Commission Delegated Regulation (EU) No 1254/2014 of 11 July 2014 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of residential ventilation units (Text with EEA relevance)

ANNEX VIII

Measurements and calculations

1. The specific energy consumption (SEC) is calculated using the following equation:

$$SEC = t_a \times pef \times q_{net} \times MISC \times CTRL^x \times SPI - t_h \times \Delta T_h \times \eta_{-1}^h \times c_{air} \times (q_{ref} - q_{net} \times CTRL \times MISC \times (1 - \eta_t)) + Q_{defr}$$

where:

— *SEC* is the specific energy consumption for ventilation per m^2 heated floor area of a dwelling or building [kWh/m^2.a];

— t_a is annual operating hours [h/a];

— *pef* is the primary energy factor for electric power generation and distribution [-];

— q_{net} is net ventilation rate demand per m^2 heated floor area [m^3/h.m^2];

— *MISC* is an aggregated general typology factor, incorporating factors for ventilation effectiveness, duct leakage and extra infiltration [-];

— *CTRL* is the ventilation control factor [-];

— *x* is an exponent that takes into account non-linearity between thermal energy and electricity saving, depending on motor and drive characteristics [-];

— *SPI* is specific power input [kW/(m^3/h)];

— t_h is total hours heating season [h];

— ΔT_h is the average difference in indoor (19 °C) and outdoor temperature over a heating season, minus 3 K correction for solar and internal gains [K];

— η_h is the average space heating efficiency [-];

— c_{air} is the specific heat capacity of air at constant pressure and density [kWh/(m^3 K)];

— q_{ref} is the reference natural ventilation rate per m^2 heated floor area [m^3/h.m^2];

— η_t is the thermal efficiency of heat recovery [-];

— Q_{defr} is the annual heating energy per m^2 heated floor area [kWh/m^2.a] for defrosting, based on a variable electric resistance heating.

$$Q_{defr} = t_{defr} \times \Delta T_{defr} \times c_{air} \times q_{net} \times pef$$

,

where:

— t_{defr} is the duration of the defrosting period, i.e. when the outdoor temperature is below – 4 °C [h/a]; and

— ΔT_{defr} is the average difference in K between the outdoor temperature and – 4 °C during the defrosting period.

Q_{defr} applies only to bidirectional units with recuperative heat exchanger; for unidirectional units or units with regenerative heat exchangers, $Q_{defr} = 0$.

SPI and η_t are values derived from tests and calculation methods.

Other parameters and their defaults are given in Table 1. The SEC for label classification is based on the ‘average’ climate.

2. The annual electricity consumption per 100 m^2 floor area (AEC) (in kWh/a electric per year); and the annual heating saved ((AHS), which means the annual saving in

consumption of energy for heating (in kWh fuel gross calorific value per year) are calculated as follows, using the definitions in point 1, and the default values given in Table 1, for each type of climate (average, warm and cold):

$$\mathrm{AEC} = t_a \times q_{net} \times MISC \times CTRL^x \times SPI + Q_{defr}$$

;

$$\mathrm{AHS} = t_h \times \Delta T_h \times \eta_{-1}^h \times c_{air} \times \left(q_{ref} - q_{net} \times CTRL \times MISC \times (1 - \eta_h)\right)$$

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TABLE 1

SEC calculation parameters

general typology					MISC
Ducted ventilation units					**1,1**
Non-ducted ventilation units					**1,21**
ventilation control					CTRL
Manual control (no DCV)					**1**
Clock control (no DCV)					**0,95**
Central demand control					**0,85**
Local demand control					**0,65**
motor & drive					x-value
on/off & single speed					**1**
2-speed					**1,2**
3-speed					**1,5**
variable speed					**2**
Climate	t_h**in h**	ΔT_h**in K**	t_{defr}**in h**	ΔT_{defr}**in K**	Q_{defr}[a]**in kWh/a.m²**
Cold	**6 552**	**14,5**	1 003	5,2	**5,82**
Average	**5 112**	**9,5**	168	2,4	**0,45**
Warm	**4 392**	**5**	—	—	**—**
Defaults					value
specific heat capacity of air, c_{air} in kWh/(m³K)					**0,000344**
net ventilation requirement per m² heated floor area, q_{net} in m³/h.m²					**1,3**
reference natural ventilation rate per m² heated floor area, q_{ref} in m³/h.m²					**2,2**
annual operating hours, t_a in h					**8 760**
primary energy factor electric power generation & distribution, *pef*					**2,5**
space heating efficiency, η_h					**75 %**

a Defrosting applies only to bidirectional units with recuperative heat exchanger and is calculated as $Q_{defr} = t_{defr} * \Delta t_{defr} * c_{air} * q_{net} * pef$. For unidirectional units or units with regenerative heat exchangers, $Q_{defr} = 0$