Document of reference “2009-06-02 WD on airco and ventilation_for_Committee_updated.pdf”

Here follows a summary of current version of the document in relation to the CO2 emissions:

Annual carbon emission C [kg CO2]: Equation for split unit

Global warming Potential [kg/kg]

Refrigerant mass [kg]

INDIRECT DIRECT

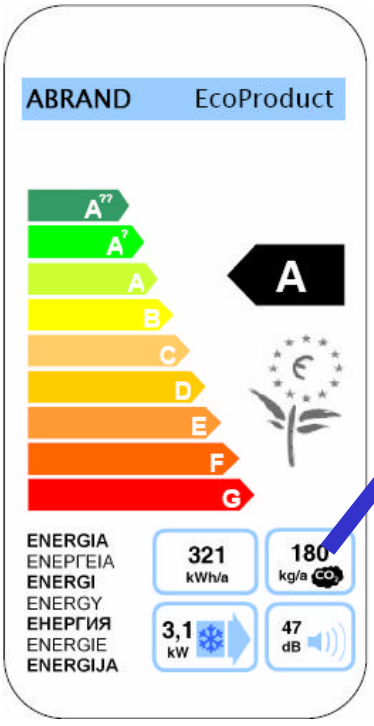
$$C = 0{,}43 * Q + 0{,}034 * GWP^{12} * m_{refrig}$$

Emissions linked to electricity consumption [g CO2/kWh] – EuP methodology

0.034 – coefficient for split
0.054 – coefficient for multi-split
0.014 – coefficient for LAC

Note. Including emission at end-of-life 5% with product life 12 years

Annual electricity consumption [kWh/year]



Components:

Direct Emmissions:
Caused by:
- leakage of refrigerant
- refrigerant type (GWP)
- refrigerant mass

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Indirect Emmissions:
Caused by the Carbon Emmissions due to the production of Electric Energy that powers the appliances and the Annual electricity consumption

Note: GWP of the typical refrigerants for this product categories (reference IPPC 2001)
R410: 1975
R407: 1526
R290: 3

Hereafter we report our comments and proposal to the current document:

Refrigerant with low GWP and Energy Efficiency

The document is missing in proposing some incentives for refrigerant with low GWP.
Our proposal is to provide an increment of energy efficiency of 15% for products with low GWP refrigerant (as in the ecolabel for heat pump).

Annual carbon emissions C (p.18 and p.20)

We welcome the introduction of an Annual carbon emissions coefficient because it represents the whole environmental impact for product having refrigerant circuit that can be connected on the field and containing a not negligible refrigerant mass.
This parameter is fundamental in assessing the trade off between energy efficiency and refrigerant mass, type (GWP) and type of refrigerating circuit (sealed in factory or field). In fact energy efficiency can't be the only parameter to be taken into account for regulating this industrial sector as efficiency can be increased easily by increasing the amount of refrigerant (as consequence of a heat exchanger increment) when leakages are neglected.

Leak rate for multi split

The current proposal differentiate split, multi-split and single package respectively with an annual leak rate during the use phase of 3%, 5% and 1% of the refrigerant mass.
Since leak rate depends very much on the number of connections we believe that is more suitable to consider this dependency for multi split units with a linear tendency instead a of a constant value (proposal of 5%). The dependency between leak rate and the number of connection might be assessed, for split and multi split, using the following equation:

$$Leakrate_{split/multisplit} = 3\% \times \left(\frac{nr\_of\_connections}{4}\right)$$

assuming 3% as yearly leak rate for nominal refrigerant fluid mass (in case of single split, nr. of connections = 4, it follows that Leak-rate = 3% as proposed).

Annual carbon emissions coefficient and Labelling

For the peculiar characteristics of air-conditioners (refrigerant type, charge, leakage and use pattern) an indicator of direct emissions affecting global warming plays a significant role.
Therefore, our proposal would be to report in the energy label for air-conditioners a CO2 indicator that focus only on direct emissions ignoring the energy use factor.
In fact it is possible to consider that the energy use factor, the indirect part of a TEWI formulation, as being already covered with the indication of the annual energy consumption and the energy labelling.