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From	*To*	*Copy*
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Subject

Océ Position regarding draft version 1.2 of ENERGY STAR program requirements for imaging equipment

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1 Introduction

Océ welcomes the opportunity to provide comments regrding the announced revision of the ENERGY STAR program requirements for imaging equipment. The purpose of the revision, i.e. clarification of the eligibility criteria and test method, is fully supported by Océ. Clarity will help to promote ENERGY STAR as the de facto energy efficiency standard for imaging equipment.
In this memo, we first give a general appreciation of the revision, followed by some detailed comments on specific parts of the revied text.

2 Assessment of revision as a whole

First of all, althoug this revision is presented by EPA as a mere clarification of requirements intended to facilitate the work of Certification Bodies, it has been found that some of the proposed changes in fact change specification levels of the eligibility requirements. This is the case with the specifications for the functional adders of OM products, as well as the requirements to print in simplex mode (while duplex is being promoted/required as a standard product function for faster products), as well as the way that the power levels (energy consumption) of Type 2 DFE's have to be incroporated in the requirements. Océ requests to not apply these changes in the current revision without a thorough assessment of the consequences for the number of product models that is eligible for ENERGY STAR.

Comparing the text of draft version 1.2 with the final version 1.1 program requirements, it is obvious that the order of the text and the presentation of tables and information have changed significantly. For ENERGY STAR partners who have been using the eligibility criteria and test procedure for more than 3 years now (i.e. since the finalisation of the version 1.0), such changes in the text need time to adapt to, in order to aling internal procedures and requirements to the ENERGY STAR program requirements. Océ proposes to allow for a 4 month grace period after finalization of the v1.2 requirements.

Further, is has been noted that a significant number of changes in the text of draft v1.2 compared to finalized v1.1 are not red-marked. Some of these changes are important for Océ and comment on them will be given in the below section.

3 Detailed comments on specific parts of the revised text

3.1 Partner commitments.

Section 11.1.1 requires that partners provide product specific energy and cost-saving potential in the user manual of products. Océ urgently requests EPA to provide complete templates for such information, as foreseen in section 11.3.

Section 11.1.2 requires that partners provide information regarding the environmental benefits of the products in the user manual. Océ is wondering what kind of environmental benefits this would be: ENERGY STAR is an energy efficiency label, where (for imaging equipment) both the electricity consumption of the product and the ability to reduce paper consumption (duplex) are addressed. Other environmental benefits are out of scope of ENERGY STAR and should not be addressed in the related information requirements.

3.2 Eligibility Criteria.

The definitions of product types in section A of the Definitions chapter shows that the qualification “commercially available” as related to products has been removed from the definitions. Océ is wondering about the background and consequences of this removal and kindly requests EPA to clarify on the reasons for this change.

Océ supports the clarification added in lines 21-22 of the draft eligibility criteria regarding the definition of an MFD.

The definition of off-mode, proposed in lines 73-76 of the draft eligibility requirements is not consistent with the definition of off-mode that is used in Regulation (EC) 1275/2008 (the so-called standby regulation). As this regulation is the basis for off-mode requirements for regulation in an increasing number of countries around the world, we urge EPA to use the referred definition 1:1.

The definition of standby, in lines 85-91 of the draft eligibility requirements, is different from the definition of standby as used in the US Energy Independence and Security Act of 2007 (H.R. 6 - 2007), and the Standby Regulation (EC) 1275/2008. The US Act and the EU Standby Regulation use the same definition, so that it is the most accepted regulatory definition worldwide. We urge EPA to use this revision in order to also update the definition of standby, in order to promote globally harmonized definitions.

The definition for continous form in lines 102 - 104 gives examples of applications that are predominantly printed on small format media. It should be noted that large format imaging equipment usually also has continuous form printing. Océ proposes to mention the typical applications for large format printing being engineering drawings and banners.

Océ supports the definition of data connection given in lines 110 and 111 of the draft eligibility criteria, as well as the definition of network connection in lines 142 and 143 of the same document.

The definitions of primary functional adder and secondary functioan adder, given in lines 146-150 of the draft eligibility requirements, are not consistent with the definitions of those adders used in

version 1.0 and 1.1 of the ENERGY STAR program requirements for imaging equipment. It should be noted that more than 3 adders can remain active during sleepmode, so that the product may have more than 3 functional adders are covered by the definition of "primary", while only 3 may be used as such on the basis of the text in line 330, this is confusing. On the other hand, products may have less than 3 primary functional adders and a number of secondary functional adders according to the proposed draft eligibility criteria. Under v1.1 of the eligibility criteria, it is allowed to count any 3 of the possible primary functional adders as such.
The above differences between the definitions of primary and secondary functional adders are not just clarifications for Certification Bodies, but in fact changes in product criteria with unkown impact so far. A statistical investigation should be done into the impact of this change on the percentage of compliant models compared to the total number of models on the market, in order to justify these changes.

The definition of TEC (lines 153-155) has been shortened compared to the v1.1 definition. In the current form, it is a little open-ended. Océ proposes to add a reference to the specific test method that is described for imaging equipment (TEC is a term that is also used in the PC criteria for ENERGY STAR), in order to avoid confusion.
The definition of marking engine in lines 156-159 says that it is "responsible" for image production. This is very vague: responsibility is a term that is normally associated with natural persons or legal entities that have some kind of free will to decide on taking action or not. Océ proposes to define a marking engine as "the essential part of imaging equipment, where the image is printed on the paper". Further it is unclear if a marking engine includes or is dependent on basic paper storage, paper input, paper output, and duplex functions, because the definition only mentions the dependence on functional adders (we understand that these functional adders are intended as defined in lines 144-150, please confirm).

To the definition of Product Family, as given in lines 170-178 of the eligibility requirements, Océ proposes to add the following:
d) Finishing or paper input options.
Justification: such options are often available in a multitude of varieties, while being irrelevant for energy consumption and sold under the same model name as the basic imaging product.

In secton 3.1.2 (related to rounding when reading a measured value from a meter) it should be clarified what is meant by "exact values": are these the values obtained from the calculations as set out in sections 3.3.2 and 3.4.3.

Océ supports the new texts in section 3.2 (lines 208-211 and 218-222).

In section 3.3.2, especially in the clarifications in lines 260-305 of the draft eligibility criteria, we urge EPA to mention the units of the defined parameters, i.e. energy should be measured in Wh, time should be measured in hours, and so on. While the units of measurement are mentioned in the tables in the test procedure, the equations in these sections are much more clear when the applicable units are mentioned in the explanatory text (italics) below

the equations, so the reader and the user can do a sanity check for erroneous results immediately.

In section 3.3.2, it is unclear how the energy consumption of a type 1 DFE that draws it's own power from the AC electricity grid should be calculated. Because there is a simple solution for this case (it is not necessary to include the DFE in the energy consumption measurement of the product), we propose that a clarification is added to the text, to the effect that for type 1 DFE's that draw AC power directly from the electricity grid, the energy consumption of this DFE shall not be measured nor included during the determination of the TEC-value of the product. Also in such cases, the term TEC_{DFE} that is used in equations 1 and 2 of section 3.3.2 shall be set to zero, and equation 4 is not applicable for such cases.

Default delay time specifications, in section 3.4.2 have been changed compared to v1.1 of the eligibility requirements. It appears that the following specification has been replaced by the text of line 317:
"In addition, all OM products must be shipped with a maximum machine delay time not in excess of four hours, which is only adjustable by the manufacturer. This maximum machine delay time cannot be influenced by the user and typically cannot be modified without internal, invasive product manipulation."
Océ kindly requests clarification why the quoted sentence was removed, as this permitted the incidental customization (by Océ technical specialists and upon specific request of the customer) of ENERGY STAR compliant products for customers with very specific needs (e.g. time-critical 24h/7d public services), whereby the automatic occurrence of sleepmode after a delay time could be completely disabled.

In section 3.4.3, equation 5 suggests that the number of primary fuinctional adders is equal to the number of secondary functional adders: both summations are summing n contributions. Océ proposes to use different characters for the number of contributions and explain the meaning of these characters in the explanatory section in italics below equation 5.
Further equation 5 has a term for DFE power allowance, as calculated in equation 6, which seems to refer only to type 2 DFE's. It should be noted that OM type imaging equipment, notably large format products with advanced functionality are using either type 1 or type 2 DFE's, where some products use a type 1 DFE that draws power directly from the AC electricity grid. Equation 6 should take this into account. For type 1 DFE's that draw power directly from the AC electricity grid, Océ proposes that the term P_{DFE} in equation 5 is set to zero, equation 6 is not applicable and the product's power level in sleepmode is measured without including the power of the DFE. This proposal is justified by the simplicity of the test procedure.

Section 3.4.4, lines 371-374 is consistent with the definition of standby mode as given in lines 85-91 of the eligibility criteria. However, this definition is not consistent with international legislation as explained above. The required power level is however consistent with the requirements of the EU Standby Regulation (EC) 1275/2008.

Océ proposes to leave out the references to the other power modes and simply require that the standby power level of the imaging product excluding the DFE power during standby is lower than the limit proposed in table 10.

Section 4.2.2, lines 388-390 refers to the number of products to be tested for the OM class of products. No reference is given for the number of products to be tested for the TEC class of products, as laid down e.g. in section A a) on page 19 of the v1.1 eligibility criteria.

Table 12 (lines 410-411) states that the effective date of v1.2 will be July 1, 2009. Océ proposes to replace this date by a date that is 4 months after the finalization of the v1.2 eligibility criteria, for reasons explained in section 2 of this memo.

3.3 Test method.

Related to the setup requirements for AC input power (lines 18-20): in the way the text is written, it is suggested that every printer should be connected to an external power supply (EPS as defined in the eligibility requirements). We propose that the setup instructions prescribe that every printer is connected to the voltage source as specifiedd in Table 2, and add a note for products that are shipped with an EPS (as defined in the eligibility requirements): these should be first connected to their EPS and then the EPS should be connected to the voltage source.

The Input Power Requirements in Table 2 (line 21) are already part of IEC62301ed1, chapter 4. Mentioning in the test method without any changes is confusing and should be avoided. Océ proposes to refer to IEC62310ed1 for AC input power as well.
Further to Table 2: Océ would like to see clarification on how to measure the voltage and frequency accuracy, as this is not prescribed in IEC62301ed1 either.
Further regarding table 2, it is not understood why the test voltage is limited to one of the standard voltages mentioned in the table. Océ proposes to allow testing at other voltages that are common in marketing territories where ENERGY STAR is recognized. IT should be required to report the testing voltage and frequency and the related accuracies.
Finally regarding table 2, it should be noted that the 1% voltage tolerance can hardly be met by laboratory power supplies at high output currents (say > 15A). Océ proposes to allow a 2% voltage tolerance for products with rated currents > 15A.

The ambient temperature requirements in line 31 are covered in IEC62310ed1 as well. Océ proposes to refer to this standard for consistency.

The requirements for Crest factor (lines 34-38) are not defined for off mode, while crest factors are the most critical at very low power levels (e.g. 1W). Can EPA clarify why this requirement is not present ?
Further to the requirements for Crest factor point i) and ii). To demonstrate that these requirements are fullfilled, a pre-measurement is needed, using some type of instrument that can measure the peak value of the current continuously and store the results. After that you will have to analyze the data, to allow for the 15% margin in the crest factor. This seems burdensome. As an

alternative, Océ proposes a requirement: 'No clipping of the current measurement allowed' will cover the issue. Most instruments have an indication when the signal is clipped. Simply by choosing a high current range, a pre-measurement will not be needed.

Related to bandwidth (lines 39-41). This requires harmonic analyses of the current and voltage, during testing, during the whole measurement. How else can you know the harmonic content for each harmonic of the current and voltage? This is not practical and very burdensome. How far do you go in determining the highest harmonic? The 40th harmonic, 100th or 1000th harmonic? The higher the harmonic the more inaccurate the measurement becomes.
Example: A measured 11A(rms) value, will be done with an instrument current range setting 20A. 1% is only 0.11A measured in the 20A range. This 0.11A value will not be very accurate, due to the high range setting of 20A. If it also is a higher harmonic, the accuracy will be reduced even further.
Further, the calculation of the measuring accuracy has to be performed for each harmonic value separately (TEC data collection sheet would have to be changed to cover this). This is not only a lot of work, but the calculations a very sensitive to errors and will be depend on the type and manufacturer of the power analyzer that is used. This will be almost impossible to check if it is done correctly. And in the end, the energy content in the higher harmonics is not very high. Therefore a bigger error in the measurement does not have a big influence on the total power or energy that is calculated. The 1% power in a higher harmonic will cause an error much smaller than the 2% required in: Measurement accuracy [line: 48]. Point 1) [line: 49] states that values >0.5W have to be measured within a 2% tolerance.
Moreover: the requirement [line: 42]: Minimum frequency response 3.0kHz includes already the 50th harmonic at 60Hz.

It is proposed to not include the requirements related to bandwidth in lines 39-41 for the reasons outlined above.

Minimum sampling frequency [line: 43]. A sampling frequency of 60Hz for a 60Hz signal seems much too low. Especially when there is a requirement for the measurement of higher harmonics. Océ kindly requests EPA to clarify the background for this requirement.

Concerning H) Time measurement [line: 55]. Only a resolution of 1 second is required, but no accuracy. All instruments used have to be calibrated (requirements IEC/ISO 17025). But if there is no requirement this will be a problem. Océ suggests an accuracy requirement consistent with PDSH 0251B and 00-OP-C0034 of 1%.

In table 3 (line 62) of the draft revised test method, there is no reference to the paper size and weight requirements for products tested for the Chinese market. Océ kindly request to add these requirements.

Lines 63-64 specify a test pattern. While test patterns are relevant for the energy consumption of inkjet and solid ink products, the energy consumption of products tested by means of the TEC methodology does not depend on the test pattern, apart from test patterns with high complexity, unlike the pattern prescribed in the draft test method. For OM products, the test pattern used is

irrelevant for the outcome of the test. It is proposed not to prescribe a test pattern and leave this at the discretion of the manufacturer to decide.

Line 82: from the context, it is understood that this line shoud read "The copy speed, unless the product *can not* print or copy, in which case" (underlined italics added). Please confirm.

Line 98 says that products shall be tested in simplex Mode. IT has to be noted, that a number of products is specifically designed to print in duplex mode, which is an important paper saving feature recognized by ENERGY STAR. Testing in simplex mode with such products would represet a denial of the paper-saving features of sich products. It is proposed to allow testing in duplex mode for those products that (according to tables 3 and 4 of the eligibility criteria) should have automatic duplex functions integrated in the base products.

Line 133 suggests that the mains input voltage and frequency of the power supply shall be measured in the no-load situation (UUT is off) of the power source. This gives no information about the tolerances under load conditions. Further, there is no information on when/how the total harmonic distortion measurements shall be done. IT should be noted that the accuracy of the load conditions will dominate the outcome of the relevant TEC of ready/sleepmode tests. Océ proposes to use the method specified in CTL-OP 110 to be used [link: CTL-OP 110]. or alternatively the method in 00-OP-C0036 [link: 00-OP-C0036]. 00-OP-C0036 also specifies the measuring method for the THD of the power supply voltage. This specification is better as the one in IEC62301. For information of EPA: All Certified Bodies issuing safety certifications according to the UL60950-1 or EN60950-1 use the referenced methods. Further to this section: The parameters: main voltage, frequency, relative humidity and room ambient temperature, have to be recorded, but there is not field to report them in the TEC/OM data collection sheets. Océ requests EPA to clarify where and how these parameters are to be reported.

Chapter 10 A) Type 1 DFE's (Line 221-229) does not prescribe how to test in case of type 1 DFE's that draw their power directly from the AC electricity grid. It is proposed to clarify in this section that for this case, the power connection to the DFE does not need to be included in the power/energy measurements, in accordance with the proposals done on sections 3.3.2 and 3.4.3 of the eligibility requirements.

Lines 234-235 prescribe that the efficiency of the imaging product's power supply is to be determined at 20% of the nameplate output current. It should be noted that the power levels of DFE's can be at no more than 2-3% of the name plate output current for the imaging product. An example is a DFE at 30 W DC idle power that is integrated in a printer with name plate output current equivalent to 1500W. The printer's power supply is then powering the DFE at no more than 3% of its rated output current, where the efficiency level will generally be lower than at 20% rated output current, meaning that the DFE power level will be underestimated when using the method proposed by EPA. Océ proposes to determine the DC power in ready mode of the DFE and then calculate what is the percentage of the name plate output current of the product at which

the DFE operates. This percentage should then be used to determine the power supply efficiency that is to be taken into account in the calculation of either TEC_{DFE} (equation 4 in lines 297-298 of the draft eligibility criteria) or P_{DFE} (equation 6 in line 353 of the draft eligibility criteria).
Justification: using a DFE with low power levels should be promoted by ENERGY STAR, by taking into account the appropriate AC power that is consumed by the DFE in idle mode, instead of under-estimating the AC-power level and thereby putting an additional penalty on the use of an energy saving DFE.