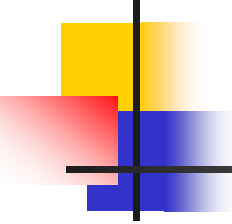


Demand Controlled Ventilation

Viljo Kaul
Termex OÜ



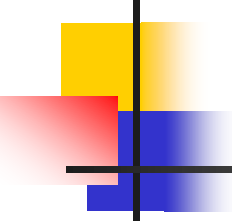
DCV

4 Conditions for ventilation

- heat recovery should be used
- EC motors should be used
- clean materials should be used
- rooms should be ventilated as much as necessary

Intake	Outside temp	Heat recovery	
14	-10	80,0%	
Inside temp.	Exhaust		
20	-4		

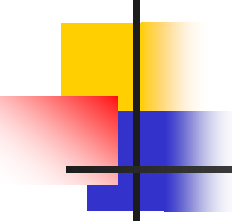
Intake	Outside temp	Heat recovery	
9	-10	63,3%	
Inside temp.	Exhaust		
20	1		



DCV

Heat exchanger

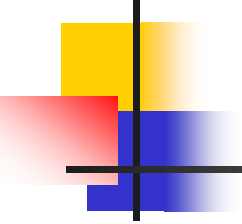
- Heat recovery over 75% is not real.
- Heat exchanger must be made of metal to condense the moisture.



DCV

4 Conditions for ventilation

- heat recovery should be used
- **EC motors should be used**
- clean materials should be used
- rooms should be ventilated as much as necessary

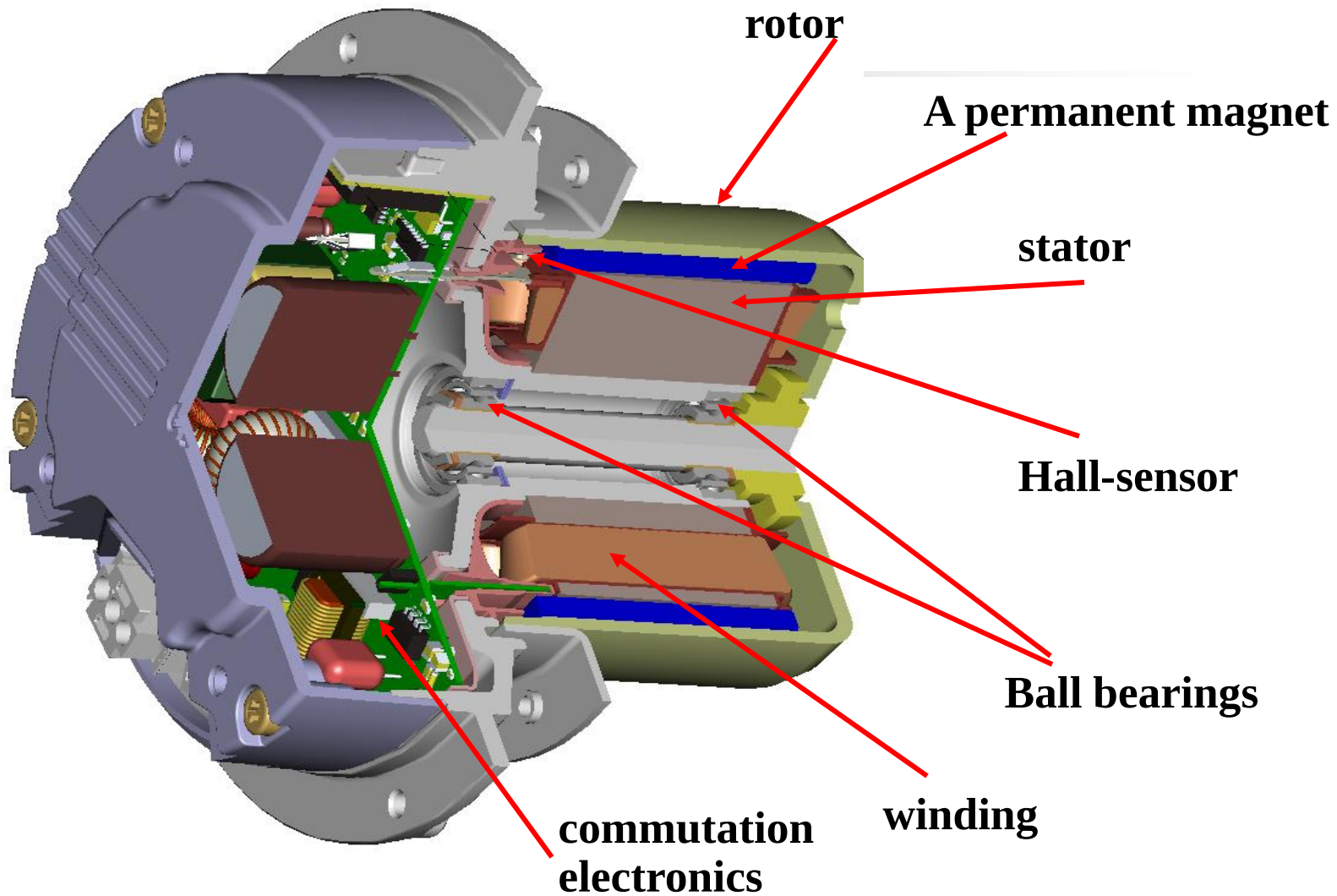


EC-motor

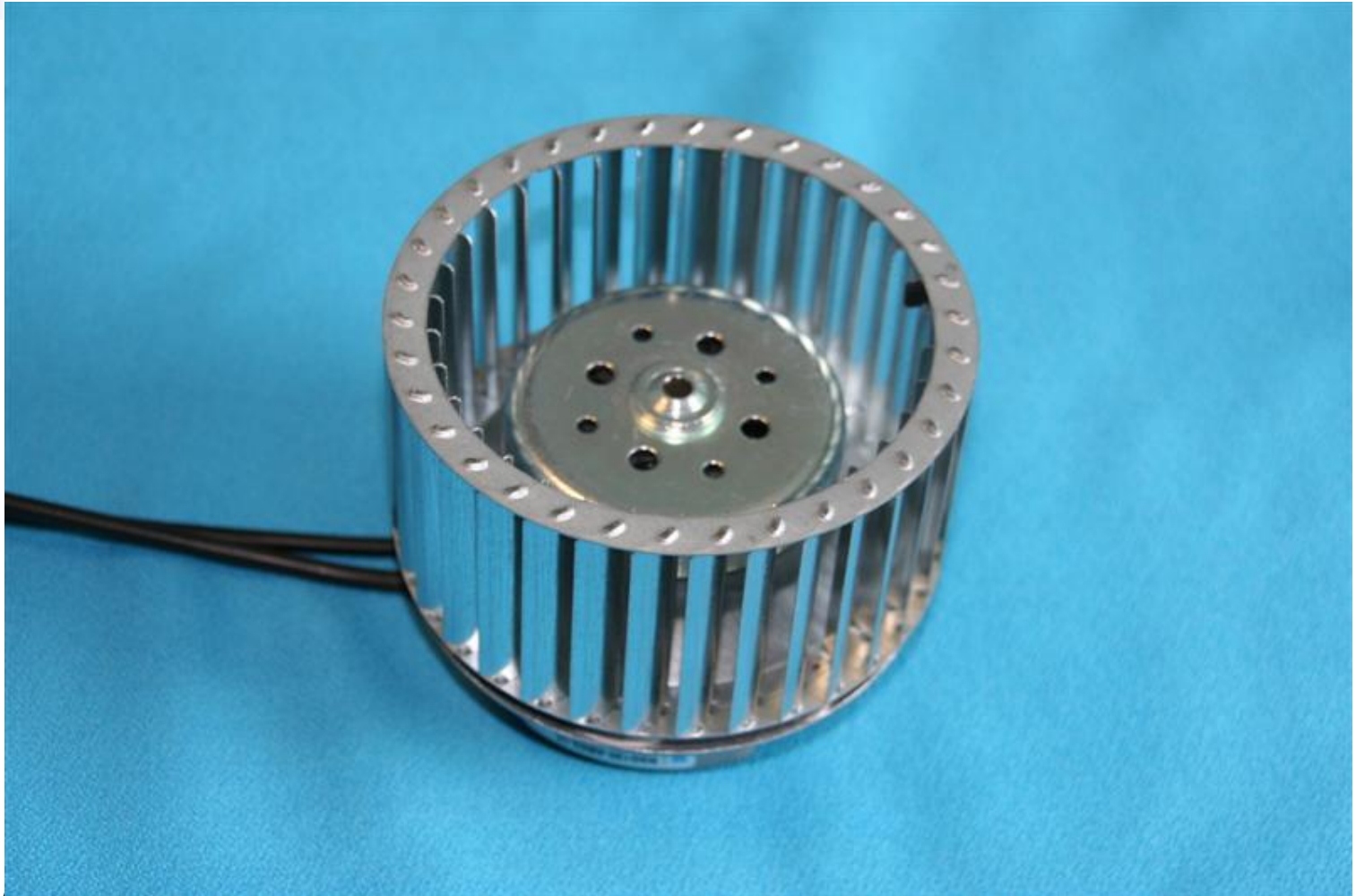
What is EC-motor?

Electronically Commutated (EC-motor)

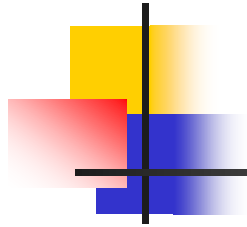
EC-motor



EC motors

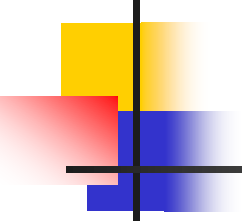


Energy consumption



M-WRG-S 2pcs.(from 2005a)			EC motor	
m ³ /h	W/h	kWh/a	€/kWh	€/a
2x60m ³ /h	24W	210	0,14	30
ParmairEX (1998a model) 230V,				
-120m ³ /h	2x115W	2015	0,14	282

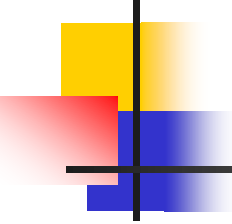
$282/30=9,4$ times bigger cost



DCV

4 Conditions for ventilation

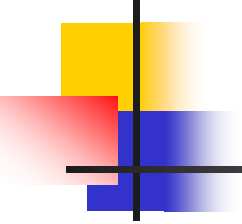
- heat recovery should be used
- EC motors should be used
- **clean materials should be used**
- rooms should be ventilated as much as necessary



DCV

4 Conditions for ventilation

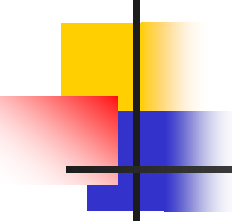
- heat recovery should be used
- EC motors should be used
- clean materials should be used
- **rooms should be ventilated as much as necessary**



DCV

- Ventilate as much as necessary
and as little as possible

•**DEMAND CONTROLLED VENTILATION**

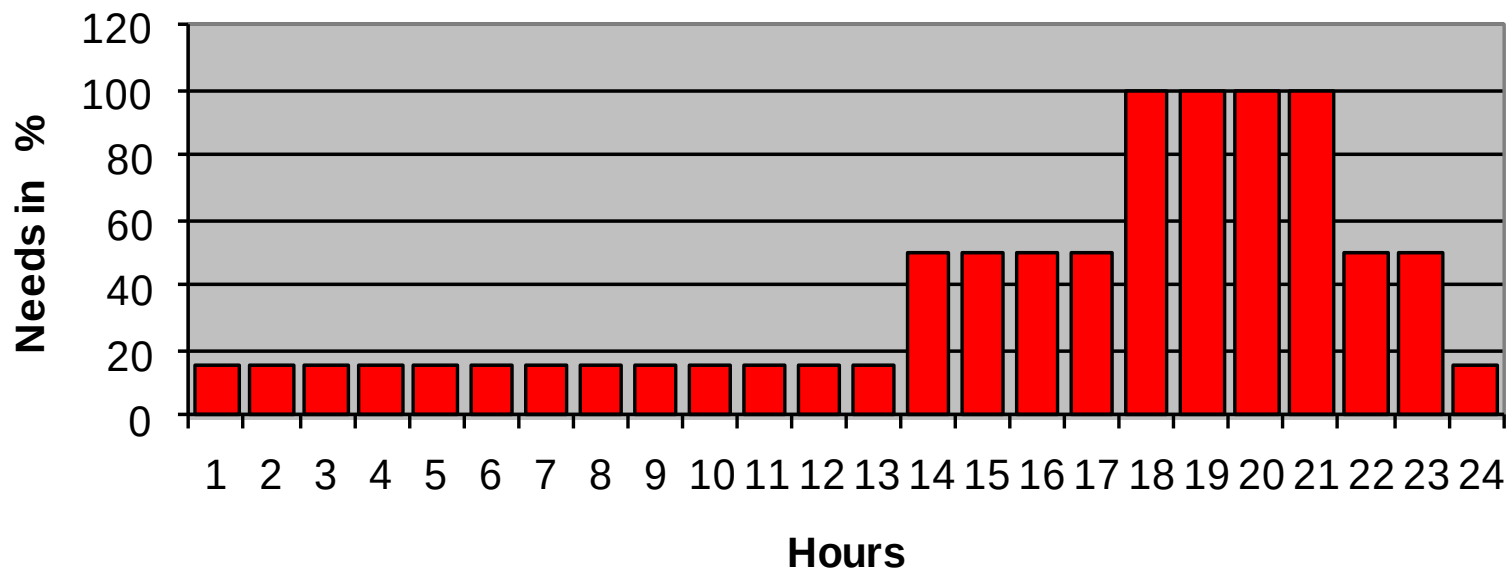


DCV

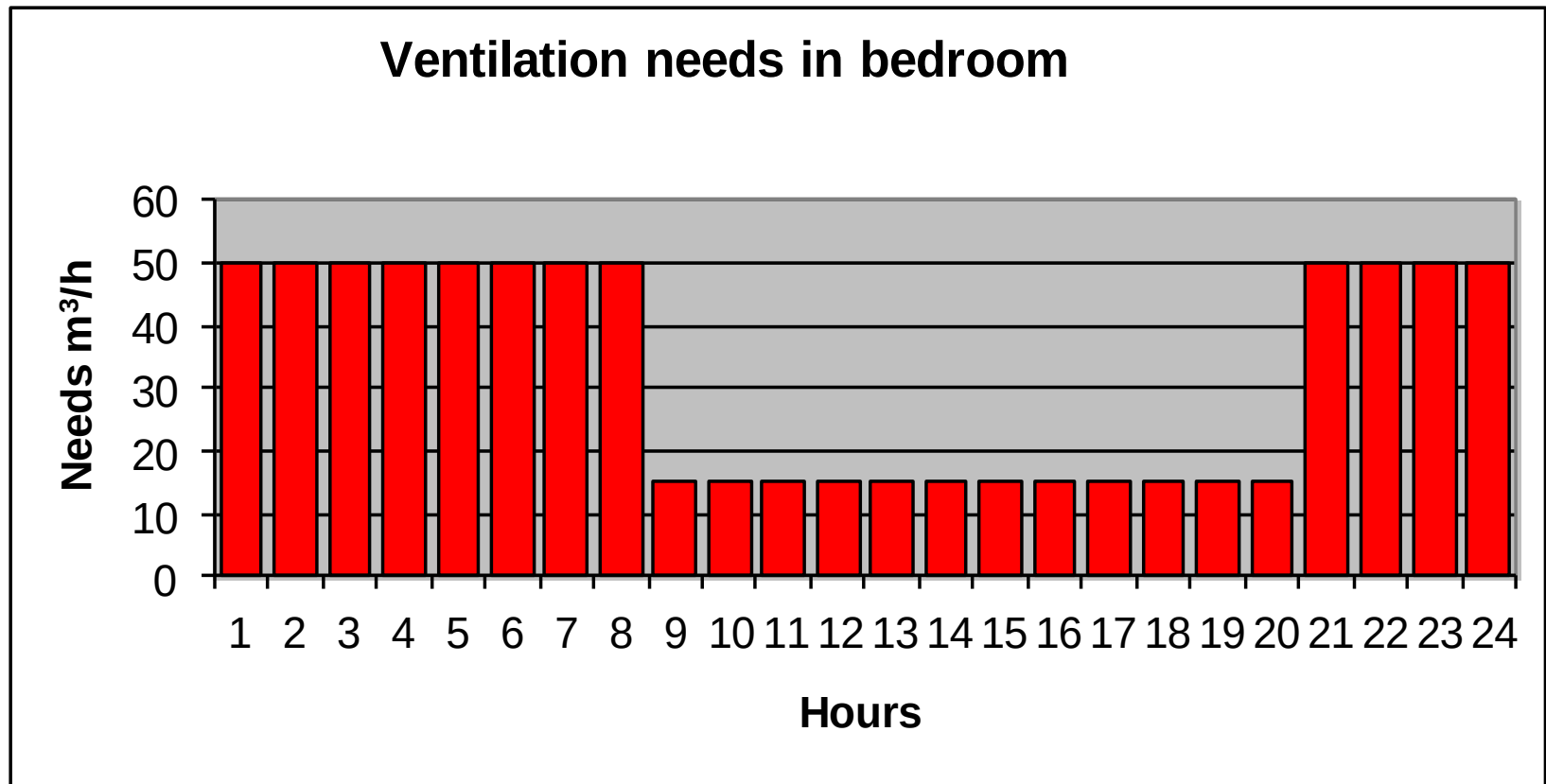
- Local Ventilation Control
according to the CO₂ concentration,
occupancy sensor or moisture sensor.

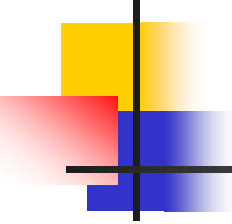
DCV

The needs in the living room



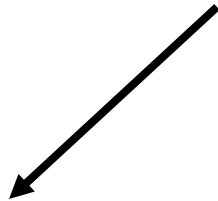
DCV



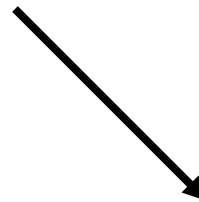


DCV

DCV



With heat recovery



Without heat recovery

DCV

DCV without heat recovery



2-speeds

-all the time $15\text{m}^3/\text{h}$
-according to sensors
 $60\text{m}^3/\text{h}$





DCV

DCV without heat recovery



3-speeds

- all the time in 1-st speed
- according to sensors up to $170\text{m}^3/\text{h}$



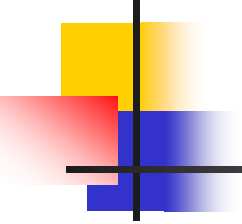
DCV

DCV without heat recovery



EC with pressure sensor



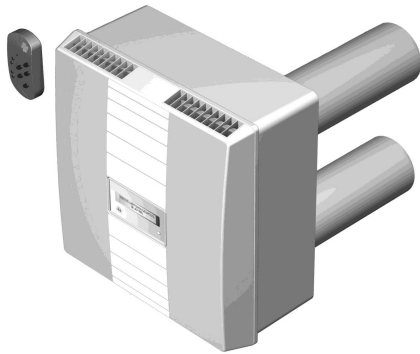


DCV with heat recovery

- Local units with heat recovery
- Central units with heatpumps

DCV with heat recovery

- Local units with heat recovery



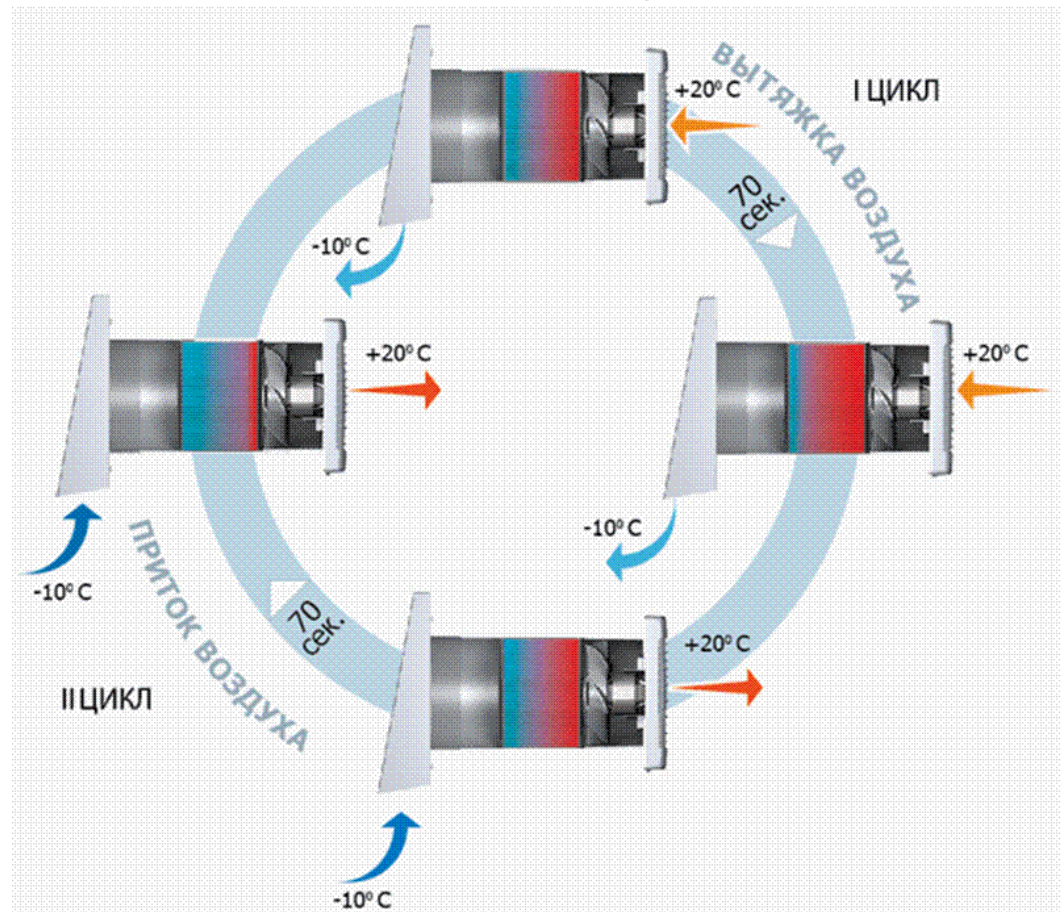
Meltem WRG



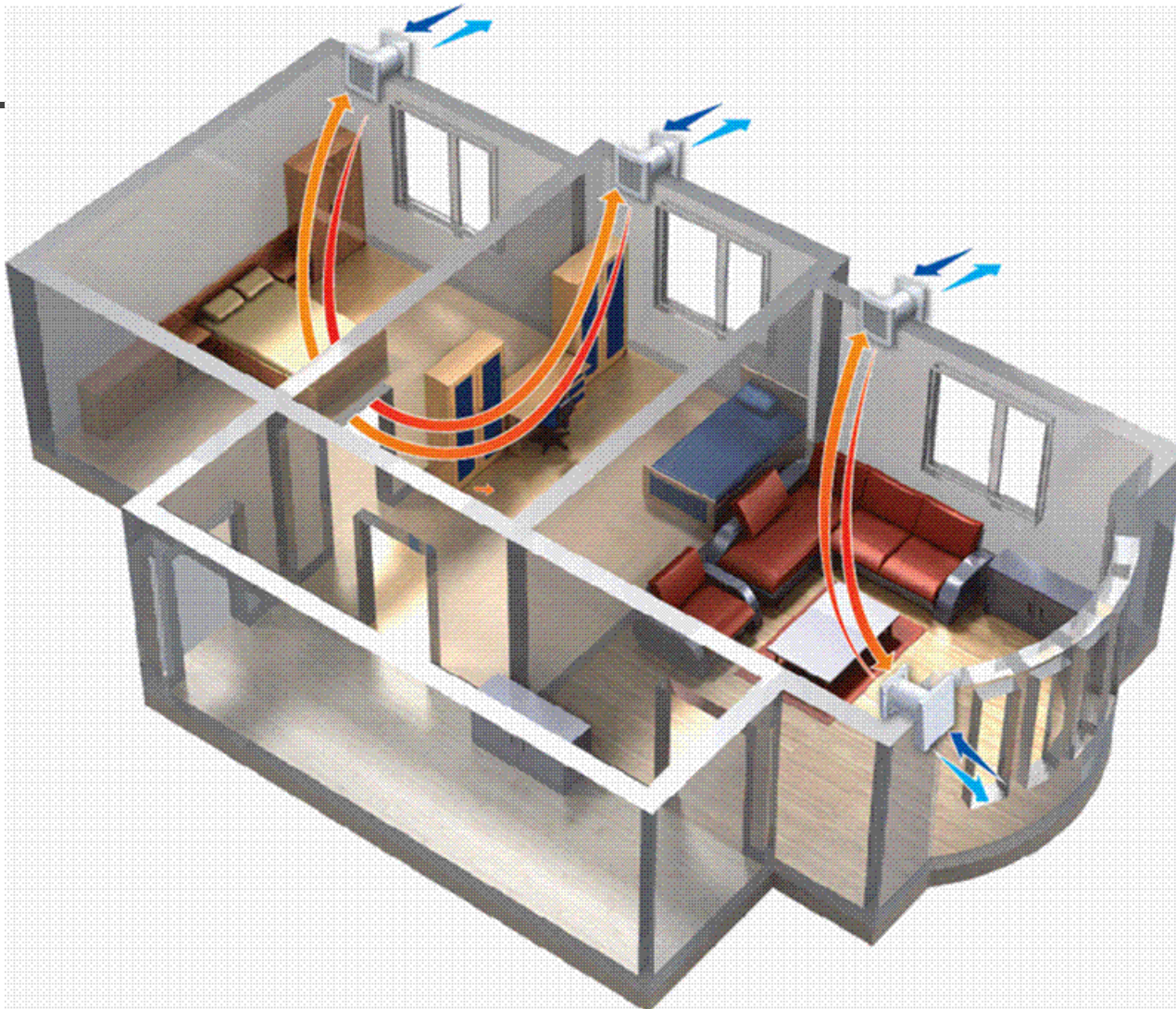
Twin-Fresh

Twin Fresh

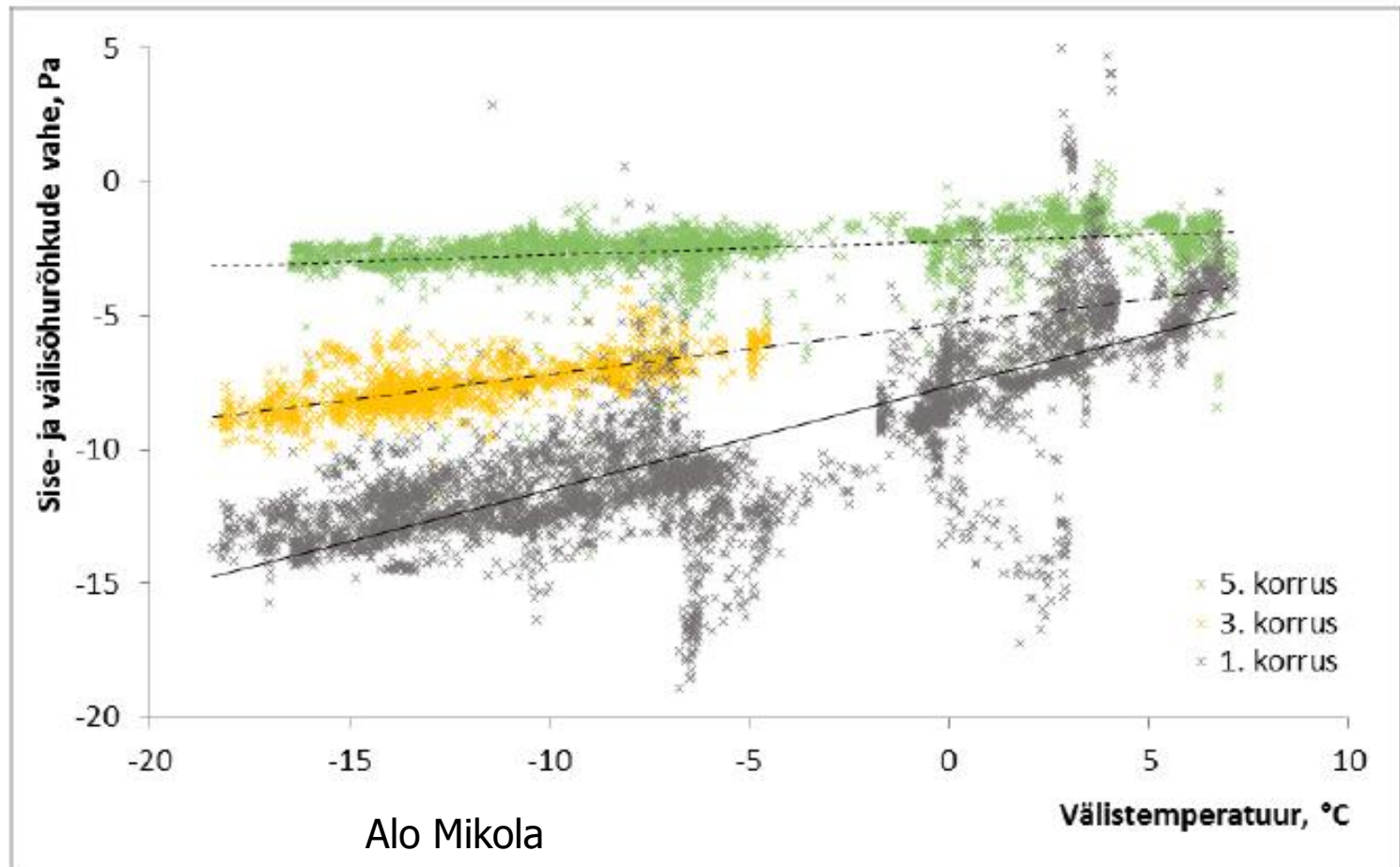
- Lokal units with heat recovery



Twin-fresh

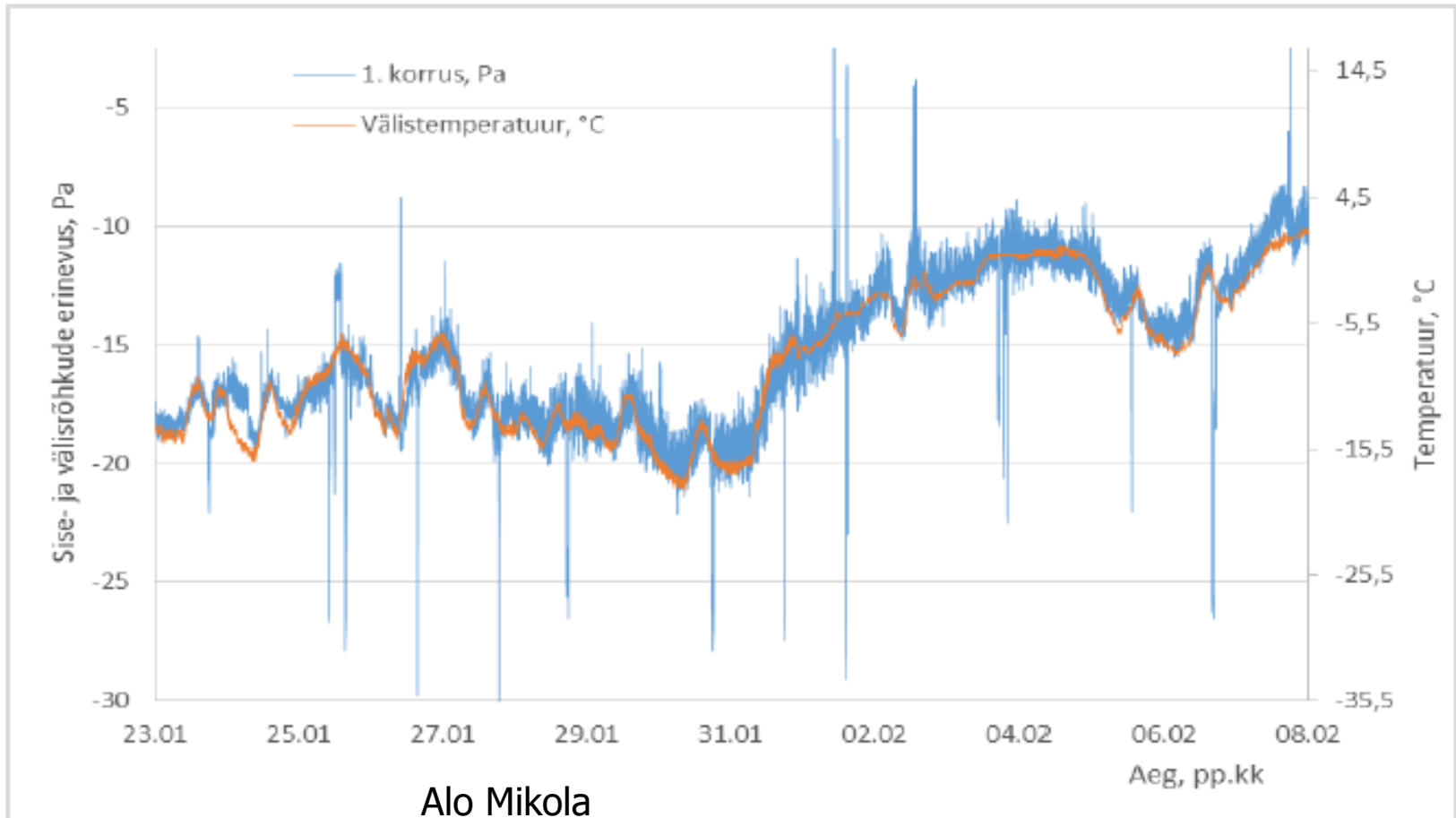


Tallinn University of Technology



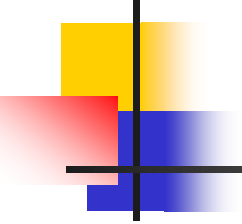
Alo Mikola

Tallinn University of Technology



Tallinn University of Technology

- With twin-fresh units air volumes is not guaranteed
- In apartment houses there could be overpressure on the highest floor and underpressure on the first floor
- Underpressure could be 20-30Pa, depends of the number of floors.
- If there is underpressure, there is no balance between supply and exhaust
- Without balance, heat recovery is not good
- Ventilators must be dimensioned right



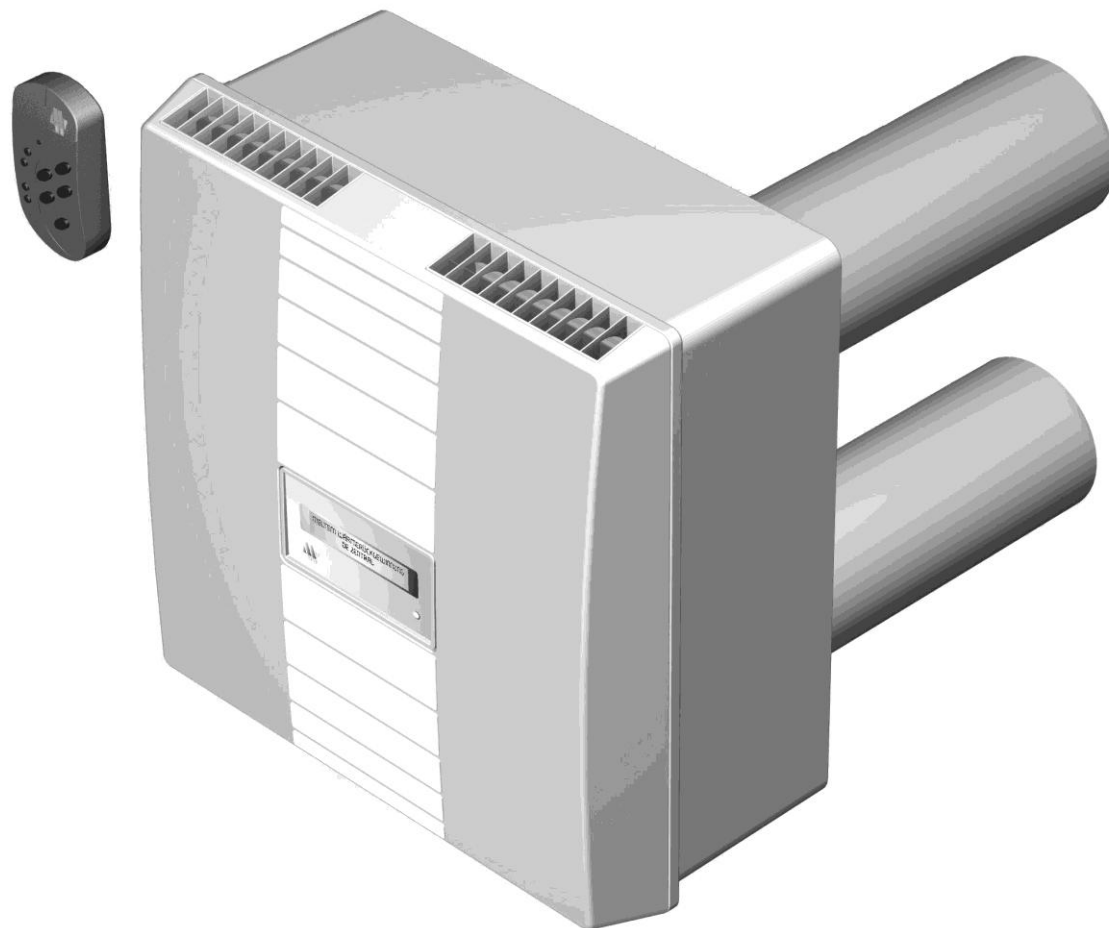
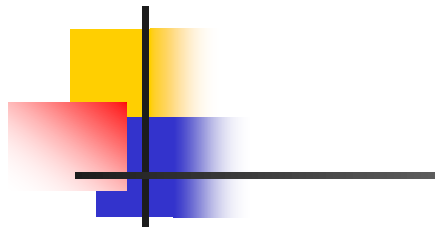
DCV with heat recovery

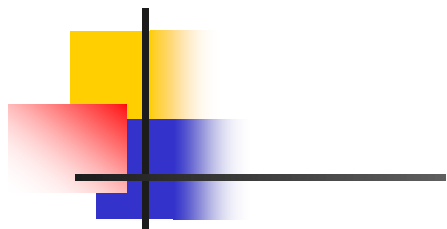
MELTEM

- Local units with heat recovery

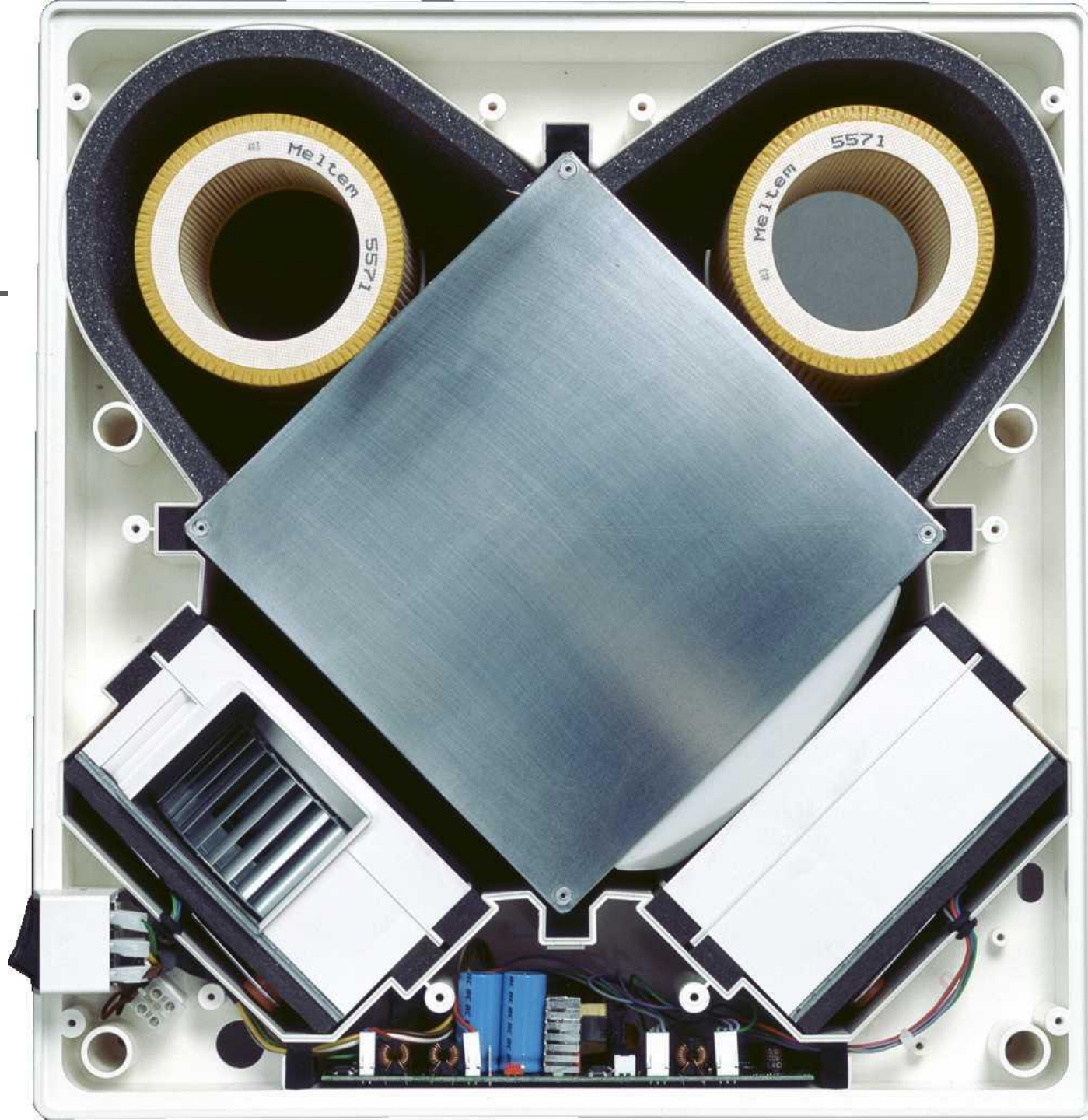


M-WRG-K/S



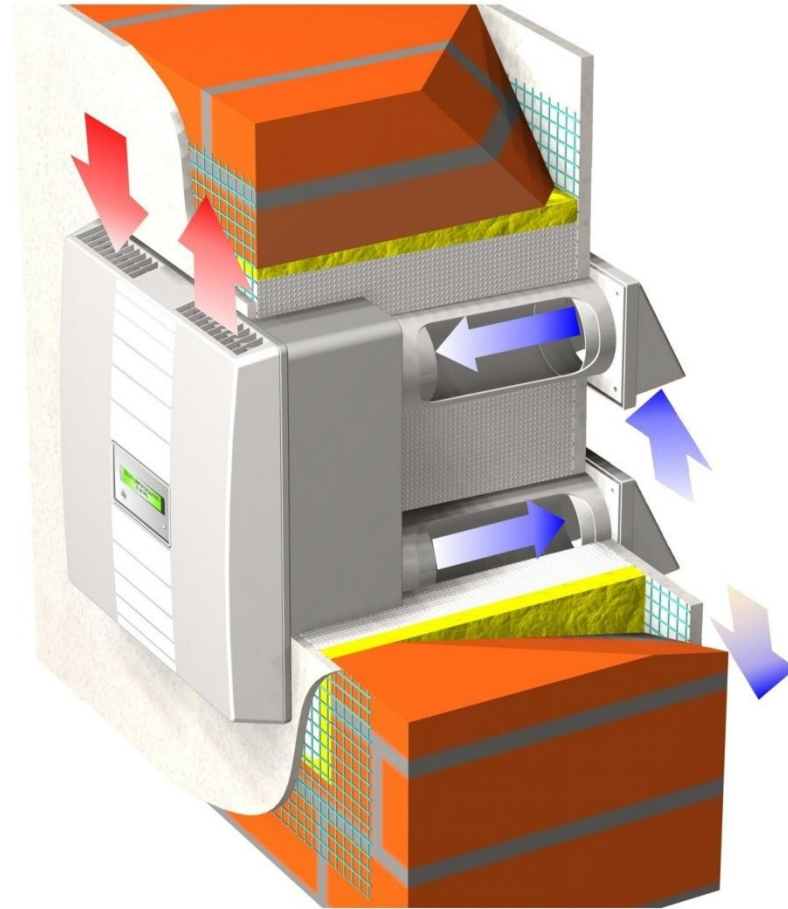


M-WRG-K/S



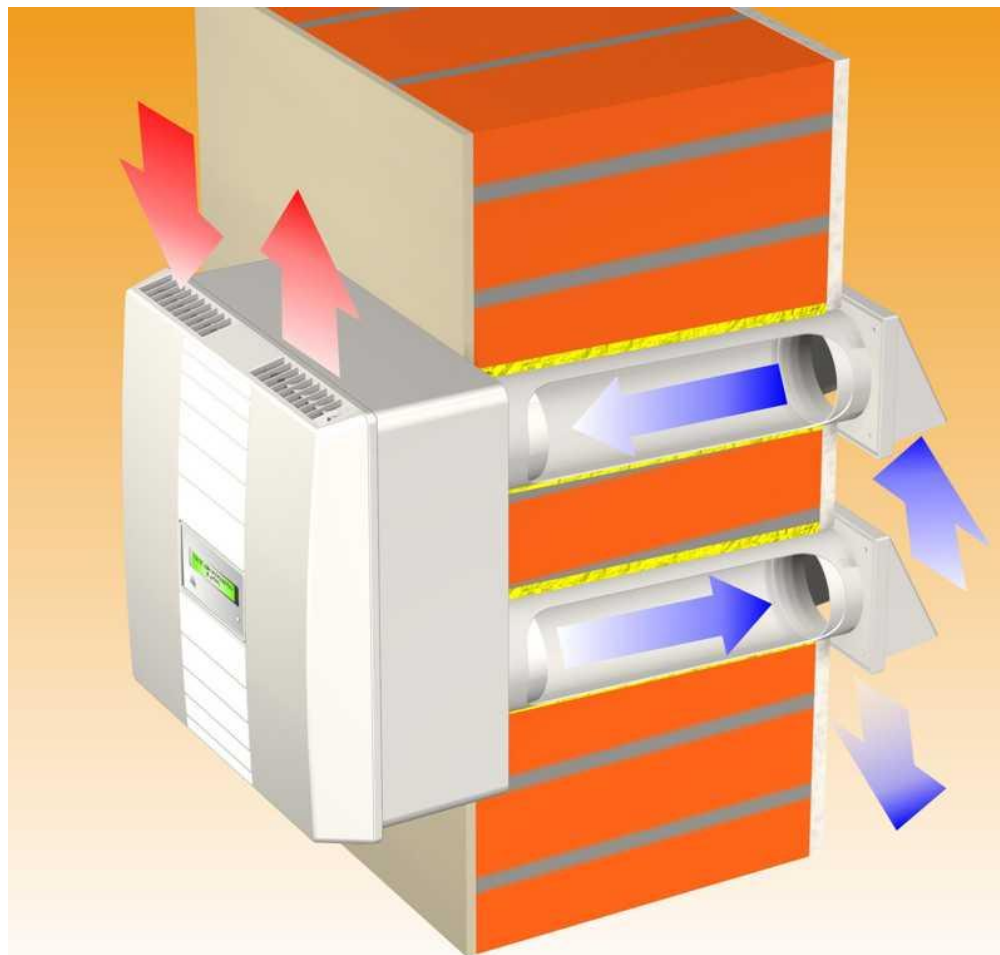
Installation options

Inside wall



Installation options

On the wall



Installation options

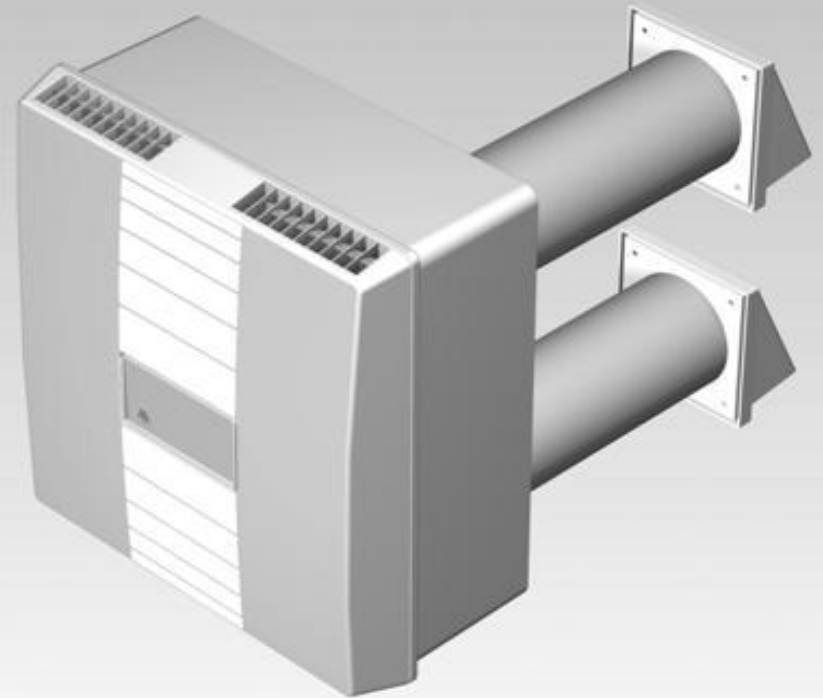
1. Lahendus



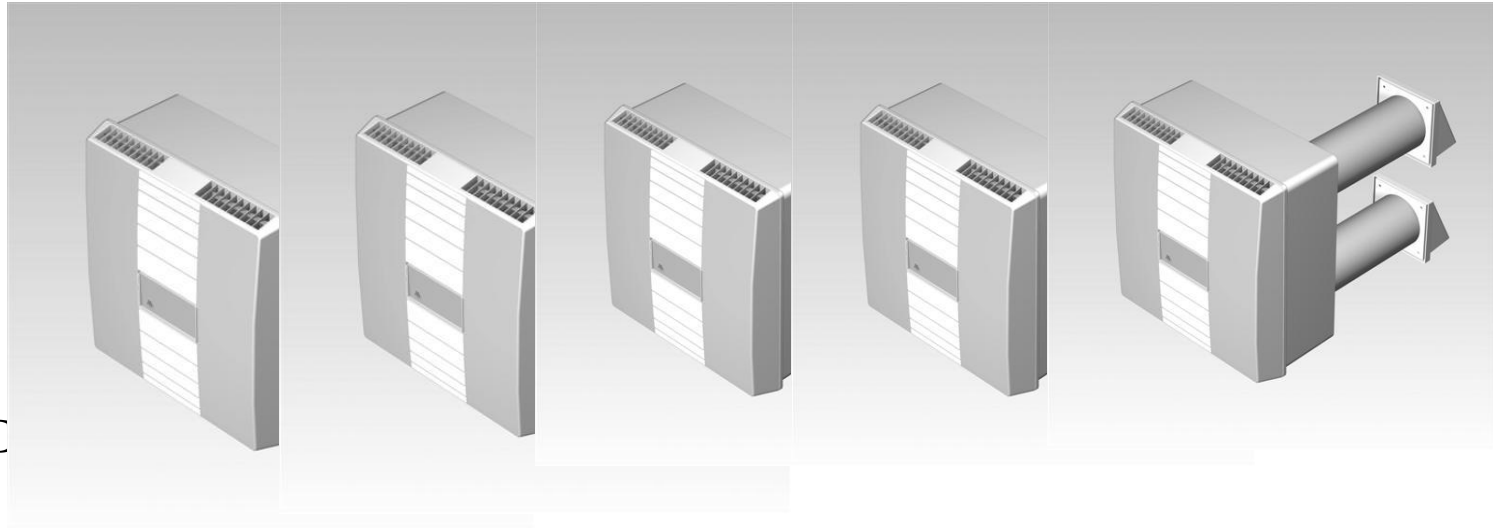
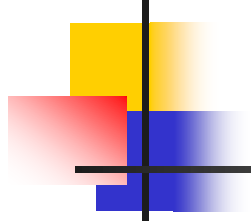
WRG-S/Z-A

One room

M-WRG-HBE/FC



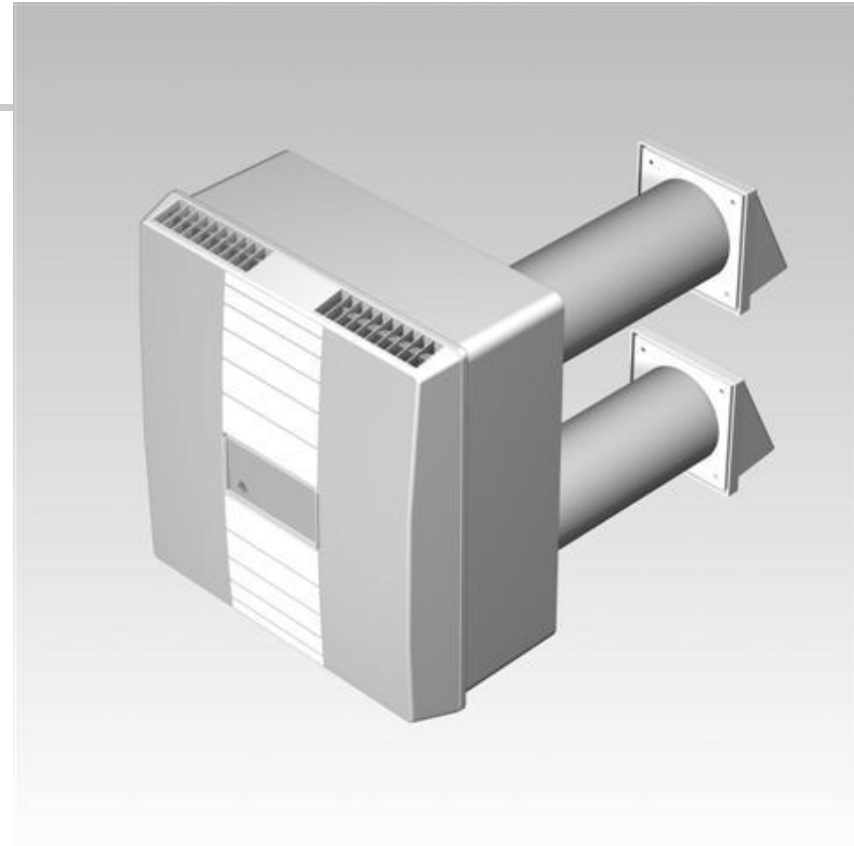
Classroom or kindergarten



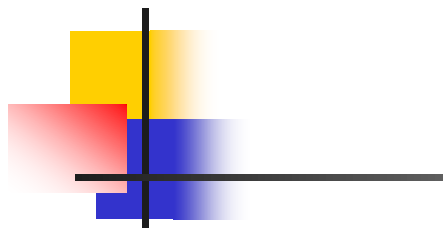
M-WRG-HBE/FC



WRG-S/BM



If there is no request from sensor 15 or 30m³/h
With sensor 60m³/h

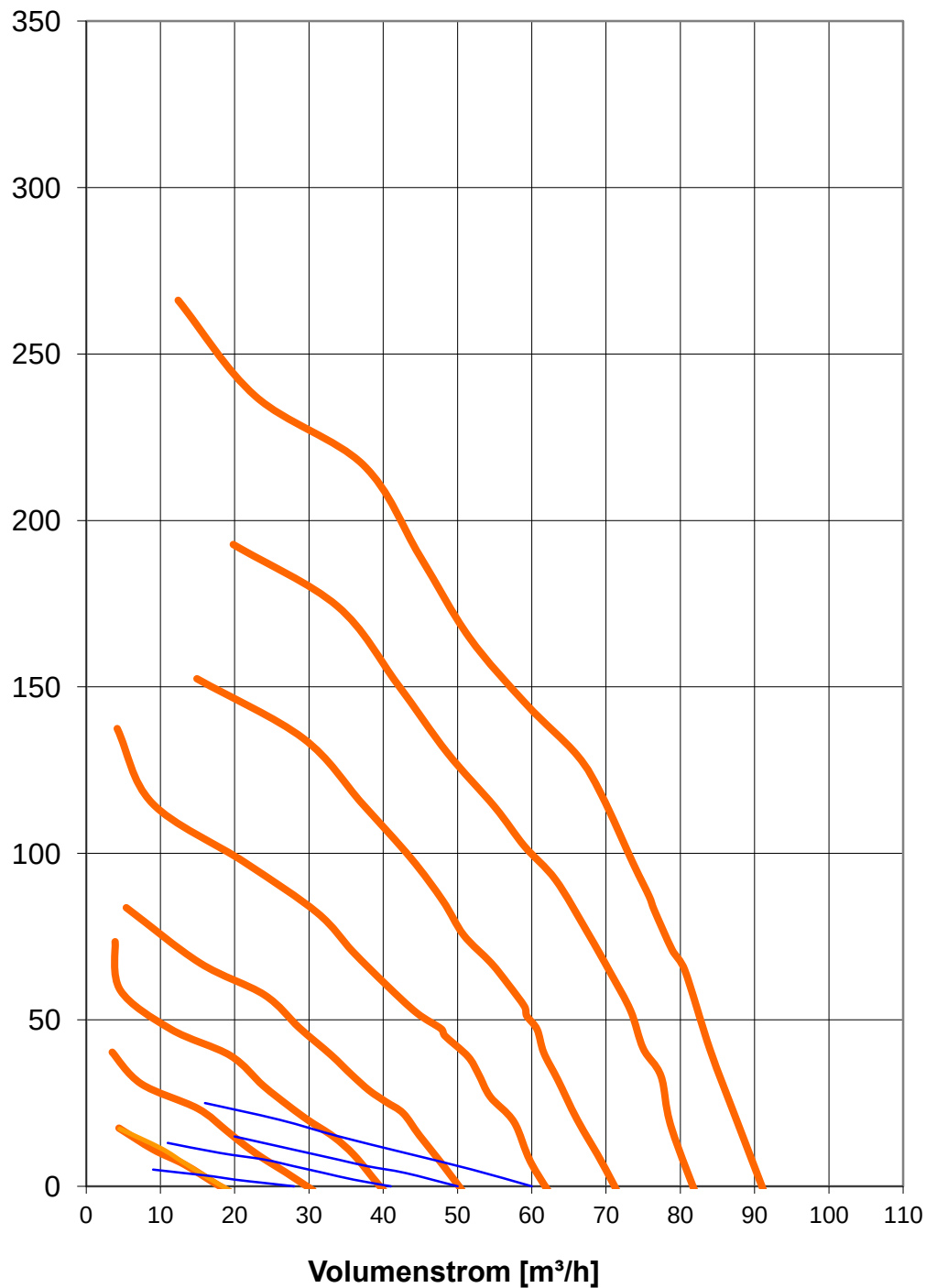


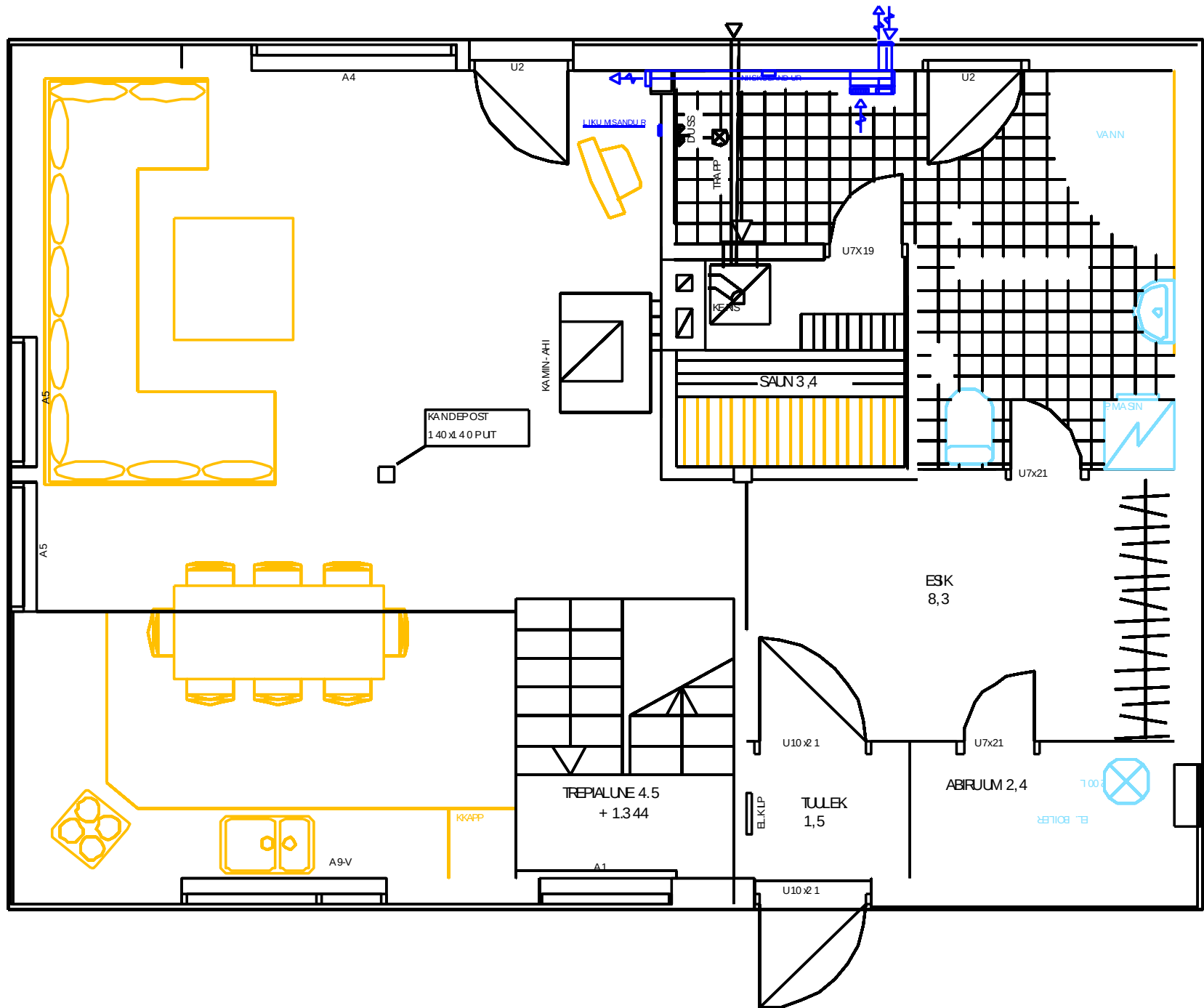
Meltem WRG

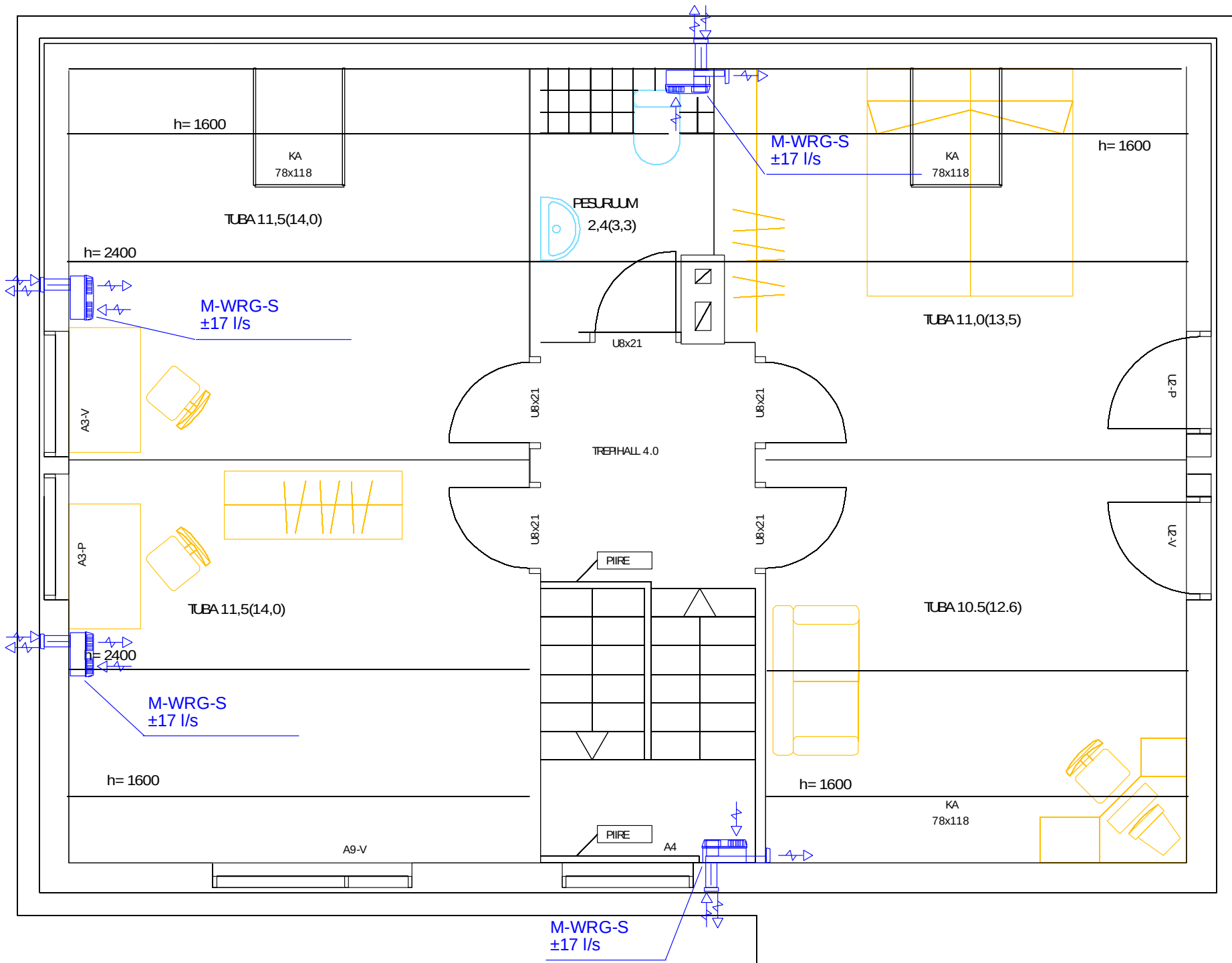


Inverter

stat. Druck [Pa]









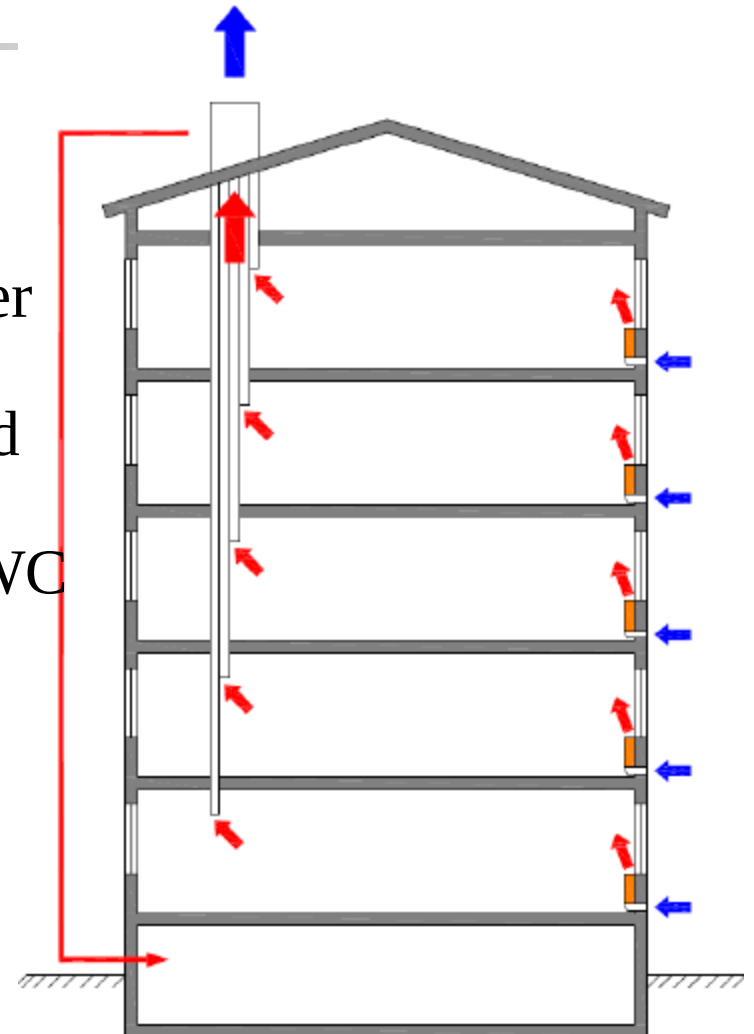






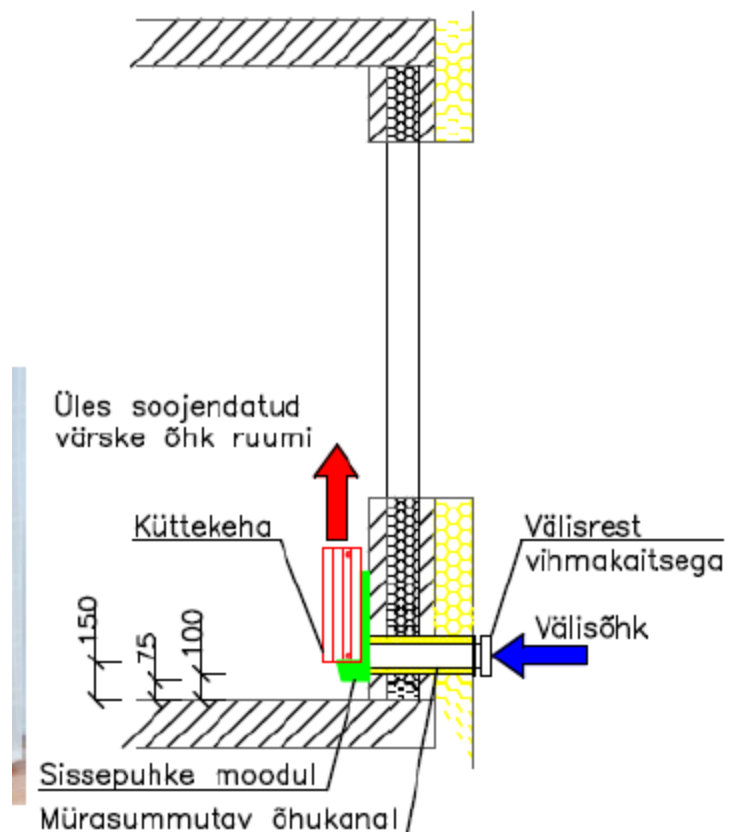
Exhaust air heatpump and fresh air radiator

- Heat-recovery 60-70% (warm water to heating reflow)
- Fresh-air radiators in bedrooms and livingrooms
- Exhaust from kitchen, bathroom, WC
- Heatpumps on roof or basement
- Good sealed exhaust ducts

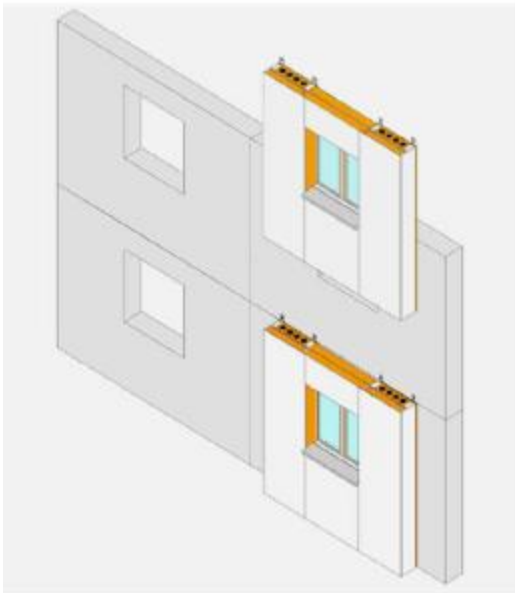


Prof. Jarek Kurnitski

Exhaust air heatpump and fresh air radiator



Experience from Finland



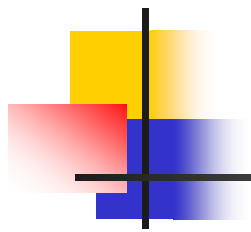
- A big central unit and supply ducts in insulation panel

Prof. Jarek Kurnitski

Experience from Finland



Prof. Jarek Kurnitski



Thanks for listening!

Questions?