World's fastest way to certify HVAC systems

Huge time savings thanks to 4 important benefits

AIRPORT LONDON
	1 m/s	2 m3/h	3 °C
01	6.0		
02	5.9	5210	22.7
03	5.9	5140	20.7
04	5.7	5140	21.3
05	5.8	4910	21.5
06	5.9	4980	21.8
07	5.9	5060	21.9
		5140	22.3

5.9 m/s
5076 m3/h
Uncertainty:
+/− 6.1 %

testo 400

Testo
15958404
Airport London
1200 m3/h

°C

% RH

td

g/kg

hPa

m/s

m³/h

ppm CO

ppm CO_2

rpm

mA

V

1st benefit

x + + +
+ + + +
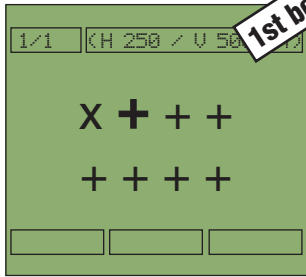
Automatic determination of measuring points in duct

2nd benefit
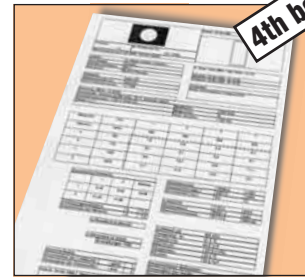

Mean value
2.0 ± 0.8 m/s
14760 ± 5525 m3/h
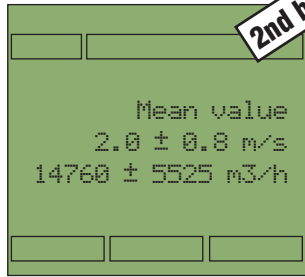
Complete assessment of measurement location on site
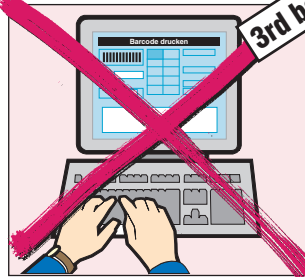
3rd benefit

Time consuming manual input in PC is eliminated

4th benefit

Automatic production of standard measurement reports

The testo 400 reference measuring instrument is now even better. The new time saving system in the testo 400 allows you to test and certifiy more easily and efficiently than ever before.
Report printouts are made from your PC at the touch of a button. Inaccurate data calculations as well as the time consuming entry of measured data are eliminated with the testo 400.
The testo 400 with its VAC module is currently the only measuring system in the world which gives a quick and objective assessment of HVAC system performance without the need for additional calculations.

We designed the VAC module to meet global standards such as the EN 12599 draft in Europe and the ASHRAE in the USA.
It is the first product to simply and completely fulfill these standards.

Your benefit: Reliable data and huge time savings.

PAST

HVAC engineers and technicians work together to measure volume flow. The engineer relays the required grid measurements to the technician who enters the data from the numerous measuring points by hand into a manual datasheet.

The tedious calculations required by the ventilation standards (error calculation, uncertainty of profile/location etc.) are made at a later time in the office. Assignment of the measured data to the location, including date and time as well as additional parameters (temperature, pressure, humidity), is absolutely necessary. At worst, it may turn out afterward that the measurement has to be repeated due to the large measurement uncertainty.

TODAY

The testo 400 is simply attached via a magnetic holder to the ventilation duct. The engineer then always has one hand free. The data relating to the location such as location name, coordinates, duct area, correction factor etc. are automatically read into the measuring instrument via the barcode. The coordinates required for the grid measurement are shown in the instrument display (see page 1). The depth specification on the vane telescope hugely reduces the work in the field.
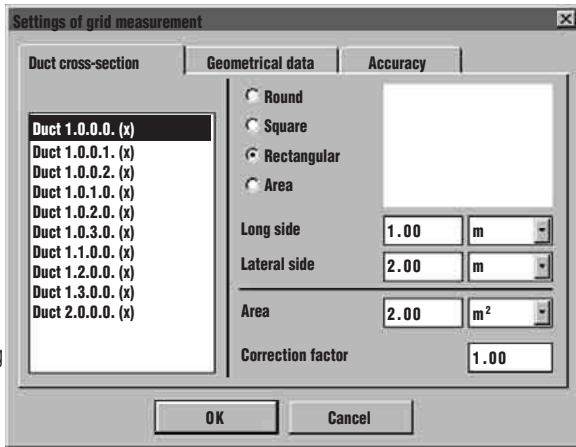

The measured data saved in testo 400 are transmitted to your PC at the touch of a button. Tedious written work is no longer necessary. The results of the measurement are printed in a standard form (see next page, step 6).

1 **Preparing the measurement on your office PC**

Settings of grid measurement

Duct cross-section	Geometrical data	Accuracy

Duct 1.0.0.0. (x)
Duct 1.0.0.1. (x)
Duct 1.0.0.2. (x)
Duct 1.0.1.0. (x)
Duct 1.0.2.0. (x)
Duct 1.0.3.0. (x)
Duct 1.1.0.0. (x)
Duct 1.2.0.0. (x)
Duct 1.3.0.0. (x)
Duct 2.0.0.0. (x)

○ Round
○ Square
◉ Rectangular
○ Area

|		
Long side	1.00	m
Lateral side	2.00	m
Area	2.00	m²
Correction factor	1.00	

OK   Cancel

Alle Angaben zum Messort geben Sie bereits vor der Messung über den PC in das testo 400 ein.

2 **Locating the measuring points without tape measure**
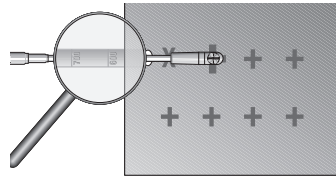
In the display the testo 400 shows the positions for the probe in the duct. The length data printed on the probe telescope help you to quickly find the exact positions required. In this way you can quickly and easily process the measuring points required for the measurement.

3 **Error calculation without additional functions**

Mean value
2.0 ± 0.8 m/s
14760 ± 5525 m3/h
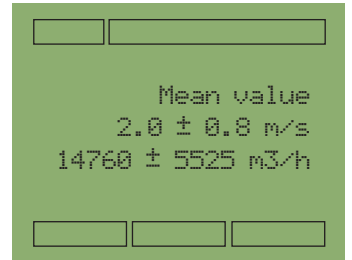
The testo 400 automatically calculates the mean values for velocity and volume flow at the touch of a button. This error calculation function, without the need for any additional input, is unique in the world.
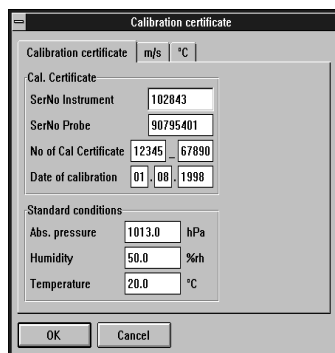
4 **On site results**

The automatic error calculation function in the testo 400 enables quick and objective assessment of the system on site. The information supplied by the testo 400 includes:
- Min/Max/Mean values
- Standard deviation
- Profile/location uncertainty
- Overall uncertainty

giving enormous time savings while diagnosing your problem systems.

If there is a big difference between the reference and actual values you can immediately increase the distance from the point of disturbance or increase the number of measurement points. Either way you will reduce the measurement uncertainty.

5 **Offsetting measured results with calibration data**

Calibration certificate

Calibration certificate	m/s	°C

Cal. Certificate
SerNo Instrument   102843
SerNo Probe   90795401
No of Cal Certificate   12345 / 67890
Date of calibration   01 . 08 . 1998

Standard conditions
Abs. pressure   1013.0   hPa
Humidity   50.0   %rh
Temperature   20.0   °C

OK   Cancel

The deviations indicated in the calibration certificate can also be included when logging the results of the measurement in the PC. This leads to significantly better measurement results and fewer uncertainties.

6 **Printout of measured results in standard form**

testo 400 takes all of the parameters into account and logs them

	Date: 25.08.1998	Page 1/1

| Log 14 | for test report no..: 637 / 0998 | |
| Grid measurement | | |

Object:	Jones Ltd.	K: 2m/s 10.08 (MIN: 7,80 / MAX: 13,10)
VAC system:	Center	
Ventilator rpm:	500 rpm	Starting time: 25.08.1998 16:14:05
Responsible:	Martin Spencer	Finishing time: 25.08.1998 16:14:20

Instrument:	testo 400	Ref. instruments:
Probe:	Pitot tube	No calibration data included
Last calibration on:	1.2.1998	

Title: Muller_12.345/8
Comment: Ref value 50.000 m3/h, 22°C, center, exhaust air

Duct dimensions: 1.000 x 2.000 (m)	Meas. area:	2.000 (m²)
Grid: 4 x 4	Meas. points:	16
	Hydr. Diam.:	1.333 (m)

Meas. point	m/s	1	2	3	4
Distance	(mm)	200	400	600	800
a	325	7.8	8,0	8.4	8.7
b	775	8.9	9.1	9.2	9.7
c	1225	9.9	10.5	10.8	11.1
d	1675	11.7	11.9	12.5	13.1

Means of quadrants:

	1	2	Mean
1	8.45	9.00	10.08
2	11.00	11.88	

| Profile irregularity: | % | 17.0 |
| Uncertainty of location: | % | 7.8 |

Volume flow:	72585.0	m³/h
Uncertainty (abs.):	6427.3	m³/h
Uncertainty (rel.):	8.9	%

Air density:	1192.0	g/m³
Mass flow:	06521.3	kg/h
Standard volume flow:	67174.6	M3/h(N)

Condition of outside air

Condition of air in duct
Settings in T400

Air pressure pa:	950 hPa
Temperature ta:	27.4 °C
Humidity RHa:	45.0 %RH
Abs. pressure:	1013.0 mbar
Temperature:	22.0°C
Humidity:	35.0 %RH

Uncertainties:		
Uncertainty of air density:	g/m³	1
Accuracy of duct dimensions:	mm	2

Uncertainties in meas. system:		
Instrument accuracy:	digit	1
Probe accuracy:	m/s	0.40

| Date: 25.08.1998 | Name: M. Spencer | Signature |

— Your company logo
— Test location
— Mean value with Min/Max

Measuring points with coordinates and mean value

Recommended kit

Simply copy this page, enter quantity required and return by fax
or post. Don`t forget to include your name and address.

The <u>professional</u> <u>kit</u> for quick assessment of an air conditioning/ventilation system

Qty.	The professional kit includes:	Part no.	
	① testo 400, 2 channel multi-function measuring instrument with batteries and Li cell (memory)	0563.4001	
	VAC module upgrade for testo 400, volume flow calculation in ducts with error calculation in instrument	0450.4010	
	② Bendable vane probe (plug-in), ∅ 100 mm, ideal for duct exits	0635.9340	
	③ Combined vane/temperature probe (plug-in), for air conditioning/ventilation ducts, Ø 16 mm	0635.9540	
	④ Telescope for plug-in vane probes, max. 1 m long	0430.0941	
	⑤ Humidity/temperature probe for meas. in air cond systems (for measuring all physical parameters in the Mollier diagram)	0636.9740	
	⑥ Surface temperature probe for super-quick temperature measurement	0604.0194	
	⑦ Physical comfort level probe for measuring turbulence intensity, incl. stand	0628.0009	
	⑨ Attachable printer, for printing data on location	0554.0570	
	⑩ SoftCase, measuring instrument impact protection with carrier strap and magnetic holder, optimum protection against impact and falls, incl. probe holder	0516.0401	
	⑪ SoftCase for attachable printer, impact protection for printer	0516.0411	
	⑫ Plug-in head cable to connect probe to measuring instrument	0430.0143	
	⑬ CO_2 probe to measure indoor air quality	0632.1240	
	⑭ The professional case made of high standard aluminium for instrument/probes/accessories	0516.0410	
	Data management for the professional kit		
	Memory upgrade to 500,000 readings	0554.9481	
	ComSoft 3-Professional, with data management incl. data base, analysis and graphics function, data analysis, trend curve	0554.0830	
	VAC module upgrade, PC software for ComSoft 3 for printing standard logs	0554.4030	
	Barcode pen to read in the locations	0554.0460	
	Barcode labels for printing on via Comfort software (1200 off)	0554.0411	
	RS 232 cable, connects measuring instrument <——> PC for data transfer	0409.0178	
	Calibration certificates		
	ISO calibration certificate for velocity, calibration range freely selectable from 0.3 to 0.5 m/s; >27 to 50 m/s	0520.0104	
	⑧ **DKD calibration certificate for velocity,** calibration range freely selectable from 0.1 to 27 m/s	0520.0214	
	ISO calibration certificate for humidity, calibration range freely selectable from 5 to 95 %RH	0520.0106	
	DKD calibration certificate for humidity, calibration range freely selectable from 5 to 95 %RH at +25 °C	0520.0216	

Specifications subject to change without notice.

Fax to:

Sender:

Name

Company

Department

Address

Date, Signature