

Ecodesign Lot 6

Residential and non-residential
air handling units



What is ErP and Ecodesign?

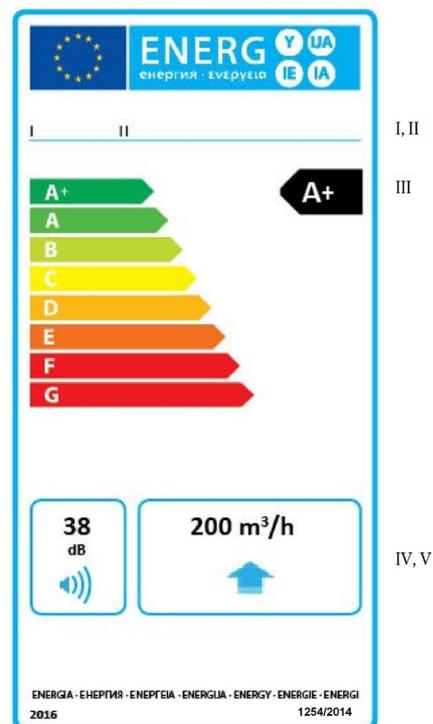
ErP stands for “Energy Related Products”. ErP is supported by Ecodesign Directive (2009/125/EC), which is aiming towards significant reduction of greenhouse gas emissions and overall energy consumption by the year 2020. While supporting efficient use of energy and energy related products and phasing out inefficient products, the Ecodesign Directive also makes energy information and data about energy-efficient products more transparent and easy accessible for consumers.

The implementation of the Ecodesign Directive is split into a number of product areas, called “lots”, focusing especially on the areas with significant energy consumption. Ventilation units are included in Ecodesign Lot 6, concerning ventilation, heating and air conditioning, an area, which represents about 15% of the total energy consumption in the EU.

Classification of air handling units

Ventilation units are classified either as “Residential Ventilation Units” (RVU) or “Non-Residential Ventilation Units” (NRVU). Residential units according to regulation 1254/2014 must be marked with a special energy efficiency label, providing the following information:

- a) supplier's name or trade mark;
- b) supplier's model identifier i.e. the code, usually alphanumeric, used to distinguish a specific residential ventilation unit model from other models with the same trade mark or supplier's name;
- c) specific energy consumption (SEC) in kWh/(m².a) for each applicable climate zone and SEC class;
- d) declared typology in accordance with Article 2 of this Regulation (unidirectional or bidirectional);
- e) type of drive installed or intended to be installed (multi-speed drive or variable speed drive);
- f) type of heat recovery system (recuperative, regenerative, none);
- g) thermal efficiency of heat recovery (in % or ‘not applicable’ if the product has no heat recovery system);
- h) maximum flow rate in m³/h;
- i) electric power input of the fan drive, including any motor control equipment, at maximum flow rate (W);
- j) sound power level (LWA), rounded to the nearest integer;
- k) reference flow rate in m³/s;
- l) reference pressure difference in Pa;
- m) SPI in W/(m³/h);
- n) control factor and control typology in accordance with the relevant definitions and classification in Annex VIII Table 1;
- o) declared maximum internal and external leakage rates (%) for bidirectional ventilation units or carry over (for regenerative heat exchangers only), and external leakage rates (%) for ducted unidirectional ventilation units;
- p) mixing rate of non-ducted bidirectional ventilation units not intended to be equipped with one duct connection on either supply or extract air side;
- q) position and description of visual filter warning for RVUs intended for use with filters, including text pointing out the importance of regular filter changes for performance and energy efficiency of the unit;
- r) for unidirectional ventilation systems, instructions to install regulated supply/exhaust grilles in the façade for natural air supply/extraction;
- s) internet address for pre-/dis-assembly instructions;
- t) for non-ducted units only: the airflow sensitivity to pressure variations at + 20 Pa and – 20 Pa;
- u) for non-ducted units only: the indoor/outdoor air tightness in m³/h;
- v) the annual electricity consumption (AEC) (in kWh electricity/a);
- w) the annual heating saved (AHS) (in kWh primary energy/a) for each type of climate (‘average’, ‘warm’, ‘cold’). 25.11.2014 L 337/39 Official Journal of the European Union EN.”



The energy labelling is not mandatory for non-residential units. However, it may be still relevant as hallmark for high-quality products, similar to the Eurovent certification, which guarantees the performance of units according to product specifications.

Residential ventilation units (RVU)

definition:

- a) the maximum flow rate does not exceed 250 m³/h;
- b) the maximum flow rate is between 250 and 1000 m³/h and the manufacturer declares the unit is intended to be used exclusively for a residential ventilation application.

Non-residential ventilation unit (NRVU) definition:

- a) the maximum flow rate of the ventilation unit exceeds 250 m³/h,
- b) where the maximum flow rate is between 250 and 1000 m³/h, the manufacturer has not declared the unit to be used exclusively for a residential ventilation application.

Non-residential air handling units

Energy efficiency acc. to ErP directive for non-residential ventilation units

ErP-Stage			January 2018 ErP-2018
Heat recovery system (HRS) BVU with thermal by-pass			required
HRS BVU minimum thermal efficiency of heat recovery η [%]	Run-around coil system		68
	Plate heat exchangers, rotary heat exchanger		73
Filter differential pressure monitoring			required
Minimum fan efficiencies UVU η_{sys} [%]	$P_{sys} \leq 30$ kW		$6.2 \times \ln(P_{sys}) + 42$
	$P_{sys} > 30$ kW		63.1
Variable speed drive for fans			required
Internal SFP-Value ⁽³⁾ reference configuration [W/(m ³ /s)]	BVU ⁽¹⁾		
	Run-around coil system	$q_{nom} < 2$ m ³ /s	$1,600+E-300 \times q_{nom}/2-F$
		$q_{nom} \geq 2$ m ³ /s	$1,300+E-F$
	Plate heat exchangers, rotary heat exchanger, miscellaneous	$q_{nom} < 2$ m ³ /s	$1,100+E-300 \times q_{nom}/2-F$
		$q_{nom} \geq 2$ m ³ /s	$800+E-F$
UVU ⁽²⁾		230	
HRS-Efficiency bonus E [W/(m ³ /s)] ⁽⁴⁾	Run-aroundcoil system		$(\eta-0,68) \times 3,000$
	Plate heat exchangers, rotary heat exchanger		$(\eta-0,73) \times 3,000$
Filter correction value F [W/(m ³ /s)] ⁽⁵⁾	Reference configuration		0
	Filter M5 is missing		150
	Filter F7 is missing		190
	Filters M5 + F7 are missing		360

(1)... "bidirectional ventilation unit" (BVU) means a ventilation unit which produces an air flow between indoors and outdoors and is equipped with both exhaust and supply fans

(2)... "unidirectional ventilation unit" (UVU) means a ventilation unit producing an air flow in one direction only, either from indoors to outdoors (exhaust) or from outdoors to indoors (supply), where the mechanically produced air flow is balanced by natural air supply or exhaust

(3)... "internal specific fan power of ventilation components (SFPint)" (W/(m³/s)) is the ratio between the internal pressure drop of ventilation components and the fan efficiency

(4)... "efficiency bonus (E) " is a correction factor taking account of the fact that more efficient heat recovery causes more pressure drops requiring more specific fan power;

(5)... "filter correction (F)" (Pa) is a correction value to be applied if a unit deviates from the reference configuration of a BVU

Lindab air handling units selection made easy

The new energy check is implemented into our selection software AirCalc++, as all air handling units, produced for European Market have to fulfill ErP2018 requirements from 1st January 2018.

Air handling units energy efficiency check

After AHU calculation the indication "ErP 2018 ready" appears on the top of drawing mask (see below). By clicking on the ErP icon a new window with detailed results appears. Calculation is done according to the requirements in the table on page 3.

Type of unit		EURO
Non Residential unit		EURO
ErP 2018 Ready		A
Details		
Non Residential unit		
Calculation valid		Yes
ErP Ready 2016		Yes
ErP Ready note 2016		-
ErP Ready 2018		Yes
ErP Ready note 2018		-
specific fan power internal	W/(m ³ /s)	559
maximal specific fan power internal 2016	W/(m ³ /s)	907
maximal specific fan power internal 2018	W/(m ³ /s)	637
effective electric power input	kW	7.45
Control unit input power	W	
Reference flow rate	m ³ /h	24.000
thermal efficiency	%	73.90
type of heat recovery system		other HRS
Motor and drive type		variable speed
directional unit type		BVU
face velocity at design flow rate	m/s	1.75
external leakage rate	%	0.00
internal leakage rate	%	0.00
internal pressure drop of ventilation components	Pa	329
external pressure drop	Pa	700
internal pressure drop of non-ventilation components	Pa	217
Efficiency bonus E 2016	W/(m ³ /s)	207
Efficiency bonus E 2018	W/(m ³ /s)	27
Correction factor F 2016	W/(m ³ /s)	200
Correction factor F 2018	W/(m ³ /s)	190
Efficiency base configuration U1	%	59.86
Minimum requested Efficiency 2016	%	
Minimum requested Efficiency 2018	%	
internal pressure drop of ventilation components U1	Pa	135
external pressure drop U1	Pa	350
internal pressure drop of non-ventilation components U1	Pa	204

CLASS	All Units	Units for full or partial outdoor air at design winter temperature ≤ 9°C		Absorbed power factor f _{class-Pref} [-]
	Velocity v _{class} [m/s]	Heat recovery system η _{class} [%]	Δp _{class} [Pa]	
A / AC / A↑	1.8	75	280	0.9
B / BC / B↑	2.0	67	230	0.95
C / CC / C↑	2.2	57	170	1.0
D / DC / D↑	2.5	47	125	1.06
E / EC / E↑	2.8	37	100	1.12
<E / <EC / <E↑	No calculation required			No requirement

Comparison case between ErP 2016 and 2018

Bidirectional unit - supply and exhaust air directions

Unit configuration:

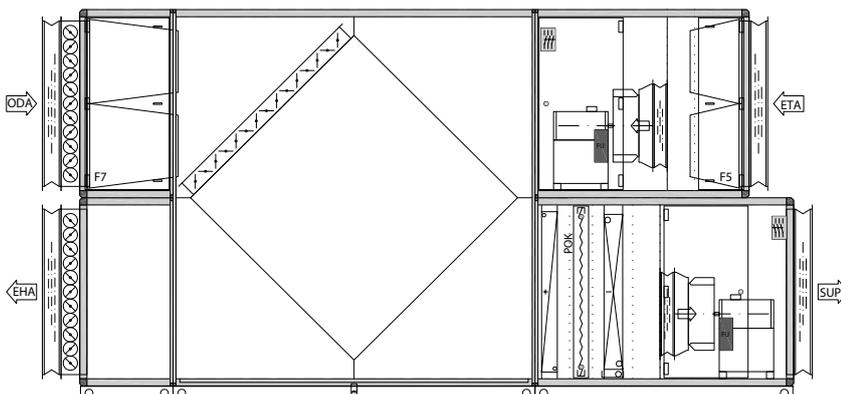
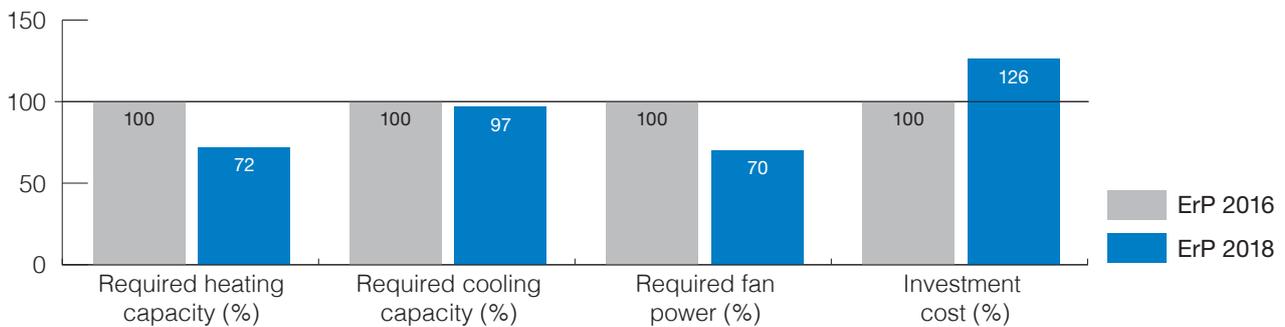
- a) Heat recovery system: plate heat exchanger
- b) Plug-in fans with frequency converter
- c) Water air heater
- d) Water air cooler
- e) Filters: F7 supply and M5 exhaust
- f) Dampers on supply and exhaust side

Air conditions:

- a) Air flow volume: 10.000 m³/h
- b) outdoor: -13°C/90° R.H.
- c) exhaust: +20°C/40% R.H.

	ERP 2016	ERP 2018
AHU size	KNND 15/9	KNND 15/12
Height [mm]	2,110	2,740
Width [mm]	1,745	1,745
Length [mm]	4,700	4,970
AHU cross section [m ²]	1.43	1.92
Cross flow air velocity [m/s]	1.94	1.45
Total pressure drop - supply [Pa]	681	632
Total pressure drop - exhaust [Pa]	574	568
Absorbed fan power - supply [kW]	4.48	3.11
Absorbed fan power - exhaust [kW]	4.14	2.89
Thermal efficiency of heat recovery [%]	67.1	73.1
SFP int [W/(m ³ /s)]	874	610

ErP 2016 vs. ErP 2018 comparison case





At Lindab we simplify construction for our customers. We do that by designing easy to use products and solutions, as well as offering efficient availability and logistics. We are also working on ways to reduce our impact on our environment and climate. We do that by developing methods to produce our solutions using a minimum of energy and natural resources, and by reducing negative effects on the environment. We use steel in our products. It's one of few materials that can be recycled an infinite number of times without losing any of its properties. That means less carbon emissions in nature and less energy wasted.

We simplify construction

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