

BROCHURE

Ecodesign Directive ErP 2016/2018
Ventilation units

What really matters



What is really important about (EU) regulation 1253/2014



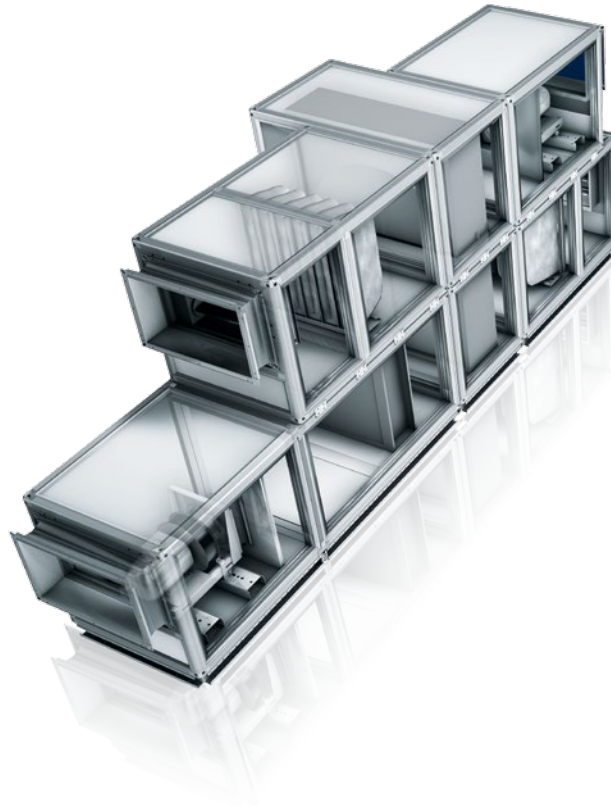
Environmentally friendly design

The European Ecodesign Directive 2009/125/EU (Energy-Related Products) defines minimum requirements on energy consumption-relevant products. With the help of the Directive, the consumption of electric energy as well as CO₂ emissions should be drastically reduced. In addition, the proportion of renewable energies or systems for heat recovery should be increased.

Within the scope of the Ecodesign Directive, the (EU) regulation 1253/2014 was adopted which describes an "environmentally friendly" design of HVAC units for living space and non-domestic ventilation equipment. From 1 January 2016, only products that conform to the requirements of the regulations may be sold on the European market.

All products from DencoHappel are to be classified as non-domestic ventilation equipment.

What must be considered?



Scope of validity

The Ecodesign Directive applies to HVAC units that replace consumed air with outdoor air in a building or building unit.

Spent air in a building arises mainly from the presence of persons and emissions caused by the use of machinery.

HVAC units for treating industrial or production emissions and removing heat loads do not fall under the scope of the Ecodesign Directive.

No blanket statements can be made about applications that apply as process air!

Applications must be examined case by case.

Exceptions:

HVAC units with the following properties are excluded from the scope of validity :

- Electrical power consumption <30 W (for each air stream)
- Fans and vapor exhaust hoods (Regulations 327/2011 and 66/2014)
- Units that are exclusively operated in explosive atmospheres (ATEX, Directive 94/9/EU)
- Emergency operation and short time periods (time period not defined, flue-gas venting, fire protection)
- Temperature range > 100 °C or < -40 °C (moving air)
- Operating temperature of the motor > 65 °C or < -40 °C
- Supply voltage > 1,000 V AC or > 1,500 V DC
- Special conditions at the installation site (toxic, extremely corrosive, combustible)
- Environment with abrasive materials
- HVAC unit for pure recirculated-air mode or with a circulatory air portion > 90%

Notice: Also after the Ecodesign Directive is effective, there is a need for discussion of the directive's scope of validity and the requirements on room-ventilation units.

With our collaboration in different professional associations, we are intensively engaged with the topic of the Ecodesign Directive for HVAC units and would gladly advise you!

Supply air – extract air

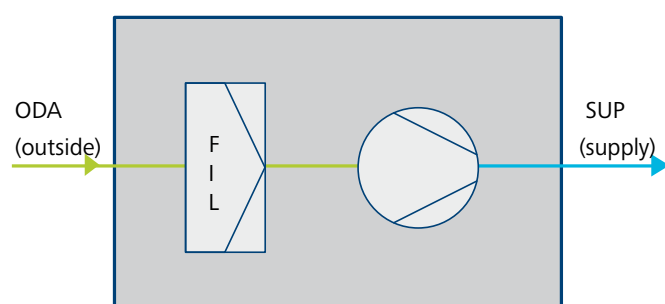
One-directional ventilation plant (ELA or UVU)

One directional ventilation plants are typically simple supply- or extract-air units. The delivery configuration of such units contains the casing, a filter, and a fan. Additional components such as heat transfer unit are designated as "non"-ventilating components.

The use of such units is only allowed if the mechanically generated air stream is balanced by using free ventilation from a window or from installed ventilation openings.

Ecodesign Directive valid from		2016	2018
Reference configuration			
Number	Air flow direction	1	1
	Fan	1	1
Filter classes	Outdoor air	F7	F7
	Extract air	M5	M5
Minimal requirements			
Fan efficiency	$P \leq 30 \text{ kW}$	$6.2 \% \cdot \ln(P[\text{kW}]) + 35.0 \%$	$6.2 \% \cdot \ln(P[\text{kW}]) + 42.0 \%$
	$P > 30 \text{ kW}$	56.1%	63.1 %
Internal specified fan power requirements SFP_{int_limit}	$W/(m^3/s)$	250	230
Fan speed regulation		required	required
Filter differential pressure monitoring		Not required	required

Reference configuration of the one direction ventilation equipment



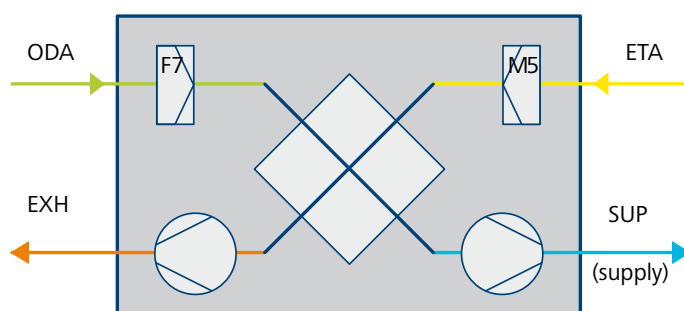
Supply air – extract air – outside air – exhaust air

Two-directional ventilation equipment (ZLA or BVU):

Two directional ventilation plants are typically HVAC units with supply- and extract-air function. The delivery configuration of such units contains the casing, a filter, and a fan for every air stream. Additional components such as heat exchangers are designated as "non-" ventilation components. These units are equipped with a performance-regulated heat/cold recovery (HCR).

Ecodesign Directive valid from		2016	2018
Reference configuration			
Number	Air direction	2	2
	Fans	2	2
Filter classes	Outdoor air	F7	F7
	Extract air	M5	M5
Heat recovery system		required	required
Minimal requirements			
Heat recovery efficiency (dry) η_k [%]	KVS	63	68
	other HCR systems	67	73
Internal spec. fan power SFP_{int_limit} [W/(m ³ /s)]	KVS	$q < 2 \text{ m}^3/\text{s}$	$1700 + E - 300 \times q / 2 - F$
		$q \geq 2 \text{ m}^3/\text{s}$	$1400 + E - F$
	other HCR systems	$q < 2 \text{ m}^3/\text{s}$	$1200 + E - 300 \times q / 2 - F$
		$q \geq 2 \text{ m}^3/\text{s}$	$900 + E - F$
Efficiency bonus E [W/(m ³ /s)]	KVS	$(\eta_k - 63) \times 30$	$(\eta_k - 68) \times 30$
	other HCR systems	$(\eta_k - 67) \times 30$	$(\eta_k - 73) \times 30$
Filter correction value F	Delivery configuration	0	0
	M5 filter is missing	160	150
	F7 filter is missing	200	190
	F7 + M5 filters are missing	360	340
Fan speed regulation		required	required
Filter differential pressure monitoring		Not required	required

Delivery configuration of the two-directional ventilation equipment



Look into the future 2018/2020



Summary

A look at the minimum requirements shows that starting in 2018, very high requirements will be placed on HVAC units and their components. A more in-depth consideration shows that according to today's state of technology, the requirements of the Ecodesign Directive with respect to SFP, HCR and fan efficiency result in technically more exacting HVAC units to conform with these high efficiency standards.

The EU Commission has moreover indicated it might apply an even more rigorous Ecodesign Directive for HVAC units starting in 2020. This conforms with the EU Directive 2010/31, which regulates the total energy efficiency of buildings and requires that all new buildings (public buildings from 2018) must be lowest-energy buildings by the end of 2020.

Practical consequences

The following example should clarify the impact of the Ecodesign Directive for HVAC units. Used as reference is a central air-handling unit with a heat recovery of 55 % and an air velocity of 2.2 m/s in the clear unit cross-section (version 2015).

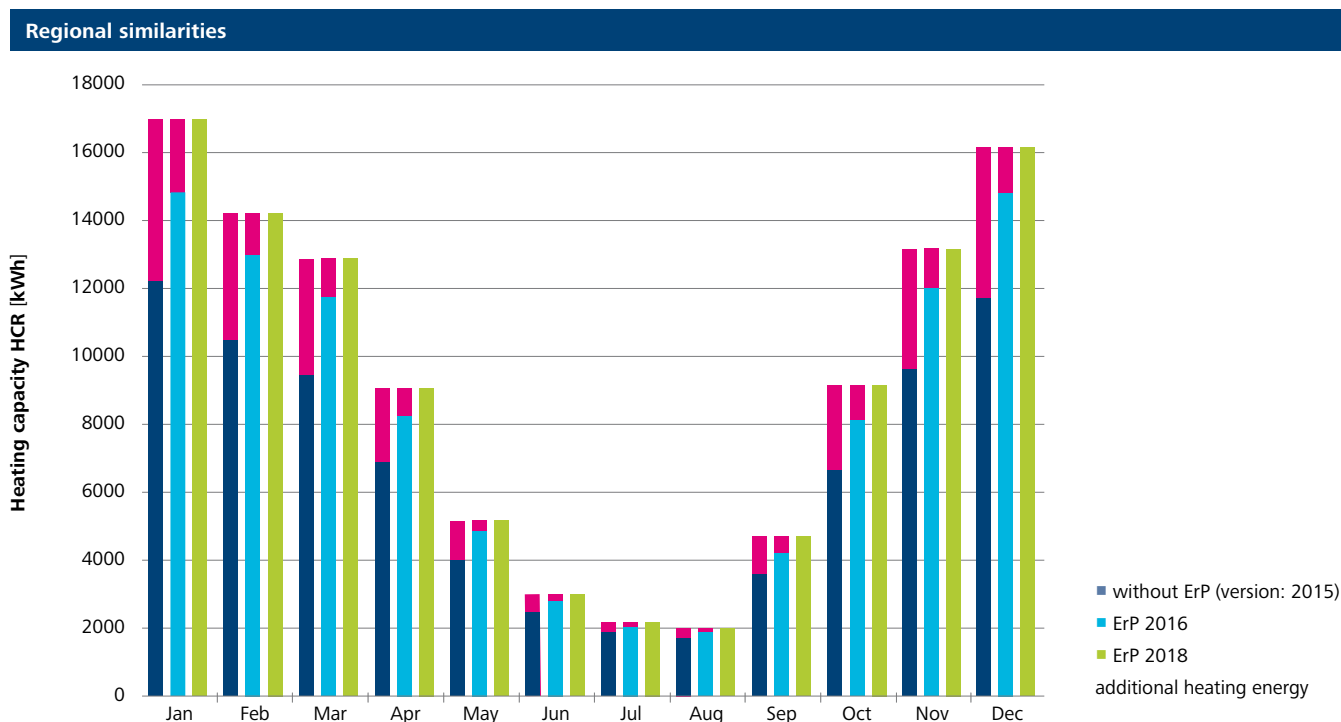
Basics of LCC calculation	
Unit location	Essen, Germany
Annual operating hours	4171
Annual heating hours	3606
Annual cooling hours	565
Volume flow (ABL=ZUL)	12,000 m ³ /h
Heat-recovery system	Plate heat exchangers
Electrical costs	0.15 €/kWh
Heating costs	0.06 €/kWh

ECODESIGN REQUIREMENTS

NON-DOMESTIC VENTILATION UNITS

The future trend

Ecodesign Directive valid from	2016	2018
Unit configuration		
Front air velocity	1.8 m/s	1.4 m/s
Heat recovery efficiency	68 %	75 %
Footprint (set-up area)	39 %	48 %
Weight	39 %	70 %
Energy consumption		
Heating capacity	-42 %	-64 %
Cooling capacity	-2 %	-4 %
Fan Power	-4 %	-15 %
Lifecycle costs		
Investment costs	25 %	57 %
Annuity of the energy costs	-19 %	-33 %
Annuity of the capital costs	25 %	57 %
Total annuity	-14 %	-24 %
Amortisation	1.9 years	2.7 years



The values from the example reflect the future trend. HVAC units will require more space in order to comply with the requirements of the Ecodesign Directive. Similarly, higher investment effort and expense must be expected since technically complex solutions will be required.

DencoHappel is a global company with expertise in air treatment, air conditioning and air filtration.

Our nearest sales and service teams will be glad to discuss ideas and develop creative and effective solutions with you.

