

TESTING PROTOCOL

Date: 2023-12-20

Protocol number: 23062

Tested unit: Air distribution box: 160-8*75

Order number: 23062


Number of sample: B23062


Customer:

Date of sample arrival: 2023-12-19

Date of test: 2023-12-19 till 2023-12-20

Test method: Information about the test method is provided on page 2

Measurements are performed by: Modestas Šimkus 

Director: Modestas Šimkus 

Note: Laboratory does not select samples, samples delivered by customer are tested.

The results apply to the sample as received.

Results of testing are related only to tested object.

When information is provided by the customer and can affect the validity of results, the laboratory disclaims liability for it.

Protocol or separate parts of the protocol can not be copied without written consent of laboratory.

Information about testing methods

LST EN 15727:2010 Ventilation for buildings - Ducts and ductwork components, leakage classification and testing.

LST EN ISO 7235:2010 Acoustics — Laboratory measurement procedures for ducted silencers and air-terminal units — Insertion loss, flow noise and total pressure loss.

(6.5) Volume flow rate and pressure loss coefficient

Information about tested unit(s) and tests**Description of sample**

Air distribution box 160-8*75.

Sample no.	model/type	Inlet connection diameter [mm]	Outlet connection diameters [mm]	Max. number of outlet connections	Dimensions W x H x L [mm]
B23062	160-8*75	160	75	8	378x200x370

Data of measurements

Description of the sample

Duct connection	0,160	m
Length	0,370	m
Width / depth	0,378	m
Height	0,200	m
Area of the sample surface (A_p)	0,539	m^2
Required air tightness class	Not declared	
Operating pressure	Not declared	
The total joint length (L)	1,005	m
The virtual product surface area (A_c)	0,502	m^2

Environment condition during the measurements

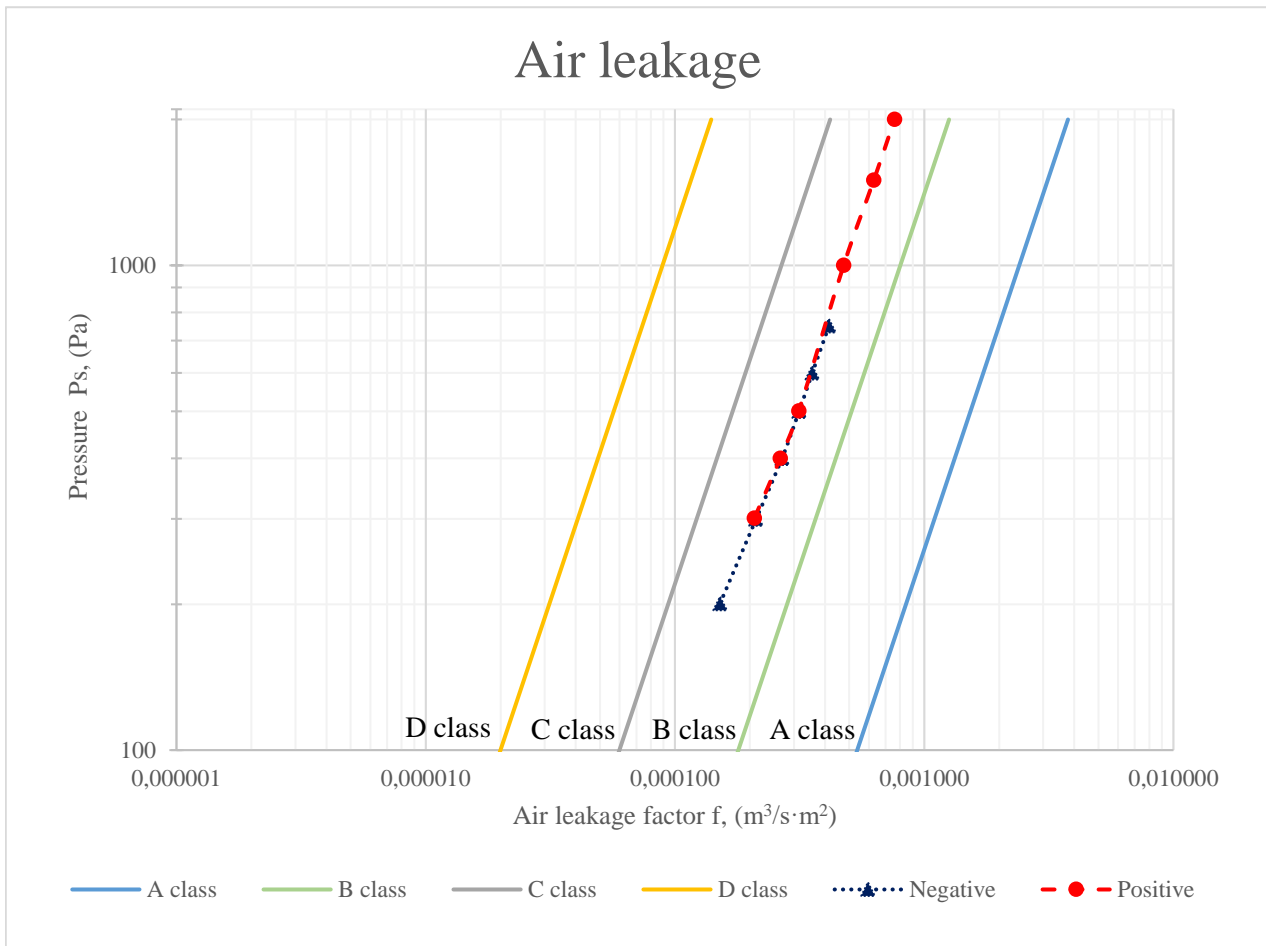
Average air temperature	19,7	°C
Average humidity	41	%
Average atmospheric pressure	741	mmHg / 98,79 kPa

	Air leakage				
	Test pressure	Air leakage	Corrected air leakage*	Air leakage factor	Classification
	Pa	m^3/h	m^3/h	$(m^3/s \cdot m^2)$	
Negative	201	0,301	0,294	0,000152	B
	299	0,420	0,410	0,000211	B
	400	0,534	0,522	0,000269	B
	500	0,626	0,611	0,000315	B
	600	0,707	0,690	0,000356	B
	751	0,825	0,805	0,000415	B
Positive	301	0,413	0,404	0,000208	B
	400	0,526	0,513	0,000265	B
	501	0,623	0,609	0,000314	B
	1001	0,945	0,922	0,000475	B
	1500	1,248	1,218	0,000628	B
	2000	1,511	1,475	0,000760	B

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

Note: the equipment is calibrated to measure air leakage from 0,078 m³/h. If the recorded value is lower, it can only be used for information purpose.

Air leakage diagram

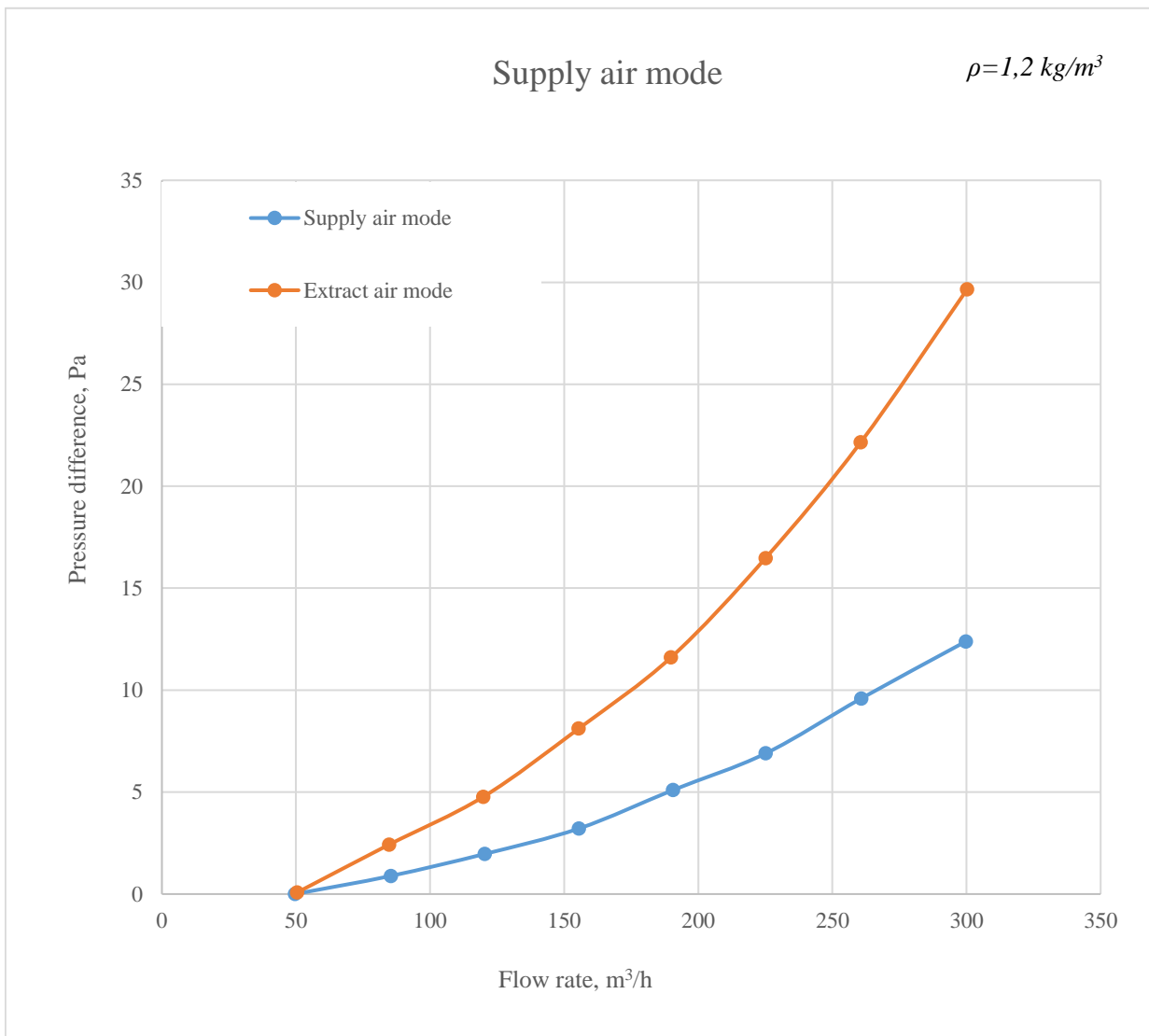


Aerodynamic characteristics test

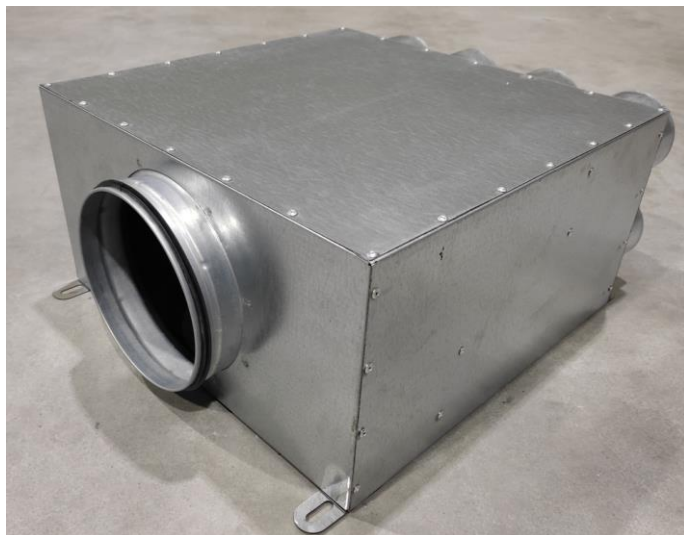
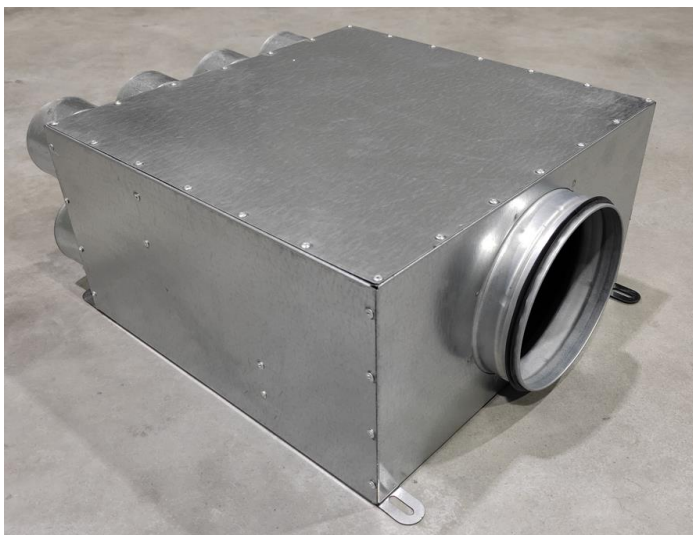
Measurement results

Supply air mode	
q_v	$\Delta p_{1,2}$
m^3/h	Pa
50	0,0
85	0,9
120	2,0
155	3,2
191	5,1
225	6,9
261	9,6
300	12,4

Extract air mode	
q_v	$\Delta p_{1,2}$
m^3/h	Pa
50	0,1
85	2,4
120	4,8
155	8,1
190	11,6
225	16,5
261	22,1
300	29,7



Annex 1. Pictures of the sample(s)



Tested unit 160-8*75

Annex 2. Equipment for measurements

Equipement for balanced airflow measurement

Type of equipment	Manufacturer / Model	Number	Range	Callibration data
Environment condition	COMET SYSTEM T7511	13960841	0÷100 %; 30÷105 °C; 450÷825,1 mmHg	2023-04-18
Pressure sensor	KIMO CP 210	PT-2F141005201; PT-2F141005151	-1000÷1000 Pa	2023-06-20
Pressure sensor	KIMO CP 210	PT-2F141005203; PT-2F141005204	-1000÷1000 Pa	2023-06-22
Pressure sensor	BD Sensors DPS 300	PT-10025951; PT-10025952	-1000÷1000 Pa	2023-06-22
Pressure sensor	BD Sensors DPS 300	PT-10025949; PT-10025950	0÷1000 Pa	2023-06-23
Air flow meter	Aplisens ISA 1932 DN 50	S-FM-3-050	20÷200 m ³ /h	2022-06-21
Air flow meter	Beck DN 110	S-FM-3-110	70÷700 m ³ /h	2022-06-21
Air flow meter	Aplisens ISA 1932 DN 50	S-FM-4-050	20÷200 m ³ /h	2022-06-20
Air flow meter	Beck DN 110	S-FM-4-110	70÷700 m ³ /h	2022-06-20
Temperature sensor	ABB TSC 430 PT 100	T-FM-3	-30÷300 °C	2022-06-22
Temperature sensor	ABB TSC 430 PT 100	T-FM-4	-30÷300 °C	2022-06-22

Equipement for air leakage measurement

Type of equipment	Manufacturer / Model	Number	Range	Callibration data
Pressure sensor	TESTO/6351	PT-02885991	-5000÷5000 Pa	2023-04-25
Pressure sensor	TESTO/6351	PT-02963093	-100÷100 Pa	2023-04-25
Flow meter	COMMON/CGR-01 G40	861912	0,65÷65 m ³ /h	2023-04-27
Flow meter	SIERRA/822S-M-4-OV1-PV2-V4	188960	0,04÷2 m ³ /h	2023-04-28
Environment conditions	COMET SYSTEM / T7511	13960841	0÷100 %; -30÷105 °C; 450÷825,1 mmHg	2023-04-18

Annex 3. Air leakage test calculation info

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.

Air tightness classification for technical ductwork products with circular cross section connections (LST EN 15727).

Air tightness class	Static pressure limit (p_s)		Air leakage limit (f_{max}) $m^3 \cdot s^{-1} \cdot m^{-2}$
	Pa		
	Positive	Negative	
A	500	500	$0,027 \times p_{test}^{0,65} \times 10^{-3}$
B	1000	750	$0,009 \times p_{test}^{0,65} \times 10^{-3}$
C	2000	750	$0,003 \times p_{test}^{0,65} \times 10^{-3}$
D	2000	750	$0,001 \times p_{test}^{0,65} \times 10^{-3}$