

TESTING PROTOCOL

Data: 2016-11-24

Sample for testing: 160-3

Data of sample arrival: 2016-11-22

Testing data: 2016-11-24

Testing method: LST EN 15727:2010

Measurements are performed by: Tadas Aleksėjus

Protocol is prepared by: Tadas Aleksėjus

Technical manager: Sergejus Rimovskis

Note: Laboratory does not select samples, samples delivered by customer are tested.
 Results of testing are related only to tested object.
 Protocol or separate parts of the protocol can not be copied without written consent of laboratory.

Data of measurements

Description of the sample

Duct connection diameter	0,160	m
Area of the sample surface (A_p)	0,461	m ²
Work pressure	2000	Pa
The total joint length (L)	1,005	m
The virtual product surface area (A_c)	0,502	m ²

Environment condition during the measurements

Average air temperature	20	°C
Average humidity	40,6	%
Average atmospheric	751,8	mmHg / 100,23 kPa

	Air leakage			
	Pressure, P_s	Air leakage	Adjusted air leakage*	Air leakage factor
	Pa	m ³ /h	m ³ /h	f (m ³ /sm ²)
Negative	203	0,004	0,004	0,000002
	303	0,004	0,004	0,000002
	403	0,004	0,004	0,000002
	500	0,004	0,004	0,000002
	605	0,004	0,004	0,000002
	753	0,004	0,004	0,000002
Positive	298	0,004	0,004	0,000002
	401	0,004	0,004	0,000002
	501	0,004	0,004	0,000002
	1003	0,004	0,004	0,000002
	1500	0,004	0,004	0,000002
	2004	0,004	0,004	0,000002

Note: the equipment is calibrated to fix minimum 0,04 m³/h. If the recorded meaning is lower, it can only be used for information purpose.

Air tightness class
D

* - adjusted to standard conditions (+20 °C temp. and 101325 Pa).

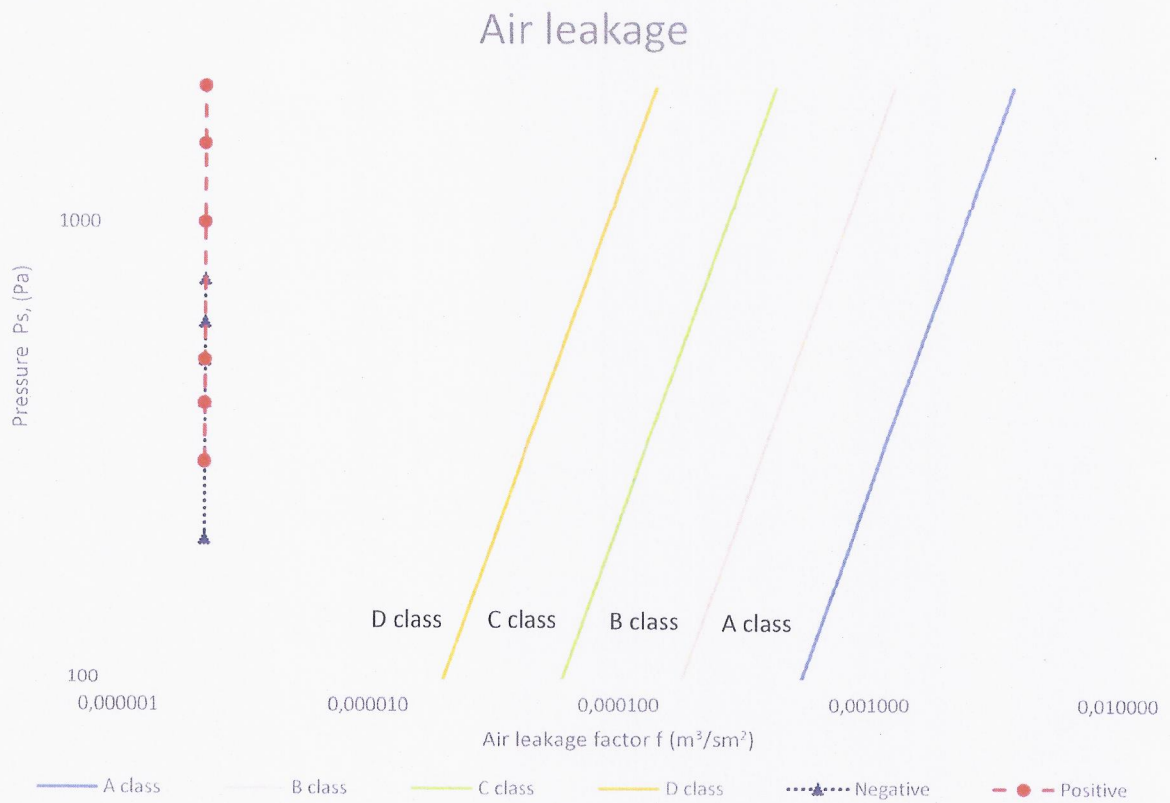
The expanded uncertainties (coverage factor $k = 2$): pressure $p_s \pm 1,6$ Pa; air leakage $\pm 0,005$ m³/h.

The measurement uncertainties conform to EA-4/16:2003 "EA guidelines on the expression of uncertainty in quantitative testing".

Annexes:

- Annex 1. Pictures of sample.
- Annex 2. Equipment for measurement.
- Annex 3. Test procedure.

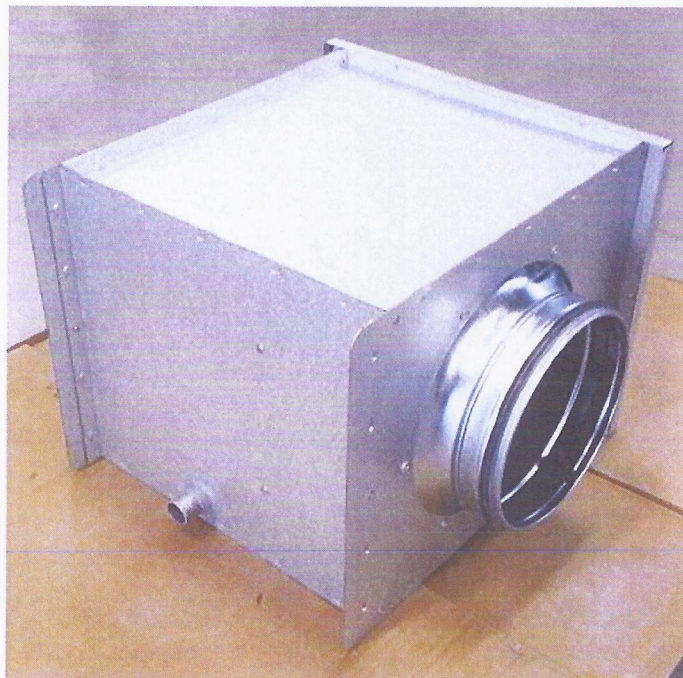
Air leakage diagram



Air tightness class	Static pressure limit (p_s) Pa		Air leakage limit (f_{max}) $m^3 \cdot s^{-1} \cdot m^{-2}$
	Positive	Negative	
A	500	500	$0,027 \times p_{test}^{0,65} \times 10^{-3}$
B	1 000	750	$0,009 \times p_{test}^{0,65} \times 10^{-3}$
C	2 000	750	$0,003 \times p_{test}^{0,65} \times 10^{-3}$
D	2 000	750	$0,001 \times p_{test}^{0,65} \times 10^{-3}$

Annex 1

according to customer's request the plug and the ring were sealed with the insulating tape during the testing.



Annex 2**Equipment for measurement****Pressure measurer**

Manufacturer TESTO
Name 6351
Range -5000,0 ... +5000,0 Pa
Calibration certificate No. 37/15-S
Calibration data 2015-12-29

Flow meter

Manufacturer COMMON
Name CGR-01 G40
Range 0,65 ... 65 m³/h
Calibration certificate No. 28/15-D
Calibration data 2015-12-15

Flow meter

Manufacturer SIERRA
Name 822S-M-4-OV1-PV2-V4
Range 0,04 ... 2 m³/h
Calibration certificate No. 91/15-C
Calibration data 2015-12-21

Environment conditions

Manufacturer COMET SYSTEM
Name T7511
Temperature range -30 ... +105 °C
Relative humidity range 0 ... 100% RH
Atmospheric pressure range 450 ... 825,1 mmHg
Calibration certificate No. a) 26/15-S
b) 14/15-SD
Calibration data a) 2015-10-02
b) 2015-08-25

Annex 3**Test procedure:****Calculation of the total joint length (L)**

The total joint length, in metres, for a product of circular cross-section is the sum of the joint perimeter of each connection (1 to n).

$$L = \pi \times (d_1 + d_2 + \dots + d_n)$$

The total joint length, in metres, for a product of rectangular cross-section is the sum of each joint perimeter.

$$L = 2 \times (a_1 + b_1 + a_2 + b_2 + \dots + a_n + b_n)$$

Calculation of the virtual product surface area (A_c)

The virtual product surface area A_c, in square metres, is:

$$A_c = L \times 0,5$$

or

$$A_c = A_p \text{ (the product surface area).}$$

whichever is the larger.