TESTING RESULTS

Performance of the airAC 300.1 ERV device

1. Testing procedure

Enthaply recovery ventilator (ERV) of airAC type model 300.1 (MG Innovations Ltd., Finland) was tested on its performance at the laboratory of Yamatake Corp., Tokyo, Japan, in November 2007. The device as supplied is shown in Fig. 1.Test installation in the climate laboratory is shown in Fig. 2. Besides air ducts, air flow sensor, power meters and computer controlled sensors with data acquisition system has been installed.

Fig. 1. ERV airAC model 300.1

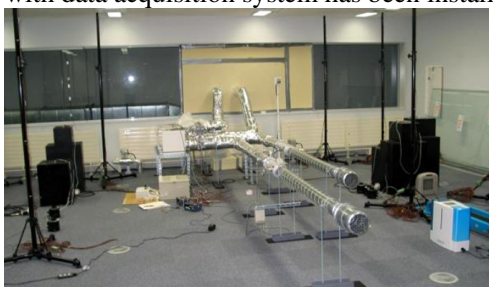

Fig. 2. Testing layout picture.

Testing conditions were chosen as specified by JIS standard below with the respective set points and an additional testing case for subzero outside air temperature:

Climate	Outdoor		Indoor	
	DB Temperature [°C]	WB Temperature [°C]	DB Temperature [°C]	WB Temperature [°C]
Winter	5 ±1	2 ±2	20 ±1	14 ±2
Summer	35 ±1	29 ±2	27 ±1	20 ±2

	Outdoor		Indoor	
	Temperature [°C]	Relative Humidity [%]	Temperature [°C]	Relative Humidity [%]
Case 1	-5	60	18	30
Case 2	5	59	20	52
Case 5	35	64	27	53

Case 2 and case 5 were setup to accord with JIS test climate conditions.

During the tests, the following parameters have been measured and recorded:

- Fan power consumption at different speeds
- Air flow rate (speed IV ~100% and speed III ~75% of maximal rated airflow)
- Static pressure (with and without air flow sensor)
- Air flows temperature and relative humidity variations

Additionally, humidity ratio, thermal, latent and total efficiencies have been calculated. As there is difference between efficiency definition by ASHRAE and JIS (the former gives higher values by 1~10% in the case of different supply and return air flows), JIS definition was used which represents the minimal value. Exact data and full results of the tests are available from Yamatake Corp.

2. Testing results

The summary of the airAC 300.1 ERV performance against the specifications and in the tests is shown below:

airAC 300.1	Specification	Result of Test
Airflow Rate	**360** m^3/h	**327** m^3/h
External Static Pressure	**250** Pa	**91** Pa
Power	**380** W (**230** V AC)	**216** W (**240** V AC, 50Hz)

Exchange Efficiency	Spec.	Result of Test			
		Include Air Temp.-rise		Deducted Air Temp.-rise	
		Winter	Summer	Winter	Summer
Sensible Heat		**1.00**	**0.62**	**0.86**	**0.84**
Latent heat		**0.69**	**0.67**	**0.69**	**0.67**
Total Heat	**0.76~0.90**	**0.89**	**0.66**	**0.80**	**0.72**
Airflow Rate	**360** m^3/h	**244** m^3/h	**323** m^3/h	**244** m^3/h	**323** m^3/h

3. Conclusions

1. The tested ERV airAC 300.1 device provides in winter sensible recovery efficiency 0.86-1.00, latent ~0.7, total 0.8-0.9, and in summer sensible 0.7-0.84, latent ~0.67 and total 0.66-0.72 (taking into account the temperature variations caused by selected fans), which corresponds well to the specifications provided by the manufacturer (0.76~0.90) or exceeds it.

2. AirAC 300.1 has been demonstrated less power consumption than specified (maximal 216W vs. 380W) and respectively lower external static pressure (91 vs. 250 Pa) at compatible airflow rates. It should be noted that fan performance depends on proper fan selection (AC fans were used in the tests) and the arrangement (fans were located at the indoor side in this test case).

3. AirAC 300.1 efficiency values are higher than competitive ERV units available at Japanese market (even when the air temperature rise due to fan losses has been deducted):

Manufacturer	Product	Media Material	η_t (Summer)	η_t (Winter)	Airflow Rate (CMH)	Price (JP¥)
Mitsubishi	Lossnay	Paper	0.64	0.67	350~2000	50,000~70,000
Daikin	HRV-VAM	Paper	0.65		350~2000	
Matsushita	HEX	Paper	0.62	0.67	350~1000	55,000~67,000
Kyoritsu	HEC	Paper	0.58	0.62	500	
Fläkt	EconoVent V	Aluminum	0.70		1500~2500	800,000
MGI	**ERV**	**Aluminum**	**0.66 (0.72)***	**0.89 (0.80) ***	**360~3300**	**367,500~?**

* The air temperature-rise of fans are deducted.