Position on the draft EC Working Document on possible Ecodesign requirements for Special Motors and Variable Speed Drives

October 2014

Following the 29th September 2014 Consultation Forum, we would like to welcome the Working Document and the European Commission's intention to regulate smaller and larger motors, motors integrated into other energy related products, and explosion proof and brake motors, that received the support of Member States and a variety of stakeholders.

To further strengthen the proposal, we call upon the European Commission to make the following changes on the rest of the product group:

- Medium Voltage motors

We firmly believe that Medium Voltage motors (up to 1000 kW and up to 6600 V) should be included in the regulation, and the savings related to this measure assessed in the Impact Assessment. As energy efficiency thresholds still need to be determined, we urge the European Commission to act as deemed most relevant, taking into account the possibility of setting preliminary values based on Chinese requirements and reassess them in 2018.

➔ **Include Medium Voltage motors in the scope of the regulatory proposal**

- Variable Speed Drives (VSDs):

As raised during the meeting, we welcome and like to echo the clear call from Member States to increase ambition on VSDs and believe that IE3C can be fulfilled in 2018 by all products, as demonstrated in the Annex 1. Savings related to this measure should be estimated in the Impact Assessment.

➔ **Set a requirement for VSDs at IE3C level in 2018.**

- Large motors (0,75 kW to 375 kW):

The removal of the IE2+VSD option should take place in 2018 instead of 2020 as this option only opens the door to lost savings. Merging the different tiers will also help simplifying the regulation and its implementation. This measure would trigger considerable savings (2.7 TWh per year in 2030, if applied in 2020).

Moreover, a Tier 2 should be introduced for these motors at IE4 level in 2020 as recommended by the preparatory study. If applied in 2020, 6.7 TWh per year could be saved by 2030. IE4 products are already on the market, both as induction motors and PM motors and their market share will increase considerably in the coming 5-10 years. European and Chinese industries have already heavily invested in IE4 technologies, leading to a natural market evolution to IE4 performance levels.

➔ **Remove the IE2+VSD option in 2018. Introduce a Tier 2 at IE4 level in 2020.**

- Small motors

We welcome the inclusion of smaller motors but regret that the Commission opted for a very conservative IE2 proposal: technology for small motors is highly advanced and currently making big jumps in technology and efficiency. We therefore invite the Commission to set a Tier 2 at IE3 level in 2020.

➔ **Set a Tier 2 for small motors at IE3 level in 2020.**

- Information requirements

We support the inclusion of information requirements, both for motors covered by the actual proposal as well as those excluded from the scope. The information gathered will form a good basis for the future review of the regulation. Furthermore, this will help ensuring that excluded products meet the required criteria to be out of the scope of the regulation. We do not believe that such information requirements will cause any additional burden, as the content of the rating plate is anyway given in IEC 60034-1. The effort to provide additional information is limited since it can easily be included into a standardised information leaflet that can be downloaded from the manufacturers' website. Moreover, we think that the proposal can be strengthened by including on the rating plate a QR code (on the basis of ISO/IEC 18004:2006) that could be scanned and would link directly to the website and the respective information.

➔ **Include a QR code on the rating plate linking to the respective information on the manufacturers' website**

Furthermore, we invite the European Commission to take a further look at the specific case of Rare Earth material used in Permanent Magnet motors. Permanent Magnet motors can contain rare earth elements which have been identified as critical materials in the medium-term based on supply risk, demand growth and recycling restrictions[1]. Devices with rare earth magnets are quite hard to identify as such without having very specific technical know-how or without conducting quite intensive testing/dismantling of devices[2]. Thus, a mandatory and standardised marking of products containing rare earth magnets above a certain minimum weight (e.g. > 10 g) can significantly facilitate future recycling practices. It is believed that a marking giving information on the presence of rare earth magnets as well as information on the applied type (e.g. SmCo, FeNdB) can positively influence the establishment of a European circular economy for rare earth elements.

➔ **Introduce an information requirement on the presence of rare earth material in magnets, their localisation, as well as their extraction process allowing safe and cost-effective recycling.**

➔ **Consider specific requirements for how these permanent magnets can be integrated in the motor to maximise cost effectiveness of reuse and recovery process (e.g no glue and no welding hampering the extraction/recovery of rare earths elements; or maximum amount of non-destructive disassembly time to foster the reuse of the magnets rather than the mere recovery of rare earths)**

Contact:
ECOS – European Environmental Citizens' Organisation for Standardisation
Chloé Fayole
chloe.fayole@ecostandard.org

[1] Aalborg University, Addressing resource efficiency through the Ecodesign Directive, March 2014 (p. 225)

[2] Source: Preparatory Study to establish the Ecodesign Working Plan 2015- 2017 implementing Directive 2009/125/EC, Task 2: Supplementary Report "Identification or resource-relevant product groups and horizontal issues", Andreas Manhart, Kathrin Graulich (Oeko-Institut), 15th September 2014 (Chapter 7.1)

Annex 1: VSD Performance

Within a motor system (motor, application and converter), VSD losses are considerable and cannot be neglected even when their benefit for the load adapted operation is considered.

Table 5 of the Working Document should be improved, taking into account the following elements:

1. It does not make sense to use converter losses at 100% load to distinguish the energy performance of converters. Converters are used for varying loads, therefore the MEPS need to reflect their performance in the key area of operation both for square torque (pumps and fans, etc.) and constant torque (conveyors, etc.) applications. See proposal in point 7 below.
2. In line with IEC 60034-30-1 (motor efficiency classes), it is desirable to rate converters by efficiency (%), instead of loss (W).
3. The reference value given as minimum requirement for an IE class 1 (IE1C) for a converter is way too high to be used as a minimum performance standard. All products found on the market today have considerably lower losses (see points 4 and 5 below).
4. For instance, the smallest VSD with 0.75 kW output of the driven motor accepts a converter loss of 142W in class IE1C. Three products (USA, Japan) are on the market (see Figure 1) with only 27, 44 and 71 Watt respectively. These products are therefore rated today according to their manufacturer's published losses at IE3C (limit is 80 W) or even IE4C (limit is 60 W).
5. The results of a test campaign for nine VSD with 18.5 kW output (see Figure 2) of the driven motor provided by ABB showed losses between 457.3 W and 638.6 W (average 548 W). The IE1C level for 18.5 kW allows for losses of 1207 W. Seven of the tested VSD products would fit IE3C (limit is 679 W), two even would meet IE4C (limit is 509 W).
6. IE3C should therefore be proposed for converters, which is two classes better (each reduces the converter losses by 25%). See Figures 1 and 2 with catalogue data of 3 manufacturers and test data of 9 converters. More test data will soon be available from the Danish Institute of Technology.
7. IEC 60034-30-2 (Efficiency classes for motors fed by converters) proposes to use six operating points and to use an average (or weighted average) to set the efficiency class. See proposal in Figure 3. It is imperative that the 6 operating points now proposed by IEC in TC2 WG 31 for IEC 60034-30-2[3] are used universally also for tests of converters only and motor systems.

The currently available market data on converter losses come from two sources:
- Catalogue values of manufacturers' product lists
- Test data from independent and industry testing laboratories.

[3] Martin Doppelbauer: New developments in IEC standards for motors driven by converters, in Motor Summit 2014, www.motorsummit.ch

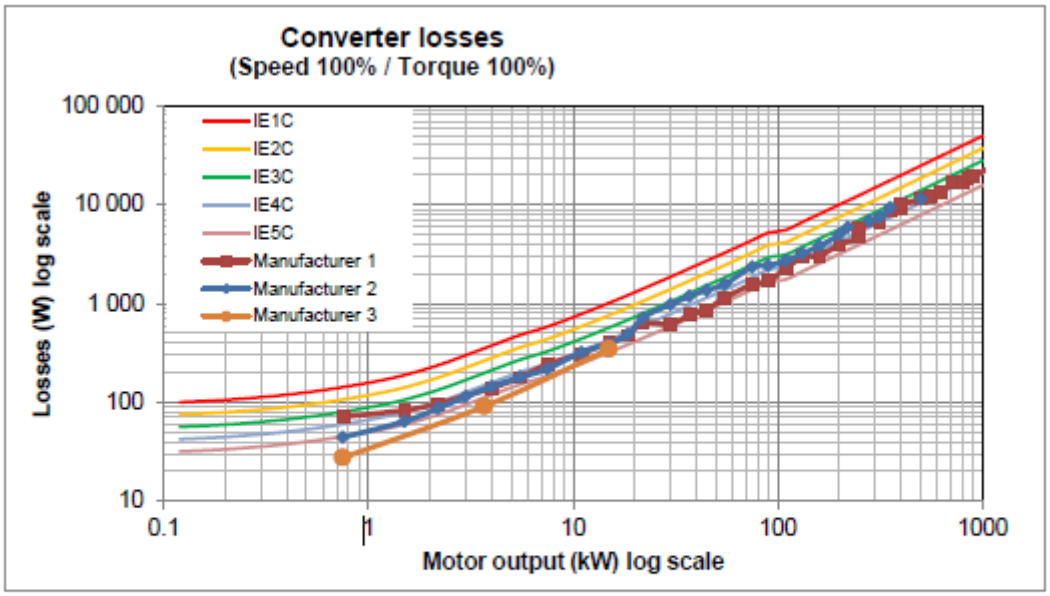

Figure 1 Converter losses IE1C to IE5C (based on FprEN 50598-2, table 20, and 25% lower losses for each further class), comparison with three manufacturers' product lists (source: CUB)

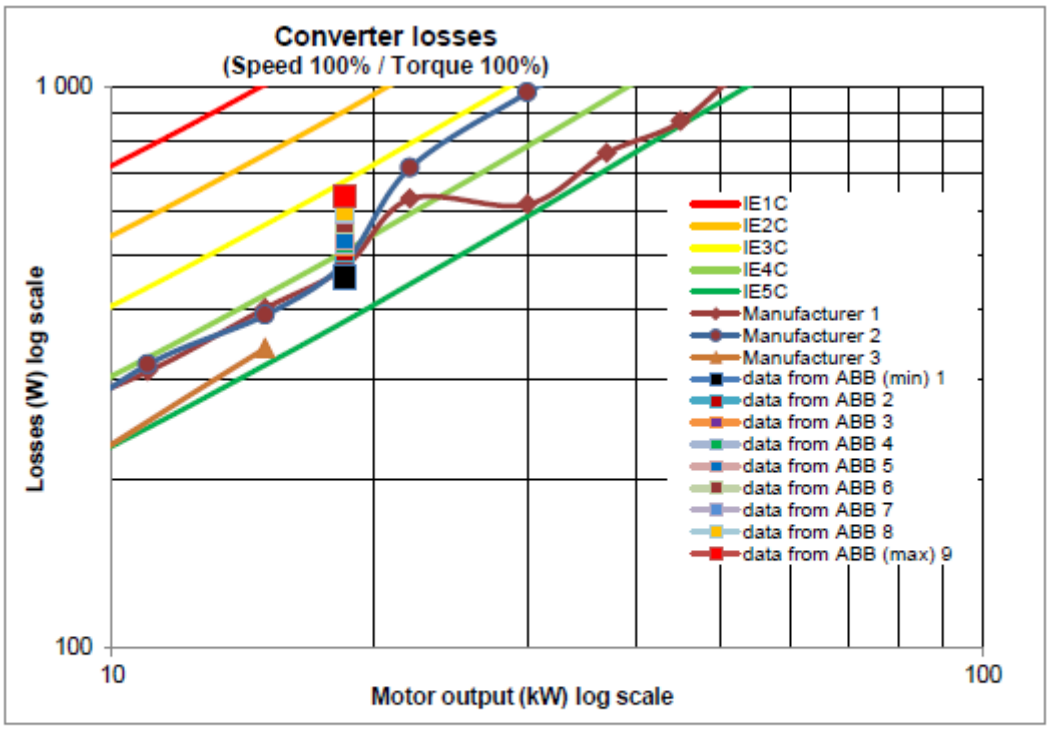

Figure 2 Converter losses IE1C to IE5C between 100 W and 1000 W for motors between 10 kW and 100 kW output power (based on FprEN 50598-2, table 20), comparison with three manufacturers' product lists and 9 converters of 18.5 kW from various manufacturers tested by ABB (source: CUB)

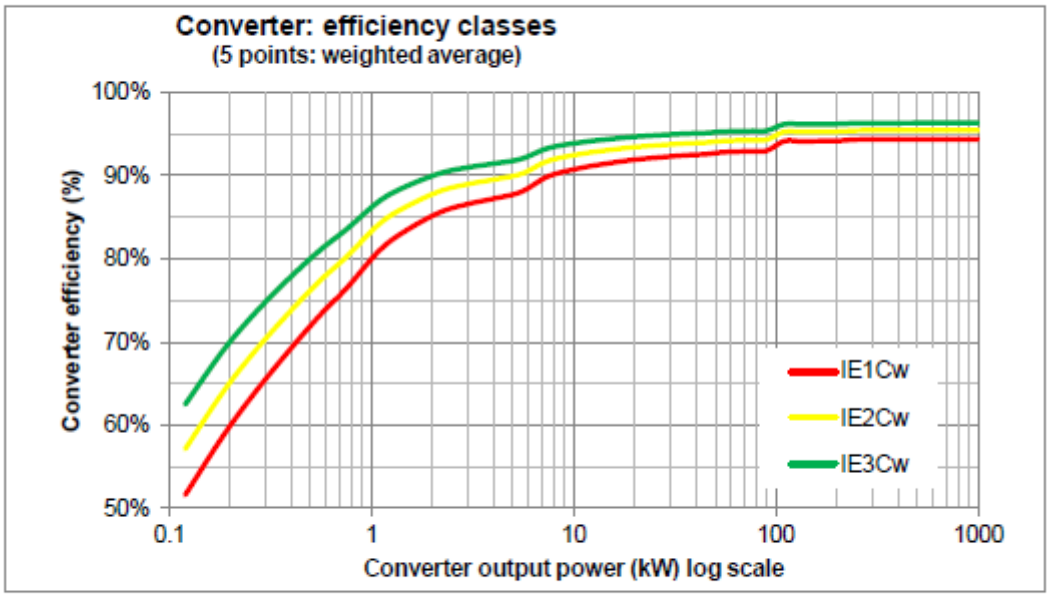

Figure 3 Possible efficiency classes from IEC1 to IEC3 for converters between 0.12 and 1000 kW (losses based on FprEN 50598-2, 5 operating points, - 25% losses between classes, weighted average according to proposal in IEC 60034-30-2, April 2014) (source CUB)

Source: Conrad U. Brunner (CUB), October 2014