

# *Ecodesign*

FROM

*AirSource*



HEATING | COOLING | RECOVERY

REGULATION 1253 & 1254/2014  
For Residential And Non-Residential Ventilation Units



**FULL FRESH AIR SYSTEMS**  
*Creating a better internal environment*

# The Ecodesign Directive

The Ecodesign Directive (also referred to as the ErP Directive) forms part of the European Union 20-20-20 target which aims to reduce emissions of greenhouse gasses by 20%, increase energy efficiency to save 20% and increase renewable energy sources to 20% of the total consumption by year 2020.

The Directive is mandatory within the states of the EU and sets out requirements for products that consume energy and are manufactured or imported to the EU. The Ecodesign Directive comes into force by law (2015 No469) on any delivered products from 1st January 2016, with new stricter requirements effective from 1st January 2018.

## How does the Ecodesign Directive affect Ventilation Equipment

The Ecodesign directive covers numerous industries and products which are divided into lots. The requirements for Air Handling Units are defined in Lot 6 Air Conditioning and Ventilation.

These regulations cover Ventilation Units (VU) for the following applications:

### RESIDENTIAL VENTILATION UNITS (RVU)

Maximum flow rate up to 250m<sup>3</sup>/h OR  
Maximum flow rate up to 1000m<sup>3</sup>/h when declared only for Residential use by the manufacturer.

**This product is not available from AirSource**

### NON RESIDENTIAL VENTILATION UNITS (NRVU)

Flow rate above 250 m<sup>3</sup>/h

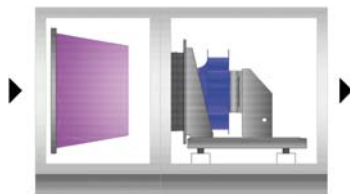
AirSource offer a fully compliant range of products for Non residential applications.

Either of the above can be categorised as shown below.

### UNIDIRECTIONAL VENTILATION UNIT (UVU)

These units are either input only or extract only, where the mechanically produced airflow is balanced by natural air.

Reference Unit Configuration for UVU:



#### Requirements:

- Must be equipped with multi speed or variable speed drive (except dual use units).
- Filter provided (Extract – M5 or Supply F7)
- Maximum internal specific fan power (SFP<sub>int limit</sub>) is:  
**2016:** 250W/m<sup>3</sup>/s) **2018:** 230W/m<sup>3</sup>/s)
- Minimum fan efficiency is:

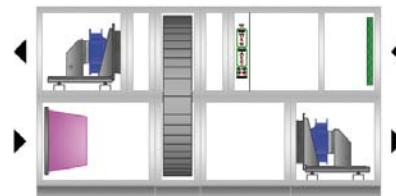
	2016	2018
Nom. Elec. Input power ≤ 30kw	6.2% *ln(P) +35%	6.2% *ln(P) +42%
Nom. Elec. Input power > 30kw	56.1%	63.1%

Where: P = Nom. Electrical Input power  
ln = Log Natural

### BIDIRECTIONAL VENTILATION UNIT (BVU)

These units include both input air and extract air

Reference Unit Configuration for BVU:



#### Requirements:

- Must be equipped with multi speed or variable speed drive (except dual use units).
- Heat recovery system (HRS) to be included with thermal bypass facility. Minimum efficiencies detailed on P.4
- Both the fresh air and exhaust air are to be filtered, grade M5 on Extract and F7 on Supply.
- Maximum internal specific fan power (SFP<sub>int limit</sub>) is:

		2016	2018
With Run Around HRS	q <sub>nom</sub> <2m <sup>3</sup> /s	1700+E-300 *q <sub>nom</sub> /2-F	1600+E-300 *q <sub>nom</sub> /2-F
	q <sub>nom</sub> ≥2m <sup>3</sup> /s	1400+E-F	1300+E-F
With other HRS (Th. Wheel/PHX)	q <sub>nom</sub> <2m <sup>3</sup> /s	1200+E-300 *q <sub>nom</sub> /2-F	1100+E-300 *q <sub>nom</sub> /2-F
	q <sub>nom</sub> ≥2m <sup>3</sup> /s	900+E-F	800+E-F

## CALCULATING THE SFP<sub>int</sub>

The SFP<sub>int</sub> is the Ratio between the internal pressure drop of ventilation components and the fan efficiency, determined for the reference configuration as shown on the previous page. This is required to be calculated as a part of the ERP regulations & should not be confused with the SFP in Part L which deals with the building as a whole.

### Calculating the maximum permissible SFP<sub>int</sub> limit for a BVU:

**Example:** BVU with thermal wheel and Nominal air volume under 2.0m<sup>3</sup>/s: 1200 + E - (300xqnom/2) – F Where:

- E = Efficiency Bonus i.e. The value that the heat recovery system (HRS) efficiency (displayed as a decimal) exceeds the required value and multiplied by 3000 eg. (0.73 - 0.67) x 3000 = 180
- qnom = (Supply Air Volume + Extract Air Volume) / 2
- F = Filter Correction to be applied as chart opposite:

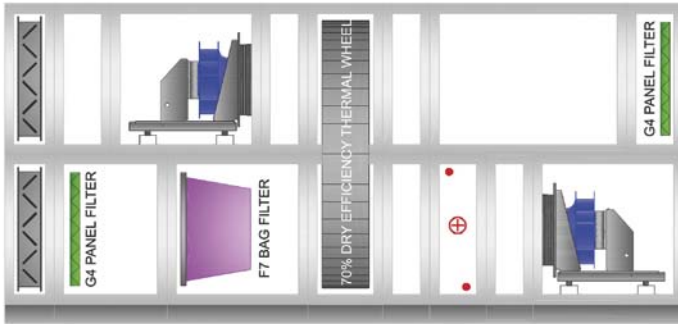
F (Filter Correction)	2016	2018
M5 Filter Missing	160	150
F7 Filter Missing	200	190
Total	360	340

### Calculating the SFP<sub>int</sub>:

$$\text{For UVU: } \frac{\Delta P_{\text{int sup}}}{\eta_{\text{fan sup}}} \text{ or } \frac{\Delta P_{\text{int ext}}}{\eta_{\text{fan ext}}} \quad \text{For BVU: } \frac{\Delta P_{\text{int sup}}}{\eta_{\text{fan sup}}} + \frac{\Delta P_{\text{int ext}}}{\eta_{\text{fan ext}}}$$

Where: ΔP<sub>int</sub> = Internal pressure drop of components based on Reference configuration at clean conditions.  
 η<sub>fan</sub> = Efficiency of fan at Nominal Airflow and Total Pressure

### Example calculation:



BVU WITH THE FOLLOWING COMPONENTS:

EXTRACT: 1.75m <sup>3</sup> /s	SUPPLY: 1.75m <sup>3</sup> /s
G4 Panel Filter	Damper
Thermal wheel 70.0%	G4 Panel Filter
Fan	F7 Bag Filter
Damper	Thermal wheel 70.0%
	Heating Coil
	Fan

Required to achieve ErP 2016 compliance

### Calculate the SFP<sub>int</sub>

$$\frac{194}{0.584} + \frac{167}{0.573} = 624 \text{ W/(m}^3\text{/s)}$$

### Calculate the maximum permissible SFP<sub>int</sub> limit for a BVU

Nominal air volume under 2.0m<sup>3</sup>/s therefore use calculation: 1200 + E - (300xqnom/2) – F

$$1200 + ((0.7 - 0.67) \times 3000) - (300 \times 1.75/2) - 160 = 868 \text{ W/(m}^3\text{/s)} \quad \text{i.e. } 1200 + 90 - 262.5 - 160$$

Notes: Unit is compliant as the SFP<sub>int</sub> is below the SFP<sub>int</sub> limit

Filter correction (F) of 160 applies as extract does not meet required M5 filter grade.

# Requirements for the selection of components

Care must be taken to ensure that the following criteria are met when selecting equipment:

## FAN SELECTION

AirSource will only supply fans with a speed control device fitted, the options available are:

- Single phase or Three Phase EC Fan (with built in speed control facility)
- Three phase plug fan with IE2 or IE3 motors and Frequency Inverter fitted

Minimum fan efficiencies apply when selecting a UVU.

When calculating the SFP use the overall fan efficiency including the Motor, Drive, Impeller and Inverter Losses.

Apply fan section pressure drop for Supply and/or Extract air streams to determine  $\Delta P_{int}$

## HEAT RECOVERY SYSTEM (HRS)

The efficiency of Heat Recovery equipment should achieve the following minimum requirements:

Minimum Dry Efficiency for HRS applies as follows:

Heat Recovery System	Modulation / Bypass Facility	2016	2018
Run Around Coil	Pump controlled by others	63%	68%
Plate Heat Exchanger	Face / Bypass Damper	67%	73%
Thermal Wheel	Variable Speed Rotor	67%	73%

A thermal bypass facility is to be fitted to all HRS

Mixing Boxes do not qualify as HRS

The thermal efficiency should be calculated using:

- Dry reference conditions (sensible energy only)
- An indoor – outdoor  $\Delta t$  of 20°C
- Balanced airflow adjusted to the supply
- Excluding thermal heat gains from fan motors and internal leakage

Apply HRS pressure drop for Supply and Extract air streams to determine  $\Delta P_{int}$

## FILTERS

Apply filter pressure drop for Supply and/or Extract air streams to determine  $\Delta P_{int}$

- If supply pre and secondary filters are included the pre-filter pressure drop will not be applied to the  $\Delta P_{int}$  as this does not form part of the Reference configuration as shown on page 2.
- If the filter included does not meet ErP requirements (i.e. M5 on Extract or F7 on Supply) the filter correction shall be applied, however the pressure drop for the filter will not be included as this has been dealt with by applying the filter correction.

From 1st Jan 2018 filter sections shall be equipped with a visual filter change warning signal.

AirSource already provide the following on all equipment:

- When control panel is fitted: either filter dirty light on control panel or indication to BMS via BACnet.
- NRVU's supplied without controls will have an inclined gauge manometer fitted to the filter section.

## DOCUMENTATION

(1) With effect from 1/1/16 the following product information shall be provided:

- |  |   |  |   |
|--|---|--|---|
| (a) Manufacturers name or trade mark   | (g) Nominal NRVU flow rate in $m^3/s$   | drop of non-ventilation components ( $\Delta P_{s.add}$ ) in pa  | (q) Description of visual filter warning for NRVU's intended for use with filters, including text pointing out the importance of regular filter changes for performance and energy efficiency of the unit |
| (b) Manufacturers model identifier   | (h) Effective electric power input (kw)   | (n) Static efficiency of fans in accordance with Regulation (EU) No.327/2011   | (r) For NRVU's specified for use indoors the casing sound power level ( $L_{wa}$ )  |
| (c) Declared typology i.e. RVU or NRVU ; UVU or BVU  | (i) SFP <sub>int</sub> in $W/(m^3/s)$   | (o) Declared maximum external leakage rate (%) of the casing of ventilation unit; and declared maximum internal leakage (%) rate for BVU's or carry over (for regenerative heat exchangers only) | (s) Internet address for disassembly instructions as referred to in point 3   |
| (d) Type of drive installed or intended to be installed (i.e. Multi speed drive or variable speed drive) | (j) Face velocity in m/s at design flow rate                                      |  |   |
| (e) Type of HRS (PHX, Thermal Wheel, RAC or None)  | (k) Nominal external pressure ( $\Delta P_{ext}$ ) in pa                          |  |   |
| (f) Thermal efficiency of heat recovery (in % or N/A)  | (l) Internal pressure drop of ventilation components ( $\Delta P_{s.int}$ ) in pa | (p) Energy performance or classification of the filters  |   |
|  | (m) Optional: Internal pressure   |  |   |

(2) The above information in item 1(a) to (s) shall be available: In the technical documentation of NRVU's; and On the manufacturers free access website

(3) The manufacturers free access website shall make available detailed instructions, inter alia, identifying the tools required for the pre- / dis-assembly of permanent magnet motors, and of electronic parts for the purpose of efficient material recycling.

## EXEMPTIONS

Some of the exemptions to the regulations are as follows:

- UVU's and BVU's with an electric power input of less than 30W per air stream (except for information requirements)
- Axial or centrifugal fans only equipped with a housing
- NRVU's which are for operation in a potentially explosive atmosphere (i.e. Atex products)
- NRVU's declared exclusively for emergency use only for short periods (e.g. Smoke Extract)
- High temperature applications above 100°C or Low temperature applications below -40°C
- High Voltage applications above 1000v
- Include a heat exchanger and a heat pump for heat recovery – See below
- Installations outside the EU
- NRVU's operating on full recirculation or below a minimum 10% fresh air rate
- NRVU's which are for operation in toxic, highly corrosive or flammable environments i.e.
  - (a) Swimming Pools
  - (b) Data Centres / Server rooms
  - (c) Heat Dissipation
  - Etc....

## TempAir Heat Pump Exemption

Units incorporating a heat recovery system and a heat pump for recovery, where the main function of the unit is heating or cooling, are exempt from the new ErP regulations. The Tempair unit as standard is equipped with the latest variable speed EC fans and 75% efficient recovery, therefore already 2018 compliant. The exemption acknowledges the efficiency benefits of the packaged heat pump for the future. Being exempt will give the Tempair a dimensional advantage over standard Air Handling with plate heat exchangers.

# TempAir

## PACKAGED AIRSOURCE HEAT PUMP

AirSource TempAir is the renewable energy heating, cooling and ventilation system that improves air quality and creates a better indoor environment. In colder outside temperatures it recovers 75% of the heat from the exhaust air to warm the fresh air supply and then additional heat is provided from the heat pump. In warmer outside conditions a combination of free cooling, recovery and heat pump cooling creates a naturally cooler environment.

## EFFICIENT, LOW COST HEATING, COOLING AND VENTILATION

### Tempair benefits:

- Renewable energy Heat pump provides the Heating and Cooling.
- High efficiency, low running costs.
- Reduced site labour, only power required.
- Free cooling.
- Integrated controls, factory commissioned.

### TempAir is ideal for:

Offices, Schools, Hotels, Restaurants, Health facilities, Sports centres...and more







*HEATING | COOLING | RECOVERY*

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