So, here we are

Etelab
we test

Test report

No.: 0032-003-2016

Equipment under test (EUT): Heat recovery unit

Type designation: FUTURA

Customer: Air Pohoda

ETELAB s.r.o.
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Testing laboratory accredited by CAI

ilac-MRA

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1. SUMMARY

The measurements have been performed according to Standard / used method:

EN ISO 5167-2 - Measurement of liquid flow by means of pressure differential devices inserted in circular cross-section conduits running full - Part 2: Orifice plates

EN 308 - Heat exchangers - Test procedures for establishing performance of air to air and flue gases heat recovery devices

1.1. Participants

Customer: Air Pohoda s.r.o., Holešovská 1692, **769 01 Holešov, Czech republic**

1.2. Order

For the measurement of EUT the following performance characteristics shall be determined
dry temperature efficiency (4 point)

The order with the number 16-ELZ0032 has been executed according to the contract "Product tests and services", dated 17.10.2016

1.3. Description of the tests

Delivery date:	18.10.2016
Testing starts:	05.12.2016
Testing ends:	23.12.2016
Testing laboratory:	ETELAB

Climatic conditions during tests:	Ambient temperature:	19,2°C
	Relative humidity:	41%
	Atmospheric pressure:	100,3 kPa

1.4. Identification of the EUT

HEAT RECOVERY UNIT

Manufacturer:	Air Pohohoda s.r.o.
Model:	FUTURA
Air flow:	110-350m^3/h
Voltage:	240V, 50Hz
Power:	35-365W
Weight:	47,5 kg
SN:	2811600000
Dimensions (mm):	1000 x 830 x 550

EUT consist of the EC fans, filters (F7,F5), counter flow enthalpy heat exchanger

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1.5. Specification of the measuring devices / instruments

Central unit	ALMEMO 5990-2 A03110153
Temperature sensors	FPA 10L0250 G5 ZA9030-FS2 (-200…+600°C, 0,01°C) FPA 10L0250 G5 ZA9030-FS2 (-200…+600°C, 0,01°C) FPA 10L0250 G5 ZA9030-FS2 (-200…+600°C, 0,01°C) FPA 10L0250 G5 ZA9030-FS2 (-200…+600°C, 0,01°C) FPA 10L0250 G5 ZA9030-FS2 (-200…+600°C, 0,01°C) FPA 10L0250 G5 ZA9030-FS2 (-200…+600°C, 0,01°C) FPA 10L0250 G5 ZA9030-FS2 (-200…+600°C, 0,01°C) FPA 10L0250 G5 ZA9030-FS2 (-200…+600°C, 0,01°C) FPA 22L0250 ZA 9030-FS1 (-200…+600°C, 0,01°C) FPA 22L0250 ZA 9030-FS1 (-200…+600°C, 0,01°C) FPA 22L0250 ZA 9030-FS1 (-200…+600°C, 0,01°C) FPA 22L0250 ZA 9030-FS1 (-200…+600°C, 0,01°C)
Pressure sensors	FDA602-S1K SN: 07080444 (±1250Pa, ±0,5%) FDA602-S1K SN: 07080441 (±1250Pa, ±0,5%) FDA602-S1K SN: 07080429 (±1250Pa, ±0,5%) FDA602-S1K SN: 07080425 (±1250Pa, ±0,5%)
Atmospheric pressure sensor	FDA 612-SA SN: 08010027 (700…1050mbar, ±0,5%)
Sensor humidity/temperature	FHA646-E2C SN: 07100861 FHA646-E2C SN:07100860 FHA646-E2C SN:07100859 FHA646-E2C SN:07100858 FHA646-E2C SN:07100850 FHA646-E2C SN:07100853 FHA646-E2C SN:07100848 FHA646-E2C SN:07100760
Orifice plate	MATTECH 200/150 SN: 72124 MATTECH 200/150 SN: 72125

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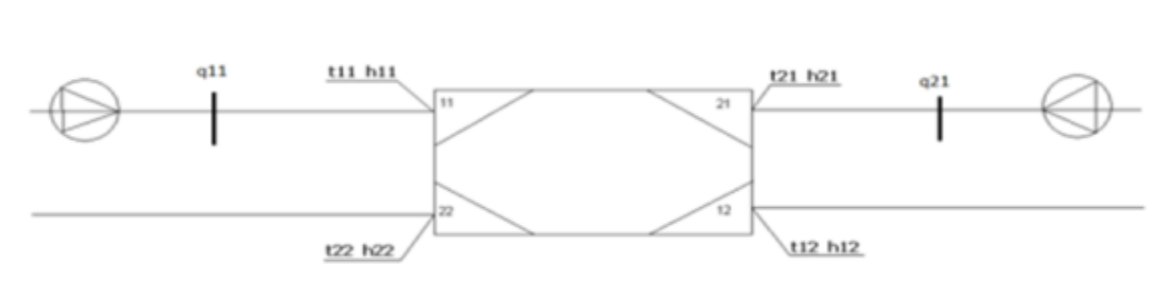
2. TEST RESULTS

2.1. Dry temperature efficiency

11 - exhast air intlet
12 – exhast air outlet
21 – supply air inlet
22 – supply air outlet



temperature efficiency : $\eta_t = \frac{t_{22}-t_{21}}{t_{11}-t_{21}}$

measuring point	q_{v11}	q_{m11}	t_{11}	φ_{11}	x_{11}	ρ_{11}	t_{12}	φ_{12}	x_{12}	ρ_{12}	η_t
	m^3/h	kg/h	°C	%rH	g/kg	kg/m^3	°C	%rH	g/kg	kg/m^3	%
1	122	144	24,8	32,3	6,2	1,17	7,2	78,8	5,0	1,24	91,3%
2	197	232	25,1	35,5	7,0	1,17	8,0	76,1	5,4	1,24	90,4%
3	253	301	25,0	37,8	6,1	1,17	7,1	73,3	5,4	1,24	90,0%
4	367	438	25,1	41,7	6,1	1,17	7,5	72,4	5,5	1,24	89,0%

measuring point	q_{v21}	q_{m21}	t_{21}	φ_{21}	x_{21}	ρ_{21}	t_{22}	φ_{22}	x_{22}	ρ_{22}	p_{baro}
	m^3/h	kg/h	°C	%rH	g/kg	kg/m^3	°C	%rH	g/kg	kg/m^3	Pa
1	115	145	4,9	63,9	3,3	1,25	23,0	24,4	4,1	1,18	100330
2	184	231	5,1	70,0	3,7	1,25	23,2	25,9	4,6	1,18	100310
3	244	305	5,3	89,7	5,4	1,25	23,0	45,7	6,1	1,17	100350
4	347	433	5,6	84,0	5,2	1,25	23,0	43,0	5,8	1,17	100360

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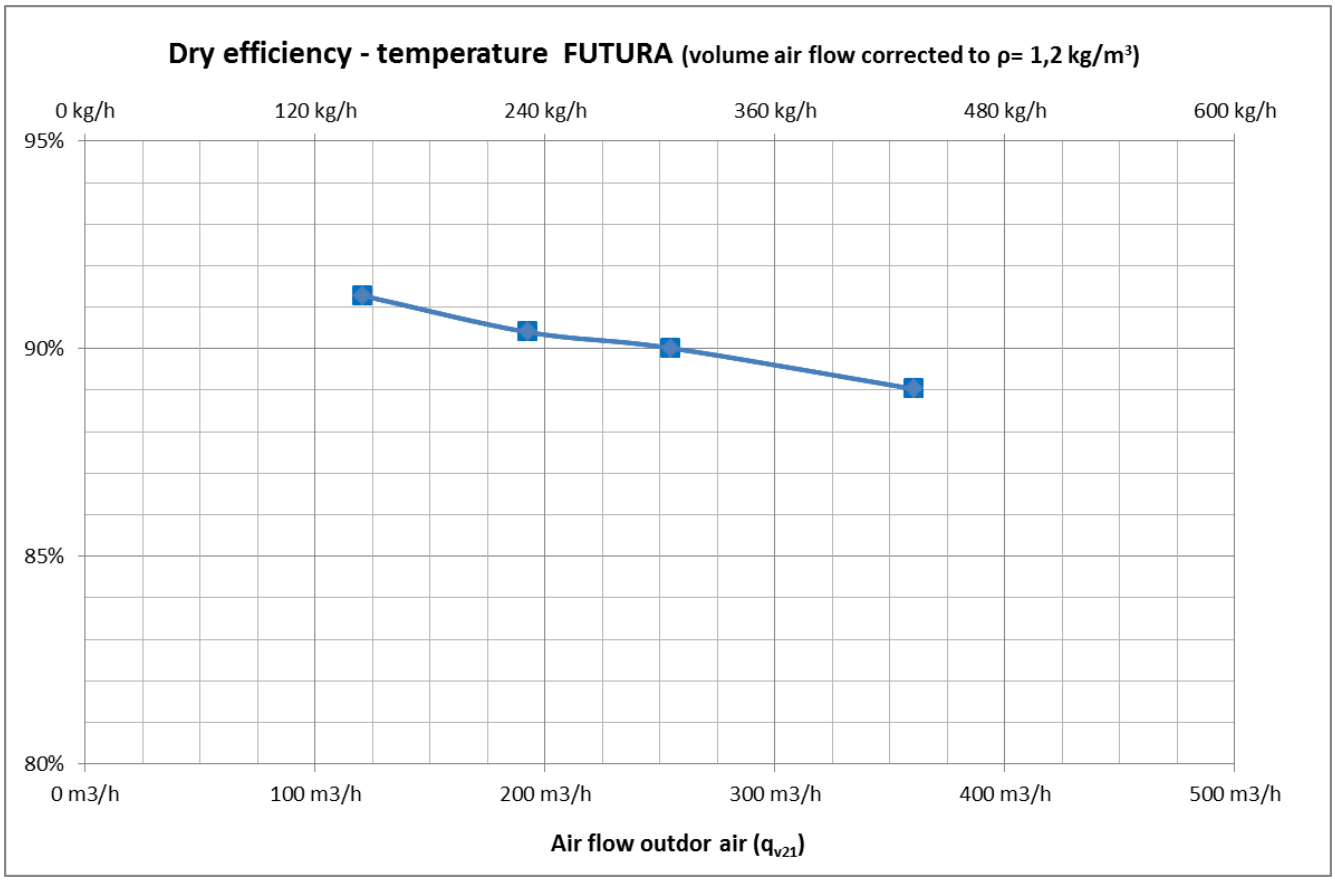

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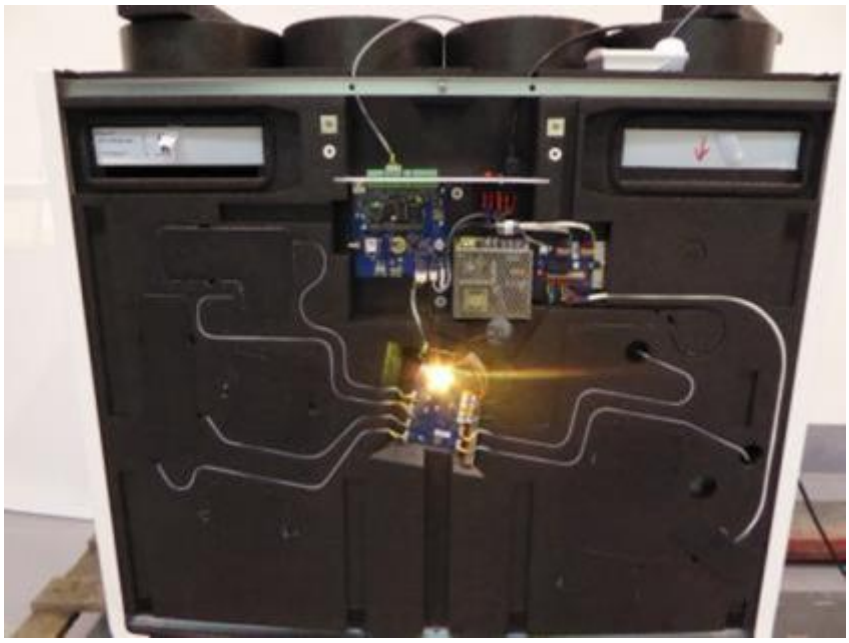
3. PHOTOS



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Formulation of the measurement uncertainty

U (flow rate) = 1,4%
U (temperature) = 0,12°C
U (humidity) = 2 %

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, which for a normal distribution provides a level of confidence of approximately 95%.

4. Non-accredited tests

Non-accredited tests: None

5. Conclusions

Tested sample (EUT) did not change its function properties after the testing.

Test results described in this test report are related just to the tested samples (EUT)

The electronically recorded data will be stored for a period of 3 years. The test report and all the related documents will be kept 10 years. During this time the customer has the possibility to look into these documents. Copies will be charged.

Date : 04.01.2017

Tests held by : Jan Stránský Signature

Tests evaluated by : Pavel Hornych Signature

Report approved by : Pavel Hornych – Head of laboratory Signature

Accredited testing laboratory 1579 ETELAB

----------The end of the test report ----------

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