04.2012

Calibration Certificate Nr.103553

Test Object	Instrument:	MAS-100 NT Microbial Air Sampler
	Serial Number:	103553
	Firmware Version:	1.4
	Sampling Head:	400*0.7 mm
	Calibration Procedure:	MBV SOP / Version 1.5

Adjustment Equipment	Adjustment Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Adjustment Conditions:	Temp.: 26.2 [°C], Amb. Pressure: 962 [mbar]

Calibration Equipment	Calibration Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Calibration conditions:	Temp.: 26.3 [°C], Amb. Pressure: 961 [mbar]

Calibration Check Results:

Measurement No:		1	2	3	Result
Target Air Flow	[SLPM]	100.0	100.0	100.0	100.0
Air Flow on DA-100 NT	[SLPM]	99.2	99.8	100.0	NA
Deviation of DA-100 NT *	[SLPM]	0.1	0.1	0.1	NA
Corrected Air Flow	[SLPM]	99.1	99.7	99.9	99.6
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	-0.9	-0.3	-0.1	-0.4
Calibration Check Status:					accepted

(*) For the DA-100 (NT) the deviation mentioned on the calibration certificate is not normalized to SLPM conditions (20°C; 1013 mbar) as it is not significant: The correction would be 0.034% per °C (1/293) and 0.09% (1/1013) per mbar difference to the SLPM standard conditions. E.g. a 0.2l/min deviation measured at 25°C and 940mbar leads to an error of 8.8% or 0.018l.

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Calibrated by: _____ Signature: _____

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Due Date: 14.04.2012

Calibration Certificate Nr.103553

Test Object	Instrument:	MAS-100 NT Microbial Air Sampler
	Serial Number:	103553
	Firmware Version:	1.4
	Sampling Head:	400*0.7 mm
	Calibration Procedure:	MBV SOP / Version 1.5

Adjustment Equipment	Adjustment Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Adjustment Conditions:	Temp.: 26.2 [°C], Amb. Pressure: 962 [mbar]

Calibration Equipment	Calibration Equipment:	DA-100 NT Digital Anemometer
	Accuracy:	+/- 1%
	Serial Number:	15777
	Adjustment Date:	22.03.2011
	Due Date:	21.03.2013
	Deviation in l/min:	0.1
	Calibration conditions:	Temp.: 26.3 [°C], Amb. Pressure: 961 [mbar]

Calibration Check Results:

Measurement No:		1	2	3	Result
Target Air Flow	[SLPM]	100.0	100.0	100.0	100.0
Air Flow on DA-100 NT	[SLPM]	99.3	99.3	99.1	NA
Deviation of DA-100 NT *	[SLPM]	0.1	0.1	0.1	NA
Corrected Air Flow	[SLPM]	99.2	99.2	99.0	99.1
Deviation from Target Air Flow: Maximum Allowable Deviation: ± 2.5 %	[%]	-0.8	-0.8	-1.0	-0.9
Calibration Check Status:					accepted

(*) For the DA-100 (NT) the deviation mentioned on the calibration certificate is not normalized to SLPM conditions (20°C; 1013 mbar) as it is not significant: The correction would be 0.034% per °C (1/293) and 0.09% (1/1013) per mbar difference to the SLPM standard conditions. E.g. a 0.2l/min deviation measured at 25°C and 940mbar leads to an error of 8.8% or 0.018l.

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