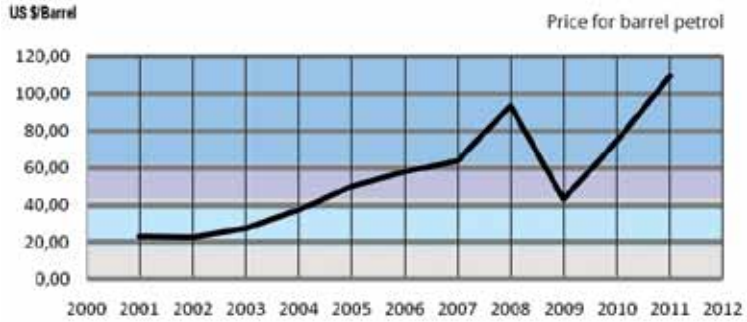
**The air we breathe is important for our life!**

*One can live 3 weeks without food, 3 days without water, 3 minutes without air!*

People in industrialized countries spend indoor, on average about 90% of the year. Modern buildings and systems do not allow natural ventilation. This is a major precondition for creation of mechanical ventilation.

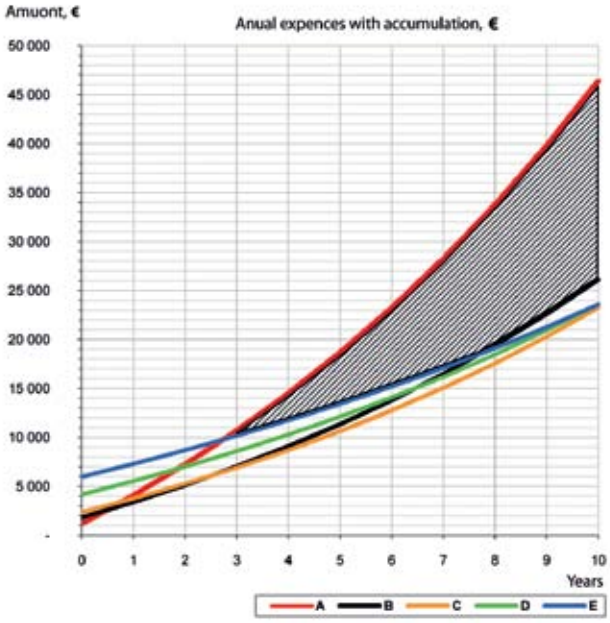
The fresh air must be heated in winter and chilled in summer, and this is related with significant energy costs. There is a preliminary trend for growing of the price of energy resources for the last 10 years:



Human health and productivity are closely connected with the air quality. Our children need fresh air even more than us – it could help to avoid illnesses and allergies.

Energy consumption leads to environmental pollution and exhausting of resources of the planet. It is our duty to protect it for future generation.

**Quickly return on investments using heat recovery systems:**

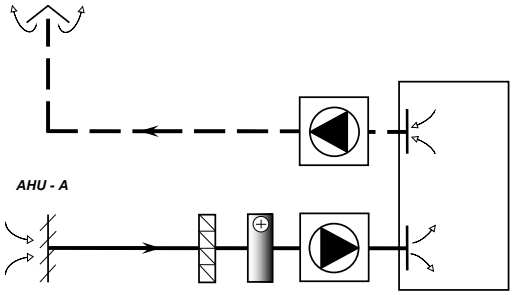


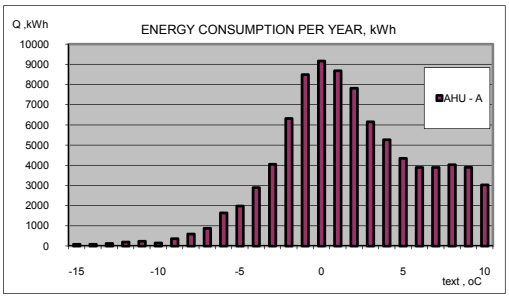

The data shown are not universal. These parameters are valid for the following conditions:

- Bulgaria, Sofia;
- Indoor temperature 22oC;
- Air flow – 3000m3/h;
- Installation working time – 10 of 24h.
- Installation life time – 10 years;
- Energy price – 0.1 Euro/kWh;
- 8% annual maintenance costs;
- Energy price growth – 12% per year;
- The initial expenses are average;

Your lost money!

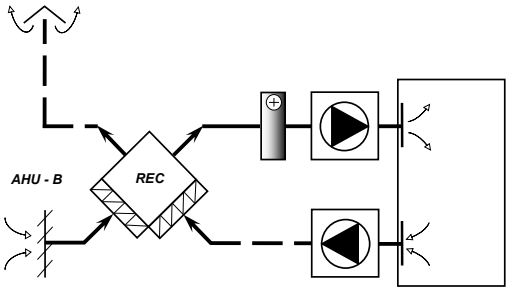
## Heat recovery systems are the proper technical and economically acceptable solution:

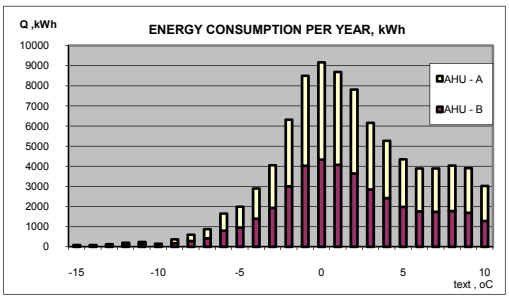



System without recuperation

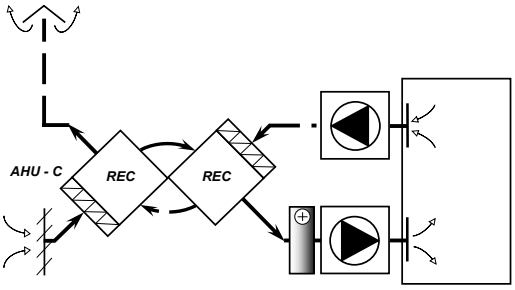
E=0%

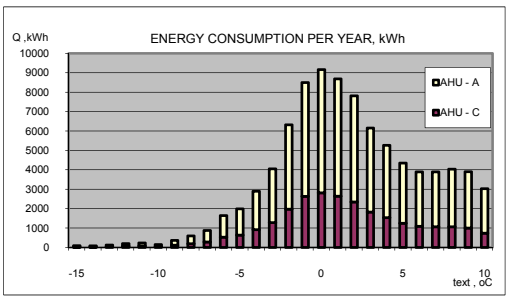



System with plate heat exchanger

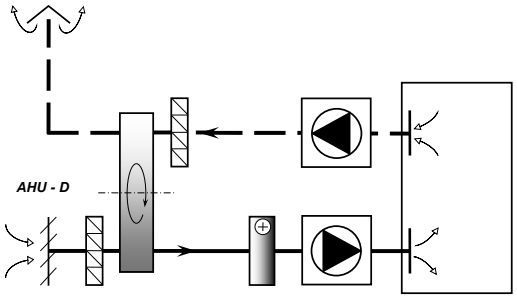
E=45 – 58%

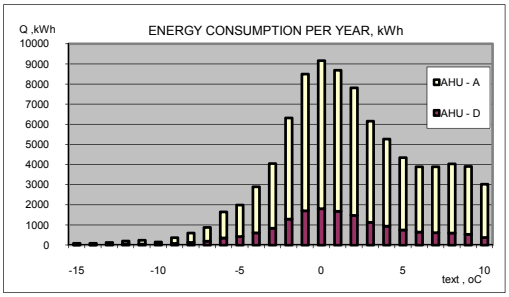



System with high-efficiency plate heat exchanger

E=65 – 70%




System with rotary heat exchanger

E=70 – 83%

E - % percentage of recovered energy

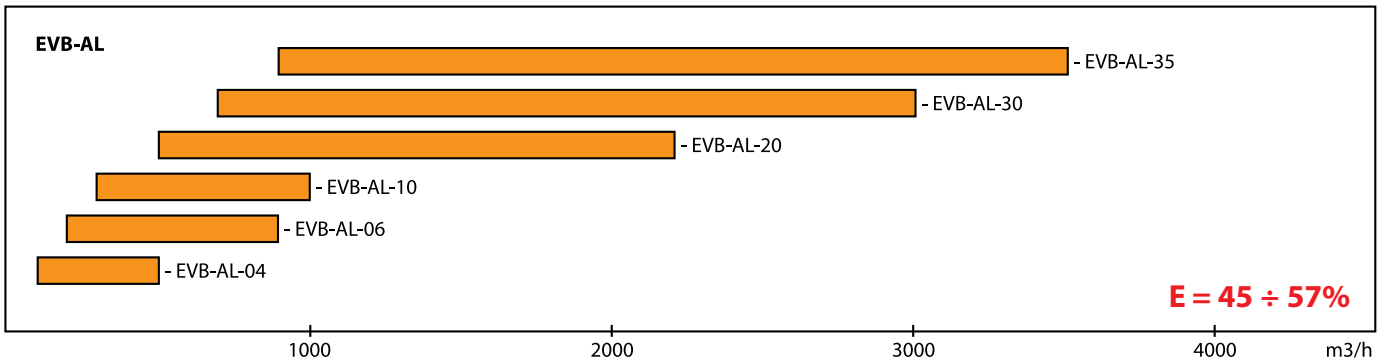
**Applications of heat recovery units:**

Ventilation and air-conditioning systems, which provide fresh air supply in:

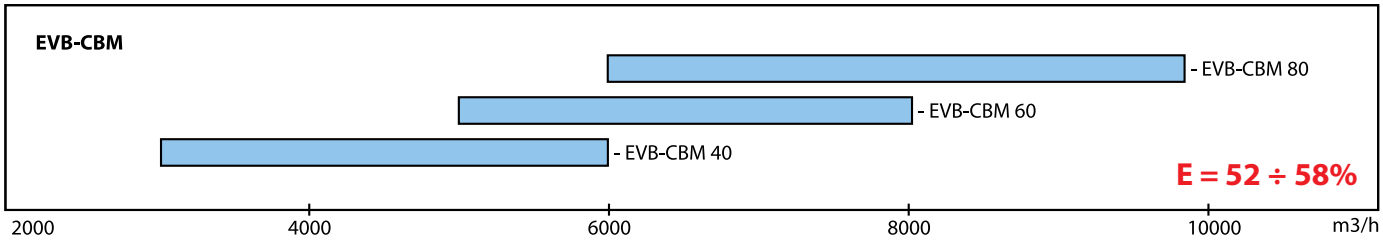
- Office and residential buildings;
- Hotels, restaurants, cafes, nightclubs;
- Sports halls, gyms and swimming pools;
- Hospitals, schools, laboratories;
- Cinemas, theaters, concert halls;
- Food industries – bakeries;
- Technological systems;
- Industrial ventilation.


We reserve the right to introduce alternations both in design and technical data without prior notice, due to continued product development.

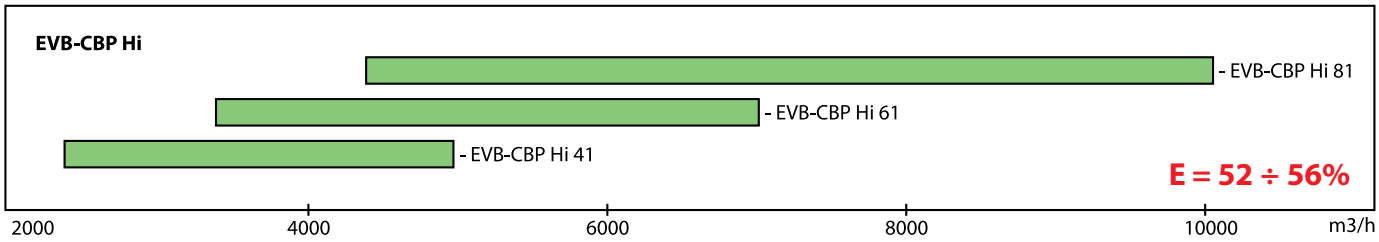
## Standard range – EVB-AL



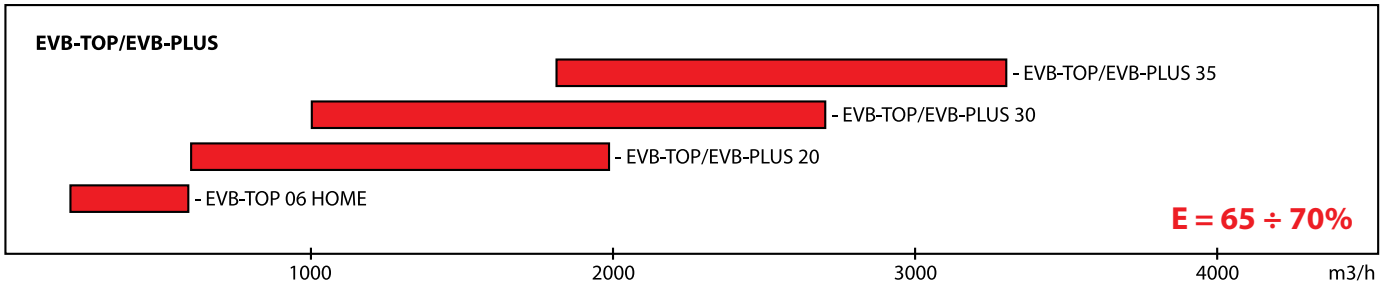

## Middle range low pressure - EVB-CBM



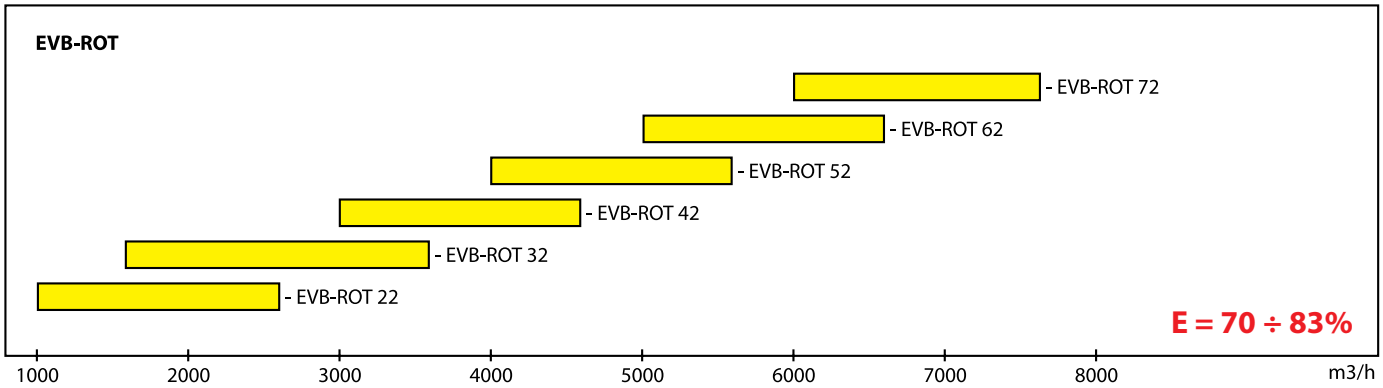

## Middle range, high pressure - EVB-CBP




## High efficiency range – EVB-TOP/ PLUS




## Rotary regenerative exchanger range - EVB-ROT




**Note**: For flow rate higher than mentioned, see Section 6 – Air handling units.

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| | | | | |
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| 05.01 | EVB AL | **HEAT RECOVERY UNITS**<br>Air flow: 200 ÷ 3200 м³/ч. | E = 45 ÷ 57 % | 7 |
| 05.02 | EVB AL-CBM | **HEAT RECOVERY UNITS**<br>**MIDDLE RANGE – LOW PRESSURE**<br>Air flow: 3000 ÷ 10 000 м³/ч. | E = 52 ÷ 58 % | 17 |
| 05.03 | EVB AL-CBP | **HEAT RECOVERY UNITS**<br>**MIDDLE RANGE – HIGH PRESSURE**<br>Air flow: 2500 ÷ 10 000 м³/ч. | E = 50 ÷ 56 % | 23 |
| 05.04 | EVB TOP/PLUS | **HIGH EFFICIENCY RANGE**<br>**HEAT RECOVERY UNITS**<br>Air flow: 150 ÷ 2800 м³/ч. | E = 65 ÷ 70 % | 27 |
| 05.05 | EVB ROT | **HEAT RECOVERY UNITS**<br>**WITH ROTARY REGENERATIVE HEAT EXCHANGER**<br>Air flow: 1000 ÷ 7500 м³/ч. | E = 70 ÷ 83 % | 37 |


Note:

* Thermal efficiency data is approximate, calculated at equal mass flow rates of both streams and without condensation.

** For more specific calculations, please, use the software on the website of "Tangra" - www.tangra.bg

# EVB ROT – HEAT RECOVERY UNIT WITH ROTARY REGENERATIVE HEAT EXCHANGER

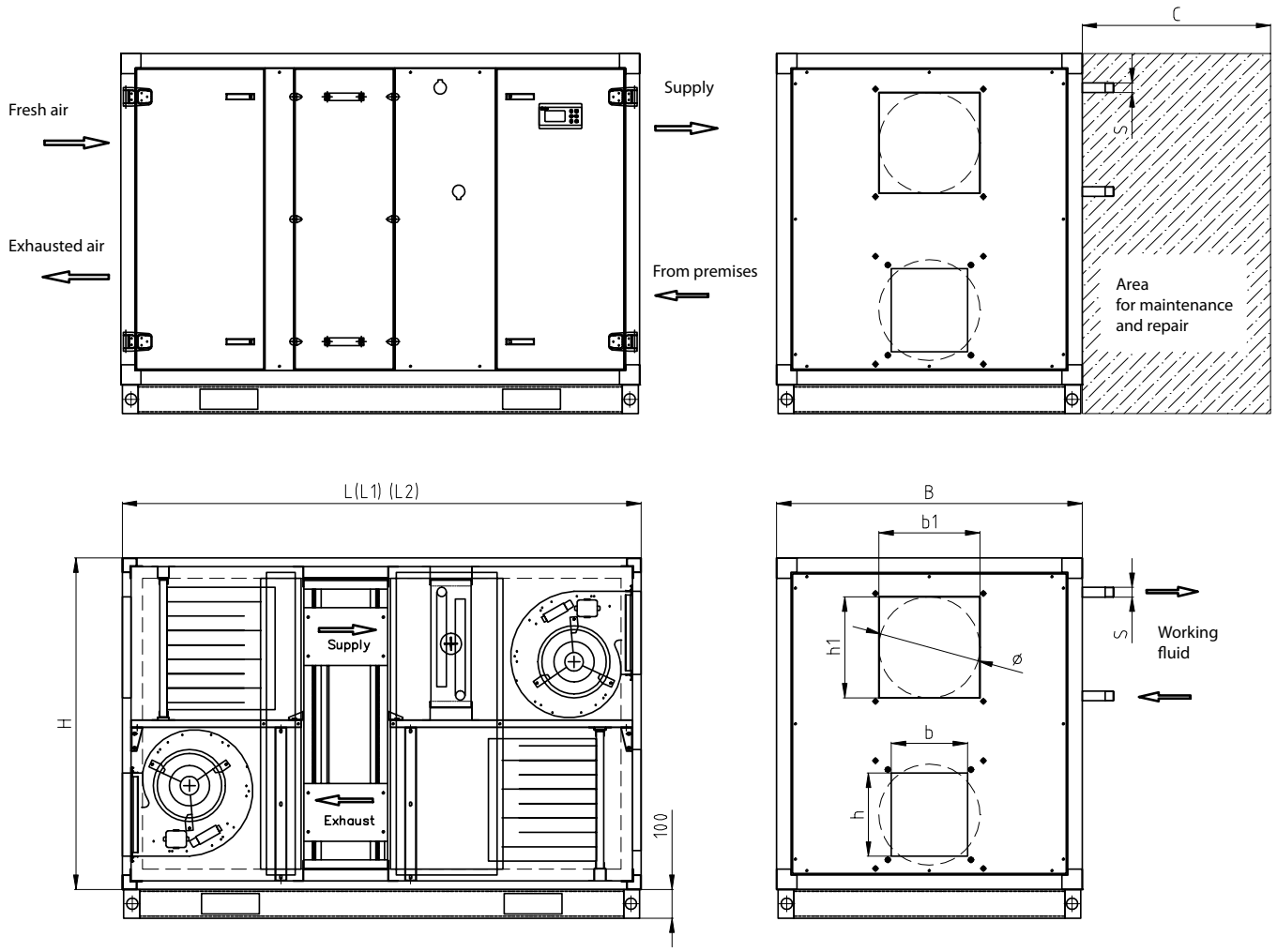
## Description

- Units for secondary use of energy of the exhaust air in ventilation and air-conditioning installations.
- Operation temperatures from -20°C to +50°C.
- Designed to work with clean air in non-aggressive and non-sparkling environment.

## Construction

- Supporting construction, made by anodized aluminum-profiles.
- Thermo and sound insulated panels, powder coated RAL 7035: Sandwich panels – 25 mm XPS insulation class M1 or fiberglass class M0.
- Rotary regenerative heat exchanger with efficiency up to 83%
- Double inlet belt driven centrifugal fans 230-380V, 50Hz.
- Air filters class F5 - EN 779:2002
- Rectangular duct connector
- Drain tray with ½" connection
- Service doors
- Heating/ cooling coil - on request
- Supporting frame - on request
- Roof panels for outdoor installation - on request
- Control and management systems - see section 7

## Overall and joined dimensions




| Model | B [mm] | H [mm] | L [mm] | $L_1$ [mm] | $L_2$ [mm] | b [mm] | h [mm] | $b_1$ [mm] | $h_1$ [mm] | S | Ø [mm] | C [mm] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **EVB ROT- 22** | 1060 | 1150 | 1550 | 1800 | 2000 | 265 | 289 | 350 | 350 | 1″ | 350 | 1200 |
| **EVB ROT- 32** | 1060 | 1150 | 1550 | 1800 | 2000 | 334 | 289 | 400 | 400 | 1″ | 400 | 1200 |
| **EVB ROT- 42** | 1310 | 1400 | 2250 | 2500 | 2700 | 311 | 341 | 450 | 450 | 1 ¼″ | 450 | 1400 |
| **EVB ROT- 52** | 1310 | 1400 | 2250 | 2500 | 2700 | 311 | 341 | 500 | 500 | 1 ¼″ | 500 | 1400 |
| **EVB ROT- 62** | 1560 | 1650 | 2550 | 2800 | 3000 | 373 | 403 | 550 | 550 | 2″ | 550 | 1700 |
| **EVB ROT- 72** | 1560 | 1650 | 2550 | 2800 | 3000 | 373 | 403 | 600 | 600 | 2″ | 600 | 1700 |

**L** - without thermal section.

**$L_1$** - with thermal section working in heating mode.

**$L_2$** - with thermal section working in cooling mode – with drop-separator and drain tray.

Rectangular flanges on input and output, as standard. Round flanges – upon request - **Φ**.

## Technical characteristics for pre-selection

| Model | Air flow [m³/h] | Eff. ROT [%] | Working-mode | $T_{OUT}$ after ROT [°C] | Heating/ cooling-section $T_{water}$ [°C] | Q [kW] | $T_{OUT}$ after COT/ COX [°C] | Hydr. pressure [кPa] | Working-fluid flow [l/s] | External pressure Pcв, [Pa] | Fan | Nominal power [kW] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EVB ROT-22 | 2000 | 79.8 | winter | 14.8 | 80/60°C | 19 | 42 | 1.5 | 0.23 | 200 | CBM/4 10/8 3V | 2x0.37 |
| | | | | | 45/40°C | 8 | 27 | 1.3 | 0.20 | | | |
| | | 79.0 | summer | 26.3 | 7/12°C | 7.4 | 18 | 4.0 | 0.35 | | | |
| EVB ROT-32 | 3000 | 72.4 | winter | 12.6 | 80/60°C | 25 | 37 | 2.4 | 0.30 | | CBM/4 10/10 | 2x0.55 |
| | | | | | 45/40°C | 11 | 24 | 2.2 | 0.27 | | | |
| | | 73.3 | summer | 26.9 | 7/12°C | 9.3 | 20 | 5.9 | 0.44 | | | |
| EVB ROT-42 | 4000 | 75.7 | winter | 13.7 | 80/60°C | 34 | 39 | 1.3 | 0.40 | 300 | CBP 12/9 | 2x1.1 |
| | | | | | 45/40°C | 15 | 25 | 1.2 | 0.36 | | | |
| | | 76.8 | summer | 26.6 | 7/12°C | 12.6 | 19.8 | 3.4 | 0.60 | | | |
| EVB ROT-52 | 5000 | 72.0 | winter | 12.5 | 80/60°C | 40 | 35 | 1.8 | 0.48 | | CBP 12/9 | 2x2.2 |
| | | | | | 45/40°C | 18 | 23 | 1.6 | 0.43 | | | |
| | | 73.2 | summer | 26.9 | 7/12°C | 14.1 | 20.5 | 4.2 | 0.67 | | | |
| EVB ROT-62 | 6000 | 74.9 | winter | 13.5 | 80/60°C | 53 | 39 | 2.0 | 0.63 | 400 | CBP 15/11 | 2x2.2 |
| | | | | | 45/40°C | 22 | 24 | 1.2 | 0.52 | | | |
| | | 76.5 | summer | 26.6 | 7/12°C | 19 | 20 | 4.9 | 0.90 | | | |
| EVB ROT-72 | 7000 | 72.4 | winter | 12.6 | 80/60°C | 57 | 37 | 2.6 | 0.69 | | CBP 15/11 | 2x3.0 |
| | | | | | 45/40°C | 25 | 23 | 1.5 | 0.59 | | | |
| | | 74.1 | summer | 26.9 | 7/12°C | 20.6 | 20.3 | 5.7 | 1.00 | | | |

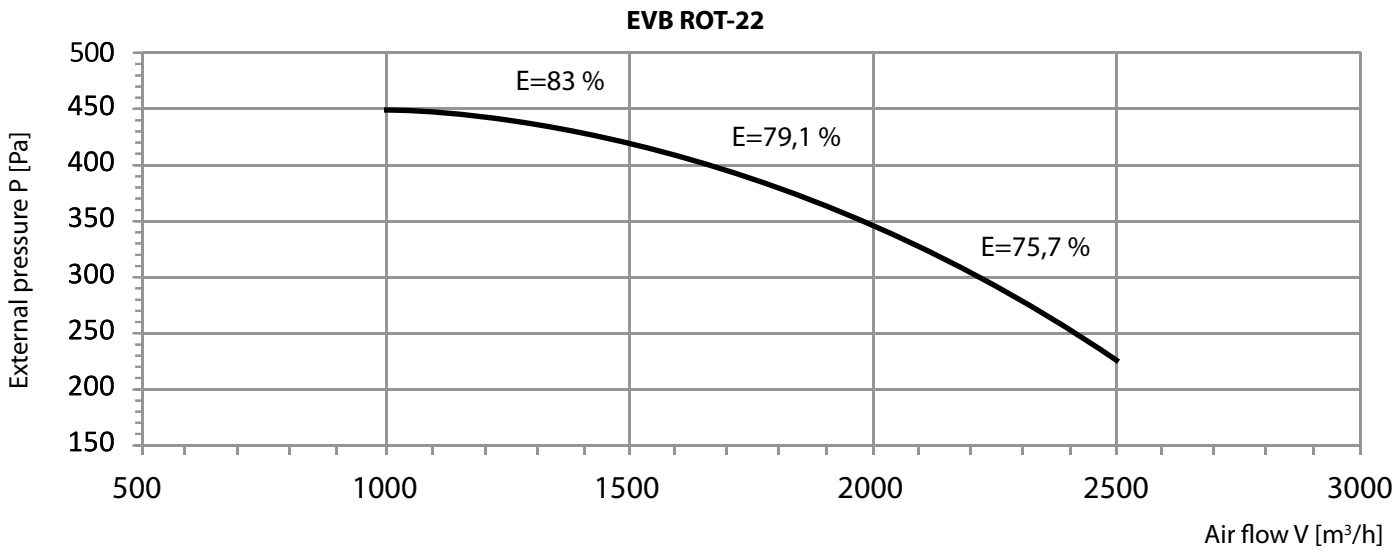
**Data given in the table are valid for the following parameters of air and water:**

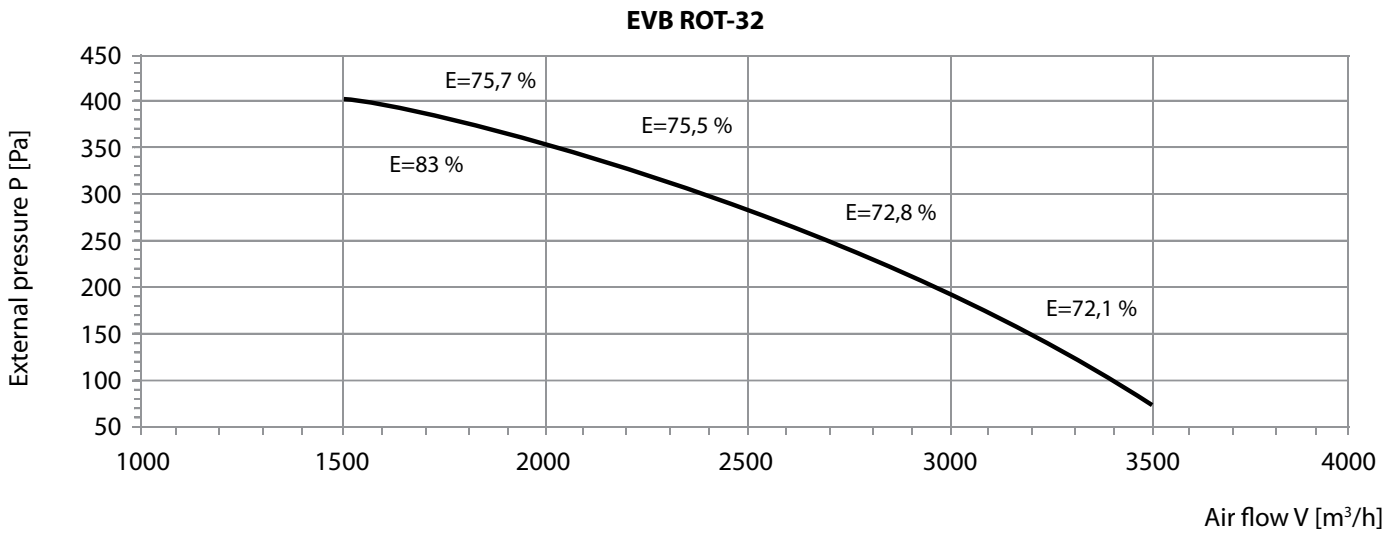
**Winter mode:** $T_{inlet}$ = -12°C, air humidity 80% (fresh air)
$T_{outlet}$ = 22°C, air humidity 30% (exhaust air)
Water temperature 80/60°C

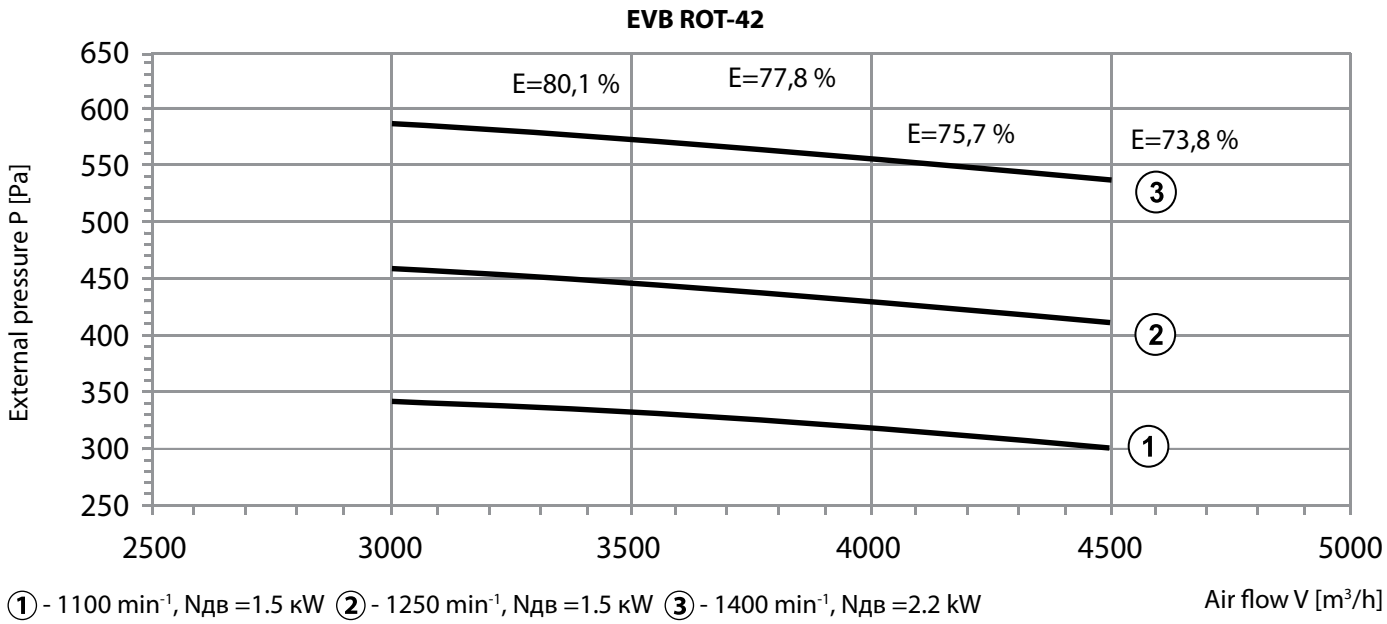
**Summer mode:** $T_{inlet}$ = 35°C, air humidity 30% (fresh air)
$T_{outlet}$ = 24°C, air humidity 40% (exhaust air)
Water temperature 7/12°C

**Note:** In case of parameters, different from the mentioned above, please, contact us.

## Aerodynamic characteristics and efficiency

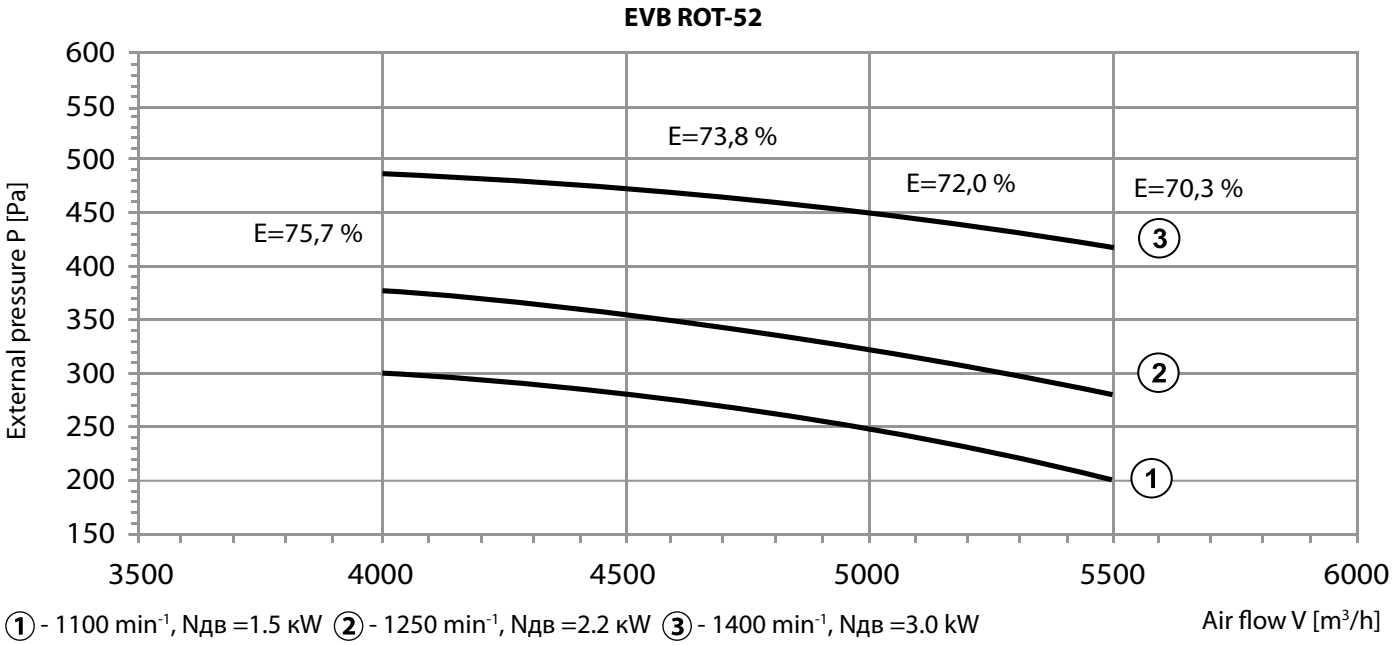


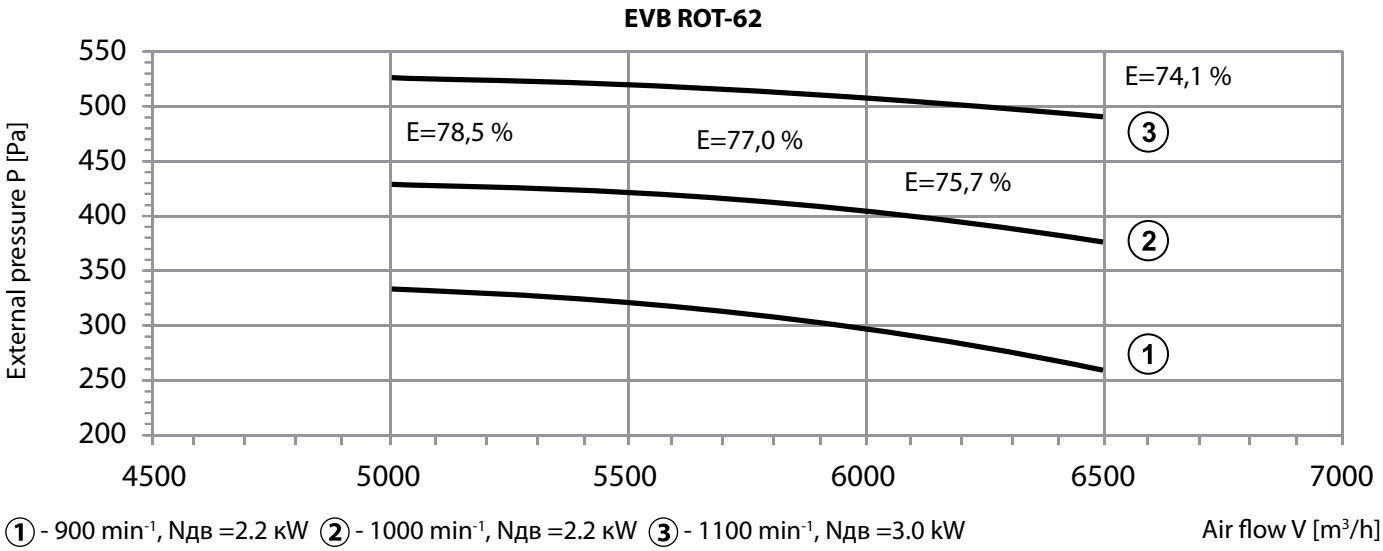




① - 1100 min$^{-1}$, Nдв =1.5 кW ② - 1250 min$^{-1}$, Nдв =1.5 кW ③ - 1400 min$^{-1}$, Nдв =2.2 kW

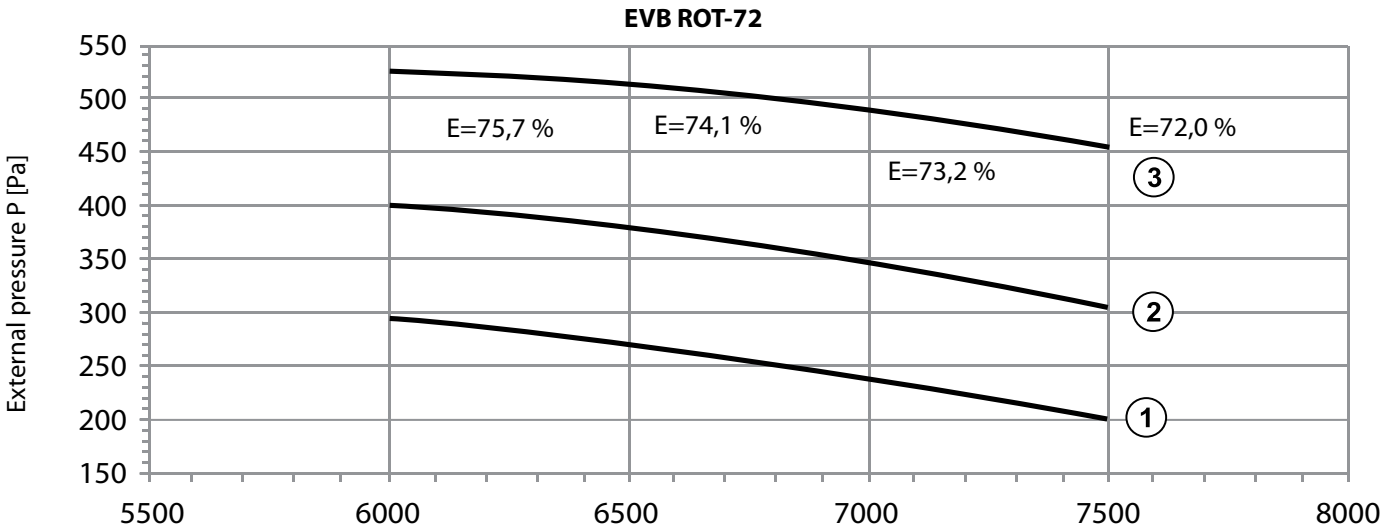
## Aerodynamic characteristics and efficiency




① - 1100 min$^{-1}$, Nдв =1.5 кW ② - 1250 min$^{-1}$, Nдв =2.2 кW ③ - 1400 min$^{-1}$, Nдв =3.0 kW




① - 900 min$^{-1}$, Nдв =2.2 кW ② - 1000 min$^{-1}$, Nдв =2.2 кW ③ - 1100 min$^{-1}$, Nдв =3.0 kW




① - 900 min$^{-1}$, Nдв =2.2 кW ② - 1000 min$^{-1}$, Nдв =3.0 кW ③ - 1100 min$^{-1}$, Nдв =3.0 kW

## Sound pressure level on frequency bands [dB]

| Model | | min$^{-1}$ | Hz | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | EVB ROT-22 | 1350 | Inlet | 49 | 56 | 63 | 66 | 64 | 57 | 56 | 45 |
| | | | Outlet | 48 | 57 | 65 | 71 | 75 | 74 | 72 | 63 |
| | | | Rad. | 48 | 52 | 55 | 54 | 52 | 45 | 42 | 32 |
| | EVB ROT-32 | 1350 | Inlet | 52 | 61 | 66 | 67 | 64 | 57 | 55 | 45 |
| | | | Outlet | 51 | 63 | 69 | 71 | 75 | 75 | 72 | 64 |
| | | | Rad. | 51 | 58 | 61 | 56 | 53 | 47 | 42 | 35 |
| 2 | EVB ROT- 42<br>EVB ROT- 52 | 1100 | Inlet | 68 | 68 | 70 | 69 | 69 | 62 | 54 | 47 |
| | | | Outlet | 68 | 70 | 73 | 74 | 81 | 80 | 71 | 64 |
| | | | Rad. | 66 | 61 | 62 | 56 | 56 | 50 | 42 | 34 |
| | | 1250 | Inlet | 70 | 70 | 72 | 71 | 71 | 64 | 56 | 49 |
| | | | Outlet | 70 | 72 | 75 | 76 | 83 | 82 | 73 | 66 |
| | | | Rad. | 68 | 63 | 64 | 58 | 58 | 52 | 44 | 36 |
| | | 1400 | Inlet | 72 | 72 | 74 | 73 | 75 | 69 | 58 | 51 |
| | | | Outlet | 72 | 74 | 77 | 78 | 85 | 87 | 75 | 68 |
| | | | Rad. | 70 | 65 | 66 | 60 | 58 | 57 | 46 | 38 |
| 3 | EVB ROT- 62<br>EVB ROT- 62 | 900 | Inlet | 69 | 67 | 69 | 68 | 67 | 61 | 54 | 42 |
| | | | Outlet | 69 | 69 | 72 | 72 | 77 | 77 | 67 | 60 |
| | | | Rad. | 67 | 60 | 61 | 55 | 52 | 46 | 40 | 30 |
| | | 1000 | Inlet | 70 | 68 | 70 | 69 | 68 | 62 | 55 | 43 |
| | | | Outlet | 70 | 70 | 73 | 73 | 78 | 78 | 68 | 61 |
| | | | Rad. | 68 | 61 | 62 | 56 | 53 | 47 | 42 | 32 |
| | | 1100 | Inlet | 75 | 73 | 75 | 74 | 73 | 68 | 60 | 48 |
| | | | Outlet | 75 | 75 | 78 | 78 | 83 | 83 | 73 | 66 |
| | | | Rad. | 72 | 65 | 63 | 61 | 58 | 55 | 47 | 39 |

**Note:** Measured in free field conditions at a distance 1,5 m.

## Options for control and automation

- Freeze protection;
- Torn belt differential presostat;
- Dirty filter differential presostat;
- Electric motor (actuator) for multiple leaf damper;
- 3-way valves for heating/ cooling water coils;
- Air temperature remote tracking;
- Power board for control and automation;
- Rotary heat exchanger automatic control system;
- Control and management systems - see section 7

## Supporting frame

Supporting frame is made of galvanized profiles with openings for lift up and transportation, drainage and etc. This is the base over which are assembled the separate sections of the heat recovery unit.

## Order designation

EVB ROT - 42 - 2

- 2 — Fan speed according to the graphics from the section
- 42 — Size
- ROT — Rotary regenerative heat exchanger
- EVB — Heat recovery unit